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c.

*Dr. Ugur Gogus*



Ugur Gogus was graduated from Faculty of Veterinary in Ankara/Turkey in 1986. He made his doctorate in Meat Technology/Food Engineering field as related to the antibiotic treatments and their effects on some quality criteria of lamb meat. He took training in rapid bacterial screening tests in The Netherlands. Followed by his doctorate, he made reviews and researches as related to food and antiaging, functional foods, meat hygiene, meat microbiology, food safety and food decontamination. He has several books and oral presentations in many countries from United States to China and a TV programme series about food and wellness in Turkey. During his activities, he has been honoured with International Professional of the Year 2006 (International Biographical Centre, Cambridge/United Kingdom) and Great Minds of 21st Century (American Biographical Centre, USA, 2008). He has been working as teaching staff in Middle East Technical University, Vocational School of Higher Education, Turkey, presently.

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A FUNDAMENTAL GUIDE FOR A
HEALTHY LIFESTYLE AND NUTRITION

Dr. Ugur Gogus,
Food Science & Technology, Ph.D



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# FOREWORD

Many articles, many media programmes including television and radio in addition to many researches have been performed as related to the food and anti-aging relation. It seems very obvious that we began to give importance to the foods more than ever since we have got a rich scientific data about the important beneficial and harmful effects of foods on metabolic diseases and disorders. All scientific claims indicate the same result that food and nutrition is an integral part of medical treatment while medical treatment can not show its curing potential without a correct and complementary food and nutrition. A blood thinning (anticoagulant) drug when combined with too much blood thinning food consumption can increase the risk of internal bleeding risk and may be fatal. Bergamottin in grapefruit can inhibit the activity of liver enzymes and can cause the accumulation of radio and chemotherapeutic agents in blood which can increase the side effects of such anti-carcinogen treatments significantly. Similarly, fibers which are introduced as healthy food components with their weight loosing and cancer protecting effects may bind some important vitamins, minerals, fatty acids and proteins which result in immunodeficiency and chronic fatigue in case of their unconscious consumptions. Omega 3 fatty acids as the healthiest fat options for the consumer may even be fatal in case of their consumption during ventricular tachycardia which may even be fatal. Some foods namely strawberry, Brussels sprout, mushroom, celery and artichoke may bind thyroid hormone and increase the severity of hypothyroid disease. Although nuts are claimed as very healthy foods with their rich omega 3 fat, selenium, zinc and vitamins B complex, many of us are still not informed with the rich content of saturated fat, harmful omega 6 and rich sugar content of these foods. On the other hand, the consumer is constantly being misinformed especially in the field of healthy foods and nutrition. Many times, some of the foods like liver and crustacean are being introduced as completely harmful because of their rich saturated fat, omega 6 fat, cholesterol and bad cholesterol without considering some of their rich anti-aging substances such as $B_{12}$, folate, folic acid, high quality protein, selenium and zinc. I have tried to inform the reader that there is no a completely healthy or a completely harmful food while there are some beneficial foods for some diseases and disorders and there are some harmful foods for some other diseases and disorders. Briefly, there is a special food list for every different disease and disorder. Food is not an easy substance to be introduced as easily and correctly defined since the harmful and beneficial food definition differ according to the disease and disorder in addition to sex, age, weight, metabolism, life style and genetic factors. The most important and correct approach for the consumer here should be to know the answer for the question 'which correct food and which harmful food for which disease or disorder' and to be able to consume the beneficial and correct ones while avoiding from the harmful ones during the diseases and disorders. This approach is the only way to be able to boost the immune system while protecting us against energy loss and early aging. Unfortunately, I could not notice any information and education of the consumer with the mentioned approach in any country. I only wanted to be a guide for you, the consumer, to show you what to eat in which disease, sex and metabolism since there is no any similar nutrition and life style guide in the field for the consumer. I must to add that there may seem some repetitions in some parts of the book as related to the relation of food and disease formation. But, I had to make these repetitions because each content of the book analysed a disease and its food list and nutrition separately. They are independent so that the reader can understand the food, nutrition, life style and the disease relations with their mechanisms in each independent content without looking at other contents which may be easier to follow for some target groups of readers. I strongly believe that you will be able to enhance the curing potential of the traditional

medicine with the correct food, nutrition and life style of the considered disease which is carefully and scientifically analysed in the book. Although I had to use some medicine terminology to be able to make you understand the strong relation of food and disease clearly with its mechanism and metabolism, the overall was written by using a simple and clear language. I have not only targeted to inform the readers who are English native speakers but for all people who knows English and who want to interest with the mentioned important field all over the world. Although genetic factors are too important as in the priority, a health life style, resistance to diseases and disorders, boosting immune system and a healthy aging can not be possible without correct food, nutrition and life style. You have got a guide about a healthy life style and nutrition with foods from now on as based on important scientific research results and my only wish from God is your and my health.

Best regards,

Dr. Ugur Gogus

(Food Science and Technology, Ph. D)

In memory of my Mom,

# ACKNOWLEDGMENT

Special thanks to my dear Mom, my dear wife Fulya, my dear sister Nina, my photographer Murat Ugur Eminoglu and my Publisher, Authorhouse.

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# BOOSTING IMMUNE SYSTEM WITH FOOD AGAINST COLD AND METABOLIC DISEASES

Stress factors such as vibration, humidity, sound, light, pressure, heat, cold, psychological factors, chemical substances and microorganisms such as mold, virus and bacteria cause the combustion of fats and oils by oxygen in cell. The result is the formation of free toxic peroxy radical compounds which are responsible for all kinds of diseases and disorders. Especially, bacteria and virus, as the most common microorganisms, can produce a great portion of free toxic peroxy radical compounds. Bacteria and virus kill our immune system cells such as leukocytes which protect us against infections .The fight between virus and immune system cells or bacteria and immune system cells determine the prognosis whether virus or bacteria or immune system cells can win this fight. The superiority of immune system against bacteria or cell means the recovery of metabolism. Therefore, a person suffered with flu or cold or any other disease in bacterial or viral origin should know how to stimulate the growth of immune system cells, protect leukocytes and how to boost immune system during these kinds of infections. Bacteria origin infections have been treated successfully by the discovery of antibiotics at the beginning of 1950's. Since then, many kinds of bacteria origin diseases can be treated. Unfortunately, some kinds of viral infections such as sinusitis, rhinitis and cold (flu) can not be treated properly because we have not any effective supplement yet to kill the viruses as the causative microorganisms. Some types of vaccines have been improved against some of flu infections but they can only be effective for some types among many serotypes. Briefly, neither vaccine nor supplement seem effective against cold although many people do not know it. Many people prefer to use antibiotics directly whenever they get flu. Antibiotics can only kill bacteria but not virus as I have indicated. Sometimes, they are taken into metabolism without doctor consultation with a hope that it may treat the infection in viral origin. Antibiotics should only be taken by doctor consultion with the prescription of a doctor in case of a bacterial complication. A virus which is the member of Influenza family is the causative agent of flu. The causative agents of bird flu and swine flu are also the members of this family. Immune system is attacked immediately followed by viral contamination. Some immune cells die and immune system becomes weaker followed by this attack. Sometimes, bacteria can see it as an opportunity to enter into metabolism since there will not be a strong immune system to make defense against bacteria. That is why bacterial contaminations and bacteria origin infections in pharynx region, joints or neck are very common as the secondary complications, just followed by flu infections. Antibiotics can be given in only these conditions by your doctor if it is necessary. Otherwise, they can not be used since they have also side effects on metabolism. In many cases of flu infections, resting, plenty of fluid supplementation with vitamin and mineral to supply immune system is required. The question here is how to supply and boost immune system during flu infection?.

Virus or bacteria or both of them cause harmful hormonal changes besides killing immune system cells followed by their entrance into metabolism. They cause to increase in the production rate of harmful prostaglandin E type 2 hormones while decreasing the beneficial and immune system boosting prostaglandin E type 1 hormones. Unlike prostaglandin E type 1 hormones, prostaglandin E type 2 hormones cause edema, allergy while increasing TNF (Tumor Necrosis Factor; a protein substance as the indicator of cancer risk), histamine and free toxic peroxy radical compounds. The increase in histamine, an amino acid which is responsible for allergy, by the effect of prostaglandin E type 2 hormones, causes

edema, rhinitis and sinusitis by increasing vascular permeability. It is also the main reason for nasal drip. Prostaglandin E type 2 hormones may also cause to the production of harmful protein substances called cytokines. Cytokines cause a kind of allergy that stimulates leukocytes to form an inflammation while increasing vascular permeability which results in edema. The penetration of leukocytes into the inflammation region, edema, allergy and inflammation form due to the effects of prostaglandin E type 2 hormones. The most important point here is that the production of these harmful hormones is triggered by bacteria and virus during flu infections. Another important harmful effect of virus and bacteria is the increase in free toxic peroxy radical compound production which is caused by prostaglandin E type 2 hormones. For all these reasons, the person who is suffered with flu struggles and makes defense on two sides. One side is the virus and bacteria side that immune system cells try to kill and inactivate the concerned virus or bacteria and the other is the side of heavy oxidative stress. The metabolism tries to defend body against both harmful free toxic peroxy radical compounds and virus or bacteria. Defending on two sides is much more difficult than defending on one side. The metabolism with flu mostly focuses on destroying virus by using immune system cells. An additional fight to decrease heavy oxidative stress and its harmful free toxic peroxy radical compounds may weaken immune system which already tries to fight and destroy virus and bacteria. Do not forget that there is always a high oxidative stress and high amount of free toxic peroxy radical compound production behind the scene in all flu infections and other infections which weaken (no s) immune system. Some people always complain for not being recovered from flu in a normal period of time. It can really take for weeks or even months. This is just because they do not give importance to heavy antioxidant intakes into their bodies. We have to be conscious that we have got a higher oxidative stress and free toxic peroxy radical compound production than ever during flu infection. We should not forget that, not only virus and bacteria, but also heavy oxidative stress and its harmful free toxic peroxy radical compounds may defect our immune cells, especially leukocytes. The destruction of these white blood cells by the effect of free toxic peroxy radical compounds weakens immune system which results in retardation of recovery. The only solution at this point is the inhibition of the high oxidative stress by the means of antioxidants. As long as the heavy oxidative stress are inhibited by plenty of antioxidant consumption, the immune system does not have to fight on two sides, instead, only focuses on its fight against the concerned virus or bacteria. Therefore, the initial must of the nutrition for flu is to make immune system stronger and inhibit the heavy oxidative stress which exists at the background of flu. Other words, plenty of antioxidant rich food consumption during flu infection is the initial address to follow.

Viral or bacterial activity during flu increases the production of prostaglandin E type 2 hormones which increases the rate of inflammation in flu as indicated above. Omega 6 fatty acids, a group of long chain polyunsaturated fatty acids that exist in fried foods, fast foods, meat, milk, poultry, egg and their products also increase the production of these harmful hormones while increasing the severity of inflammation. Thus, these fatty acids and foods rich in these fatty acids should definitely be avoided, especially during flu infections, as more than ever. Remember that, red meat and its products such as sausage, salami, pastrami, fatty milk and dairy products such as yogurt, cheese, poultry and its products such as chicken meat, turkey meat should be avoided during flu because of their higher n-6 omega fatty acids.

All animal origin proteins and foods rich in animal origin proteins should be avoided since they are closely integrated with fat, saturated and trans fat and cholesterol because these substances increase oxidative stress and its harmful

free toxic peroxy radical compounds during flu. Essential amino acids especially L-lysin, as a structural component of proteins, which is exist in animal origin proteins in high amounts, is a vitally important amino acid. It is claimed that it stimulates the proliferation of leukocytes and supports immune system. L-lysin tablets as 2 x 500 mg/day may be advised all through three or four days during flu. Essential amino acids like L-lysin are the structural components of proteins so they may help for boosting immune system in flu. But, why did I not recommend consuming animal origin proteins instead the tablets form of the amino acids. ? The answer is the highly rich amounts of fat, saturated fat, triglyceride, cholesterol, bad cholesterol in animal origin proteins. They can weaken the immune system which is already inhibited by the effect of flu virus and bacteria species which are complicated. On the other hand, proteins in plant origin which means fruits, vegetables, cereals and legumes can be consumed in plenty amounts in flu since they are free of cholesterol and bad cholesterol. They may have got trace amounts of saturated fat but they are rich sources of antioxidant vitamins and minerals which may help for boosting immune system. Briefly, strategy for protein intake into body during flu should be consisted of protein consumption in plant origin rather than animal origin. The most preferable is fruit and vegetable consumption because of their richer antioxidant capacity than others.

Saturated fat, cholesterol, bad cholesterol and triglyceride rich content is not the only factor for animal origin proteins which makes them harmful in flu nutrition. But milk and dairy products among other animal origin proteins are the most hazardous and harmful in flu infection since the milk protein, casein, as one of the most quality proteins in the world, covers the surface of Influenza virus and becomes a host for the virus which protects it from heavy humidity, heat and acid conditions. Virus in casein particles can easily proliferate and be protected. That is why, animal origin proteins, especially milk and dairy products such as yogurt, drinking milk, cheese and kefir, should be avoided in flu infections.

Influenza virus likes heavy humidity conditions, juicy and humid mucus surfaces. But, they can not grow and proliferate on dry surfaces. All through the day, mucus of upper respiratory track can be kept as humid by drinking honey and lemon juice mixture. Half spoonfull of honey can be mixed in half glass of fresh lemon juice and this mixture can be sipped in minute amounts all through the day.

The initial ways for the elimination of virus are feces, urine, sweat and exhalation. Especially, elimination by the means of urine is very effective in decreasing virus concentration in blood. The person suffered with flu should drink plenty of water, more water than ever to be able to excrete the virus by the means of urine. More water consumption means more urination and more urination means more virus excretion. Water and fluid consumption in plenty amounts are required and advised as one of the most important cornerstones of anti-aging, healthy aging and boosting immune system because it is a vehicle to discharge the causative agent of diseases and disorders. Water and fluid consumption in plenty amounts should never be neglected and should never below than 1.5-2 liters/day. But there is an exception for flu that the virus should be excreted out of body, thus the consumption of water and fluid should be increased up to 3-4 liters for each of 4-5 days.

Many people believe that alcohol consumption kills Influenza virus and they prefer to drink alcohol whenever they get flu. Although there are no serious scientific researches which claim the antiviral effect of alcohol in viral infections,

we have got enough scientific data as related to the harmful effects of alcohol by the means of blood on brain and liver tissue even in minute amounts. Alcohol is a toxic substance. Some media in many countries try to impose the beneficial effects of alcohol such as their good cholesterol increasing and bad cholesterol decreasing effects, anti-clotting effect and protective effect against hypertension. Alcohol which may increase the diameter size of blood vessels, support blood into organs and tissues, may be protective for cardiovascular health but its risks as an important toxic substance on liver and brain should also have been considered. Every food has got its own beneficial and harmful effects on human metabolism. The profession in the kitchen or media is not to show and consider only the beneficial attributes and functions of the food while hiding bad and harmful effects. Another important parameter which makes alcohol as a harmful food in flu is its high oxidative capacity. 1 gram of carbohydrate and 1 gram of protein gives you 4 Kcal while the same amount of fat gives you 9 Kcal and alcohol gives you 7 Kcal. Briefly, fat gives you two times more energy when compared with the same amount of carbohydrate and protein. This excess amount of energy coming from alcohol may not be spent by daily activities and may accumulate in body as in the form of body fat. Therefore, fat is in the first risk group which can yield much more free toxic radical compound in your metabolism but then comes alcohol closely behind fat. Its energy production capacity, other words, oxidative stress and free toxic peroxy radical formation capacity is in the second risk category followed by fats. A person suffered with flu has not any tolerance to heavy oxidative stress and harmful effects of free toxic peroxy radical compounds any more because they already face and fight with a highly oxidative capacity of flu virus.

Salt binds water and increase water binding capacity of metabolism. If you want to excrete your dirt such as free toxic peroxy radicals, biogenic amines, trans fatty acids, saturated fats, triglycerides, benzopyrenes, nitrite, nitrate, sugar, carcinogens and many other harmful compounds out of body by the means of urine, you should have got a normal urination function. Urination is only possible way which requires plenty of water and fluid consumption. Otherwise, urine can not be produced and the pressure on kidneys increases. As a natural result, the toxic metabolites are given back into blood stream from kidneys. The concentration of the toxic metabolites begins to increase in blood which may result in toxemia. Toxemia may be life threatening depending on its severity. Some metabolisms, in spite of their fluid and water consumption, tend to bind water in their bodies with a very less frequency of urination because of some genetic problems. Except these abnormal conditions, plenty amount of water and fluid consumption is always a guarantee to excrete the mentioned toxic metabolites out of body by the means of urination since water is the main structural component of urine. However, salt decreases the frequency of urination by its water binding effect. The increase in the ratio of bound water causes a decrease in free form of water which is used in urine formation. The result is the less production of urine, more water accumulation in metabolism, more toxic metabolite accumulation in blood including Influenza virus as the causative agent of flu and retardation of recovery in flu infection. You have to definitely avoid from consumption that are rich in salt content such as cured products which use high concentrations of salt, phosphate, nitrite and nitrate, in all period of life and especially during flu infections.

Salt is a tradition. Many of us like and enjoy the taste and aroma of salt. We can not help eating without salt because we are used to eating salty foods too much and every time all through the day. We always tend to add some amount of salt into our meals every time. But we never think that all foods have got less or high amounts of salt (NaCl) in

their created natural forms. I can not recommend you to leave salt promptly because it is impossible for many of us. But you can begin by using seasonings (spices) instead of salt. You can continue to use salt but in decreased amounts while replacing it with spices. **Isoflavones rich in cumin, ginger, coriander, mint, black pepper, red pepper and cinnamon have got very important beneficial effects on metabolism, opposite to salt. They increase the diameter size of blood vessel, decrease cholesterol and bad cholesterol, increase good cholesterol, decrease TNF and protect against cancer, inhibit allergy and decrease the production rate of free toxic peroxy radical compounds.** Replacing isoflavone rich compounds and foods such as spices, fruits and vegetables will improve your life quality. They may also help for replacing the aroma, flavor and taste of salt. You can enhance your energy production capacity with these spicy foods while they protect you against cancer, diabetes and cardiovascular diseases and disorders. As a natural result, you will be able to adapt to the lack of salt in your foods much easier. Isoflavon give taste, aroma, and flavor but do not increase oxidative capacity and the production of harmful free toxic peroxy radical compounds, opposite to salt. Protection from high oxidative stress and harmful free toxic peroxy radicals is a must to make a much better defense against Influenza virus in flu. Prefer isoflavon, prefer spices, but not salt. Begin to decrease the consumption rate of salt and salty foods immediately by replacing them with spicy foods, not only during flu infections but all through your life.

Similar to the excess salt concentration in blood which increases the rate of oxidative stress and amount of harmful free toxic radical compounds, another compound in the same effect is excess amounts of sugar. Food consumption rich in sugar may cause high rate of oxidation and increase the production rate of harmful free toxic peroxy radical compounds which defect or kill leukocytes, the immune cells that fight with Influenza virus in flu infections. In every period of life and also in flu infections, you have to avoid from excess sugar consumption and control blood sugar concentration. This approach can help to protect your leukocytes from the defects of Influence virus. Sugar and sugar rich foods increase oxidation rate and therefore energy level. This energy accumulated in the body helps to raise fever in flu infections. You have to avoid from the consumption of sugar and sugar rich foods in plenty amounts for both protecting leukocytes and preventing fever. Mushroom has got rich amounts of chrome which enters into structure of Insulin hormone, the hormone responsible for decreasing and controlling blood sugar. Mushroom should be dominated in kitchen in all periods of life including flu infections.

Panthotenic acid is claimed to decrease nasal discharge and increase resistivity against fatigue (being tired) in flu. The rich sources of the vitamin are bean, haricot, fatless chicken, turkey meat and fish meat.

Zinc is an important mineral which should be included to daily nutrition and life style to boost immunity. It has got a great antioxidant capacity. It also increases super oxide dismutase which forms a protective layer around cell membrane that protects the cell against free toxic radical compounds and virus. Haricot, bean, legumes such as green pea, horse bean can be advised as the rich sources of zinc. Although milk and dairy products and meat, meat products and egg are the other rich sources of zinc, I will not recommend them because they may be closely integrated with saturated fat which may increase free toxic peroxy radical amount and retard recovery in flu infection. You can also take zinc gluconate tablets as 23 mg/day.

Celery and artichoke are the two vegetables which are rich in isoflavon. Therefore, these two vegetables can decrease bad cholesterol, increase good cholesterol, decrease serum triglyceride, inhibit allergy and inflammation, increase diameter size of blood vessel, dilute blood and support cardiovascular system, convert excess amount of cholesterol into bile acids which improves protein digestion. Briefly, they have got all advantages and benefits of isoflavones since they are very rich sources of these components. They can be consumed in plenty amounts as low calorie and healthy foods in flu infections.

Garlic and onion are the two vegetables which have got anyl and anyllidin bioflavones. These substances are antiviral. They may be helpful by killing viruses in flu. Garlic and onion ground form can be mixed with a half glassful of apple cider and then can be diluted with two glassful of water. The solution may be consumed as two glasses daily all through flu infection which can be helpful for the cleanup process of liver while using the benefit of antiviral substances of onion and garlic.



Citrus fruits such as lemon, strawberry, kiwi, orange, grapefruit and apple should be consumed in plenty amounts in flu since their great content of vitamin C can inhibit high oxidative stress and decrease free toxic peroxy radical compound production caused by the virus.

# WEIGHT CONTROL WITH FOOD

Weight control is a must for anti-aging, for wellness and for being resist against diseases and disorders because, too much body fat and its degradation products are always responsible for many important metabolic diseases and disorders such as cancer, diabetes, cardiovascular diseases and disorders. Fats and oils are our energy giving nutrients and also structural components. Our cells, our body cavities, joints and vessels are all supported in structure by fats and oils. 1 gram of fat gives 9 Kcal while the same amount of carbohydrate and protein gives 4 Kcal. In spite of their importance on health and body, their energy producing and structural capacity, the excess intake of these nutrients increases oxidative stress while producing too much energy but additionally free toxic peroxy radical compounds. The excess amount of the free toxic peroxy radical compounds accumulates around the cell membranes, defect them and cause aging and organ and tissue failures. Excess of the free toxic peroxy radical compounds can be converted into sugar, can increase sugar concentration which may result in diabetes type 2 while excess of the same compounds can be converted into carcinogens which may result in various types of cancer. These are possibilities. It is not necessary to be suffered with all of them. Sometimes, excess of fatty acids and toxic radicals can accumulate on the walls of vessels; decrease the diameter size of vessels which may cause vessel calcification. If it happens on the walls of brain vessels, brain stroke and neurological disorders such as Parkinson and Alzheimer can be possible. The calcification of coronary vessels results in cardiac failure, stroke, arterial fibrosis, thrombosis and emboli. Briefly, obesity, other words fattening is harmful not just because of physical parameters but because of its life threatening effects. Therefore, a person who targets being fit should be conscious about harmful life threatening effects of fat rich nutrition and obesity. There are many theories and recommendations about weight control and prevention of obesity in food origin. Please, do obey the facts mentioned below;

- Weight loss should be completed in a long period of time rather than short. Prompt decreases in weight loss may result in toxicity and harmful poisoning in metabolism with irreversible defects. The deposited fats are also the deposits of chemical and microbial toxins. Body, not only produces fat from too much fat and oil which comes from fat rich nutrition, but also your body produces fat to detoxify, to melt and absorb microorganism, chemical, physical, biochemical toxins, objects, microorganisms and toxic and harmful metabolites of microorganisms. During rapid weight loss programs, the speed of fatty acid separation from fat deposits into blood stream is very important since melted and separated fatty acids give the mentioned toxic substances, the harmful metabolites of microorganisms, chemical toxins into blood stream and the concentration of these harmful compounds increase in blood. On the other hand, the increase of these toxic metabolites in blood stream can increase up to abnormally high concentrations that liver gives an important response to detoxify these harmful compounds in blood. It produces fat to be able to absorb and melt these hazardous compounds. This is only a response. It does not mean definitely that liver fattening is an absolute solution to be able to absorb and melt the toxic compounds which are transferred from fat deposits into blood during these types of rapid weight loss programs. Fattening of liver, kidneys and pancreas does not only form because of fat and oil rich nutrition but any microorganism such as bacteria, yeast, mold, virus, or their toxic and harmful metabolites, toxic minerals, overdose of many minerals and vitamins can trigger this response and the mentioned organs can produce fat to absorb and eliminate the mentioned toxic compounds. Therefore, the toxicity and fattening of these important organs should always be taken into consideration in such rapid and unconscious

weight loss programs. Note that you can only lose 500 Kcal a week which makes 0.5 Kg weight loss. You should make exercise and consume low calorie foods so that the calorie spent in your metabolism should be 500 Kcal more than total Kcal which is taken into your body by the means of foods. Briefly, you should have spent 500 Kcal more than the total calorie which you take into your body from nutrition and life style at the end of the week. If you continue such weight loss mentality, each month you could have lost 2 Kg body weight which is healthiest and can be tolerated by your body easily. Otherwise, there are many programs and many persons which lose 5-10 Kg body weight a month which is always in high risk since these types of huge amounts of fatty acid separations from fatty regions of body can increase toxic compound and metabolite concentrations in blood promptly which may result in severe poisonings and toxicity. Anorexia nervosa and such neurological problems many times appear during these types of unhealthy weight loss programs that too much fat, toxic substance and toxic radical compound existence after such programs can result in serious damages of nerve system which may accompany with nausea, depression, heavy stress, amnesia and vomiting. The other risk is also very serious that too much fatty acid which passes directly from fat deposits into blood stream rapidly can accumulate on the wall of blood vessels since their amounts are too much while the excess amount of the fat can not find opportunity to be combusted and converted into energy by the cell via to oxidation. Briefly, vessel calcification which may result in renal failure, cardiac failure, stroke, thrombosis and emboli can form. The fat deposits on the wall can trigger the severity of calcification and it can be bigger in size by the addition of new fat particles which makes a solid fragment. The solid fragment sometimes closes all the diameter size of blood vessel which is called as thromboses. Sometimes the fragment in thromboses can be separated into smaller particles which can close other vessel by the effect of blood stream. The result may be life threatening depending on the severity of vessel with thrombosis or emboli which can even result in stroke or cardiac spasm. As you notice, a rapid weight loss can be toxic on nerve system while it can be fatal because of its life threatening potential on cardiovascular system and brain.

- Because the separation of toxic compounds and metabolites into blood stream from fat deposits during weight loss, these harmful compounds should have been excreted out of the metabolism by the means of urine and feces immediately. The only and healthy mean for it is the regular consumption of water all through day during weight loss program. One glass of water before and one glass after meal should have been consumed. Also, one or two glasses should be consumed between meal times like 11:00 am and 17:00 pm. Totally, 10 glass of water or preferably more, should be consumed to be able to excrete the separated and melted fatty acids, their toxic radicals, toxic metabolites and compounds which are separated from these fatty acids as in the form of urine and feces. Otherwise, they can accumulate in blood stream and can cause the mentioned life threatening effects.

- These types of rapid weight loss programs are always accompanied with severe defects of liver. Liver is one of the most important organs because it is the initial organ which defends our immune system against diseases and disorders. All microorganisms, their harmful metabolites, toxic chemicals, toxic biochemical agents are all detoxified by liver and its P-450 cytochrom system. Unfortunately, liver is severely damaged by the effect of excess fatty acid, toxic radical, toxic chemical and microbial compounds which are separated from fat deposits and transferred into blood stream during such rapid weight loss programs. These harmful compounds will also be treated by liver like in all

other detoxification processes, but the same compounds may give hazard and cause defects on liver tissue followed by their detox process in liver tissue. Therefore, I want to underline the importance of slow and long run weight loss rather than rapid programs but while doing this, you should also not neglect to consume plenty amount of water all day long and finally you should consume plenty amounts of sulfur rich foods. These foods help for the detox process of liver. Liver detoxify microorganisms, toxic chemical compounds, biochemical compounds, carcinogens, allergens and toxic radicals by three processes. Sometimes its enzyme system P-450 cytochrom can add oxygen which is called as oxidation and sometimes it adds hydrogen which is called as hydrogenization. But, most important of all is sulfurilization that liver and its enzyme system add sulfur coming from foods into these harmful and toxic compounds and convert them into non pathogen and non toxic compounds which can easily be excreted out of body. For all these reasons, in all detox and weight loss programs, sulfur rich foods should not be neglected such as garlic, celery, artichoke, apple, mushroom, tomato, onion, Brussels sprout, broccoli, white cabbage and cauliflower. You should consume all the mentioned foods in plenty amounts to supply liver recovery during such weight loss programs, but also in many parts of your life. For example, you can dominantly consume these foods for a week or you can fast with these foods for one or two weeks at the end of each three month periods which means three-four times a year. Your liver always needs it since it is a kind of garbage of your body and should be cleaned up in some periods of the year.

Do not neglect to consume plenty amount of water during weight loss.

Do consume plenty amount of sulfur rich foods in more amounts than ever especially during such weight loss programs namely;

Broccoli,
Brussels sprout
White cabbage
Celery
Artichoke
Apple
Mushroom
Cauliflower
Tomato

Also note that apple cider, pickles produced with apple cider and honey with its more than 300 antioxidant enzymes are very friendly for liver and detox process of your body.

- **Do not believe in diets or weight loss programs which are based on only some or one group of nutrients. Do not forget that Atkins' diet, Mediterranean diet or similar diets which dominate some group of nutrients while excluding others always failed and accompanied with many disasters on individual metabolism. Each**

**food product is unique and has got its own important and essential nutrients for body. They should all be consumed. But, persons who want to lose weight or who targets weight control should avoid fat and oil rich foods and too much sugar rich food consumptions since they cause fattening and obesity.** Therefore, you should consume foods which are low in fat, oil and carbohydrate. But, it does not mean that you should exclude the consumption of meat and milk and dairy products since they are closely integrated with fats and oils. You can prefer less fatty milk and dairy products while you can separate fat cover of meat before cooking. I want to recommend an easy procedure to you. After you separate the fat cover from the surface of meat bulk by using knife, chop it into cubic pieces and place into the bottom of the pan. Cover the surface with water and cook for only one minute that you will see yellow fat droplets on the surface. When you see these droplets on the surface, stop cooking. Rinse the water with fat away and place chopped meat into the freezer. The chopped meat will be very low in fat and cholesterol since the yellow droplets on the surface of water will be the fat and cholesterol itself. Also, you should continue to consume milk and dairy products and I will never recommend you to prefer and consume fatless ones such as skimmed milk because these types of milk and dairy products are free of fat and fat soluble vitamins such as vitamins A, D, E and K. Because all the fat soluble vitamins are separated from milk and milk product during the separation process of milk fat. That is why, you should better consume less fatty milk and dairy products but not completely fatless. By this way, you could also benefit the important antioxidant effects of the fat soluble vitamins in less fatty milk and dairy products which is very important especially against the risk of toxicity of rapid weight loss. But, I have to recommend you the consumption of green leafy, legume and fruit consumption in much more amounts than others. This recommendation is expected since these groups of foods are very low in calorie. Briefly, a healthy weight loss program dominates low calorie foods such as green leafy, legumes, fruit but also includes proteins in animal origin because of their important protein quality and rich essential amino acid contents while they are also rich sources of important antioxidants such as $B_{12}$, folate, folic acid, magnesium and iron which are essential for blood proliferation, energy production and resistance of nerve system. Do not forget that milk and dairy products should always be included in such programs and also in other parts of life because of their high quality calcium which is an essential mineral for the protection against osteoporosis and osteomalacia.

- Some foods increase insulin tolerance which means that they trigger the production of insulin by pancreas more and more. Insulin tries to transfer increased amount of sugar from blood into cell to convert it into energy and eliminate it out of body as in the form of energy without fattening. But too much fatty and carbo rich food consumption can raise the sugar concentrations in abnormal levels that too much insulin is produced to lower the increased sugar concentrations. The excess amounts of the fat and sugar molecules by the effect of insulin pass into cell but the amounts are above the standard levels of the cell that cells can not convert them into energy. These fats and sugars begin to be deposited as in the form of fat on the cell wall. Cell fattening results in tissue and organ fattening and the final point is obesity with its own harmful side effects. Therefore, both weight control and weight loss programs should exclude white bread, chips, crackers, fast food, nuts, nut oils, fried products, fatty milk and dairy products, fatty meat and meat products, dried foods, cured foods that are rich in salt content while less fatty milk and dairy products which have got fat less than 1.5% should continue to be exist in the list. Remember that the mentioned

foods below are not only low calorie but also they are the ones which increase the effect of insulin and decrease the risk of cell fattening mentioned above. They are;

Green leafy
Legume (especially green ones)
Less fatty milk and dairy products
Fish meat in low fat amount
Less fatty veal meat
Chicken breast meat

You can wonder why I did not recommend fatty fish meat rich in omega 3 fat. Although omega 3 fatty acids have got many beneficial effects on metabolism and many protective effects against many important metabolic diseases and disorders such as cancer, diabetes and hypertension, unfortunately, in the consideration of obesity, weight control and weight loss, they should be better avoided since they are fat at least, no matter how beneficial they are.

The most important factor in obesity is calorie excess. It is a simple calculation that excess amount of calorie taken from foods into body accumulates as in the form of fat beyond the walls of vessels, in tissue and around cells. We produce our energy, in other words 'calorie', from foods by the means of oxidation reaction that fats, oils and carbohydrates of foods are combusted in our cells by the effect of oxygen and yields energy. This energy is used in many biochemical reactions such as digestion, cardiac contraction and relaxation, blood tonicity, hormone production, the functions of every organ, even in sleeping process. The energy from foods which is used in these vital and basic metabolic functions is called as 'basal metabolic rate'. If your calorie coming from foods which you consume is used for basal metabolic rate and also for your daily activities and efforts completely, there is no problem. There will be no excess of calorie in your metabolism since all of it will have been spent by basal metabolic rate and other daily activities and efforts. On the other hand, if you consume too much fat, oil and carbohydrate rich foods and if you produce too much calorie more than your metabolic rate and daily activities and efforts need, there will be excess amount of calorie. This excess energy can only be deposited as in form of fat which is the main causative agent of obesity. According to this simple calculation, your calorie production and calorie amount which you produce from foods should have been used by your basal metabolic rate, daily activities and efforts and there should be no calorie excess in your body. Opposite, if you take less food, very low amounts of fat, oil and carbohydrate rich foods into your body, but if you make too much sport and exercise in high velocity, if you are very active, if your daily activities and efforts and additionally your metabolic rate requires more energy, this time there will be a calorie deficiency. For replacing the required energy gap, body may tend to use its own fat deposits and you begin to loose fat which means weight loss. According to this explanation, it is obvious that the more active life you run, the more you spent calorie and the more you can avoid from calorie excess. Also, the less fat and carbohydrate rich foods you consume, the less calorie production and the less risk of obesity will be for you. An important headline should always be the key in maintaining your life quality. This key is 'more activity and less calorie food consumption' (less fat, oil and carbohydrate consumption).

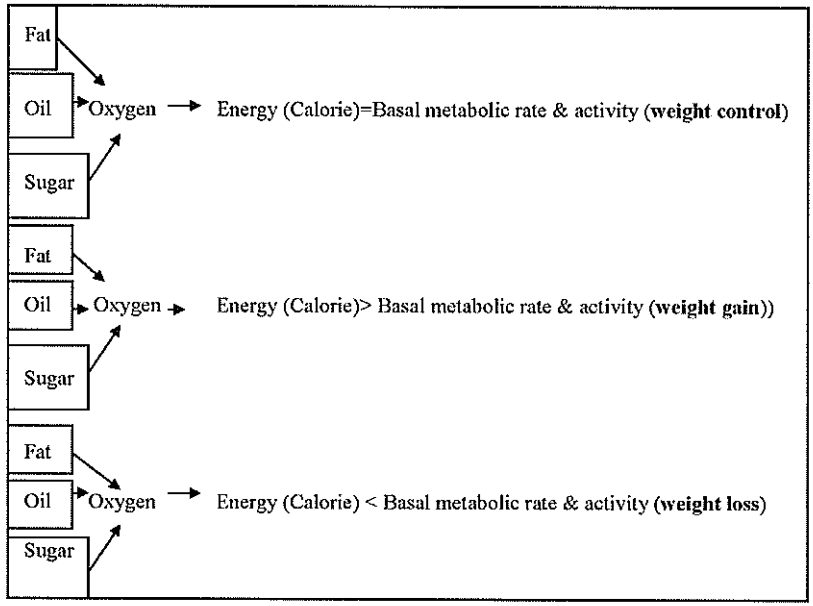



**Diagram 1**

You should not neglect to consume plenty amount of water as I mentioned above but also include fresh fruit and vegetable juice to the list. Prefer vegetable juice more than fruit juice because vegetable juice is richer in fiber which binds fat, oil and sugar and thus helps more for weight control and weight loss.

Sometimes, the mentioned low calorie diet as combined with exercise, sport and plenty amount of water consumption, fruit and vegetable juice consumption which are all low in calorie but rich in fiber may not cause a significantly important level of weight loss. The reason is that nutrition and life style are not the only causes of obesity. There may be other important factors such as genetic factors and hormonal factors. Hormonal factors may also be linked to genetic factors but sometimes it may progress as independent. Especially, thyroid hormone imbalance is a great factor in weight concept that less amount of thyroid hormone production can result in obesity while super function of thyroid and higher amount of thyroid production due to the super function of thyroid can cause severe weight losses. The reason for the effect of thyroid hormone on weight is due to its function. It is the main hormone which causes the entrance of fat, oil and sugar particles into cell. Thyroid hormone should be produced and exist in normal amounts in blood stream so that normal amount of sugar, fat and oil can pass through the pores of cell membrane and these nutrients can be transferred into cell. They are combusted by the effect of oxygen in the cell which is called as oxidation reaction but some of them can be utilized as in the production of new cell bodies, cell membrane and cell recovery or cell reproduction. In case of thyroid insufficiency, sugar, fat, oil and also proteins can not make entrance into cell, as a result, cells can not utilize these nutrients. Neither can they do energy from fat, oils and sugars nor can they use them in reproductivity and recovery.

The results can decrease life quality and be life threatening as long as hypothyroidism is not taken under control. One of the initial complications is obesity since fat and oils tend to accumulate on the walls of blood vessels and among cells which means cell and tissue fattening and vessel calcification. Vessel calcification can cause severe organ failures such as renal failure, cardiac failure, stroke, thrombosis and emboli while increasing the severity of hypertension. Person with hypothyroid complains about weight gain and obesity, no matter how she or he concerns carefully about low calorie nutrition and exercise. This does not mean that exercise and low calorie nutrition, a healthy life style and a healthy nutrition style close to regular sport and exercise will be useless and not effective. But their effect will not be significantly important and will be restricted. Because, the main causative factor, the main reason here is the hormone insufficiency. The medical treatment which is based on hormone administration with doses which is determined by a doctor who is qualified in endocrinology is the main solution. Sometimes, the treatment may need long term use of hormone tablets under the control of doctor. But, you can help for the increase of thyroid hormone production as complementary in addition to hormone replacement. Thyroid hormone is produced from iodine. **Condensed milk, sea food such as fish meat, e.g., haddock and cod, algae, malt bread, egg, salt with iodine and cheddar cheese are the richest sources of iodine. These iodine rich foods can be administered during medical treatment (in thyroid insufficiency; hypothyroidsm). Also vitamin B complex, zinc, vitamin A, calcium, magnesium, tyrosine and essential fatty acids enter into the structure of thyroid hormone. Tyrosine is an essential amino acid and it exists in rich amounts in eggplant, sauerkraut, figs, raisins, cheese, cheddar cheese, sausage, salami, poultry meat, red meat and fish meat.** You should prefer and consume less fatty or non fatty sausage, salami and red meat of course since the main problem in hypothyroidism is obesity and fattening of vessels and tissues. **Cheese, green pepper, egg, fish meat, Spirulina (algae), liver, kidney and spleen are rich sources of both magnesium, B complex, folate and folic acid, all of which act importantly in thyroid synthesis.** Essential fatty acids, the ones which are also very beneficial and protective against many important metabolic diseases like Omega 3 fatty acids also participate in thyroid production. You can supply these fatty acids in tablet form or by the consumption of fish meat. **Fish meat, shellfish and marine origin products are both rich in magnesium, B complex, vitamin A, zinc and omega 3 essential fatty acids which are utilized in thyroid production.** Therefore, you may not need omega 3 supplements in tablet form. But if you consume these foods rarely and if you are willing to benefit omega 3 supplements, do not forget that you should not be using aspirin, kumadin, warwarin, tabochan, gingo bloba, coenzyme Q10, ginger, coriander, leukopen, parsley and vitamin C tablets. All of them are anti-clotting and two of them as combined in the same day can increase the risk of internal bleeding risk. Spirulina as in tablet or powder form supplies you a plenty amount of beta carotene, magnesium, vitamins $B_{12}$, $B_6$, folate and folic acid, soluble fiber but also its iodine content is sufficient enough to show a beneficial effect in hypothyroidism. Tyrosine is the main essential amino acid which is utilized in thyroid production. Tyrosine can also be supplied from amino acid complex tablets.

Another type of hypothyroidism progresses naturally due to aging. In accordance with aging, thyroid gland cells become older and take difficulty in producing enough thyroid for metabolism. Hypothyroid which forms due to aging is called as 'Hashimoto hypothyroid'. Not in all old people, but a great amount of old people are suffered with hashimoto while many of them even do not know whether they are suffered with it. Blood tests which detect hypothyroidism accidentally can inform old people about the disorder. Such people are also prescribed by the use of thyroid tablets under the strict

control of doctor. Nutrition for thyroid can always be complementary and improve the effect of medical treatment. Either elderly or other age groups which are suffered with hypothyroidism should have got medical treatment immediately but as combined with a conscious nutrition.

Broccoli, Brussels sprout and white cabbage are rich sources of vitamins $B_6$, folate, folic acid, $B_1$, $B_2$ and $B_3$. They seem perfect with their rich B complex content for hypothyroidism since these vitamins are required and used in the production of thyroid. But the same foods have got some substances which inhibit thyroid production at significantly important levels which are called as goitrogens. Beetroot, white cabbage, cauliflower, spinach, tomato, strawberry, soy and soy products, celery, artichoke besides broccoli and Brussels sprout have also got high amount of these substances. But, I know that many of you while reading these lines will say that all the mentioned products are very beneficial and healthy food products. That is what I want to explain in the book that there are no definite borders of a healthy food definition because a food which is very healthy, nutritious and which has got many beneficial and protective effects against many important metabolic diseases can be harmful for another disease or disorder. Therefore, each disease or disorder has got its own healthy and harmful foods. Although spinach, broccoli, Brussels sprout, tomato, strawberry, soy and soy products, white cabbage, cauliflower, celery and artichoke are wonderful, healthy and nutritious in many diseases and disorders, they may be harmful in hypothyroidism in case of their rich consumption. They are so nutritious that their rich antioxidant and fiber contents are the main factors for a healthy living and healthy aging for many individuals. Therefore, in spite of their goitrogen content, I will not recommend you to avoid from these foods completely. But you should always remember that if you are the one who is suffered with hypothyroid problem, the mentioned foods are rich in goitrogen and these substances inhibit thyroid hormone production and decrease its level. Thus, you should avoid from heavy consumption of these foods but you can consume them in little amounts. You should not be deprived of their great antioxidant and fiber contents. Also, there are some important studies which claim that heat process decompose and inactivate goitrogens in them. Unfortunately, we still do not know what amount of goitrogen is inactivated and decomposed at which temperatures. We also do not know the time and heat combinations that inactivate these substances. But, as long as you cook and as long as you avoid from heavy consumptions, you can continue to consume little amounts of the mentioned foods.

Sulfonamides and other medicines that contain sulfur adversely affect hypothyroidism. Therefore if you are suffered with hypothyroid problem, consult to your doctor and want to replace this group of medicines with other equivalents.

One of the main adverse effects of hypothyroidism is calcium loss and decrease in calcium binding capacity. Because thyroid itself is the hormone which also able calcium entrance into cell. In case of its deficiency, calcium can not make entrance into bone cells which means lower calcium binding capacity of bones. **Persons who are suffered with hypothyroid should be conscious that their calcium metabolism is getting worse because of thyroid hormone deficiency and they should dominate calcium rich foods in their nutrition such as milk, yogurt, cheese and kefir. Especially condensed milk and milk products in condense structure such as yogurt and cheese are also rich in iodine.** Green leafy vegetables, legumes which are low calorie foods should be dominated in hypothyroid kitchen against obesity which can be accompanied with hypothyroidism many times. Green leafy and legume rich consumption cause

less insulin secretion from pancreas and protect cells from too much sugar and fat entrance. The less fat and sugar entrance means less risk of cell and tissue fattening.

The production of thyroid hormone requires vitamin C, vitamin A, iron and magnesium. Therefore a kitchen and life style against hypothyroidism should be dominated in green leafy vegetables and citrus fruits. **Not that the more sour the fruit and vegetable is the more their vitamin C content is because vitamin C (ascorbic acid) itself is an organic acid. Of course, like all other organic acids, it is sour in taste.** The increase in the concentration of the organic acid is an indicator for the rich concentration of vitamin C. **Especially tropic, juicy and sour fruits such as pineapple, apple, lemon, grapefruit, kiwi, mandarin and grape are the richest sources of vitamin C. Tomato and strawberry are also very rich in vitamin C but I will not be able to recommend them because of their high goitrogen contents which inhibit thyroid production.**

Fish meat, milk and dairy product consumption against hypothyroidism will supply you plenty of iron, magnesium, iodine, all of which are utilized in thyroid production while they will supply a great content of calcium and high quality protein content. Remember that, thyroid suffered persons do not benefit from proteins enough because of thyroid hormone deficiency. Protein consumption alone will of course be useless if you still do not take medical treatment and the tablets of thyroid under the control of doctor. But, if you consume all the mentioned foods above as combined with thyroid hormone therapy, then you can be protected against the harmful complications of hypothyroidism such as osteoporosis, osteomalacia and anemia. Hypothyroid is an important disease but it can be taken under control by combined administration of medical treatment (hormone therapy) and nutrition as combined. Thyroid hormone therapy alone may not be properly effective as long as the person insists on consuming goitrogen rich foods. If you are the one who is suffered with the disease, avoid from heavy consumption of the mentioned goitrogen rich foods while dominating calcium and iodine rich foods in kitchen. A kitchen and nutrition style against hypothyroid should be dominated in;

Green leafy vegetables excluding spinach, broccoli, Brussels sprout,

Citrus fruits namely; orange, grapefruit, kiwi, mandarin, pineapple, apple but exclude strawberry and tomato or consume them as less as can be,

Legumes,

Calcium rich foods namely condensed milk, yogurt, cheese, kefir but exclude soy and soy products because of their high goitrogen content.

Wholesome bread should have never been neglected as the main bread option. Bran which is the surface crust layer of cereals, like wheat, corn, malt, is rich in B complex vitamins, folate and folic acid. These vitamins are used in the production of thyroid hormone. Prefer wholesome bread and pasta products.

# SPIRULINA, A FRIENDLY SUPPLEMENT IN ALGAE ORIGIN IN BOOSTING IMMUNE SYSTEM AND IN FLU:

One of the great risks waiting for consumers today are food and market. We have got many food products and many of them are processed which have got many food additives. There are also many speculations as related to hormone addition and genetic modification that many of us are unable to understand and determine whether they are free of hormone or any harmful food additive. Therefore, especially in this century with its many pollutions including food, we have to know the healthy foods or the foods less in any risk but rich in benefits, especially the natural ones as much as possible and but not the processed ones. A healthy food definition is not scientific and clear as I mentioned it in many parts of the book since some foods may appear as harmful for some metabolisms in some diseases while the same foods may be beneficial for some metabolisms in some other diseases. Description of a food as 'healthy' depends on sex, age, metabolism, blood profile, obesity and disease or disorder. On the other hand, there are some foods or food products which have got a very rich content of isoflavon, antioxidant, good quality protein, low amount of fat, high amount of water content and fiber. They are beneficial for many metabolisms in many diseases and disorders. One of them is Spirulina although it is not known by many people in many countries. I want to share some scientific data with you about this food in plant origin. Natural, very rich in antioxidant vitamin and mineral, easy digested, rich in omega 3, high quality protein source, but most interestingly part is its rich content of antiviral substances.

Spirulina was first discovered 500 years ago and since then, it has been consumed as a food supplement especially in communities in Africa. In fact, its great antioxidant, vitamin A, antiviral substances and isoflavon content made it very popular and a very important nutrient source in some developed countries like United States of America, United Kingdom, France, Germany, Japan and Italy. The main and the only target groups of Spirulina have become the persons who make regular sport and exercise like professional athletes and body builders and elderly. Unfortunately, many people except these target groups still do not know the nutritional importance of Spirulina.

Sprulina has got very important beneficial effects on human metabolism which can be categorized in four sections. 1. Boosting immune system and increasing resistivity against diseases and disorders. 2. Improving digestion, regulating digestive actions, increasing the speed of recovery in diseases in gastrointestinal origin. 3. Having got a strong detoxifying effect on liver and kidney. 4. Binding many toxic compounds in blood by acting as a chelate, eliminating toxic compounds from blood and 5. Having a wonderful antioxidant capacity and a strong anticancerogenic effect by using its great antioxidant capacity.

**The most important protective effect of Spirulina against diseases in inflammation origin and one of the initial reasons which makes it as a strong anti-aging food is its great vitamin A content.** Vitamin A is a strong antioxidant but also improves visual health by protecting macula and retina in eye against harmful effects of free

toxic peroxy radical compounds. One disadvantage of the vitamin is that it is a fat soluble vitamin and in case of its excess intake into body, your body tries to form fat to make it soluble and absorb it. Any excess amount of vitamin A can cause liver and kidney fattening. Beta carotene is the precursor of the vitamin which is converted into vitamin A followed by its transportation into liver by the means of blood. The amount of vitamin A spent is replaced by vitamin A which is produced from beta carotene in liver. Therefore, vitamin A can accumulate in blood and can cause the risk of liver and kidney fattening risk but beta carotene is far from this risk and it is safe. **The most beneficial and wonderful effect of Spirulina is that it has got a huge amount of beta carotene rather than vitamin A. 10 mg of Sprulina has got 23000 IU beta carotene which is 460% of the dose recommended by World Health Organization. Briefly, your all daily vitamin A requirement can easily be supplied by Spirulina.**

Vitamin D is required to enhance calcium binding to bones, for the synthesis of cholesterol and the production of adrenalin which regulates blood circulation. This vitamin is also exist in plenty amounts in Spirulina. **Spirulina has got the vitamin 300 times more than its daily requirement.**

One of the great advantages of Spirulina is that it has not got any side effect on human metabolism. The only risk may be the metal contamination which is an important risk from the point of health. But, this risk is only for Spirulina which is collected from unknown and contaminated fields. In case of its cultivation in controlled atmosphere which may be defined as culture Spirulina, it is free of this contamination. Therefore, Spirulina should be supplied from the famous and known companies or stores which should guarantee that the product is culture Spirulina. Spirulina is sold as in two forms in market as powder and tablet. 2-5 grams of powder can be added your meal or 6-20 tablets daily can meet your daily requirement. I do not recommend tablet form since they should be taken in huge amounts and thus, it can cost higher than powder form. In case of its intake into metabolism just before meal, it decreases appetite and helps for weight control. If you consume it after your meal, it increases appetite. Briefly, you can keep weight and become fit or you can get weight by using Spirulina.

Global warming, as the most important threatening factor and reality of today's world, continues to be a stress factor more and more in our life. Many scientific researches and meetings are being held to discuss the protective actions. All of them claim one of the most important protective actions, using special plants which show resistance against drought while giving too much oxygen and absorbing carbon dioxide. One of these plants is Spirulina that it absorbs 6.3 ton of carbon dioxide and emit 16.8 ton oxygen.

Spirulina is a healthy plant. Its main wonderful effect is for cardiovascular system. I had mentioned above that decreasing bad cholesterol and increasing good cholesterol is the most effective protective action against cardiac spasm, stroke, hypertension and similar diseases in cardiovascular origin. Very few foods increase good cholesterol while decreasing bad cholesterol. Many of them decrease both bad cholesterol and good cholesterol. Spirulina is the one which decreases bad cholesterol but it makes this function while increasing good cholesterol.

Spirulina is a rich source of polysaccharides and complex carbohydrates. These are the substances which give you energy very fast. If you are the one who make regular sport and exercise in high velocity, if you have not got enough off days to store energy to the next sport training, if you are older than fifty, if you are the one who is suffered from chronic fatigue, if you always complain for being tired, then you can use the benefit of Spirulina. It is rich in polysaccharides and complex carbohydrates which meets your energy requirement very fast. Minister of Sport in Cuba included Spirulina to the diets of athletes in 1999. The bioavailability of the algae is very high, higher than many other plant origin products because most of the fiber is exist as in its soluble form rather than insoluble. Therefore, Spirulina can easily be absorbed and transferred into blood stream. This is the main reason which makes Spirulina as one of the initial complete nutrient for elderly. Unfortunately, neither athletes nor old generations in many countries do know about Spirulina.

*Escherichia coli* is a bacterium and it is one of the most common causative agents of food borne diseases especially in gastro digestive system. Candida is important yeast which is responsible for a similar food borne disease in gastro digestive origin. These two important food contaminants and pathogens are inhibited by other bacteria and microorganisms which are not harmful for metabolism. You know them from media with the name of 'probiotic'. Spirulina and its important nutrients, especially polysaccharides, are the initial food compounds and special feeds for the probiotics which inhibit these pathogens. So, Spirulina can help for the defense against these pathogens which cause diseases and disorders in gastro digestive origin.

Spirulina has got rich amount of sulpholipids. These compounds prevent virus entrance into cell. Virus including Influenza is responsible for flu should first enter into the cell to be able to cause infection because they can not live out of the cell for long periods. They should enter into cell and reach nucleic acid to be able to grow and multiply. Then, they can increase in number, pass into blood stream and cause disease. Especially, in prevention against viral diseases, Spirulina can be a perfect supplement with its rich sulpholipids in antiviral effect.

Calcium, iron, potassium, zinc and selenium in Spirulina are in their colloidal forms. Colloidal forms of minerals can be absorbed and utilized much easier. Other words, Spirulina has got a rich mineral content in a higher bioavailability.

Spirulina can be used as food supplement in early childhood which stimulates growth and help to get weight while accelerating recovery of diseases.

Interferon and Interleukin are the two important and beneficial cytokines which are produced by immune system cells like leukocytes. Leukocytes are also known as T cells and they are the main protectors of body against diseases and disorders. They produce these two beneficial cytokines; Interleukin and Interferon, that Interferon prevents virus entrance into cell while interleukin kills bacteria. This mechanism is the main effect of Spirulina in boosting immune system.

Spirulina also contains a huge amount of B complex. $B_{12}$ is a member of the complex which exists in great amounts in Spirulina. The vitamin is used in the synthesis of enzymes which regulates nerve cell and blood cell proliferation. Protection against anemia and neurological disorders can not be complete without $B_{12}$ supplementation. $B_{12}$ also enters into the structure of a protective layer called myelin which covers all round of nerve cells. Nerve cell is protected against hazardous extrinsic factors by myelin coat. Deficiency of myelin coat results in defect of nerve cells which is one of the main reasons for many neurological disorders and diseases including Multiple Sclerosis (MS). Spirulina appears as a good and healthy supplement for the protection against neurological diseases and disorders with its great $B_{12}$ vitamin content. Remember that many plant origin foods are deprived of $B_{12}$ while very rare foods such as Spirulina are rich of the vitamin.

Omega 3 fatty acids which will be introduced later in detail are the beneficial fatty acids while many saturated and trans fatty acids are responsible for cardiovascular diseases, cancer, and diabetes. Only omega 3 fatty acids supply cardiac system and make protection against cancer and diabetes, increase energy production rate and decrease cholesterol and bad cholesterol. The precursor of the fatty acids, linolenic acid should be in rich amounts in the concerned food to produce these fatty acids. Omega 3 fatty acids are produced from the precursor, linolenic acid, followed by its consumption in body. Thus, we should include linolenic acid rich foods into our nutrition and life style. One of the richest sources of linolenic acid is Spirulina. In other words, Spirulina is a very rich source of omega 3.

Spirulina also contains rich amounts of chlorophyll which is the main pigment responsible for color of plants. It is also rich source of iron and magnesium. You can see many tablets of chlorophyll from many companies in market to supply energy and for the protection against anemia.

## CAROTENOIDS AND VITAMIN A FOR BOOSTING IMMUNE SYSTEM:

Another important weapon in boosting immune system is carotenoids, the precursors of vitamin A. Carotenoids and vitamin A are first required for immune system and then visual health. Boosting immune system and visual health make these vitamins as an essential for life quality. Also calcium binding into bone surface is enhanced by carotenoids and vitamin A. Carotenoids are taken into metabolism by the means of foods like all other food components. Followed by their absorption by the effect of stomach acid and intestinal enzymes, they are absorbed through bowel mucosa and transferred into blood circulation. They reach into liver by the means of blood and are converted into vitamin A by the enzymes of liver and given into blood as in the form of vitamin A. Some of vitamin A reaches into cornea, the layer which covers the surface of eye and retina which is responsible for the visual process. Rhodopsin is the pigment which exists in retina. The degradation of the pigment with vitamin A forms an electricity and this electricity is transferred into visual process center in brain tissue. Briefly, visual process is only possible by the formation of electricity. The formation of electricity is produced by the degradation of both rhodopsin and vitamin A. The degradation of only rhodopsin in retina produces low amount of electricity which is the main cause of many visual health problems. Therefore, vitamin A and its precursors, carotenoids, are recommended in these conditions. Vitamin A is also participated with rhodopsin and causes to a higher electricity production which able a healthy visual process.

Carotenoids and vitamin A are also required because of their anti-aging effects and immune boosting effects. They are one of the cornerstones of healthy living and aging. First, they enter into the production of a mucus layer. It is a kind of layer but not a solid layer. The layer has got a high viscosity. It covers all cavities of body and the surfaces of every organ in body. Microorganisms; virus, bacteria, yeast or mold first make entrance into body by using the cavities such as eye, nose, ear, rectum, anus and vagina. All these cavities and organs are covered by the layer which is produced by vitamin A. Microorganisms can not penetrate into deeper tissues of organs when they face with the protective layer which is produced by vitamin A. Other words, the mucus protective layer which covers the surface of cavities and organs is the main protection mechanisms of organs and tissues that microorganisms responsible for all kinds of infections are first kept by this protective mucus structure. In the case of vitamin A and carotenoid insufficiency, the mucus layer can not be produced enough and a solid compound is produced instead. This compound defects the smooth tissue beneath because of its hard and tough structure and causes bleeding. There may be several internal bleeding areas in the body and the reason as can easily be understood from the explanation is the carotenoid and vitamin A insufficiency. The bloody areas attract microorganisms since blood is a perfect media for their growth and activity. These bloody areas may be converted into infection areas. The solution for such disorder is to enter into a nutrition style which is very rich in vitamin A and carotenoid, plenty of green leafy and yellow colored foods. The same solid compound may even cover the surface layer eye (cornea) and can cause a solid layer formation on the surface of cornea. On the other hand, lack of vitamin A and carotenoid increase the production rate of free toxic radicals. These free toxic radical compounds also accumulate on cornea and can contribute to the formation of solid layer on the surface with the previously mentioned solid compound. The solid layer sometimes can cover all cornea and can defect the visual process. In many cases of cataract, especially in the

early phase, the rich nutrition in carotenoid and vitamin A and also vitamin A supplementation as in tablet form can make some recovery. If the treatment of cataract is not made immediately, by the supplementation of carotenoid and vitamin A or operation, the layer may be thickened and damages the visual process completely which is called as xhreopthalmia. If you want to enhance your visual health and be protected against cataract and xhreopthalmia, you should never neglect to consume plenty amounts of foods rich in carotenoid and vitamin A.

Cornea, the surface layer of eye, is the first part which meets the light beams. The receptors which meet and take the light beams in retina send these beams into nerves. These nerves transfer light and electricity that is produced by the degradation of rhodopsin and vitamin A in retina into the visual process center in brain. These nerves are a kind of transmitter. The damage or any kind of defect of these nerve cells by the effect of free toxic radical compounds or toxic and hazardous substances such as glutamate interrupts the electricity transfer into visual process center and this results in visual health problems. The solution is the heavy consumption of antioxidants such as carotenoids and vitamin A which can decrease free toxic radical compound production. Not only carotenoids and vitamin A but also niacin, folate, folic acid, $B_{12}$, vitamin C and alpha tocopherol is also very beneficial and effective in reducing the production rate of the harmful free toxic peroxy radical compounds and glutamate which damage visual tissues and health.

The nerve cells in Retina contain a substance called glutamate. Glutamate may become free followed by death of cells by aging or defects on cells. Free glutamate is toxic on other nerve cells in retina which may result in visual health problems. The disorder is called as glaukoma. Lutein and zeaxanthin, carotenoids as the precursor of vitamin A protect nerve cells in retina against glutamate and other toxic compounds such as free toxic radical compounds, trans fats, saturated fats, sugar and cholesterol. Carotenoids cover the surface of nerves in retina and protect them against harmful effects of ultraviolet. Carotenoids are rich in egg yolk (vitellin), fruits and green leafy vegetables. $B_{12}$ vitamin is another vitamin which protects nerve cells and also nerve cells in retina by entering into the structure of myelin coat, a coat which protects nerves against extrinsic factors such as microorganisms, pressure, and physical defects. It is rich in Spirulina, fish meat, liver, white cabbage pickle, yogurt and cheese in rich amounts. Note that, in spite of its cholesterol and saturated fat risk, liver is great from the point of $B_{12}$, folate, folic acid, magnesium, iron and carotenoid contents. Many people believe that this offal is very dangerous, harmful and an aging food because of its high saturated fat and cholesterol content. As I indicated in many parts of the book, there is no completely healthy, wonderful or anti-aging food or there is no completely hazardous, harmful or aging food since each food as in their natural form has got its own harmful or beneficial attributes. The most important think and target here is to know which food is the best and healthy for which metabolism, sex, disease and disorder and which food is the harmful and aging for which metabolism, sex, disease and disorder. If we have to make a comparison of liver between its harmful and beneficial attributes, it may be a big surprise that this offal appears as one of the richest foods in nutrient capacity.

Free toxic peroxy radical compounds, saturated fats, allergens, trans fats, salt and sugars, some of the food additives and their degradation products can contribute into the production of the layer on cornea in cataract. They are

also responsible for the progress of many visual health problems. Therefore, carotenoid rich nutrition, vitamin A and carotenoid supplementation should not be neglected but while doing this, fatty foods, fried foods, processed foods such as cured foods, smoked foods, canned foods, also candies and fast food should be restricted and avoided in plenty amounts to improve visual health. I want to share an important data as related to the effects of carotenoids on human health. A research was carried out on 634 human in Japan and the anticancerogenic effects of many carotenoids such as lutein, alpha carotene, beta carotene, cryptoxanthin, zeaxanthin and also ascorbic acid (vitamin C) and alpha tocopherol (vitamin E) were compared. Especially alpha carotene and leukopen as the important carotenoids were claimed as superior against cancer than others. Ascorbic acid, alpha tokopherol and beta carotene were claimed as effective anticancerogens but in a lower degree when compared with leukopen and alpha carotene.

Beta carotene as one of the initial precursor of vitamin A is a strong antioxidant. It protects you against many cancers, aging rapidly, defects caused by free toxic peroxy radical compounds while improving visual health by protecting macula and retina. But, **if you are the one who smoke, you should not consume beta carotene in plenty amounts or you should not use the supplements of beta carotene.** Very interesting, isn't it? This strong anti-aging substance, this important antioxidant which should not be neglected and should be included into daily nutrition and life style definitely, can be life threatening in persons who smoke. When we inhale, single oxygen atoms accumulate in our blood and they become free. In our blood and cells, single oxygen atom can easily trigger the oxidation of free fatty acids, causes oxidation and as a result, forms energy and free toxic peroxy radical compounds. Energy is necessary since it is utilized for all kinds of metabolic functions while free toxic peroxy radical compounds are excreted or eliminated by the means of immune system in a healthy body. In persons who consume beta carotene rich foods in plenty amounts or use beta carotene supplements, beta carotene binds single oxygen atom and interrupts the chain of oxidation. The bound oxygen can not oxidize fatty acids and thus, free toxic peroxy radical compounds are not produced as well as energy. But, sufficient amount of energy is produced from other fatty acids and single atoms continue to be free in blood. In the persons who smoke, nicotine also binds the single oxygen atom. If such persons consume beta carotene in rich amounts or use beta carotene tablets without leaving smoking, nicotine binds free oxygen in blood but also beta carotene. The blood and all cells in body may be deprived of oxygen and may begin to die. It is also the same for the patients who are suffered with cancer. Since beta carotene binds the single oxygen atom in blood which can be tolerated by a healthy person and immune system, cancer patients may be suffered with the lack of oxygen. The metabolisms in cancer are already suffered with the lack of oxygen and therefore a further oxygen deprivation due to beta carotene and nicotine combination may not be tolerated by cancer patient. I want to underline that two target groups should avoid the use of beta carotene supplements; persons who smoke and cancer patients. Of course a person who smokes will have to deprive of the benefits of beta carotene. **The person who smokes should prefer one of them; leaving smoking and beginning into a new healthy life style without cancer and the risk of many other metabolic diseases by using the benefits of beta carotene and vitamin A or leaving beta carotene and vitamin A which will bring you the risks of aging rapidly, cancer, diabetes, hepatitis, renal failure, upper respiratory track infections and inflammations with many other metabolic diseases and disorders.**

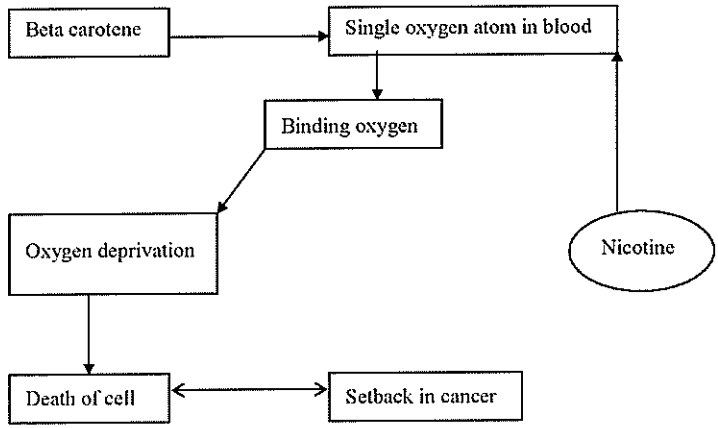



**Diagram 2**

Beta carotene and nicotine may be life threatening. Leave nicotine and increase your life quality with the benefits of beta carotene or leave beta carotene and face with many serious metabolic diseases and disorders, live in a life full with many life threatening factors!.

Although alpha carotene and leukopen are superior carotenoids in the prevention against cancer, zeaxhantin and lutein are the other important carotenoids which protect retina, cornea and macula against defects caused by free toxic peroxy radicals. All these carotenoids; alpha carotene, beta carotene, lutein and zeaxhantin stimulate the growth of immune system cells; T cells and B lymphocytes. These cells produce a beneficial protein compound which is called as 'cytokine'. The name of the cytokine is interleukin. Interleukin is used as protein in the proliferation of immune cells. Thus, carotenoid and beta carotene supplementation by the means of beta carotene and carotenoid rich foods is a must in boosting immune system and protection against infections.

I should underline the importance of beta carotene and vitamin A rich food consumption rather than vitamin A supplementation. Especially, I want you to avoid from vitamin A tablets. **If you want to use tablet and want to an additional supplement, prefer beta carotene instead of vitamin A.** Beta carotene is converted into vitamin A in liver step by step and releases the required amount of vitamin A into blood stream. But, vitamin A, in case of its supplementation as an overdose, can accumulate in blood and reaches up to abnormally high amounts. Liver, pancreas and kidneys produce fat to soluble this vitamin since it is a fat soluble vitamin. Vitamin A mega doses which many consumers may face with the use of these types of supplements as in tablet form can face with the risk of pancreas, kidney or liver fattening. I do not want to mean that the fattening risk of the mentioned organs does not exist for beta carotene mega dose or beta carotene supplementation in case of its overdose. But the risk is very lower in beta carotene tablet supplementation when compared with the tablet supplementation of vitamin A. Beta carotene conversion into

vitamin A and its release into blood as in the form of vitamin A also is an advantage for beta carotene that its excess amount can find an opportunity to be excreted as in the form of urine and feces out of the metabolism. Opposite, vitamin A, in the case of its direct intake into metabolism as in its overdose, can accumulate in blood in excess amounts which enables its excretion by the means of feces and urine. Briefly, do prefer beta carotene tablets instead of vitamin A tablets if you want to use a tablet supplement. **What about the benefits of using such beta carotene tablets? Unfortunately, the answer will disappoint you if you are the one who really trust to the benefits and effects of the tablet forms of beta carotene. Because the strongest antioxidant form, cis 9 isomer, is not exist in tablet form but exists in natural form. Therefore, always prefer natural consumption rather than tablet. Melon, watercress, kale, tomato, cucumber, peach, apricot, spinach, liver, cress, red chili pepper, broccoli, Brussels sprout, green pepper, fish meat, dark green leafy vegetables, egg yolk are the richest sources of carotenoids and vitamin A. Note that kale is also wonderful from the point of manganese, calcium, iron and potassium.**

# PROBIOTIC CONCEPT IN BOOSTING IMMUNE SYSTEM:

One of the most common advertisements today is for probiotic added foods. Many of them claim that they are important in boosting immune system and protecting against diseases and disorders. Are they correct? I should share some important data as related to them to make a better evaluation about their role in life and nutrition quality.

All mammalian and living creatures are contaminated with billions of microorganisms; bacteria, virus, yeast and mold. Some of them are toxic and harmful for metabolism. They can contaminate body by entering from cavities such as eye, nose, ear, rectum, anus, vagina, upper respiratory track but sometimes they can be taken into body by the means of foods. The contaminated foods can contaminate huge amounts of microorganisms to body. Food forms a good media for a wide range of microorganisms because of its rich protein, vitamin, mineral, fat and water content. Microorganisms can utilize these nutrients, proliferate and increase in number in foods. Such contaminated foods are digested in stomach and bowel followed by their digestion and the microorganisms they contain become free. They are absorbed through bowel mucosa and pass into blood stream. These microorganisms also continue to proliferate and increase in number by using the rich nutrient content in blood. They are transferred into tissues and organs and can cause inflammations with their toxins and allergens.

There are two types of immune cells which defend our body against these harmful microorganisms. These are leukocytes that are white blood cells in blood and lymphocytes in lymph tissue. Both cells produce some proteins which are called as antitoxin. They detoxify the toxins of harmful microorganisms. Interleukin is one of the mentioned antitoxins produced by leukocytes, a protein which is called as cytokine and it inhibits the proliferation of harmful microorganisms including viruses. Also there are beneficial microorganisms most of which are bacteria that they protect us against the harmful microorganisms with leukocytes and lymphocytes. They are not harmful for body and metabolism. In fact, most of them naturally exist on the mucosa layer of bowel and stomach. There are also harmful microorganisms which exist on the same bowel mucosa and stomach mucosa and also in the cavity of bowel and stomach such as; *Klebsiella, Salmonella, Yersinia, Escherichia, Staphylacoccus, Proteus, Citrobacter* and *Campylobacter* but these harmful bacteria species that are also causative agents of many food borne diseases are inhibited by the beneficial bacteria species which are not pathogen. These beneficial microorganisms which inhibit the proliferation of harmful microorganisms are also the main cause of the balance between good and bad microorganisms so that this balance also supports immune system and its resistance against infections. These beneficial microorganisms which inhibit the activity and proliferation of harmful microorganisms are called as probiotic. Definition of probiotic bacteria is not so easy. Many of them naturally exist in the cavity and on the mucosa of bowel and stomach. They are native microbial flora which means that they are not foreign for the body and metabolism. Being not foreign, being friendly, being native is the first must for a microorganism to be defined as probiotic. Otherwise, a microorganism which produces harmful toxins and allergens for body and metabolism, which contains foreign genes and proteins, are repelled from body and metabolism by immune system. That is why, probiotics which are added consciously and extensionally into foods take their origin from bowel and stomach and they are not foreign for body and metabolism, rather, they

are familiar. Any substance, any body which is foreign as in protein structure and gene structure is not accepted by immune system. They are met as foreign bodies by immune system and repelled immediately from body.

The second attribute of a microorganism which makes it probiotic is its resistance against bowel enzymes and stomach acidity. Stomach acidity is about 2.3-2.4 pH and can kill many harmful bacteria species, yeast and mold with its very low pH level. Therefore, a probiotic should be resist against the high acidity of stomach but also enzymes of bowel. Otherwise, probiotic can not reach on the mucosa of stomach and bowel. They can not stay there and begin to proliferate. A probiotic should be resist to high acidic levels and enzymatic conditions that they should be able to reach on mucosa of bowel and stomach. They begin to proliferate and increase in number. They also produce special biofilm layer followed by their arrival on mucosa of bowel and stomach.

Probiotics also produce some types of inhibitory substances on other pathogen microorganisms which are called as bacteriosin. It is a kind of antibiotic like substance and bacteriosins inhibit the activity and decrease the proliferation rate of pathogen microorganisms. Briefly, a microorganism should have got some attributes to be defined as a probiotic. These are; 1. They should not be pathogen, should have got no adverse effect and any side effect on human and animal organism, 2. They should be able to stick on mucosa surface of bowel and bowel by using their suction pads. The adhesion of them on stomach and bowel surface by the means of suction pads is too important since they can make a layer (biofilm) which is produced by them. This is a protective barrier which interrupts the absorption of cholesterol, bad cholesterol, homocystein, toxic radicals, salt, nitrite, nitrate, sugar, bad cholesterol, trans fat, saturated fat and many other harmful compounds which cause diseases and disorders. Even pathogen microorganisms can not pass this barrier. Note that the barrier has got two actions in preventing the formation of diseases and disorders. First, it is a physical barrier, a kind of wall which prevents the penetrations of the mentioned harmful substances and microorganisms from the cavity of bowel and bowel surface into blood stream. Second, the barrier is completely consists of beneficial microorganisms, probiotics, which can fight and kill some of the pathogens. 3. The microorganism to be defined as a probiotic should be resist to enzymes of bowel and acid of stomach.

The main effective mechanism of probiotics is their metabolic activity in the cavity of gastro digestive track. The metabolic activity of probiotics, the growth and proliferation of them requires some nutrients. So, they consume most of cholesterol, bad cholesterol, homocystein, salt, sugar, saturated fat, unsaturated fat, nitrite, nitrate and allergen. Their consumption of all the mentioned harmful compounds naturally reduces the amount of these harmful compounds. Also, they want to become the dominant flora in the cavity of bowel and bowel followed by their arrival by the means of probiotic rich fermented foods and they fight with pathogens in digestive system. For example, *Helicobacter pylorus, important bacteria as the causative agent of gastritis, is* reduced in number by probiotics. The decrease in the number of *Helicobacter pylori* due to the inhibitory effects of antagonist probiotics is the main reason of recovery in ulcer by probiotic consumption. Diarrhea which is caused by *Clostridium deficile* is one of the most common health problems of infants which can also be treated by probiotics that one of the most common used probiotics, *Lactobacillus* GG, is the antagonist of this pathogen kills it and decreases its number (Kopp-Hoolihan, 2001, Journal of the American Dietetic Association, 101, 229-238; Van Niel et al. 2002, Pediatrics, 109, 678-238).

Similarly, *Lactobacillus* GG, *Lactobacillus plantarum, Streptococcus thermophilus, Bifidobacter, Lactobacillus acidophilus, Leuconsotoc* and *Pediococcus* which are the most common probiotics used in many fermented products are antagonist of *Salmonella typhi* and *Salmonella paratyphii*, the causative agents of typhoid and paratyphoid. Thus, the effect of vaccination against typhoid and paratyphoid is claimed as much more in elderly metabolism which consumes plenty of fermented products rich in probiotics than in infant metabolisms which do not consume probitic rich foods (JUNG, 1999, FASEB Journal, 13, A872).

One of the most important and beneficial effect of probiotic rich foods is for persons who have got lactose intolerance and the persons who make regular sport and exercise. Cheese and yogurt are the most common and known probiotic rich foods. They are fermented products which are produced by probiotics. Milk is pasteurized up to 90 °C to eliminate pathogen microorganisms and to be safe for public consumption. The heat process also eliminates antagonist microorganisms of probiotics which kill and inhibit probiotic activity. The milk is first pasteurized and then cooled below 45 °C as the optimum growth temperature for probiotic microorganisms. Probiotic microorganisms as diluted with some amount of milk are poured into milk in small quantities by mixing. Yeast also added in the same way in cheese production as combined with or without starter. Yeast or starter, briefly probiotics, ferment milk sugar lactose and convert it into lactic acid, glucose and galactose, simple sugars, which can easily be absorbed. The formation and increase of lactic acid in milk followed by probiotic addition decomposes milk protein casein and degrades it into smaller fragments one of which is called as alpha para casein. Alpha para casein takes calcium and phosphate and accumulates at the bottom of container. This solid fragment is yogurt or cheese itself, while the supernatant is the water fragment of milk. The water fragment which is called as 'whey' contains very important proteins that are called as 'whey proteins'. They have become even much more popular and important than the main milk protein casein because they can decrease cholesterol and bad cholesterol, dilute blood and support cardiovascular system, inhibit *Helicobacter pylori* and can help to the treatment of ulcer and gastritis, enhance muscle production while supporting bone and skeleton. Also milk protein casein is one of the most important animal origin proteins since it has got all of the essential amino acids such as lysine and methionin which are required for bone and muscle growth. Infants and child who consume plenty of milk and dairy products are much taller and stronger and they are in much more rapid growth periods than others who do not consume these products. The reason may be genetic factors but the rich consumption of milk and dairy products which are complete from all essential amino acids, calcium and whey proteins is another important factor to be taken into consideration after genetic factors.

Although genetic factors support body length and muscle growth, unfortunately, important amount of individuals can not reach their optimum growth and length because of poor consumption of milk, whey and dairy products.

In spite of their rich nutritional composition, some people, although they want to consume, can not consume milk because of gas, pain and diarrhea problems. Whenever they consume drinking milk, they complain about abdominal gas and pain problems and many times diarrhea. These types of metabolisms can not produce an enzyme called as lactase which decomposes lactose (milk sugar) into glucose and galactose. Therefore, lactose passes from stomach cavity, comes into intestines and is transferred from intestine into colon as the last part of bowel. Lactose is attacked by pathogen

microorganisms in colon and they produce ammoniac, potassium hydroxide gasses and also some kinds of allergic substances such as histamine, histidine, putressin, ornithin, cadaverin all of which cause abdominal pain, itching and allergic reactions. Briefly, lactase secretion of bowel to decompose lactose into glucose and galactose is very important to prevent gas, pain and allergy. Some people can not produce this enzyme in their gastro digestive tracks because of some genetic problems. Some people may have got the enzyme in sufficient amounts but the enzyme and its production may be depleted if drinking milk is not consumed for long time of periods. The more the consumption the more the enzyme can be secreted. It is a kind of response and adaptation of metabolism to milk sugar, lactose. You should not make your decision promptly; continue to consume drinking milk for a period, three weeks, one or two months. If you stop the complaints for diarrhea, gas and pain, then it means that you could start to produce and activate the enzyme. But if you still continue to the same problems, it means that you have got **lactose intolerance.** What can you do.? As I have indicated above, yogurt and cheese are the two most common known and consumed fermented probiotic rich foods, also kefir. In case of consumption of such products, the risk of lactose intolerance is too low since lactose will have already been decomposed during production by lactase enzyme and high levels of acidity of these products before the product is marketed. Other words, lactose in these products exists in its degraded form as glucose and galactose which are ready to be absorbed in bowel. No lactose comes into colon since it is already decomposed and absorbed in bowel. In conclusion, one of the important application and beneficial effect of probiotics is their consumption against lactose intolerance.

One of the important attributes of probiotics is that they can stick on the wall of stomach and bowel by using their suction pads as I indicated above. They form a layer which protects the pathogen microorganism entrance into blood stream and many other harmful compounds such as cholesterol, salt, sugar, fat, allergen and carcinogen. The same layer also protects the cells on bowel and stomach surface from acid of stomach and enzymatic activity in intestine. Enzymes in intestine and colon may defect and wound the surface cells of colon and intestine. Similarly, high acidity can wound and defect the surface cells of stomach which can result in gastritis and ulcer. The layer which consists of probiotics protects the surface cells of stomach against harmful effect of high stomach acidity. This may be helpful especially in the treatments of ulcer and gastritis. The consumption of probiotic rich dairy products, in other words, fermented dairy product consumption in plenty amounts can be complementary to the medical treatments of ulcer and gastritis and can shorten the recovery period whereas the consumption of drinking milk which is free of probiotics can trigger the severity of ulcer and gastritis (Elmsahl et al. 1998, Eur J Clin Nutr, 52:668-674).

Allergens and carcinogens make their entrance into cell from special pores of cell membranes which are called as receptors. They are protein structures. A carcinogen or an allergen should be bound into the receptor to be able to enter into the cell. Probiotics competitively work with allergen or carcinogen and they bind these receptors before carcinogen or allergen and prevent their entrance into the cell (Kalliomaki et al. 2001; Lancet, 357, 1076-1079; Isolauri et al, 1995; Vaccine, 13, 310-312). This is the main mechanism for the protective and beneficial effects of probiotics in many cancer and allergy diseases and disorders.

Probiotics also produce surfactant substances. They make the mucosa, the surface layer of bowel and stomach sticky that many pathogen microorganisms can not adhere on the mucosa. The surfactant effect of probitics is another important effect of probiotics in interrupting the absorption of pathogen and their transfer into blood stream through gastro digestive track.

Diarrhea in pathogen microbial origin can be fatal in infant because of dehydration. The most common used probiotics in probiotic rich foods namely *Lactobacillus* GG, *Lactobacillus acidophilus, Lactobacillus reuteri, Lactobacillus bulgaricus, Streptococcus thermophilus* and *Bifidobacter* can inhibit the activity and proliferation of pathogen microorganisms responsible for diarrhea and help for the protection of infant against death in diarrhea and dehydration origin (Szajewska&Mrukowicz, 2001, Journal of Pediatric Gastroenterology and Nutrition, 33, Supply 2, p.17-25). The rich consumption of probiotic rich and probiotic added foods can help for recovery during treatments of eczema as complementary to the medical treatment (Isolauri et al. 2001).

Prebiotic may be defined as the feed or the food of probiotic microorganism. Probiotics like all other microorganisms consume foods, require proteins, fats, oils, carbohydrates, vitamins and minerals also water for their energy production, their growth and metabolic functions. Especially, oligofructosaccharides and other polysaccharides as complex carbohydrates are the main food compounds of probiotics. They are decomposed and digested by probiotics and converted into glucose, the simplest sugar. Glucose is converted into lactic acid and some other organic acids by the effect of the same microorganisms which increases the total acidity in the cavity of bowel and stomach. The increase in the acidity in cavities of bowel and stomach inhibits or kills pathogens but also decomposes complex fiber compounds in the same cavity. Fibers are essential for healthy aging and in prevention of many metabolic diseases and disorders such as cancer, cardiovascular diseases, diabetes, allergy and stroke since they can bind excess of cholesterol, bad cholesterol, many carcinogens, allergens, trans fats, sugar and many other harmful compounds. On the other hand, they are not selective and they can bind very beneficial substances such as high quality form of iron, calcium, vitamins, minerals, omega 3, whey proteins, casein, essential amino acids and many other important nutrients. Fibers are in fructooligosaccharide or polysaccharide structure, other words, they are prebiotics for probiotics. Probiotic microorganisms try to consume, digest and decompose them into smaller compounds which can be digested easier from the mucosa of bowel and stomach and transferred into blood stream. The decomposition and digestion of the complex fiber compounds by probiotic activity results in positive ion release which enhances the absorption of calcium and iron through the mucosa of bowel (Cummings et al. 1979, Journal of Clinical Nutrition, 2086-2093). As a result, calcium and iron are absorbed easier in greater amounts which act beneficially in prevention of anemia and osteoporosis. The same decomposition and digestion of complex fibers by probiotics also decreases the risk of binding of nutrients by fibers and hence increases the bioavailability of important and beneficial nutrients. In conclusion, probiotic rich consumption has got an important status for easy digestion while they have got no serious side effects on metabolism (Davidson & Butler, 2000, Current Opinion in Pediatrics, 12, 477-481).

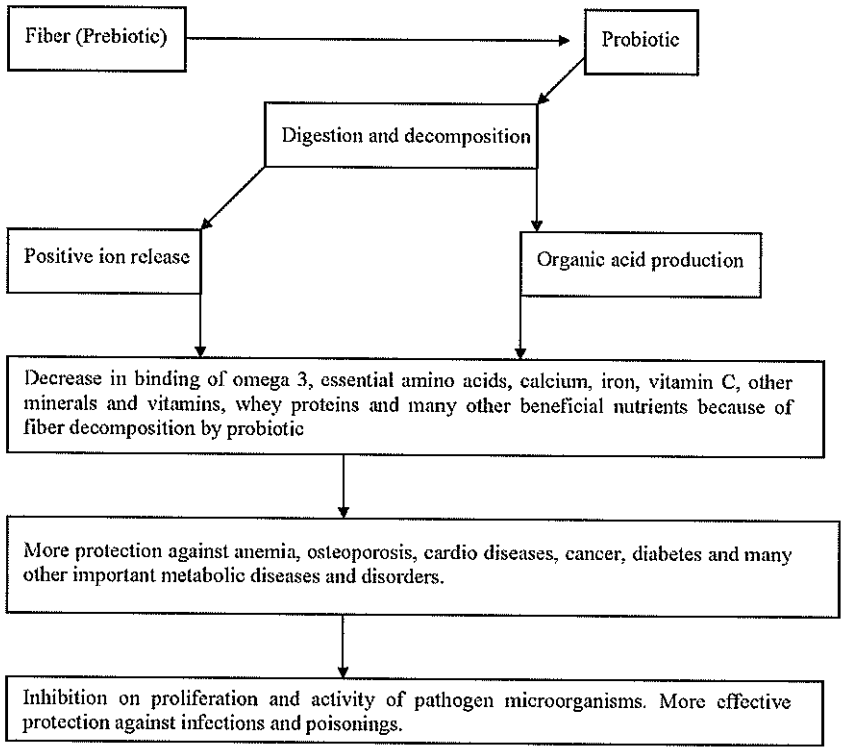



**Diagram 3**

Among probiotics, especially the two of them, *Lactobacillus acidophilus* and *Bifidobacter bifidum* can be complementary to the treatment of ulcer and gastritis in case of their rich consumptions which contains $10^9$cfu/g (Colony Forming Unit: although it is not correct scientifically, a cfu may be assumed as one microorganism) (Gismondo et al. 1990, Clin. Ter. 134:41-46).

One of the important protective effects of probiotics is against cardiovascular diseases and disorders which form due to excess amount of cholesterol. Probiotics consume the excess of the cholesterol in the cavity of bowel and stomach so that less cholesterol is absorbed and transferred into blood circulation. The consumption of cholesterol by probiotics and the decrease in the total cholesterol in gastro digestive track is one of the most common and accepted theories as related to the protective effects of probiotics against cardiovascular diseases and disorders. Another theory is the fructooligosaccharide consumption of probiotics that probiotics consume and utilize fructooligosaccharide, a complex polysaccharide and a prebiotic which produces cholesterol (Delzenneand & Kok, Journal of nutrition, 1999, 129:1467S-1470S). Some probiotics also produce hydrogen peroxide which is toxic and lethal on many pathogen microorganisms.

I have tried to share some important data as related to the beneficial and protective effects of probiotics against many diseases and disorders and their functions in healthy aging. Unfortunately, like in all other nutrients, we face with some information and advertisements in media as related to their medical effects with a very big exaggeration. Yes, we have got important scientific data as related to their beneficial and protective effects against many important metabolic diseases and disorders and they are healthy products, healthy foods which should be consumed in plenty amounts in every period of life. But, this does not mean that when you begin to consume a probiotic rich food such as yogurt or kefir, you will be able to benefit all the mentioned protective and beneficial functions of them suddenly. Some advertisements in some media of some countries are constantly claiming that 'the commercial probiotic added products, yogurt, kefir or any other, can cause wonders in your metabolism when consumed one or two weeks'. Such claims and advertisements are completely and scientifically wrong.! I had indicated that probiotics can be effective with some various mechanisms such as forming a film layer on the surface of bowel and stomach mucosa, increasing the acidity of stomach, killing pathogens or inhibiting their proliferation and activity. But, for all these effects, they should be in sufficient numbers and they should reach up to the high numbers in the cavity of bowel and stomach. There are always some types of pathogen microorganisms in different origin, different genus and they are always the antagonists of probiotics and they always try to fight and kill these probiotics. Although you consume probiotic rich foods and probiotic added food products, important amounts of probiotics in the food will be killed first, by the effect of stomach acid and second, by the effect of pathogens. Some numbers will be able to reach into stomach and intestine and will survive in gastro digestive track but they will always be in fight with pathogens as long as they live. They should be successful in this fight against pathogen and they should be superior at the end of this fight. For this, they should be in higher population numbers, other words they should be dominant in the cavities of bowel and stomach. The domination of probiotics as the main flora against pathogens is not so easy. Sometimes you may have consumed your probiotic rich foods for weeks without a day missing but then, when you miss even one day, when you forget to consume it even one day, pathogens can kill the probiotics which are taken into metabolism before. What I mean here is that the domination of probiotics is not so easy and you have to consume these types of probiotic rich food products every day without any missing as long as three or four years to be able to see their mentioned protective and beneficial medical effects on metabolism. But, you should not leave the consumption of the product when you see the effects or benefit the effects in your metabolism after these three or four years. Your metabolism will turn back to the beginning because of pathogen invasion when you stop consuming probiotic rich foods. The probiotics already exist will not be able to take support any more and they will be killed by pathogens and decrease in number. Therefore, you have to consume probiotic rich foods, not for a period of time, but all through your life as long as you live. When you stop consuming these products, the beneficial and protective effects will no more continue to exist. The necessity of probiotic rich and probiotic added food product consumption all through life without even a day missing may seem to you discouraging but I should remind you that if we are talking about healthy aging as it is the most important aim of the book, we see the clearest and biggest samples in people who live in Kafkas, in the mountains of north Russia and China who consume yogurt, kımız, kefir and fermented soy products such as tofu which are the products rich in probiotics and prebiotics. Such people can live 100, 110 and although they are very old, they are very healthy and their life quality is very higher than their coevals. The reasons may be genetic, the oxygen of rural environment, being free of stress, natural food consumption instead of processed, activity. But it seems clearly that one of the important reasons is the consumption of probiotic rich dairy and soy products in plenty amounts by these people.

Yogurt is the most common type of probiotic rich dairy product besides cheese. We know these products as rich in calcium and high quality protein. We consume them because of their rich nutrition value. Very few of us know that they should also be consumed to supply probiotic and to use the anti-aging (healthy aging) benefits of probiotics. Humanbeing has been consuming yogurt, cheese and similar probiotic rich foods for ages without knowing their benefits due to their rich probiotic contents. Fermented dairy products are produced by the addition and fermentative action of probiotic microorganisms in milk media which I mentioned above. Therefore, all fermented dairy products themselves are probiotic rich foods since they are produced by probiotic activity. Presently, we have got both probiotic rich food and fermented dairy product on the shelves in the market which seems a little bit confusing that all of them are probiotic rich and all of them are fermented because of probiotics. We have been consuming lots of probiotics for ages although the concept of probiotic is new. In fact, it is old, very old, because cheese, kefir, yogurt and many dairy products in high acidity are fermented naturally by probiotic and they are rich in probiotic. So, the question is the difference of fermented dairy product and probiotic rich food. Whenever you see an advertisement about milk which is fortified with probiotics, it means that it is a product which is treated with heat and probiotics are added after heat process. The definition of such advertisement is very clear since a drinking milk is always without probiotic because it is heated and it loses all its probiotic content because of heat process. But, what about a yogurt and a probiotic rich yogurt? Here, the definitions are wrong. Because a classic yogurt is a probiotic rich food since it is produced by these microorganisms like probiotic rich yogurt. What is the difference between them? Because of these types of wrong definitions in media, many people assume yogurt as probiotic free and they may tend to consume the one which is advertised and introduced as probiotic rich yogurt. What you have to do in the selection of probiotic rich foods should be the definition. You should be sure that the definition of the product should be correct. All yogurts and kefirs and cheeses and many other fermented dairy products are fermented and therefore they are probiotic rich foods. They may have got these probiotics naturally or probiotics may have been preferably, additionally and extensionally added into milk during their production. It does not change the result. These types of dairy fermented products have got $10^3$-$10^7$ cfu/g probiotic microorganisms. If the dairy product or soy product or any other fermented food product is defined and advertised as probiotic rich, then it means that they are added additional huge numbers of probiotics in addition to their native probiotic content or in addition to the normal amounts of probiotic starters in their traditional type of productions. These types of products have got $10^7$-$10^{10}$cfu/g or even more.

Kefir is consumed as a probiotic rich food and many people tend to consume the product because of its advertisements claiming the anti-aging and energy giving effect of it. I have to repeat that there is no wonder food; there is no completely good or bad food. Each food has got its own good and bad, beneficial and harmful effects on some metabolisms in some conditions, in different sex, age, weight, nutrition and life style and blood profile. Kefir is one of them. Opposite to the claims of many advertisements about it, it is not a wonder product or anti-aging. Once again, I have to underline that, I do not enjoy from anti-aging word. Actually, it is not scientific. There is no opposite of 'aging' and opposite of it can not be since all living organism becomes older later or earlier. If anti-aging, the opposite of aging exists, then we would not have died. All of us are going to get older and die, definitely, later or earlier, because of aging process. Healthy nutrition and life style can only be important means to get older healthier. Therefore, I always prefer to use the term 'healthy aging' instead of anti-aging. Kefir is a healthy product, but of course not every time, like all other foods. For example, if you

are the one who is being treated with one of cancer therapies, if you are the one who is suffered with obesity, if you are the one who is suffered with flu, you should better avoid consuming it since the high content of biogenic amines in kefir may be converted to carcinogen substances in addition to its high fat, cholesterol and sugar contents. But, in all other conditions, its rich nutritional status and probiotic content help for healthy aging and it is one of the perfect foods for healthy aging. Now, I want to share the reasons with you.

Many processed foods and also raw foods have got different carbohydrate, protein and fat contents most of which are in complex form. They should be decomposed into smaller fragments to be absorbed through bowel mucosa and transferred into blood stream. Complex carbohydrates come into digestive track from esophagus, treated with stomach acidity and pass into bowel. Here, the complex carbohydrates are decomposed into further smaller fragments which are called as simple sugars; glucose, galactose and fructose. Only these simple sugars can be absorbed and transferred into blood stream properly through bowel mucosa. Similarly, complex proteins come into stomach and bowel. They are decomposed into smaller fragments which are called as amino acids by the effect of stomach acid and enzymes in bowel. Fats and oils are decomposed into their smaller fragments which are called saturated and unsaturated fatty acids and also three value alcohols. Only after these decompositions, unsaturated and saturated fatty acids, amino acids and free sugars can be absorbed and transferred into blood stream. Briefly, we can digest and benefit from complex nutrients by decomposing them into their smaller fragments by the effect of stomach acid and enzymes in bowel. Otherwise, some components such as insoluble fibers which are very resist against stomach acidity and enzymatic activity bind them and excrete them out of metabolism by the means of feces and urine. There are two important target groups which are suffered with digestive problems or disorders such as inability in digestion, abdominal pain, allergy to the many food allergens, gas and diarrhea problems. Many of these complaints in these two target groups; elderly and infant, are due to the improper function of digestive track. Older people over 40s, by aging, loose their quality in digestion because their cells on the surface of stomach and bowel become older. Aging of the surface cells of stomach naturally reduces the secretion rate of stomach acidity while the older cells on surface of bowel cause lack of enzyme production. The decrease in enzyme concentration in bowel and acid concentration in stomach enable digestion since enzymes and stomach acid decompose complex nutrients into smaller fragments. Because stomach acidity and enzymes in bowel decompose the complex nutrients, they are responsible for the proper digestion and absorption of the complex nutrients. The complex nutrients such as polysaccharides and lactose reach into colon and rectum, the end of digestive track, and they are attacked by harmful microorganisms by giving gas and forming allergic substances.

The second target group is infant, preliminary childhood up to 7-8 years old, is also suffered with similar digestive problems. This time, the reason is being too young rather than aging. The cells on bowel surface which are responsible for enzyme production and cells on stomach surface which are responsible for the secretion of acid are too immature. These immature cells can not produce sufficient amounts of acid and enzymes. In conclusion, both groups may have got problems as related to improper digestion due to immature or older cells in their digestion tracks. The initial solution at this stage seems the consumption of digestible products such as yogurt, cheese and kefir. Especially, kefir is much more digestible or in other words, can be digested easier than other products, because its complex nutrients are already decomposed and converted into simple digestible nutrients during production as indicated above. Kefir is

produced by adding *Lactobaccillus kefir* and *Lactobacillus kefiranofaciens*. These probiotics (that are bacteria) are added into milk followed by pasteurization at 70-90 °C and cooling below 45 °C. The mechanism is the same like in all other fermented dairy products such as cheese and yogurt. The only difference in production mechanism is the difference of starter probiotics. Another difference between kefir and others is that the rate of fermentation is weaker in kefir than in cheese and yogurt which is also the main reason for the lower acidity in kefir. *Torula kefir* is another probiotic but it is yeast, not bacteria. *Torula kefir* and *Lactobacillus kefiranofaciens* and/or *Lactobacillus kefir* combinations are the most common combinations which are used in most of the productions. The bacteria and yeast combined starter probiotics are mixed with some amount of milk which is previously heated and cooled and the milk is incubated in a warm place as tightly closed. This process is required for the proliferation of kefir probiotics. The mixture container is opened and poured into milk which is previously heated and cooled and incubated for some days as tightly closed. Similarly, three or four passages may be produced and the final mixture is added into the pasteurized and cooled milk, tightly closed and incubated. The probiotic content which is consisted of kefir bacteria and yeast is great and in huge numbers because of these several passages and a long term of incubation in a warm atmosphere. Both bacteria and yeast probiotics find enough opportunities to proliferate and increase in number by using the rich protein (casein and whey), water, B complex and lactose (milk sugar). They may have increased up to very huge numbers so that the end product may have got $10^{10}$-$10^{16}$ cfu/g. The proliferation and existence of probiotics; *Torula kefir* and *Lactobacillus kefiranofaciens* in huge numbers is the main characteristic of kefir which makes it beneficial and protective against many diseases and disorders. Because these probiotics have got a very important amounts of $B_6$, $B_1$, $B_2$, $B_3$ and $B_{12}$. I will share an important data as related to the important effects of B complex soon, but I have to underline that the rich B complex content is not the only benefit of kefir. Easier digestibility should always be concerned. Milk protein casein and whey proteins are the wonderful proteins rich in high quality animal origin proteins. But, they are complex and can not be absorbed properly by elderly, infant or persons with different diseases and disorders or persons in recovery as I mentioned above. Also, if you are the one who make regular sport and exercise in high velocity, or if you are a professional athlete, you have to take rich nutrients during your off days to be prepared for the next sport training or match which means that you need short amount of time to take and digest extra quality nutrients. You have to digest your concerned product so rapidly, easily and properly that you should have been ready to the next training. Kefir is ready for you. It is already digested for you with its probiotics. No need to decompose and digest complex casein and whey proteins of milk because they are already decomposed into amino acids by probiotics and they are ready for their absorption and transfer into blood stream in your metabolism in kefir. If you are the one who has got lactose intolerance, you will not be suffered any more by consuming kefir since lactose will have already been decomposed into glucose and galactose by kefir probiotics during production before you consume it. You will be able to absorb these simple sugars without forming gas or any allergic substance and will avoid you against diarrhea. Also kefir gives you energy much more rapidly than drinking milk because its lactose is already decomposed into simple sugars which are ready to be absorbed through your bowel mucosa and this is important especially for elderly, infant, athlete and the ones in recovery. Calcium in kefir is much more mineralized when compared with drinking milk because of the acidity in kefir. The probiotics in kefir produce lactic acid and other organic acids followed by decomposition of lactose. The acidity helps for calcium mineralization while enhancing its absorption through the mucosa of bowel. It can be claimed that the calcium bioavailability and absorption degree of calcium is higher and the time for its transfer into blood stream is shorter than any other raw and probiotic poor food products.

This character of kefir is very important for the persons who want to be protected against osteoporosis. Members of B complex are utilized for the proliferation and recovery of blood and nerve cells. Therefore, regular consumption of kefir may be beneficial in protection and increase of immunity of blood and nerve system. The rich B complex vitamin content in kefir can be complementary with the treatments of neurological disorders such as Parkinson, Multiple Sclerosis and Alzheimer. In spite of the high quality of milk protein and casein, some individuals may show allergic reactions to the protein. Kefir may be a good alternative for such metabolism since casein will have already been decomposed into its amino acids and will have been as in amino acid form in kefir. But, this should not be accepted as a general rule because some individuals may show allergic reactions to the probiotics of kefir. At least, probiotics in kefir are microorganisms, in protein structure, which can be recognized as a foreign body by your metabolism. You have to know your body response to kefir whether you have got allergy to the probiotics of kefir. If you are the one who shows allergy to drinking milk but the one who stops showing allergy when you pass to consume kefir, then you can think that you have got allergy to casein. But, if you still continue to show allergy during kefir consumption, it may indicate that you have got allergy to the probiotics of kefir.

One important beneficial effect of kefir is its rich content of $B_{12}$ vitamin while it is also rich of the other members of B complex. The rich content of vitamin $B_{12}$ makes kefir as a healthy food product which can be consumed regularly for healthy aging. I want to share some important data as related to $B_{12}$ vitamin with its initial points to be able to evaluate the nutritional importance of kefir.

DNA is the genetic compound of the cell which transfers genetic information through generations and is responsible for all futuristic metabolic progress. DNA is formed by various kinds of enzymes which are produced especially by folic acid and $B_{12}$ vitamins. Thus, $B_{12}$ vitamin is required for a healthy genetic view of individual. The vitamin is also required for blood proliferation since important number of enzymes which regulates the proliferation of blood cells is also made of $B_{12}$. In case of $B_{12}$ insufficiency, blood cells can not proliferate and reach up to the sufficient numbers. As a result, a kind of anemia, the decrease in blood cell number, which is called as 'pernicious anemia', occurs. The difference of pernicious anemia from other forms of anemia is the formation of blood cells low in number but also in abnormal shape. These insufficient numbers of blood cells in abnormal shape can not bind enough oxygen and transfer it into other cells. Other cells can not receive enough oxygen, can not combust sugar and fat and can not produce energy. These cells are deprived of energy which is the main reason for the people who are always suffered with lack of energy problems. Such people always complain for energy problem, being tired for whatever they do. Chronic fatigue is the prognosis of not only $B_{12}$ insufficiency but also is observed in all anemia forms due to folic acid and $B_{12}$ insufficiencies.

Pernicious anemia is not the only side effect of $B_{12}$ insufficiency. Nerve cells are covered with a protective layer which protects these cells against harmful effects of free toxic radical compounds, nitrate, nitrite, cholesterol, bad cholesterol, allergens, trans fats, sugars and homocyteine. All the mentioned substances with many others defect nerve cells and their membranes. The protective layer around nerve cell which is called as myelin coat has got uppermost importance for the protection of these cells against the mentioned extrinsic factors. Otherwise, once these cells have been defected, it needs a very long periods of time for recovery which means years and years. Very little recoveries form in spite of

many years. Nerve health is important for not only neurological and mental health but also it is closely connected into bone, skeleton, joint and muscle health. Any kind of damage or defect in nerve system can result in disorders of joints, muscles, bones and skeleton. Nerve cells are the first organelles which take the stress factors such as microorganism, heat, vibration, pressure, humidity, sound, light. The positive and negative ions of these cells exchange their positions through the cell membranes of the cells followed by the effects of these stress factors which creates electricity. I always define the formation of the electricity as the center of living and universe and also I always choose to define human being and all other living organisms as bioelectrical bodies rather than biological organisms since the electricity is the source of all kinds of hormonal and biochemical changes in our bodies. This electricity is transferred from nerve cell into the joint which connects the cell into the muscle cell where new electricity is created. Finally, the electricity is transferred from nerve to muscle and muscle to nerve cell by acetylcholin secretion in the joints each time and finally it reaches into brain tissue. All hormones which are responsible for the utilization of all kinds of metabolic reactions are secreted by brain only when brain is stimulated by the electricity. In case of any defect to nerve cells, sufficient amount of electricity can not form, can not reach into brain and brain is not stimulated enough which results in lack of hormone productions. Sometimes serotonin responsible from relaxing, sometimes dopamine responsible from the coordination of bone and muscle and sometimes melatonin responsible from sleeping process can not be produced in sufficient amounts which may result in insomnia, Alzheimer, Parkinson or manic depression.

Any kind of interruption in the transfer of the electricity mentioned above also effects muscle and vessel. Vessels and muscles are always stimulated by nerves. But, the defects in nerve cells due to the lack of myelin coat production because of $B_{12}$ deficiency can cause dysfunction of nerve cells. Neither nerve cells nor their myelin coats can transfer electricity to muscles and vessels. Vessels can not contract and dilate since they are not stimulated enough by nerves. Muscle cells can not supply sufficient amount of blood from such inactive vessels and can not grow. They decrease in volume which is called as atrophy. Similarly, bones can not supply blood and bone cells begin to die and bone density decreases which makes individual liable to osteoporosis. Muscles and bones can not move because they are not stimulated by nerves which is called as paralyze. I am trying to define the possibilities due to the deficiency of vitamin $B_{12}$. One of them or some of them may form to any of us as long as we do not give enough importance to the nutrition rich in vitamin $B_{12}$. Each of the probiotic itself in kefir is a rich source of vitamin $B_{12}$. The amounts of these probiotics are approximately $1.5x10^{12}$ cfu in 500 ml of yogurt and $1.5x10^{15}$-$10^{16}$ cfu in the same amount of kefir.

Folate is another vitamin which exists in kefir in rich amounts. Folate is required for the production of enzymes which are responsible for the production and proliferation of red blood cells. In case of folate and folic acid, anemia may form. The difference between $B_{12}$ vitamin and folate/folic acid is that vitamin $B_{12}$ participates in the structure of myelin coat of nerve cells whereas folate and folic acid do not. Therefore, the deficiency of vitamin $B_{12}$ may result in both anemia and neurological disorders such as amnesia (forgetfulness), Alzheimer, Parkinson, complete and partial paralyze. But, folate and folic acid deficiency is usually accompanied with anemia and related disorders like fatigue. The severity of amnesia may be too high like in Alzheimer depending on the severity of vitamin $B_{12}$ deficiency. In some cases, it may even be difficult to make a differentiation between Alzheimer and $B_{12}$ deficiency.

In spite of its uppermost importance, unfortunately $B_{12}$ hardly dissolves in water. Metabolism gives a response to be able to dissolve $B_{12}$ and produces fat to dissolve it. Therefore, the toxicity, the overdose of $B_{12}$ can cause liver, kidney and pancreas fattening. But, the toxicity due to overdose is very rare since it is exist in very few food sources and its metabolism is also very slow in body. $B_{12}$ vitamin needs a carrier to be absorbed through the mucosa of bowel. The carrier is a kind of protein which highly exists in animal origin products which makes them superior in vitamin $B_{12}$ bioavailability. The richest sources are kidney, liver, fish meat, milk and dairy products and especially kefir, egg and cheese. **Very few plant origin food products are rich in $B_{12}$. One of them is the pickle of white cabbage that normally white cabbage does not contain $B_{12}$ vitamin. During pickle production, $B_{12}$ vitamin naturally forms by the conversion of other members of B complex into $B_{12}$ in white cabbage.**

$B_{12}$ daily recommend is 1.8-2 micrograms (mcg). Although it is a very small amount, very huge amounts of $B_{12}$ vitamin precursors should have been taken into metabolism to be able to reach to this amount. The reason is the very little amount of conversion of $B_{12}$ precursor, cyanocobalamin into $B_{12}$ derivatives; metylcobalamin and adenosylcobalamin. Only after this conversion, metylcobalamin and adenosylcobalamin can be absorbed and transferred into blood stream. 500 mg cyanocobalamin can produce only 1.8 mug $B_{12}$ vitamin. The most effective way to supply the vitamin is to place tablet which contains 1000 mg vitamin $B_{12}$ under tongue. The daily recommended dose in the treatment of pernicious anemia is 2000 mg of vitamin $B_{12}$ which is injected as intramuscular (into muscle). Elderly is one of the important target group which is suffered with $B_{12}$ deficiency and they should supply it as three times a day as each contains 600-1000 mg as oral (Elia, M.The Lancet. 352:1721-1722, November 28, 1998). 2000-3000 mg dose can be injected into joint (intraarthricular) as complementary to the treatment of arthritis (the inflammation of joints).

Another important application field of $B_{12}$ is for chronic fatigue syndrome. Advertisements about $B_{12}$ make exaggerations about the effects of $B_{12}$ on chronic fatigue. **Please, do not believe such advertisements because there is still no treatment of chronic fatigue syndrome!.** We still do not know the definite causative factor. $B_{12}$ deficiency is only a theory while some scientists claim that the reason is virus or bacteria and some others claim the reason as oxidative stress, toxic substances. Because we do not know the main causative agent for the syndrome, we still could not find an effective treatment for the syndrome. $B_{12}$ mega dose with the application of the concerned compounds below may somehow support the energy metabolism according to Werbah, M (2000).

Folic acid: 1-10mg/day (as long as 3 months)

$B_{12}$: 6-70 mg/intramuscular (as long as 3 weeks)

Vitamin C: 10-15 g/day

Magnesium: 600 mg/day/ (as long as 8 weeks)

Zinc: 135 mg/day

5-hydroxytryptophan: 100 mg/3 times a day(as long as 3 months)

L-carnitine: 1-2 g /3 times a day (as long as 3 months)

Omega 3 (EPA): 135 mg / 3 times (as long as 3 months)

Note that one complication of $B_{12}$ deficiency may be Diabetes type 2. The decrease of red blood cell count enables the transfer of sufficient amount of sugar into other cells. Sugar is combusted by oxygen in the cell followed by its transfer by red blood cells. The decrease of these carriers due to $B_{12}$ deficiency can cause the accumulation of sugar in blood which can raise blood sugar concentrations.

I want to underline the important functions of $B_{12}$ and also kefir since it is rich in $B_{12}$ once more;

- It is very effective against progress and formation of neurological disorders such as amnesia, Alzheimer, Parkinson, manic depression,
- One of the reasons of chronic fatigue is claimed as $B_{12}$ deficiency,
- $B_{12}$ deficiency may cause to the formation of arthritis while megadoses can be injected into joint under the strict control of qualified doctors,
- Elderly, infants and persons who make regular sport and exercise in high velocity such as professional athletes need more $B_{12}$ and can supply from kefir,
- Cheese, liver, kidney, kefir, white cabbage pickle, egg and fish meat are the richest sources of $B_{12,}$
- You can obtain $B_{12}$ production in white cabbage by pickling white cabbage yourself at home.
- Two important application fields that seem very complementary to the treatments and recoveries are anemia and chronic fatigue.
- $B_{12}$ participates for both the production of myelin coat of nerve cells and production and proliferation of blood cells while folate and folic acid only participates in enzyme production which is required for blood cell production and proliferation.

# FIBROMYALGIA AND FOOD

Fibromyalgia (FM), although not completely a correct definition, is the inflammation and defect of muscle cells with joints. I want to underline that it is not completely correct definition since the correct and complete definition of the disease could not still be made because causative agents are still not known definitely due to many causative factors for the disease. There are many theories as related to the formation of the disease but the main mechanism to cause the progress of the disease is still not known. First, I want to share the most common and accepted theories which are also supplied by scientific findings as related to the causative agents of the disease.

One of the most important causative agents of FM is claimed as heavy oxidative stress. I have tried to present many adverse effects and important roles of heavy oxidative stress in many important metabolic diseases and disorders in many parts of the book. Heavy oxidative stress depends on many factors but life style and nutrition style, especially the foods we consume act very importantly in increasing oxidative stress. Some nutrients; fats and oils and also sugars, in case of their excess intakes, are combusted by oxygen in cell which results in energy production but also free toxic peroxy radical compounds form at the end of this important biochemical reaction. One of the most accepted theory is the defect of muscle cells which may be due to the mechanical pressure of free toxic peroxy radical compounds. The excess amount of fat and oil rich food consumption increases oxidative rate and the production rate of free toxic peroxy radical compounds. They accumulate around membranes of muscle cells and make a mechanical pressure on cell membranes of muscle cells. This pressure can defect muscle cell. Fibromyalgia sometimes form as a natural result of these defects on muscle cells. Therefore, the protection of muscle cells against harmful effects of free toxic peroxy radical compounds can protect these cells from defects and can be protective against fibromyalgia (FM). **If FM is already exist, you should remember that there is no definite treatment of the disease yet and the restriction of fat and oil consumption, the inhibition of oxidative stress and decrease in free toxic peroxy radical compound concentration in metabolism can not heal the wounded and defected cells but can slow the progress of FM.** The most common mistake about nutrition and food today is misinformation and fallacies which give people hope that some people and some diets claim to treat the disease such as cancer and FM with only some food and food products. Of course, they make money and they do this to make money. Most of the solution is medical treatment under strict control of doctor which I always want you to remember. All of us want to get better with the consumption of one food or some foods or some herbals and get rid of cancer or Multiple Sclerosis but unfortunately, we still could not manage to find out what are these foods or herbals. But, what we know is that every food can contribute to the treatment of the disease or disorder, can complete the effect of medical treatment and can enhance the beneficial effect of the treatment while many foods can inhibit and decrease this effect. Therefore, knowing 'which foods should be consumed more and which foods should be avoided' is the main matter for consumer. Otherwise, you can trust to many advertisements and fallacies and exaggerations that this food or that herbal will cure your disease. But, at the end of these trials, you will not have got any effect. Your feelings and hopes will be exploited. Especially if you are the one who suffers with cancer, multiple sclerosis, diabetes or any other important metabolic disease, you are already ready to be exploited. You will always think that food consumption even it is too exaggerated or is a complete fallacy; at least it will be a hope for you. But, this kind of approach will not only

exploit your hope and feelings but also give too much damage to food science and technology and the science of clinic nutrition. This type of approach has been decreasing reliability of these sciences today more than ever.

The reason to point out the item above is that I want you to know that FM is a kind of disease which has got no definite treatment in medical platform. Therefore, nutrition or herbal remedies also can not do anything. But they can slow the progress of FM, decrease its severity and enhance the effect of medical treatment. If you can keep my advice and apply them to kitchen and nutrition style immediately before being suffered with FM, you can be protected against the disease. The first rule in the protection or contributing to medical treatment is fat and oil restriction since they can produce huge amount of free toxic peroxy radical compounds which can accumulate around the membranes of muscle cells and wound them. Less fatty and oily and also less sugar rich product consumption will always be protective or helpful to the treatment in FM.

Fat is not only effective and causative factor by producing free toxic peroxy radical compounds and defecting muscle cells via to it but also especially omega 6 fatty acids opposite to omega 3 fatty acids can cause directly FM. Omega 3 fatty acids as I mentioned in many parts of the book have got many important beneficial effects on metabolism and these fatty acids sometimes may be protective against many diseases and disorders such as cardiovascular diseases, stroke, diabetes and cancer. These fatty acids inhibit prostaglandines E type 2, the hormones which are harmful for metabolism. Prostaglandin E type 2 hormones produce some toxic and harmful cytokines, special protein compounds, such as leukotrienes, interleukines, TNF which cause platelet aggregation, increase in vascular permeability, leucocyte penetration onto tissue. Briefly, these hormones form an allergy or allergic reaction while increasing the severity of inflammation and also may cause cancer by increasing TNF (Tumor Necrosis Factor). Omega 3 fatty acids in case their regular consumption; inhibit Prostaglandin E type 2 hormone production and their harmful cytokine production. Omega 3 fatty acids may decrease oxidative stress on muscle cells and the severity of inflammation by decreasing and inhibiting harmful prostaglandin type 2 hormones while increasing the production rate of beneficial prostaglandin type 1 hormones. These hormones inhibit harmful cytokine production, decrease the risk of penetration of leucocytes into tissue, prevent calcification in vessel, decrease TNF and decrease the risk of cancer by decreasing TNF. Briefly, the domination of omega 3 fatty acids can decrease free toxic peroxy radical compounds by inhibiting oxidative stress. The more you can dominate omega 3 fats in your kitchen and life style, the more you can protect your muscle cells and muscles against inflammation, against inflammatory effects of prostaglandin E type 2 hormones. Controversially, the domination of omega 6 fatty acids causes an inflammation or may have got many inflammatory effects on metabolism including muscle cells. You have to protect your muscle cells against inflammation in FM. You have to know that your muscle cells are somehow defected and under the effect of inflammation in FM and thus they have got no tolerance to inflammation any more. In other words, they show no tolerance to the inflammatory omega 6 fatty acids and omega 6 rich foods. Perhaps, a healthy person can tolerate and can inhibit these types of inflammatory reactions and can make a protection against inflammation and harmful cytokine attack but it is very difficult and sometimes may be impossible for a person who suffers with FM. Therefore, FM kitchen should always be restricted in fat, oil and sugar, but also be dominated in omega 3 and be omega 6 free. I want to remind you the rich sources of omega 3 foods once more that they are; fish meat, strawberry, nuts (they should be consumed up to an extend as less than a handful daily since nuts are

also very rich in omega 6 which is always neglected by media to inform public), spinach, bitter chocolate and flax seed. The omega 6 food sources are fried products, chips, crackers, nuts, red meat and its products such as salami, sausage, pastrami, fast food, canned products, poultry, egg and egg products. Once more, we face with the same conclusion; heavy consumption of plant origin products such as legumes, vegetable, fruit, cereal, fish meat while decreasing consumption rate of fried products, chips, crackers, nuts, red meat and its products such as salami, sausage, pastrami, fast food, canned products, poultry, egg and egg products. The mentioned nutrition type is also ideal for FM.

FM is an allergic disease although it is not properly defined yet. We still do not know the causative agents which cause the disease since there may be many factors that can contribute to the disease. But what we should definitely know is that it is an inflammatory disease which means that your body shows a reaction or a series of reactions to the allergic substance whatever that is; bacteria, virus, yeast, mold, a food substance, a molecule in the weather, gas, toxic particle.. .Therefore, the guy who suffers with the disease should try to eliminate all allergens. But, allergy shows difference from person to person that, there are foods and food products which do not make allergy in some metabolisms while producing very hard allergic reactions in other bodies. Thus, you have to know which foods cause allergy in your metabolism and which foods do not. Then you can eliminate and do not consume these allergic foods and may protect your muscle cells against these allergic reactions. Your body should be your laboratory. No one can say you which food is allergic food for your metabolism without making allergy tests because only your body and your metabolism knows it. Some foods which are allergic for others may not be allergic for you while opposite is possible. But, there are some foods that many metabolisms show allergy to these foods. They may be defined as critical allergic foods. One of them is gluten. Gluten is a protein which exists in cereals especially in wheat, malt, barley and bulgur. Thus, flour and flour rich products are always rich in gluten. Gluten is detected to cause pain and also allergy in muscles in some metabolisms. Test your body. If it shows allergy and pain to gluten, stop the mentioned cereals and cereal added product consumptions. **Note that milk and dairy products, meat and its products, rice and rice by products, vegetables, fruits and nuts are lower in gluten risk.**

Trans fat is also claimed to cause allergic effect on muscle cells. These fats can directly wound muscle cells. Plant origin oils which are consisted of unsaturated fat combinations with three value alcohol glycerin were very popular until 1990s since they are free of cholesterol. People who wanted to be protected against cholesterol risk, cardiovascular diseases and disorders such as hypertension and cardiac failure preferred to consume oils because they are plant origin and therefore they are free of cholesterol. Scientists and producers wanted to solidify oils and treated them with hydrogen gas. Hydrogen gas saturated unsaturated bonds of fatty acids in oils and made them solid. Unfortunately, the solidified and saturated fatty acids by the effect of hydrogen gas were no more healthy unsaturated or saturated fatty acids. There was a radical change because of the position of carbon and hydrogen atoms with their bonds. The new formed saturated fats which are called as 'trans fatty acids' were going to go to the inner layer of blood vessels, bind them and decrease diameter size of vessel. Other words, their atherosclerotic (calcification) effect was greater than cholesterol and bad cholesterol. Finally, these trans fatty acids were discovered with their new hazardous effects such as cancer, inflammation and allergy. The richest source of trans fatty acids is margarine and it should be definitely avoided in a healthy kitchen, nutrition style including FM. Margarine today is very low in trans fatty acids by using new margarine

production technologies but they are completely saturated fats and saturated fats are also very harmful like trans fatty acids. Saturated fats can be converted into cholesterol by liver and they are claimed as allergic and inflammatory on muscle cells in the case of their accumulation around muscle cells.

Garlic and onion should be dominant in kitchen for FM since both have got rich amounts of sulfur, sulfothiosynate and sulfoooxide. These compounds are antiviral and antibacterial, other words, they kill virus and bacteria. I had mentioned that FM is not a well defined disease since there may be many causative agents some of which are bacteria and virus. Thus, garlic and onion may be helpful for inhibiting viral and bacterial activity and boosting immune system in FM.

Always prefer alkali foods rather than acid foods. Flour and flour added products, meat and meat products, milk and dairy products, egg and egg added products, fast foods, nuts and some citrus fruits are rich sources of acid. Because they are rich of complex sugar and glucose and glucose is converted into lactic acid which increases the acidity of blood. High acidity in blood also defects muscle cells, wound the membranes of these cells. Therefore, acidic foods should be avoided especially in metabolism suffered with FM, but avoidance of these foods is also very helpful in protection against many diseases and also has got a very important antiaging effect. Note that sour and acidic (citrose) foods are rich in vitamins A, B and C which are strong antioxidants that decrease sugar and lactic acid levels in your body. The consumption ratio of the mentioned foods should increase in the disease.

Many food additives can defect cell membranes of muscle cells and trigger the severity of FM. Some of these agents are nitrate and nitrite. Nitrite and nitrate are antibacterial which kill *Cl. Botulinum*, an important food poisoning agent in sausage, salami and canned meat products. Nitrite and nitrate also kill many other bacteria species and therefore widely used especially in canned food and meat technology to extend shelflife by killing important food poisoning and food infection agents. Also, both additives extend the shelf life of the desired red meat color while giving flavor and aroma to food product. These additives also improve texture. But, they form nitrosamine compounds with proteins followed their consumption in stomach and in the cavity of intestine. Nitrosamines are proven as carcinogen and especially regular consumption of nitrite and nitrate added canned and meat fermented products are claimed to closely be linked in various cancer of colon, intestine, rectum, stomach, anus, pancreas and kidney. Nitrosamines can also wound the membranes of muscle cells while increasing cancer risk in gastrointestinal origin. Nitrite and nitrate added foods such as pickles, meat products namely salami, sausage and canned products should be very limited in kitchen and life style for not only FM, but also for healthy aging and life style.

Magnesium, calcium, B complex; these minerals and vitamins should be dominantly supplied for FM. But, I have to underline the protective effects of these vitamin and minerals rather than their treating effects. As I mentioned previously, there is no treatment or cure for FM. But, the deficiencies of the mentioned minerals and vitamins can lead to FM like the domination of omega 6 fats in consumption can cause FM. In case of formation of FM, during the disease, the supplementations of these minerals whether in tablet form or in food form, can not cause recovery. They can only slow the progress, protect body from a new progress of FM. Briefly; these supplementations are required as protective and complementary to the medical treatment at the background. Do not forget that magnesium and

calcium are the most important two minerals for muscle cells. These two minerals help for the muscle relaxation and contraction that these movements are always difficult in FM. The stress factor such as humidity, sound, microorganism, defect, mechanical pressure, vibration, heat and many other stress factors affect the membrane of nerve cell and cause change in the positions of positive and negative ions. Negative and positive ions change their positions through the cell membrane and this exchange form electricity. You will remember from the related part that I had described human beings and other living animal creatures as bioelectrical. The electricity causes new electricity formations while it goes further through the cells and each unit of electricity passes to the next muscle cell by the secretion of an electric conveyor, acetylcholine. Electricity makes entrance into muscle cell and reaches into sarcoplasmic reticulum of muscle cell and release calcium from muscle cell. Calcium release makes the gap between thick and thin muscle fibers lubricous so that they can contract over each other. Contraction can only form when calcium is released into muscle fibers. What we know about calcium is only that it is an important structural mineral for bones but many of us do not know that every contraction and relaxation of our muscle fibers can only be possible by this mineral. The calcium release into muscle fibers decomposes the bridge between energy source ATP and magnesium and magnesium and ATP becomes free. Then, free ATP is used as energy source in the contraction of the concerned thick and thin muscle fibers. Magnesium deficiency does not make ATP free and energy for muscle relaxation and contraction can not form. In conclusion, both calcium and magnesium are vitally important for muscle cell contraction and relaxation. Do not forget that calcium and magnesium supplementation in huge amounts can not recover FM but normal amounts can help for muscle functions which are already impaired in FM. Making ATP free, the transfer of electricity through the membranes of the cells, muscle contraction and relaxation and the biochemical reactions which are required for all these actions are made by using energy. Energy is produced from nutrients via to the combustion of fats, oils and sugars by the effect of oxygen in each cell which is regulated by enzymes. Members of B complex such as $B_1$, $B_2$, $B_3$, $B_5$ and $B_{12}$ enter into the structure of these enzymes which are required for energy production. In the case of B complex deficiency, these enzymes can not be produced and energy can not be produced as in desired amounts which may result in chronic fatigue. Chronic fatigue and energy depletion is always a problem which is greatly caused by B complex deficiency. In most of FM cases, chronic fatigue exists and many patients suffered with FM complain for chronic fatigue. B complex rich food nutrition can be helpful. Similarly, magnesium also enters into more than 300 enzymes which act importantly in energy production. This mineral is therefore called as energy giving mineral. I want to underline that the B complex rich nutrition in plenty amounts will not make you more energetic. Only an important risk, chronic fatigue, which always accompanies with FM, may be complicated in case of its deficiency.

I made a brief indication as related to the importance of harmful effects of free toxic radical compounds and heavy stress in FM. Free toxic peroxy radical compounds effect muscle cell membranes adversely, can wound them and can make the situation worse in FM. You can inhibit heavy oxidative stress and the risk of harmful effects of free toxic radical compounds in the kitchen for FM by increasing the consumption rate of antioxidant rich foods. How can you understand that a food in the market during your marketing is rich from the point of antioxidant?

**There is a very practical way to predict the food which is rich in antioxidant capacity. All green leafy vegetables, green colored fruits and vegetables, yellow, pink, red colored fruits and vegetables and legumes are rich in beta**

**carotene and vitamin A. Additionally, citrus fruit which are sour in taste and juicy are rich sources of ascorbic acid, other words vitamin C.** Many of us do not want to consume sour citrus fruits and tend to buy and consume sweeter ones which are more maturated. Citrus fruits are sour due to their ascorbic acid (vitamin C) content but it becomes sweeter when they mature because of the increase in glucose and decrease in ascorbic acid concentration. Briefly, **sour taste is a great indicator for the high content of vitamin C in citrus fruits. The point I am trying to mention is actually very important since there is a way for you to supply great amounts of antioxidants as long as you tend to buy dark green leafy vegetables, red, pink, yellow and green colored vegetables, fruits, legumes, sour and juicy fruits. I know that many of us do not want to consume sour citrus fruits because of their sour taste but do not forget that the more you prefer sweet foods other words sugar rich foods and candies, the faster you will get older and the more you prefer sour foods, the healthier and later you will get older while you will be much more resist to diseases and disorders.**

**Why citrus fruits which are more sour in taste helps for healthy aging and boosting immune system?.** First, they are richer in vitamin C (ascorbic acid) as I indicated above vitamin C is a great antioxidant. It is an organic acid and it is the main causative factor for the sour taste of citrus fruits. Greater acidity or sour taste is a clear indicator for greater amount of vitamin C existence in citrus fruits. Sweeter taste rather than sour is the indicator of glucose increase and vitamin C decrease in the concerned food. That is why; we should be used to preferring citrus fruits, more sour citrus fruits and consume them more and more all through our life. Many of us know vitamin C as only an antioxidant and important in boosting immune system. I indicated its various important beneficial effects in the related part but because of its importance in nutrition for FM, I want to indicate the beneficial effects of the antioxidant once more. Vitamin C is not only an important antioxidant which boosts immune system, decreases oxidative stress and the production rate of harmful free toxic peroxy radical compounds but also it decreases cholesterol and bad cholesterol, increases the protective barrier, glutathione, around cell membranes. The increased glutathione around the membranes of muscle cells is deathly important for the protection of muscle cells in FM and also other diseases and disorders. Trans fatty acids, saturated and unsaturated fatty acids, cholesterol and bad cholesterol, homocystein, allergens, carcinogens, salt, sugar, polycyclic aromatic hydrocarbons, nitrite and nitrate, sweeteners such as Aspartame, Acesulpham K, many of which come from food consumption, accumulate beyond the membranes of cells including muscle cells. Even the excess amount of vitamin C itself and calcium can accumulate around cell membranes in case of their consumptions in abnormally high amounts. They make mechanical pressure against to the membranes and can wound membrane of the cell many times. Wounded cells are the main reason for aging since these wounded cells form wounded tissues and they cause organ failures. Such defects on cell membranes due to the free toxic peroxy radical compounds and all other mentioned harmful agents can result in renal failure, cardiac failure, liver failure, stroke and many other life threatening diseases and disorders. For all these reasons, protection of cell membranes against the harmful effects of the mentioned harmful agents is not only important in FM but also in healthy aging and in all kinds of metabolic diseases and disorders. Increasing the antioxidant protective layer around cell membranes and muscle cell membranes may not recover FM as I already mentioned that there is no turning back to the beginning and a complete recovery in FM with our present data. But, you will be able to protect the other healthy muscle cells against harmful effects and defects of harmful compounds by increasing the protective layer (glutathione) concentration around cell membranes. This approach may enhance healing

effect of medical treatment while slow the progress of FM. Vitamin C is one of the greatest antioxidants which increase the protective antioxidant layer, glutathione concentration around cells. Another important nutrient compound group is omega 3 fatty acids that these fatty acids also increase glutathione concentration while many other fatty acids whether saturated or unsaturated can accumulate around cell membranes and defect cells. Remember that you have not got too many alternatives as protein sources in high quality since many animal origin food products are rich in cholesterol, bad cholesterol, trans fat, saturated and unsaturated fat which all defect muscle cells and can decrease the healing effect of medical treatment in FM. It is impossible to separate closely integrated fat from red meat and red meat products such as sausage, salami, pastrami or milk, yogurt and cheese. In fact, milk and dairy products have got much more advantage at this point since the fat in their structure can be separated prior to the diary production. You can consume low fatty milk and dairy products but unfortunately, it is impossible for meat and meat products. I never recommend you the consumption of dietetic meat products since they are added Aspartame, Acesulpham K and some other sweeteners which have got carcinogenic effects and also the same types of food additives were claimed as destructive on muscle cells. That is why these types of dietetic meat products should also be avoided in FM. **So, what should be the main high quality protein source in FM?.**

The answer for the question above is first, fish meat proteins and second, whey proteins. Fish meat is not only rich in high quality proteins and all essential amino acids but also $B_{12}$ vitamin, folate and folic acid, calcium, high quality iron, fat soluble vitamins A, D, E and K. Note that the rich existence of fat soluble antioxidants A, D, E and K and folate and folic acid, $B_{12}$ vitamin, magnesium, zinc and selenium creates a great antioxidant capacity and can protect your healthy muscle cells against harmful effects of the toxic agents and free toxic peroxy radical compounds. As I mentioned in detail above, omega 3 fatty acids are rich and closely integrated with fish proteins. These fatty acids, opposite to the other saturated and unsaturated fatty acids, can contribute to the healing effect of medical treatment since they increase the protective layer around cell membranes. Whey proteins, cheese water or yogurt water proteins also increase glutathione around cell membranes and muscle cell membranes. You can cook cheese water or yogurt water in a pan and soon you will see the formation of a special cheese which is whey protein itself. You can also buy this cheese in market. Do not forget that you can also enhance the absorption of low quality iron through the wall of intestine by lactopherrin of whey while you can boost your immune system against diseases by alpha lactalbumin, immune globulin and beta lactoglobulin in whey. The third alternative protein source may be the low fatty milk and dairy products. Do not neglect to consume plenty amounts of low fatty milk and dairy products since they are rich in calcium and magnesium which can support muscle relaxation and contraction while supporting electricity transfer through muscle and nerve cells during FM.

Free toxic peroxy radical compounds, saturated and unsaturated fatty acids, homoscytein, trans fatty acids, nitrite and nitrate, allergen and carcinogens, excess of salt and sugar and many other harmful compounds can only be excreted out of metabolism by the means of urine. Urine is produced by water. You have to consume 2 L of water minimum daily and you should never neglect to consume it. Otherwise, some of these harmful compounds can immediately find an opportunity to accumulate and increase up to high concentrations in tissues, blood and around muscle cell membranes and can worse the severity of FM.

In addition to water consumption in plenty amounts, you can benefit from fresh fruit and vegetable juices. **Especially, vegetable juices seem advantageous since it is richer in fiber than fruit juices that less glucose is absorbed from vegetable juice. Other words, fresh vegetable juices are in less oxidative stress and therefore higher in antioxidant capacity.**

Avoid from the consumption of orange and lemon that although they are great vitamin C, magnesium, fiber, beta carotene, vitamin A and B rich foods, they are too much acidic fruits. There is some important scientific evidence which claims adverse effects of the two fruits in FM. Instead, prefer much more alkali foods such as kiwi, papaya, apple, peach, apricot, pineapple.

In spite of rich beta carotene, vitamin A, B, C, folate, folic acid and fiber content of Broccoli and Brussels sprout, the two vegetables can cause allergy in some persons. Test your body and understand whether the two vegetables are allergic for your body or not, before including them into your daily diet.

Proantosyanidin supplementation is also helpful in enhancing the healing effect of medical treatment in FM. Proantosyanidines are isoflavones, the biochemical agents that dilute blood, decrease cholesterol and bad cholesterol, inhibit the harmful prostaglandin E type 2 hormones and allergy. These isoflavones also increase glutathione around cell membranes, muscle cell membranes and protect them against harmful effects of free toxic peroxy radical compounds and other toxic agents. **Resveratrol is another isoflavone which is 20 times richer than vitamin C and 50 times richer than vitamin E in antioxidant capacity. It has got similar beneficial effects. Resveratrol and proantosyanidine rich sources are purple grape, grape, raspberry, cranberry and strawberry.**

Probiotic added and probiotic rich foods such as regular consumption of yogurt and kefir after very long time periods may be helpful in enhancing the beneficial healing effect of medical treatment. I want to remind you the same thing that you can remember it from the related part about probiotics. Probiotics are beneficial, non pathogen microorganisms which consume excess amount of salt, fat, trans fat, homocystein, allergen, sugar, carcinogen and many harmful compounds in the cavity of intestine and decrease the absorption rate of these harmful compounds into blood stream. Therefore, they may be protective against many important metabolic diseases and disorders such as cancer, diabetes and inflammation. Inflammatory agents which defect muscle cell membranes can also be consumed by probiotics in stomach and intestine cavity and their entrance into blood stream from intestine can be interrupted by probiotics. But, you should consume them for long time periods such as three-four years. Only after these long years, they can proliferate and be dominant flora in the cavity of stomach and intestine and show their protective and beneficial effects. The long run consumption of a dairy product with its rich probiotic content will not only bring you the protection against inflammation and FM, cancer and diabetes, but also it will help for healthy aging and boosting immune system with their calcium, vitamin $B_{12}$, magnesium and vitamins A, D, E and K. For example, yogurt is a kind of food product which should be consumed regularly without a day missing all through life to be able to benefit its anti-inflammatory effects against inflammation and FM with its rich probiotic and antioxidant content.

S-adenosylmethionine is used for the treatment of liver diseases especially during recovery from cirrhosis and liver failure. But, it may have got side effects and it should be prescribed by your doctor. This supplement may also be helpful by cleaning up your liver tissue which detoxifies many of harmful compounds. Liver health should not be neglected in also FM that your muscle cells can only be protected by liver which detoxifies all toxic compounds in your body. Sulfur rich foods can help to the detox process of liver by supplying sulfur. Sulfur rich foods such as broccoli and Brussels sprout (if they do not cause allergy in your body), garlic and onion, celery, artichoke, mushroom, apple, spinach, cauliflower and white cabbage should be consumed in plenty amounts. Also, selenium is a great antioxidant which can protect muscle cells against harmful inflammatory effects of free toxic peroxy radical compounds and other harmful compounds. This mineral as 200 micrograms daily can be supplied to support immune system in FM.

$B_{12}$ vitamin as combined with magnesium sulphate combined injections as intramuscular can be helpful since they are utilized by muscle cells in muscle metabolism.

Bromelain is a strong antioxidant and may be helpful in protection of muscle cells against free toxic peroxy radical damage. Bromelain rich sources are pineapple and onion. If you are the one suffered with FM, plenty amounts of onion and pineapple consumption regularly can decrease your oxidative stress and can protect your muscle cells against the harmful effects of free toxic peroxy radical compounds.

Unfortunately, many patients suffered with FM tend to use Coenzyme Q10 tablets to be able to increase their energy production. Coenzyme Q10 is an enzyme which exists in each cell in our body. But, the additional intake of the enzyme as in tablet form or by the means of food consumption can not increase your energy. Also, many people prefer to consume vitamin tablets to be energetic. As I mentioned in many parts of the book, no vitamin or enzyme tablets that you will administer can increase your energy production rate. Only, the deficiency of vitamins and enzymes can decrease energy but excess intake of them can not. Uncontrolled supplementation and overdose can result in various and serious side effects in your metabolism. All scientific researches claimed that **Coenzyme Q10 intake does not increase energy although its deficiency results in fatigue.**

FM is not known in detail with its formation but many causative agents to cause the disease are well introduced. The most important and initial cause which causes FM is the excess amount of oxidative stress and excess amount of free toxic peroxy radical compounds as I indicated above. Therefore, person suffered with FM should dominate antioxidant foods in kitchen and life style. While doing this, oxidant foods should have been limited and avoided as much as possible. These are;

- Plenty amount of tea and coffee consumption.

- Alcohol and alcohol added products that I want to remind you once more. Alcohol is a great calorie producer and you can not eliminate the calorie of alcohol very easily, so it accumulates in body. Finally, this excess calorie is converted into fat and cause fattening. Fat deposits in body can worse the progress of FM since fatty acids separated

and transferred into blood stream can be oxidized in blood and cells to form free toxic peroxy radical compounds. Oxidative stress increases with the increased amount of free toxic peroxy radical production which defect muscle cells. A metabolism in FM can not show more tolerance to the defects of muscle cells caused by fat and free toxic peroxy radical compounds. Alcohol is also toxic for liver that your body and metabolism will be protected against all types of mentioned inflammatory and allergic compounds and free toxic peroxy radical compounds by liver. Your liver health will also be important during FM, perhaps more than ever. You can not take a risk to give harm to your liver tissue with alcohol and alcohol added products.

- Nicotine and smoking. Always remember that nicotine defects muscle cell membranes directly, but there are more than 500 toxic peroxy radical compounds in smoke of cigarette. Therefore, no need to consume fatty, candy foods that will produce free toxic proxy radical compounds in your body, followed by combustion by the effect of oxygen because cigarette smoke will already have got free toxic peroxy radical compounds. Even though you do not smoke, if you are near a person smoking, you will have taken into your body more than 500 free toxic peroxy radical compounds and defected your muscle cells with them.

- Less amount of water consumption than 1.5-2 L/day will always help for increasing heavy oxidative stress and its harmful effects.

- Excess amount of salt and sugar use in diets, meals and life style.

- Nitrate and nitrite added foods; ready eat soups, packaged foods such as chips and crackers, meat products such as salami and sausage, canned food products, salad dressings.

- Lack of sport and exercise.

- Excess amount of sport and exercise in high velocity.

- Fatty foods, excess amount of fat addition into foods and recipes during their preparations, fatty milk and dairy products, fatty milk and dairy products.

- Too much candy consumption, sweeties, consumption of excess amount of sugar and sugar rich products such as pasta, cake, macaroni, bread and flour added products.

- Margarine use in kitchen and in the preparation of foods.

- Poor nutrition in vegetable and fruit origin.

- Omega 6 rich food nutrition; fast food, nuts, fried foods, fast food, meat and meat products, fatty milk and dairy products.

**Also use frying oil only once and never use them twice since they can form some carcinogen and inflammatory agents in the next frying processes. Do not consume ready to eat and processed products. Rather than, prefer natural foods. Dominate kitchen with citrus fruits, fresh fruits and vegetable, fish meat, whey proteins, water, legumes while avoiding from lemon and orange. Take stress under control by social activities, music, sport and exercise, avoid from overcrowded places, avoid from smoke of cigarette and air pollution.**

# CALCIUM AND MAGNESIUM AGAINST OSTEOPOROSIS, OSTEOMALACIA AND CALCIUM RICH FOODS FOR BONE AND MUSCLE HEALTH

Calcium and magnesium are both required for muscle contraction and relaxation and also bone density. A 70 Kg person requires 1 g (1000 mg) daily calcium requirement. 98% of calcium is deposited and utilized in bone, 1% exists in teethes and 1% exists in the cell. Calcium in cell is utilized in enzyme production and enters into the structure of coenzyme parts of enzymes. Therefore, calcium is not only a structural mineral, but also acts importantly in energy production and metabolic activities by entering into the structures of enzymes. Calcium is also required for clotting process. Scar formation which blocks bleeding is formed by fibrin; the special protein components which are activated by calcium. Briefly, calcium is also required to stop bleeding by forming scar and clotting. Two hormones act importantly to regulate calcium absorbance through bowel mucosa and its excretion by the means of feces and urine. They are parathyroid and calsitonin. Parathyroid hormone is secreted by parathyroid gland and increases calcium concentration in blood by inhibiting kidney activity. In case of calcium excess in blood, calcitonin interrupts the entrance of calcium from bone into blood, also increases the activity of kidneys and increases frequency of urination and decreases calcium concentration in blood.

Calcium rich foods are one of the fundamentals of healthy life style and nutrition since calcium is one of the most important structural and functional mineral of body. Dental health, bone and muscle health, a healthy clotting function and cardiac health, all needs sufficient amounts of calcium.

Many people remember calcium for only bone health. Most of us know that calcium is the structural component of bone and insufficiency of the mineral results in weak and porous structure of bones which is always liable to fractures and defects. The decrease in bone and the weak and porous structure as a result of low bone is called as osteoporosis. As a result, bones with their weak and porous structures are more liable to fractures. Naturally, the thinner these walls, the easier the fractures and defects in bone may be. That is why, until 30s, you should consume plenty amount of calcium rich foods as much as possible and you have to deposit more and more calcium in these walls. The thicker these walls due to calcium deposition, the more resist and dense the bones will be against defects and fractures.

Calcium can only be bound to the surface of bone until 30s because bone cells are still young to be able to bind calcium from blood on the surface of bone which are called as osteoblast. Aging after 30s decreases the concentration of osteoblasts, young bone cells, which are naturally converted into mature cells, osteocytes, which have got no calcium binding capability. But, this does not mean that there will be no need to calcium intake into body by the means of calcium rich foods any more because of the loss in calcium binding capacity. Calcium is not only required for bone, but also for muscle relaxation and contraction. Thick and thin muscle fibers can slide on each other by the means of calcium. Calcium release into the gaps between thin and thick muscle fibers makes these gaps so lubricous that these fibers can slide over each other and leave each other. If you still insist on not taking calcium after 30s like you did before 30s, this

time, muscles require and supply it from muscle calcium deposits. As a natural result of this, both muscle and bone calcium reserves will have been depleted. This point is the most dangerous one since both muscles and bones decrease in volume and strength and the severity of osteoporosis increases. In conclusion; you have to consume calcium rich foods in all periods of life for protection against both osteoporosis and osteomalacia (weakness and liability of both bone and muscle to fractures and defects).

Calcium rich foods are milk and dairy products such as yogurt, drinking milk, kefir, cheese, ice cream and desserts in milk origin. Also, dark green leafy vegetables such as broccoli, spinach, Brussels sprout, purslane and cress are the other calcium rich sources. But, like higher quality proteins of plants when compared with proteins in plant origin, calcium quality of animal origin is also superior to plant origin. Because, fibers and fiber like substances bind calcium and decrease its absorption level through bowel mucosa. That is why bioavailability of calcium in plant origin is always lower than animal origin. Phytat and phytic acid in wheat and many other cereals, oxalic acid and salisilic acid in green leafy, oxalic acid in chocolate and cocoa, caffeine in coffee and tannin in tea decrease bioavailability of calcium by binding it. Similarly, nuts are rich in calcium but phytic acid, phytat, oxalic and salisilic acid in them bind calcium and decrease calcium bioavailability. Alcohol and nicotine directly bind calcium. Nitrate and nitrite in fermented meat products such as sausage and salami and also canned products bind calcium and decrease its bioavailability. Here, the most important point you have to remember is that first, consume your calcium rich foods in high quality such as fish meat, red meat, milk, yogurt, ayran, kefir, ice cream, cheese and wait for awhile like 2-3 hours. This period will able to complete calcium digestion and absorption through bowel mucosa and its transfer into blood without the risk of binding by fibers. Then, you can consume fiber rich foods such as tea, coffee, chocolate, cocoa, salad, fruit and cereal. But of course, this advice may sometimes be not practical since meat and salad, fish and rocket are always presented as perfect combinations in taste and aroma. But other times, you can separately consume them as much as you can at home conditions. At least, you can drink tea and coffee or consume chocolate or cocoa added desserts and cakes, not just after meals but 2-3 hours after meal times.

One of the important mineral which enhances calcium absorption and its bioavailability is phosphate. The ratio of them should be 1/1. Otherwise, less or higher ratio of phosphate can decrease calcium absorption and its bioavailability. If you want to supply calcium tablets, you must pay attention to see phosphate and its ratio to calcium. Prostate and colorectal (both colon and rectum) cancer, kidney stones, premature pregnancy, calcium poor nutrition, menopause and premenstrual syndrome, osteoporosis and dental diseases, depression, coronary diseases, cardiac failure and hypotension can cause calcium deficiency.

Calcium excess can form during degenerations of joints and vessels, calcification of smooth tissues and organs, hypertension and stroke, chronic fatigue, some of diseases in gastrointestinal origin and excess of low density lipoprotein (bad cholesterol). The most important adverse effect of calcium excess is the decrease in the absorption level of vitamin D through bowel mucosa. Vitamin D deficiency due to calcium excess is especially important since it can increase the liability of body to cancer because of important anticancer effect of the vitamin.

Another important mineral for the absorption and utilization of calcium is magnesium. 65% of magnesium is in bone and teeth structure and the rest is in the cells, body fluids, smooth tissue and organs. Magnesium is required for protein synthesis and hormone synthesis because hormones are also produced from proteins. The main special position of the mineral is that it enters more than 300 enzymes which regulate biochemical reactions to produce energy. Therefore, magnesium is also called as energy giving mineral although it is not scientifically correct. Magnesium deficiency results in lack of energy, fatigue but excess amount of the mineral never increases energy. The excess may even result in toxicity and decrease calcium absorption and calcium deficiency. The strong relation between calcium and magnesium is due to the role of magnesium in energy production. Thin and thick muscle fibers can only bind of each other by using energy and this energy (ATP) is bound to magnesium. Only when the mineral is decomposed, ATP becomes free and can be used for muscle contraction and relaxation. In other words, energy utilization for muscle contraction and relaxation can only be possible by the means of magnesium. Therefore, magnesium deficiency results in both fatigue and also cramps. Thick and thin muscle fibers can not live each other due to lack of energy in magnesium deficiency. But, magnesium is not the only mineral which acts importantly in cramp progress. Also, calcium deficiency can cause cramps. As indicated above, calcium is released between thin and thick muscle fibers to make the gap lubricous so that these fibers can slide over each other. In the case of its insufficiency, the contraction can not be possible that is what we call as 'cramp'.

Calcium ratio should be kept as twice of magnesium and always be lower than calcium. The two minerals are especially important in cardio health that cardiac muscle beats every second, contract and relax. Each of these processes requires calcium and magnesium. Also vessel tonicity, vessel dilation and contraction are regulated by the minerals. Briefly, they are the most important minerals that regulate blood circulation and cardiac function.

Magnesium deficiency is a base to cause kidney stones. The risk of kidney stones can decrease by 400 mg magnesium oxide and 500 mg $B_6$ combined use. The deficiency of magnesium can result in kidney stone formation, but also tachycardia, cramp, chronic constipation, insomnia, anxiety and hyperactivity may accompany.

Antiacids and the use of magnesium sulphate in excess amounts can decrease the absorption of calcium, sodium, iron and potassium. The results may be hypotension, joint dysfunction, bowel and stomach problems, excessive fatigue, dizziness, dry skin, depression, nausea and diarrhea.

Calcium, magnesium, copper and chrome are the minerals that both their excess intake and insufficient intake into body can cause degenerations in tissue and organs.

Excess intake of calcium and copper can cause bleeding in brain tissue and calcification of vessels.

Many of us do not know the strong relation between calcium, magnesium and depression that deficiencies in one of them or both can cause depression. Unfortunately, many of the individuals who complain about depression are directly prescribed by antidepressants without checking magnesium and calcium levels.

Anti-clotting such as aspirin, coumadin and warfarin can cause deficiency of calcium and magnesium but it depends on the dose of anti-clotting agent.

Calcium alone as in tablet form or by the means of foods should not be alone. Magnesium, phosphate, chrome, boron, $B_6$, vitamins A, D, E, K and C increase the absorption level of calcium and increase bioavailability of calcium. Therefore, calcium and the mentioned mineral and vitamin rich foods should be consumed as combined. Calcium-magnesium, zinc-calcium, magnesium-selenium-calcium, calcium-magnesium-vitamin C-vitamin D and many other various combinations should be preferred in tablet rather than calcium alone.

In the preference of calcium tablets;

- One important factor affecting calcium absorption is how well the pill dissolves. Try buying calcium pills of US Pharmacopeia's standards. The "USP" on the label indicates that the calcium pill meets the USP standards of supplying adequate elemental calcium and how well it dissolves in our intestines.

- **Calcium Citrate:** Calcium is best absorbed in an acidic environment, hence calcium citrate is the best which has got higher absorption levels than other forms of calcium. It does not require extra stomach acid for absorption; hence we may take it any time in a day, even on an empty stomach. However, calcium citrate usually provides less **elemental calcium** per pill. Therefore, one may need to take a relatively more numbers of pills per day depending to the needs. **Cautions: people with acid-reflux may not be able to tolerate calcium citrate.**

- **Calcium Carbonate:** Most calcium pills in the market are in the form of calcium carbonate. It requires extra stomach acid for better absorption; hence it is best taken after meals. When compared with other forms, unfortunately its absorption level is especially lower than calcium citrate.

- Dolomite, Bone Meal or **Oyster Shell:** These naturally occurring calcium pills may contain heavy metal or lead. At the moment, calcium supplements are not tested by any regulatory agency for lead content. Therefore, it is best to avoid. Unfortunately, many consumers prefer this form. They think this form as natural because of the word 'oyster shell'. Others are also natural in origin but this form can only be complicated with the risk of heavy metal such as lead, also it has got lower calcium bioavailability.

- **Calcium Gluconate** and **Calcium Lactate:** These types of calcium pills contain low content of elemental calcium. Hence, one may need to take a large amount of tablets to meet the calcium requirement!

- **Coral Calcium:** A salt of calcium which is obtained from coral reefs. Many blogs claim it such a wonder, very beneficial in many diseases and disorders. Do not believe, it is not scientifically correct, this information is only a spam information!. Because, it is very low in concentrate and bioavailability. Additionally, it has got lead and heavy metal risk!

When you buy calcium supplements, ensure to look for the **elemental calcium** content, not the total content. For instance, a pill containing 500 mg of Calcium Carbonate provides 200 mg of elemental calcium. Hence, one pill in this example only provides 200 mg of calcium, not 500 mg.

It may be helpful during your marketing to remember as related to calcium that; Calcium fortified milk as 240 ml contains 400 mg Calcium; Calcium Fortified Orange Juice as 240 ml contains 300 mg Calcium; Cheese, Gruyere, as 25g contains 287 mg Calcium; Cheese, Mozzarella 25g contains 207 mg Calcium; Cheese, Cheddar, as 25g contains 204 mg Calcium; Macaroni and Cheese as 150g; 240 mg Calcium; Salmon, Canned, with bones as 75g contains 185 mg Calcium.

Here below are some of the calcium rich foods with their elemental calcium contents;

- **Yogurt, low fat, plain, vanilla, coffee, 200g; 400 mg Calcium**
- Yogurt, low fat, fruit, 200 g; 345 mg Calcium
- Yogurt, nonfat, 150 g; 200-250 mg Calcium
- Yogurt, frozen, 240 ml 240 mg Calcium
- **Calcium fortified milk, 240 ml 400 mg Calcium**
- Milk, nonfat, 1%, 2%, whole, 240 ml; 300 mg Calcium
- Cream, half and half, 1 tablespoon 16 mg Calcium
- **Calcium Fortified Orange Juice, 240 ml; 300 mg Calcium**
- Ice cream, vanilla, 240 ml; 176 mg Calcium
- **Cheese, Gruyere, 25 g; 287 mg Calcium**
- **Cheese, Mozzarella, part skim, 25 g; 207 mg Calcium**
- **Cheese, Cheddar, 25 g; 204 mg Calcium**
- Cheese, American, 25g; 174 mg Calcium
- Cheese, cottage, 2% fat, 240 ml; 155 mg Calcium
- **Macaroni and Cheese, 150 g; 240 mg Calcium**
- **Salmon, Canned, with bones, 75 g; 185 mg Calcium**
- Rhubarb, cooked, 240 ml; 174 mg Calcium
- Oatmeal, fortified 240 ml; 163 mg Calcium
- Spinach, frozen, cooked, 240 ml; 138 mg Calcium
- Tofu, firm, 240 ml; 258 mg Calcium
- Almonds, 240 ml; 92 mg Calcium
- Beans, boiled, baked or refried, 240 ml; 50 mg Calcium
- Mustard greens, cooked from fresh, 240 ml; 52 mg Calcium
- Orange, 1 medium 52 mg Calcium
- Halibut, baked, 75g; 51 mg Calcium
- Kale, fresh, cooked, 240 ml; 47 mg Calcium

- Broccoli, cooked from fresh, 240 ml; 36 mg Calcium (and also a good source of vitamin D)
- Bread, whole wheat, slice; 32 mg Calcium
- Milk (125 g): ~ 300 mg
- Yogurt (175 ml): ~300 mg
- Frozen Yogurt (60 g): ~ 100 mg
- Ice Cream (60 g): 85 mg
- Cheese is also a good source of calcium, but the amount contained in a serving depends on what kind of cheese you eat.
- If you have lactose intolerance, there are still choices in the market. You can enjoy the pre-treated milk with 99% less lactose, or consume lactase enzyme tablets or drops. And some dairy products such as firm cheese, yogurt, and buttermilk are naturally low in lactose.
- Calcium-fortified soy drink (120 g): ~300 mg
- Tofu (60 g): ~250 mg
- Canned salmon with bones (85 g): ~ 200 mg
- Canned sardines with bones (85 g): ~ 250 mg

Calcium absorption may be in low capacity in some individuals. $B_5$ (panthotenic acid) and $B_2$ (riboflavin) can be advised to enhance absorption of calcium through bowel mucosa in such individuals. $B_6$ is claimed to decrease magnesium excretion out of body and increases bioavailability of magnesium by accumulating it in blood. $B_6$ and $B_{12}$ vitamin deficiencies may result in magnesium deficiency which may be complicated with tachycardia, insomnia, chest pain, anxiety, depression, pain in joints and muscles. Vegetarianism may often appear as deficient from $B_6$ and $B_2$ vitamins because meat and meat products, egg, poultry and poultry products are rich sources of these vitamins. Hence, vegetarians especially complete vegetarians who reject meat and meat products often complain about these disorders. Boron is antagonist with magnesium and calcium and therefore excess of boron should be avoided.

Too much acidity in stomach can defect and wound the surface cells of bowel mucosa and decrease calcium and magnesium absorption through bowel. On the other hand, less stomach acidity also can not sufficiently enough to utilize calcium and this condition decreases its bioavailability.

In spite of important body functions of zinc and important benefits of plenty of zinc rich food consumption, zinc supply into body as in abnormally huge amounts can also cause harmful effects on body like hair loss, tiredness, dizziness, vomiting and nausea, necrosis in the filtering membranes of kidneys, muscle spasms, digestive problems, impotance, prostate inflammation, immune deficiency and anemia (decrease in the concentration of blood cells).

One of the most effective attacks against Influenza infections (flu) is the consumption of plenty of antioxidant rich foods. Antioxidant rich nutrition is also required for the prevention against flu. The reason is the cause of flu infections. Viruses which are smaller than bacteria cause flu infections. Unfortunately, although antibiotics can kill bacteria and cure the bacterial infections, the same agents can not be effective for virus and viral infections like flu. The only chance left to us seems to boost immune system since antibiotic or none of the similar medicines are effective for the viral infections including flu. Under these circumstances, there are very few protective actions left us to do to be able to prevent or fight with such viral infections. One is the rich antioxidant consumption and the other one is the rich fiber consumption while another is the rich fluid consumption. Huge amounts of fluid intake which may be water and sometimes may even be cola no matter how it may have got adverse effects on our metabolism, in case of flu infections, fluid consumption, may be cola or directly water, will be a mean to excrete the virus by urine out of body. Briefly, all fluids except alcohol may be beneficial includig even cola, since they will help for the excretion of the viruses out of your body by the means of urine. But alcohol can not be advised since it may cause dehydration and worse the severity of viral infection. Virus or bacteria, briefly the microorganism which causes infection make harm on two sides. On one side, they try to kill our defense cells like T cells and leukocytes and weak our immune system. On the second side, they indirectly increase the production rate of oxidation and production rate of harmful free toxic peroxy radical compounds. Briefly, our body has to make defense on two sides. On one side, the fight is directly with the viruse or bacteria species and the other fight is to reduce the increased oxidative stress and reduce the production rate of harmful free toxic peroxy radical compounds. The worse thing during the viral infections like flu is that the increase level of free toxic peroxy radical compounds can rupture the wall of immun cells and kill our immun cells, especially our defense cells like leukocytes and T cells which results in immune deficiency. For all these reasons, our body should win the fight not only on one part but on both sides at the same time. If we can manage to reduce the production rate of harmful free toxic radical production and reduce the level of oxidative stress, then we may have protected our cells from the harmful effects of free toxic radical compounds of the excess oxidative stress. **Thus, antioxidant intake should have been doubled during viral and bacterial infections. Fibers, soluble or insoluble, can bind harmful free toxic radical compounds directly and help for the excretion of these harmful compounds by the means of feces and urine. Briefly, we must succeed to boost our immune system by the means of antioxidants, fibers and fluids during infections in viral or bacterial origin.** Zinc is one of the strongest antioxidants which is claimed as one of the most effective one in viral infections like flu. Although there are some conflicting results of some researches, many of the scientific researches claim the important benefit of this antioxidant in reducing the oxidative stress and boosting immune system of the person with flu. But here, what I am trying to underline is not the medicinal effect of a mineral. Medicines are different and vitamins and minerals are different. They can never replace each other. What an antioxidant vitamin or mineral makes is the boosting or

protection of immune system by reducing the oxidative stress and the production rate of free toxic radical compounds. Unlike medicines, they can not affect the microorganism directly. I am only trying to indicate that you should never exaggerate the importance of antioxidants including zinc although they are deathly important for a healthy life style and immune system. Some of us have been using plenty of antioxidant vitamin and mineral tablets daily including zinc tablets. Always remember that both the abnormal amounts of zinc and other antioxidants can be contraindicated with some other important vitamins and minerals and decrease their bioavailability. You may face with the deficiencies of some other vitamins if you administer the huge amounts of zinc or other similar antioxidant.

If you are the one with a severe zinc deficiency, you may benefit a zinc preparate but notice to the daily required doses here below before marketing;

| | |
|---|---|
| 0-6 months; | 3 mg |
| 6-12 months | 5 mg |
| 1-10 years | 10 mg |
| 11-18 years | 15 mg |
| 18 years and above | 15 mg |
| Pregnancy | 22 mg |

Another important mineral like zinc for a healthy life style and living is potassium. I have to remind you once more that we are the creatures produced by electricity. The electricity is produced through our cell walls by the exchange of some important minerals like potassium, sodium and chlor. Sodium and chlor comes into the cell while potassium goes out of the cell membrane due to some external and internal effects such as sound, vibration, pressure and microorganism. Finally, this exchange of ions through the cell wall creates electricity and electricity arrives into brain through the nerve and muscle cell membranes. As the electricity comes into brain, many hormones are secreted and we utilize our metabolic functions. Briefly, the stimulation of brain and the hormone production by brain followed by its stimulation by electricity is the life itself and that is why we live by using electricity in our body. In fact, directly or indirectly, most of the metabolic diseases or disorders form due to the interruption or abnormality in the transfer of the mentioned electricity. For example, in case of lack of electricity transfer to brain, brain can not produce enough serotonin, the relaxing hormone and depression may form or similarly dopamine can not be produced in sufficient amounts and Parkinson disease may form. Many of the lumbar dislocations and hernia in the vertebras are also due to the abnormality in the transfer or the lack of the transfer of electricity. The potassium deficiency decreases the production amount of the electricity. Note that, potassium, sodium and chlor, the three minerals, are vitally important since the deficiency of any of them can result in the lack of electricity production in body. The decrease in electricity level naturally can not stimulate muscles, the muscles in tissues or the muscles around the joints or vessels. Thus, vessels can not be contracted and relaxed or the most important is that cardiac muscle (heart muscle) can not be contracted or relaxed due to the weakness of cardiac muscle because of insufficient level of stimulation by electricity which can even be fatal. Briefly, potassium deficiency can result in heart failure. The deficiency of potassium may also result in edema formation in body since it is one of the minerals which makes a balance between the mineral concentrations in and out of the cells. If the concentrations of

potassium out of our cells are less than the concentration of the minerals in our cells, fluid may penetrate into the cell from out to be able to decrease the inner mineral concentration and the cells swallow and may even rupture and die. Opposite, in case of potassium concentration increase out of cell, the fluid from cell into tissues begin to penetrate and fluid accumulates in tissues, forming edema. In conclusion, potassium deficiency may cause heart failure, muscle cramps, depression or any other diseases and disorders due to the abnormality in electricity transfer because of potassium deficiency or odema formation in body. One important point which I have to point out is the ratio of potassium to sodium. Although potassium is an important and essential mineral, too much potassium can easily accumulate on the walls of vessels and may cause calcification but the worse possibility is that the mineral can also accumulate on the walls of filtering membranes of kidneys. Especially, the filtering membranes of kidneys have got a strong affinity to potassium that the mineral can easily precipitate in the cavity of the filtering membranes of kidneys. The richest potassium sources especially as the ones having got the highest potassium to sodium are banana and dry bean. The ratio is much lower in celery, artichoke and spinach. Other potassium rich foods are peach, apricot, green bean, cereals, nuts, tomato, cacao, avocado, banana, cantaloupe, dried fruit, honeydew, mango, sweet potato, winter squash, seeds, nuts, molasses, pumpkin, papaya, orange, orange juice, kiwi, salt, meat, milk and their products while apple, berries, grape and their juices, mushed potatoe rather than baked, onion, bell pepper and mushroom have got lower potassium level and may be better options in kidney health. As I indicated in the part related to renal failure, the mentioned potassium should be avoided during renal failure and intensive consideration should be given to the consumption of potassium poor foods as combined with plenty of fluid intake during renal failure. Milk, poultry meat, lamb meat, egg, veal and fish meat has got 6 and 10 times more potassium than sodium. The persons with renal failure should also avoid from these foods.

Potassium deficiency shows its most important effect on vessels and cardiovascular system. As clearly mentioned above, the abnormality in electricity transfer or the lack of the transfer may cause insufficient level of stimulation of vessels and muscles by electricity. Not only cardiac spasm and failure, but also failure in blood transfer through vessels which can not be stimulated because of insufficient electricity level may form since such blood vessels can not contract and transfer enough volume of blood into brain and heart. In long term potassium deficiencies, brain and cardiac tissue (heart) may be deprived of blood and naturally energy and coma or paralysis may form. Briefly, long term potassium deficiencies may be severe and fatal. But, under normal conditions, a person with a healthy nutrition can rarely face with potassium deficiency since the potassium amounts taking into body by the means of foods are sufficient enough for metabolic functions of body.

One important item about potassium use in a healthy lifestyle and nutrition is the medicines which contain high amounts of potassium and which are commonly used for loosing weight. Potassium is diuretic meaning that it eliminates water out of body and causes dehydration. The regular use of some supplements and medicines which contain potassium to lose weight cause too much water loss from body while increasing blood sugar concentration in blood. Under normal circumstances, sodium is also excreted out of metabolism with water followed by potassium intake by the means of potassium containing medicines and preparates. Sodium is one of the mineral which decreases insulin hormone which is produced by pancreas. But, in case of sodium loss from body due to excess potassium intake, insulin can not be reduced since there is not enough sodium mineral in blood. On the other hand, pancreas continues to produce insulin and gives

it constantly into blood because of the increase in sugar concentration due to potassium and this may result in extreme decreases in blood sugar concentrations. Increase in sugar concentration (diabetes) is harmful for body since too much sugar attracts water from cells and cells lose water and become dehydrated and die. Opposite condition is also harmful and may even be fatal. Decrease in blood sugar concentration can also kill the cells since cells produce energy from blood sugar and they can not survive without energy. Briefly, both conditions, hyperglycemia (increase in blood sugar concentration) and hypoglycemia (decrease in blood sugar concentration) may cause harmful effects and be fatal in extreme conditions. Sugar is a must for the cells since it is the easiest and common energy source and this attribute is for all cells including nerves (the cells in nervous system). The extreme and constant decreases in blood sugar concentrations may defect the nerve. This is the main reason for the defects of nerve systems and some neurological disorders due to sugar and energy deficiencies. Unfortunately, it is very common among women to administer such medicines of preparates or potassium rich foods and herbals to be able to eliminate water out of body and lose weight. They should know that these applications may be harmful and may even defect the nerve system such as bulimia or anorexia which are very common disorders among women. The nerve cells should never be deprived of energy and the address is of course sugar itself, not too much but not too low. Otherwise, the nerve cells of body can not produce the energy required and may be wounded or can not repair or proliferate or live. The result may be a neurological disorder. Note that, once the nerves are defected or died, it is impossible to heal them. This is an unfortunate reality and for all these reasons, many neurological diseases and disorders take too much time to be cured and the response to the treatments in some of them seems less than expected because of the same reasons.

Another important item which should be taken into consideration is the relation between potassium and cholesterol that **potassium deficiency may cause low cholesterol concentration in blood. Sounds good, does it? I should take your attention that preference of potassium poor foods and avoidance from potassium rich foods may not only protect you against renal failure, cardiac spasm, stroke and diabetes, but also will have protected you against cholesterol and bad cholesterol risk.** If you face with a great potassium deficiency, then you may benefit a potassium supplement. Here below are the daily doses required;

| | |
|---|---|
| 0-6 months; | 90-500 mg |
| 6-12 months; | 500-700 mg |
| 1-10 years | 700-1600 mg |
| 11-18 years | 1600-3000 mg |
| 18 years and above | 2000-5000 mg |
| Pregnancy | 2000 mg |

Some women complain about regular sweating at nights. One group of the preparates is potassium and zinc containing cream preparates. Such cream products give potassium and zinc into skin and this process accumulates sodium beneath skin. Sodium attracts water and interrupts its penetration out of skin which results in the elimination of sweating problem. Unfortunately, progesterone (a hormone) and progesterone containing supplements prescribed by doctors have been very popular in this field rather than the cream products containing zinc and potassium.

# ONE OF THE GREATEST ANTIOXIDANT MINERAL; MAGNESIUM;

Magnesium exists in nature especially in soil but it is depleted by the use of potassium and phosphor by plant organism. Similarly, many procedures which are used in the preparation and preservation of foods like cooking, curing, smoking, simmering, frying and grilling also cause important amount of magnesium losses in food products. Especially, magnesium can escape into water during simmering and boiling by the effects of heat. Hence, salad mixes of fruits, vegetables or fruits and vegetables as combined without heat process gives you the best benefit of magnesium content without any loss of the mineral. I do not want to mean that you should never consume cooked meals, but what I mean at this point is the necessity of the raw salad mixtures of fresh vegetables and fruits prepared in hygienic conditions without any heat to be able to benefit the maximum magnesium content. On the other hand, cooking, simmering, grilling, briefly any kind of heat processed food preparations may increase the concentration of beta carotene, the precursor of vitamin A while decreasing the amount of calcium and magnesium. In case of fruit and vegetable consumptions as in salad forms without heat and cooked fruit and vegetable recipes can easily meet your daily calcium, magnesium and beta carotene requirements.

Diuretics and insulin treatments cause significantly important amounts of magnesium loss. Also, if you are the one who makes regular sport and exercise in high velocity, under heavy stress, in a polluted environment, then you should know that you face with magnesium loss and you should supply magnesium rich foods and sometimes magnesium tablets. Tiredness, heavy muscular activity, obesity, diabetes, insomnia, hypertension, renal disease, stroke, Multiple Sclerosis (MS), Angina pectoris, Alzheimer, Parkinson, constipation, immune deficiency, asthma, cardiac arthym, chronic fatigue syndrome, fibromyalgia, stomach and bowel disorders, muscular cramps, menopause and premenstrual syndrome, upper respiratory track infections, thyroid hormone imbalances, dental disorders, nutrition disorders like anorexia and bulimia, alcohol, nicotine, caffeine, salt (sodium) and soda are the other important factors which cause significantly important amounts of magnesium losses from body. **Soda and mineral water is richer in potassium and the higher potassium concentration in soda and mineral water may cause magnesium loss.**

Magnesium mineral is a strong antioxidant which means that it decreases the production rate of free toxic peroxy radical compounds in body. Magnesium like all other antioxidants increases the concentration of glutathione, the antioxidant protective barrier around cell membrane which protects the cells against many toxic and harmful substances including toxic radical compounds. Thus, magnesium is a must for a living style which targets anti-aging and healthy living. Magnesium is a mineral which enters into the structure of enzymes which regulate the proliferation of blood and nerve cells. Therefore, many neurological diseases and disorders like Alzheimer and Parkinson and blood disorders like anemia may be linked with magnesium deficiency. Glutathione increase by the effect of magnesium helps for the protection of nerve and blood cells against many harmful and toxic compounds. On the other hand, the enzyme production which is responsible for blood cell and nerve cell proliferation by the participation of magnesium in enzyme structures naturally protects you against both neurological and blood diseases and disorders. Magnesium is one of the initial minerals which can protect you against chronic fatigue syndrome since it participates with the structure of enzymes which regulates and ables blood cell proliferation. In case of magnesium deficiency, blood cells can not be proliferated in number and

anemia may form. Thus, **magnesium loss and deficiency is another factor which may cause anemia like folate, folic acid, B complex and iron deficiency.** The main symptom which is inspected and monitored by the patient with anemia is the energy loss and chronic fatigue. Blood cells are the cells which carry the carbs, fats and oils into cells. These cells also carry the dissolved oxygen in blood into blood cells. Only after these transportation of these nutrients and oxygen by blood cells into each cell of our body, oxygen combusts carbs, oils and fats and produce energy. For this reason, any decrease in blood cell amount shows itself with the energy loss and chronic fatigue. That is why many people know the mineral as energy giving mineral. In fact, this definition is not scientific since the more magnesium intake does not mean more energy gain into body. Only, the deficiency of the mineral causes energy loss and fatigue but the excess can not give you more energy.

Another important function of the mineral which is also not commonly known by many of us is that magnesium is a hormone transmitter. It transmits dopamine, serotonin, testosterone, melatonin, estrogen and dehydroepiandrosterone (DHEA) to the places where they should go for their activation. For example, thyroid hormones or dopamine can not circulate all parts of brain tissue and can not be transmitted to the points where they should reach in case of magnesium deficiency. Dopamine is a neurotransmitter which transfers electricity through brain. When this important hormone can not reach to the point in brain and not be activated, dopamine deficiency forms and muscle and bone incoordination is unavoidable, briefly Parkinson. The same exists for other hormones. Hence, magnesium deficiency may complicate with many other important diseases and disorders from Alzheimer and Parkinson to guatr and depression.

Magnesium is also important to balance the mineral concentrations between cell and its environment. If the mineral concentration in the cell exceeds the mineral concentration out of the cell, water begins to penetrate into the cell and cell begins to swallow. It may continue until cell burst and dies. Opposite, in case of higher mineral concentration out of the cell, water from the cell begins to penetrate to the out of the cell to be able to decrease the higher mineral concentration out of the cell. The cell can not survive when it losses water and it dies. Briefly, in both circumstances, cells die due to the mineral imbalance in and out of the cell. The water penetration is always to prevent the mineral concentration imbalance and at both circumstances, it continues until the two concentrations, in the cell and out of the cell, becomes equal to each other. Magnesium and also calcium, potassium, chloride and some other minerals act importantly in the mineral concentration balance. Briefly, magnesium is one of the minerals which prevents cell from dying due to mineral imbalance in and out of cell.

Although magnesium is commonly concerned with its function in energy production, the mineral has also got a different position among others with its anti-toxic effect. It protects the cells against the harmful effects and toxicity of cadmium, aluminium, lead, beryllium and nickel. All these toxic compounds may accumulate in the case of magnesium deficiency and can defect brain tissue. The damage caused by these toxic minerals in case of magnesium deficiency is one of the contributor to form Multiple Sclerosis (MS), Parkinson, Alzheimer, dementia, learning inability in childhood.

The daily requirement of magnesium is 2.5-4.5 mg/Kg which means that a 75 Kg man needs approximately 300 mg daily magnesium amount. But if the person is the one who makes regular sport and exercise in high velocity or under

heavy stress or in a polluted environment, if consumes too much carbohydrate, using nicotine and alcohol or suffered from diabetes or any cardiovascular disease and disorder or use diuretic then it will be better to increase the dose as 5-7 mg/Kg body weight.

Normal amounts of calcium and magnesium intakes into body increase their bioavailability but the intake of each in excess amounts decreases the bioavailability of each other. Many people do not not know how to use calcium supplements. The tablet forms of calcium should have 1000 mg elemental calcium per tablet and each tablet should be divided into equal portions and taken in several times through the day. The intake of such huge doses of calcium at once without dividing into equal portions and not taking different times of the day decreases magnesium by competing with it. The huge amount of calcium competes with magnesium and binds magnesium while some of the calcium is absorbed through bowel mucosa instead of magnesium. Another important point which you should remember about magnesium and calcium dualism is the increase in calcium bioavailability when you **divide a 1000 mg calcium tablet into portions as each contains 200 mg. When you take these portions at five different times with intervals all through the day; first, you will have absorbed more and more calcium since the excess amount of calcium in blood will not need to pass urine and not excreted out of body and second, these small portions of calcium taken into body with intervals will not have bound magnesium and will not cause any magnesium loss.**

Diarrhea is the initial symptom which indicates to magnesium overdose. **If you need to take a magnesium tablet, you would better chose chelate form which is glycinate, lysinate, oratate, taurate, alpha getogluconate but the best chelate forms are glycinate and lysinate. Thus, prefer magnesium glycinate and magnesium lysinate tablets during marketing. Note that albion chelate may cause pain and defect in bladder.**

Squash, mussels, crustaceans, fish, soy, broccoli, black bean, spinach and nuts are the rich sources of magnesium. Do not forget that if you mix the vegetables in your salad with nuts you can increase the total magnesium amount.

# FOOD FOR LUPUS

Systemic Lupus Erythematosus can be defined as the attack of the immune system to body. Immune system and antibodies of the immune system give a reaction to body and accept it as a foreign body. Hence, body and its immune system begin to form a series of allergic reactions in this disease.

Our immune system is the main defense mechanism of our body that any kind of microorganism such as bacteria, yeast, mold and virus are eliminated and detoxified by the attack of antibodies of immune system. But, in case of Lupus erythematosa, antibodies do attack to the body's own muscle cells, organs and tissues. Antibodies and white blood cells of immune system react against body's own cells, tissues and organs as a foreign body and threatening factors like bacteria or virus and attack to destroy them. Two group of antibodies; antinuclear antibodies and antiDNA antibodies enter into cells and attack to DNA, genome of the cell. DNA is responsible for the direction of protein synthesis, all genetic characteristics, hormone regulation and metabolic activities that a series of abnormal allergic reactions occur followed by the mutation of DNA. Vessels are dilated; blood cells go out from vessels and penetrate into tissues. Edema and bleeding and sometimes inflammatory regions may form.

90 % of Lupus suffered patients are women although men can also be suffered with the disease. Especially American in Africa origin is more liable than European.

Some medicines may also cause Lupus which can then result in systematic lupus if medicines still continue to be taken. Especially two medicines; Hydralazine which is used to decrease hypertension and Procainamide which is used to treat cardiac arrhythmia can cause Lupus in the case of their long term use. If Lupus formation due to the medicine use is not understood properly and if medicine use still continues for long periods, it can easily pass to erythemotous form. Therefore, if you are the one who is prescribed by doctor with one of these mentioned medicines, consult your doctor to change them with other safer ones immediately.

Cutaneous Lupus is Lupus in dermal origin. Coin shape red areas in various parts of body form while there are inflammatory regions in tissues and organs. In dermal origin, in medicine origin or in main form (erythemotous) of Lupus, kidneys, liver, lung and cardiac tissue (heart) can be invaded by body's own immune system cells, antibodies. Irin may form in these points with bloody areas and edema. Vessel dilation (increase in diameter size of vessel) can many times be complicated with all these allergic reactions.

One important protection action is that the person suffered with Lupus in dermal origin should always wear hat or cap or should use umbrella in sunny weather to avoid from UV since UV triggers the severity of Lupus in dermal origin. Person suffered with this form should wear clothes and should cover all parts of the body to avoid UV.

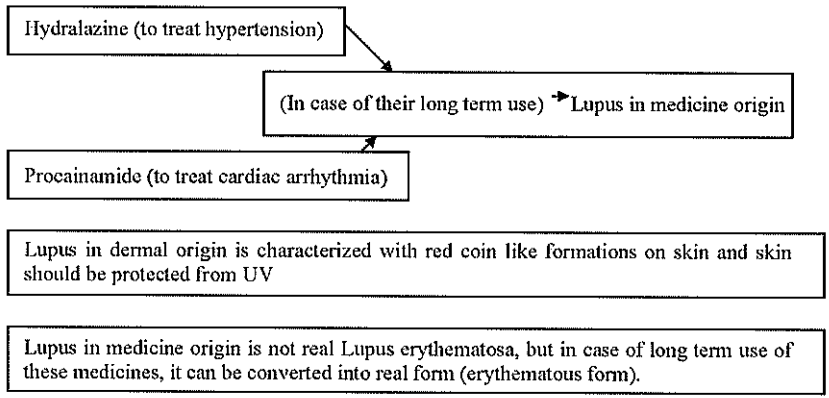



**Diagram 4**

Lupus is very difficult to understand and prognosis. It can be easily confused with other systematic inflammatory diseases since it is also a systemic inflammatory disease. The most important barrier is that there may be no virus or bacteria or similar causative agent for the allergic and metabolic reactions in most of the cases. Because, own immune system of the body forms all these allergic and metabolic reactions against its own body in this disease. Therefore, there are many procedures to prognosis and many of them are applied by doctor. These are;

Anti DNA and anti Smith antibody using antinuclear antibody panels.
Red coin like allergic areas on skin.
Pleuritis (inflammation and liquid accumulation in chest cavity) and peritonitis (inflammation of periton and accumulation of fluid in abdominal cavity)
Rustling in chest and abdomen which can be heard by stethoscope
Biopsy from kidney
Check up for nerve system
White blood cell count
Electrophoresis of serum globulin
Protein and urine levels
Electrophoresis for protein
Determination of blood, clot in urine
Coombs test
Antithyroid microsomal antibody
Rushes on skin
Sensitivity to light
Degeneration in kidney tissue
Existence of antinuclear antibodies

**Very important**! Note that the medicine substances below can result in progress of Lupus in medicine origin in case of their long term use; If you are the one, consult your doctor to change immediately;

- Procainamide
- Isoniazid
- Chlorpromazine
- Sulfozalazine
- Hydralazine
- Methyldopa
- Quinidine

**Diagram 5**

Arthritis (inflammation of joint), fatigue, loss of appetite, degenerations and inflammatory regions in lung, liver, heart and kidneys, neurological disorders can be complicated in Lupus in medicine origin.

Corticosteroid creams can be advised by doctor for Lupus in dermal origin. Hydroxychloroquine and similar medicines which are commonly used in the treatment of Malaria can be administered in case of arthritis and skin lesions by doctor.

**Phenyl alanin and tyrosine are the two amino acids which are essential amino acids and required for bone, muscle, blood, hormone, and liver. Therefore, animal origin proteins which are higher in bioavailability and rich in these amino acids should not be neglected in every period of life but not in Lupus! Although these amino acids are very important and beneficial and have got very important metabolic functions in body, the same amino acids are very hazardous and harmful and can trigger the severity of Lupus. Hence, they should be avoided in Lupus. Especially proteins in animal origin rich in these amino acids are namely;**

**Drinking milk**
**Yogurt**
**Whey protein**

**Desserts produced by milk**
**Salami**
**Sausage**
**Pastrami**
**Ground meat**
**Chopped meat**
**Fish meat**
**Egg and egg added products**
**Ayran**
**Crustacean**
**Poultry meat and products**

Briefly, animal origin proteins should be avoided. It seems to you very conflicting that animal origin, as long as they are low in fat, is an essential cornerstone of anti-aging and healthy nutrition and life style. Especially, fish meat even with its fats is very beneficial and has got important metabolic benefits for metabolism. Omega 3 fats in fish meat increase diameter size of vessel and help for the treatment of hypertension while the same fatty acids are anti-clotting which makes these fatty acids as a close friend for cardiac health. They also decrease Tumor Necrosis Factor (TNF) and decrease the risk of cancer while inhibiting harmful prostoglandin E type 2 hormones which are strongly oxidative. Fish meat is also very rich in essential amino acids which have got very high bioavailability, higher than proteins in plant origin which are utilized in bone, hormone, skin, hair, cartilage, blood and bone. Fish meat is also rich in antioxidant vitamins A, D, E and K, folate and folic acid, $B_{12}$ and antioxidant minerals selenium, calcium, magnesium and zinc. Whey proteins are rich in proteins such as alpha lactalbumine and beta lactoglobulin which are extensively utilized in antibody production which boost immune system. Now, the conflicting point is that all these proteins including fish and whey proteins have got rich content of these important antioxidant vitamins and minerals which boost immune system. If Lupus is an immune system disease, shouldn't we boost immune system and shouldn't we consume the foods such as fish and whey? The answer is 'yes', we should consume immune boosting high quality proteins, antioxidant rich foods, but not fish meat and whey since they are richer in phenyl alanin and tyrosine which may trigger the progress of Lupus as I indicated above. Not only whey and fish, all other animal origin proteins are very rich in these amino acids, the foods listed above should better be avoided. What is left to us as high quality protein source? Although they are not in the same quality, plant origin proteins should be addressed that they are also rich in antioxidant vitamins and minerals. Plant origin proteins are closely integrated with antioxidants. Especially, Spirulina and spinach as great sources of beta carotene and vitamin A can be consumed in plenty amounts since beta carotene and vitamin A boost immune system, increase glutathione antioxidant layer around healthy white blood cells and help for their protection against attack of antibodies in Lupus.

Most important vitamin which can boost immune system and inhibit oxidative stress is vitamin A and its precursor beta carotene. Do not forget that if you are the one who suffered with Lupus, you have got a metabolic immune system disorder and your immune system is attacked by your own immune system. The attack of your body by your

own antibodies first increases your oxidative stress and hence free toxic peroxy radical production. When compared with healthy individuals, metabolism with Lupus faces with much more oxidative stress and free toxic peroxy radical production. Therefore, oxidative stress and free toxic peroxy radical production rate which is 2-3 times more in the metabolisms with Lupus should be reduced. The address here is antioxidant use and plenty amount of antioxidant rich food consumption with plenty of fluid consumption. Do not forget that these are only protective and the actions can only help for better medical treatment which enhance the effect of it but can not cure. Medicines and diets should have been applied as combined but diets which are presented in this topic should not be exaggerated and you should not hope that antioxidant rich food consumption can treat the disease. Only, the defined nutrition in this topic as long as it is combined with medicine treatment can enhance the effect of the treatment and slow the progress of the disease while inhibiting heavy oxidation and high rate of free toxic peroxy radical consumption at the background. Inflammation can be inhibited by the means of only antioxidants and antioxidant rich food products. Especially, beta carotene as the precursor of vitamin A, and vitamin A itself has got two importance in Lupus. They inhibit free toxic peroxy radical production and decrease oxidative stress since they are antioxidants but they are also known as anti-infection vitamins. This does not mean that beta carotene and vitamin A treat infection and inflammation because there are no such effect of antioxidants including vitamin A and beta carotene. But, beta carotene and vitamin A deficiency cause a solid particle production on the surface of smooth tissues and organs which cause internal bleeding. These bloody areas attract microorganisms since blood is a very good media which is rich in nutrients. These bloody areas are attacked by these microorganisms immediately and inflammated. Body with Lupus can not tolerate these types of inflammations, bleedings and similar complications because it is already weakened by Lupus and has got a very weak immune system which constantly fights against inflammation and allergy. Therefore, the risk of possible bleeding and formation of the bloody areas should be eliminated. The address for it is beta carotene and vitamin A supplementation with beta carotene and vitamin A rich foods. One of them is Spirulina. Spirulina should be exist in the kitchen of Lupus since this algae is the richest in vitamin A and beta carotene rich source in the world that it contains 460 times more beta carotene and vitamin A than the daily requirement of body. The second address is the rich consumption of dark green leafy vegetables that these plants are rich sources of beta carotene and vitamin A. Note that the darker the vegetable is the more beta carotene and vitamin A content is. Brokoly, Brussels sprout, cress, purslane and spinach should always be dominant in kitchen of Lupus. I want to underline that cooking and heat application increases antioxidant activity of beta carotene and vitamin A while causing significantly important losses of vitamin C (ascorbic acid). For this reason, **you should cook some of dark green leafy vegetables and consume them as cooked.** You will be able to benefit much more vitamin A and beta carotene by this way. But, what about vitamin C intake? Vitamin C is another great antioxidant like beta carotene and vitamin A which can help for Lupus treatment by inhibiting oxidative stress and high rate of free toxic peroxy radical production in Lupus. **Raw consumption always avoids vitamin C loss while cooking and other heat process cause loss of vitamin C while increasing the antioxidant activity of vitamin A and beta carotene. Citrus fruits such as strawberry, kiwi, apple, pineapple, tomato and all others which are sour in taste and juicy and commonly consumed as raw can supply you plenty amounts of vitamin C. You can also divide dark green leafy vegetables into equally two half and consume half as cooked while consume the other as raw to be able to supply both vitamin A and C.**





Magnesium is another important antioxidant. This important mineral enters more than 300 enzymes which act importantly in energy production. Deficiency of the vitamin may result in fatigue (being tired) and lack of energy. But, magnesium also increases the protective layer, glutathione, around membranes of cells like other antioxidant vitamins and minerals, Coenzyme Q10, Gingko bloba and whey proteins. The increase in concentration of glutathione may be helpful and beneficial in Lupus because healthy cells can be protected with thicker antioxidant protective layer against attack of antibodies. They can be protected against free toxic peroxy radical compounds and allergens which are constantly produced by the body during Lupus. **Liver, spleen and heart briefly offal is very rich in magnesium but person with Lupus should avoid from offal and meat and meat products since they are rich in trypsin and phenyl alanin.** Also, these products are rich in saturated and unsaturated fatty acids, trans fat, omega 6 fats, all of which are very harmful in Lupus because of their cholesterol and oxidative stress increasing effects. But, dark green leafy vegetables and Spirulina are also rich in magnesium. I want to share a very important and very practical knowledge with you. Generally, meat, fish meat, cheese, offal, nuts and also dark green leafy vegetables are rich in magnesium. It may be difficult to remember one by one but one of the richest sources of magnesium is chlorophyll, the pigment which gives green color and its tones to plants. **The more chlorophyll content is a strong indicator for the rich content of magnesium at the same time. That is why dark green leafy vegetables and dark green colored fruits are very rich in magnesium. You can understand chlorophyll content from only green color density and the more concentration of the pigment is a very clear indicator for rich content of magnesium.**

Citrus fruits are effective in two mechanisms; one of them is fiber and the other one is vitamin C as indicated above. Soluble and insoluble fibers of fruits and vegetables rich in citrus fruits directly bind inflammatory end products of Lupus and free toxic peroxy radicals. They excrete them out of metabolism by the means of urine and feces.

Carrot because of its rich content of beta carotene and vitamin A should be consumed as raw and cooked and also as in juice form. Do not forget to drink carrot juice by adding two-three drops of vegetable oil since vitamin A and beta carotene is only soluble in fat and can be absorbed and transferred into your blood as in fat globules. Therefore, carrot juice without oil may not be too effective in taking the benefits of beta carotene and vitamin A.

Kale is another rich source of beta carotene and vitamin A. You should not forget to add it to diets for Lupus.

**Many of us do not know the rich content of vitamin A and beta carotene in peach and apricot. Many of us know about the rich content of these vitamins in tomato and carrot but beta carotene and vitamin A contents of peach and apricot is more than all others except kale and Spirulina. Dried peach is richer than its normal form, since heating process activates beta carotene and vitamin A and increases their antioxidant capacity. Dried peach and apricot may be preferred for supplying more beta carotene and vitamin A.**

**Sun flower oil, corn oil and canola oil can be used as oil options but you should avoid from olive oil in Lupus!.** Olive oil is richer in omega 3 fatty acids and therefore should always be preferred in kitchen of healthy individuals but olive oil is claimed to have important adverse effects in Lupus. Therefore, olive oil should be avoided in Lupus kitchen and instead, sunflower oil and corn oil may be used. Also, soy oil should better be avoided since it is rich in estrogens in plant origin which can cause minor changes in hormonal balance. These types of changes in hormonal balance no matter how they are minor can be serious in a metabolism with lupus since these types of metabolisms have already got hormonal imbalance and allergy.

Nuts have got both beneficial and harmful effects on metabolism as mentioned in various parts of the book. Many media source in many countries recommend the consumption of nuts regularly and in plenty amounts. I want to remind you once more that nuts except walnut are not only rich in omega 3, but also in omega 6 fatty acids. Omega 6 fatty acids are inflammatory opposite to omega 3. They increase toxic cytokines such as leukotrienes, interleukins, Tumor Necrosis Factor and increase the risk of cancer, edema, and allergy. Do not forget that a metabolism with Lupus is already familiar with allergy, fibromyalgia and edema. The regular consumption of omega 6 fatty acids in plenty amounts can trigger inflammation and increases its severity in Lupus. Only, walnut has got high amounts of omega 3 and as opposite to other nuts, its omega 3 content is higher than omega 6. Therefore, walnut can be consumed and preferred to other nuts as long as it is consumed in 4-5 numbers daily.

Note that you should dominate and consume the foods mentioned below during Lupus;

Spinach
Spirulina
Raspberry
Ginger
Coriander
Cherry
Grape
Thyme
Chick pie
Purple grape
Carrot
Green pepper
Pear
Kale
Garlic
Onion
Sweet pea
Barley
Oat
Rice
Cress
Papaya
Green apple
Tomato
Mint
Strawberry

# VITAMIN $B_6$ AND HOMOCYTEIN FOR THE HEALTH OF CARDIOVASCULAR SYSTEM

$B_6$ contains 3 related compounds which are pyridoxine, pyridoxamine and pyridoxal. $B_6$ tablets that we purchase from market are pyridoxine hydrochloride form. Pyridoxine rich foods are digested in stomach and gut and pyrodoxine becomes free in intestine followed by digestion. Free pyridoxine form is transferred into blood stream and is bound by albumin (a blood protein), carried into red blood cells by albumin and then transferred into other cells and tissues by the means of red blood cells.

$B_6$ vitamin is first required for amino acid production. Amino acids are the smallest structural components of proteins. They come together to form proteins and proteins enter into the structure of hormones that regulate all metabolic functions. Blood circulation and tonicity of vessels, sulfur, protein and carbohydrate entrance into cell and elimination of metabolites out of cell, the rate of oxidation and energy production, biochemical reactions as related to sex, pregnancy, hair, nail growth with blood cell proliferation, sleeping process, digestion, calcium binding all are only possible by the effects of hormones. Hormones are the life itself in mammalian and they are also produced by proteins which are produced by amino acids. Thus, vitamin $B_6$ is deathly important for a healthy living and antiaging that hormone production, blood production, nerve system all depends on the sufficiency of the vitamin. Cells and tissues can repair themselves by the means of proteins which are produced by the means of vitamin $B_6$ that recovery process of tissues and organs also depends on vitamin $B_6$. The most important is the immune boosting effect of vitamin $B_6$ that white blood cells which protect body from viruses and bacteria species are protected by vitamin $B_6$ from the harmful effects of toxic radicals. White blood cell and lymphocyte proliferation are also due to the effect of vitamin $B_6$.

One of the most important anti-aging vitamins is $B_6$. A person who targets healthy aging should sleep well and should feel relaxed that these two factors decrease oxidative stress and free toxic peroxy radical production. Sleeping irregularities, insomnia, anxiety, depression and obsession increase oxidative stress and peroxy radical production in addition to the harmful effects of toxic radicals on cells and tissues. $B_6$ is an antioxidant that it does not only decrease oxidative stress and free toxic peroxy radical compound production directly with its antioxidant effect but it also increases the production rate of serotonin, the relaxing hormone, that you feel yourself more relaxed. It also increases the production rate of melatonin which is responsible for sleeping process. That is why $B_6$ is a key vitamin in sleeping quality that many people do not know enough about serotonin and melatonin increasing effect of the vitamin. Jet Log, a great problem for passengers who often flies among continents, takes too much difficulty in adapting to time variation. In fact, the main reason in Jet Log syndrome is fluctuation in melatonin secretion and $B_6$ supplementation especially during these flying periods may be helpful in preventing insomnia and sleeping irregularities of these periods.

Melatonin is the main hormone which regulates sleeping process as indicated above. But, less than 1 mg of it can decrease tension of the eye (Samples et al, Curr Eye Res. 1988:7:649-53). Daily twice intake as 0.125 mg each time can make an important protection against winter depression. The same doses can help for insomnia and sleeping irregularities which

are often complicated in depression (Dolberg et al, Am J Psychiatry, 1988. 155: 1119-21). Unfortunately, melatonin can also trigger depression while improving sleeping quality in case of its use without control. Therefore, melatonin and melatonin containing food supplements that we are very familiar to see in markets should definitely be used under the strict control of your doctor.

Melatonin also helps for the regulation of body temperature, blood circulation and can treat headache up to an extend by improving sleeping, blood circulation and body temperature (Nagtegaal et al, 1998, 38:309-7, Preliminary Observations. Headache).

Melatonin is also protective against cancer. Especially, there is significantly important effect of melatonin against chest, mammary and uterus cancer. But the protective affect of melatonin against cancer takes its origin from its anti-inflammatory potential. Melatonin decreases oxidative stress and free toxic peroxy radical production rate. There is always a possibility and risk in body that excess of free toxic peroxy radical compounds can be converted into carcinogens. Melatonin shows its anti-carcinogenic effect by decreasing the formation rate of carcinogens from free toxic radical compounds (Grin et al, Gynecol Invest. 1988, 45: 62-5/ Lissoni et al, 1997, Eur Urol. 31: 178-81/ Lissoni et al, 1997, 11: 157-9. J. Biol Regul. Hoeost agents).

Melathonin as 5-10 mg daily intakes are claimed as beneficial in epileptic periods of child [Fautech et al, Biol Signals Recept. 1999. 8(1-2):105-10].

Fibromyalgia is very difficult to treat and recover since there are many causative factors in disease formation but melatonin is also claimed to relief the pain in muscles during the disease.

Melatonin also helps for the regulation of blood circulation and can make a protection against hypertension while decreasing hypertension in the persons with hypertension (Arangino et al, Am J Cardiol, 1999, 83:1417-9). The hormone is secreted by pineal gland which locates just beneath brain tissue. But it should be seriously taken into consideration if you are the one who use aspirin and beta blockers since these substances decrease the production rate of melatonin.

What about melatonin rich foods? Can we benefit from melatonin in food origin? Unfortunately, my answer will be very pessimistic for the question since there are very few food products and many of them have got very low amount of melatonin which is not sufficient to show all the claimed effects above. But, **cherry and morello are the two fruits which have got the highest amount of melatonin among all foods.** If you want to be protected against cancer, if you want to improve your sleeping quality, if you want to be relaxed by increasing your serotonin level, if you want to improve your cardiovascular health, you have got a wonderful option; cherry and morello. Hence, you should include the two fruit consumption regularly in plenty amounts into your life style from now on.

**Homocystein** is another toxic and harmful substance like cholesterol excess and bad cholesterol. Cholesterol, but not the cholesterol excess, is a wonderful and a must for life which have got various kinds of beneficial and important

metabolic functions in body. But it is not the same with homocystein since this substance, homocytein, is directly toxic. In case of its high concentration in blood, it binds to the wall of vessel and decreases the diameter of vessel like cholesterol and bad cholesterol. Also, there is a great relation with high homocyteine concentrations and some cancers. Today, we know that not only protection against cholesterol, bad cholesterol, saturated fat, trans fat and free toxic peroxy radical compounds but also protection against homocyteine is very important for a healthy life style and nutrition. Avoidance from excess of homocyteine can contribute to decrease the risk of hypertension, atherosclerosis (vessel calcification) and cancer. The decrease in diameter size by the effect of homocyteine accumulation on the wall of cell interrupts blood flow into tissues and organs which may cause to progress of hypothyroid, cardiac failure, osteoporosis, Alzheimer and Parkinson (William et al, 2000. Circulation. 1012034-9). Especially calcification of brain vessels by homocystein can greatly contribute to the progress of insomnia, anxiety, depression, Alzheimer, Parkinson, sleeping irregularities by interrupting sufficient amount of blood into brain tissue. So, what should we do to be protected against the risk of homocyteine. ?

**First, homocyteine is a substance in animal origin proteins. Homocyteine is produced by destruction of methionin amino acid in the cavity of bowel and stomach. Therefore, especially after 30s, you should avoid too much methionin containing food products. Many people do not know how to decrease their high homocyteine concentration. ? It is easy when you can succeed to begin to consume less animal origin food while dominating vegetables and fruits in kitchen. You can begin from meat and meat product consumptions and you can replace them with soy proteins and non fatty milk and dairy products. Although milk and dairy products are in animal origin and rich in methionin, I can not advise you to stop consuming milk and dairy products since you are very close the risk of osteoporosis after 30s and you also need high quality calcium. Here, we face with a conflict situation that we should avoid from milk and dairy products since they can increase homocyteine concentrations like they increase cholesterol and bad cholesterol, but on the other hand, they are richest in calcium and have got excellent quality of calcium in higher bioavailability than many other food products. As I indicated, because of their great and excellent quality of calcium, excluding milk and dairy products from diet is not possible and is always wrong. I always declare in my seminars, conferences, presentations and media programs that milk and dairy products are inflammatory and aging with their fat, saturated fat, homocyteine, bad cholesterol and cholesterol and trans fat, but the same foods are anti-aging with their high contents of calcium, magnesium, folate, folic acid, $B_6$, vitamins A, D, E and K, high quality proteins and all essential amino acids.** For example arginin as an amino acid contributes to bone, muscle and blood production and recovery but also reduce tension while cholesterol and bad cholesterol and also homoscytein in the same foods cause hypertension. Especially, high protein quality and high calcium quality with its great content make these foods as basic of a healthy nutrition and life style although they have got the mentioned risks. My advice is to continue to consume milk and dairy products even though they have got the risk of increasing homocyteine concentration. You should benefit high quality and great content of calcium with fat soluble antioxidants of the same products but if you select less fatty milk and dairy products less than 1.5 %, you can benefit fat soluble antioxidant vitamins A, D, E and K in addition to high quality protein and rich calcium content. But, you should know that homocyteine risk continues to be exist. What may be the solution if we have to continue to consume plenty amount of milk and dairy products every day for the protection

against osteoporosis and osteomalacia but if we want to be protected against the risk of homocystein at the same time? The answer is the black written headline below;

**$B_6$, $B_{12}$ and folic acid combined use in daily nutrition.** $B_6$ rich foods are potato, banana, lentil, liver, turkey meat, fish meat; folic acid rich foods are shellfish and fish meat, liver, turkey meat, heart and spleen, broccoli, Brussels sprout, cauliflower, spinach, cress and $B_{12}$ rich foods are liver, cheese, spleen, kidney, turkey meat, and pickle of white cabbage. I am sure you noticed that most of the recommended foods here are also rich sources of methionin and can cause homocyteine production. But, $B_6$, $B_{12}$ and folic acid in their composition, especially in their combined existence can strongly reduce homocyteine concentration.

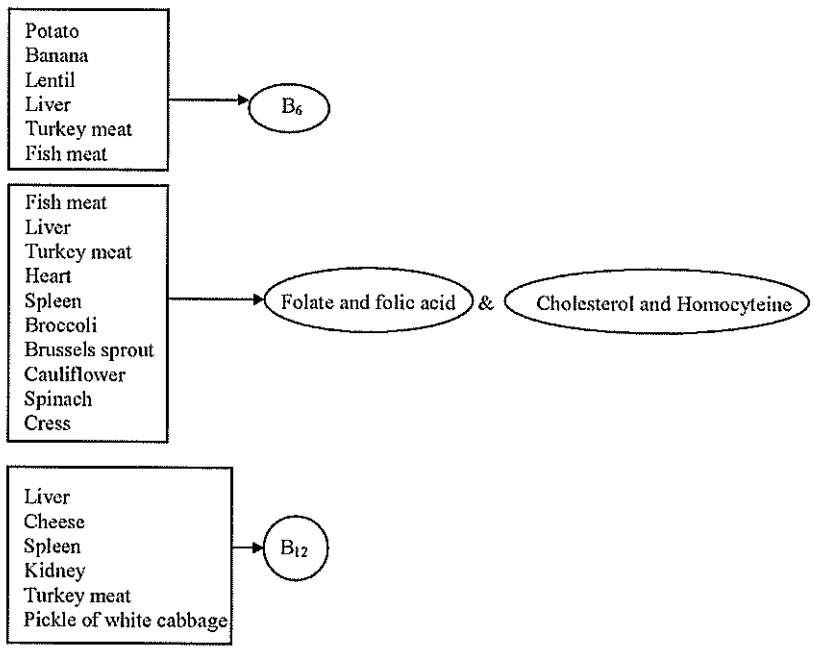



**Diagram 6**

Folic acid, vitamin C, beta carotene and vitamin A rich food consumptions as combined can also reduce the concentration of homocyteine. Therefore, green leafy vegetables and yellow-red and red fruits and vegetables, liver, spleen, kidney as beta carotene and vitamin A sources can be combined with the consumption of citrus fruits such as pineapple, orange, lemon, kiwi, tomato, apple, mandarin, grape, purple grape, strawberry which are rich in vitamin C (ascorbic acid) (Boers et al 1985, Engl, J. Med. 313:709-15). Additionally, $B_6$ rich foods mentioned above should be included. Butter, margarine

and saturated fat rich foods always increase homocyteine concentration. While you begin to dominate $B_6$, $B_{12}$ and folic acid rich foods in your life style, you should also not forget to avoid from margarine, butter and saturated fat.

Caffeine binds calcium and causes inactivation of calcium. Calcium has got dilating effect on vessels besides having got protective effect against osteoporosis and osteomalacia. Calcium is also anti-clotting. But, hypertension can form and blood can accumulate in vessel which may result in homocytein accumulation in blood due to the binding of calcium by caffeine in coffee and caffeine containing products since too much cafein may bind calcium which is a strong vasodilator (increasing diameter of blood vessel and dilating it) (Nygard et al, Am. J. Clin. Nutr. 1991.67:263-70). Therefore, if you want to decrease your homocyteine concentration, you should also avoid from caffeine and caffeine containing products.

10-25 mg $B_6$ daily intake can meet daily requirement. In case of its deficiency, under the strict control of your doctor, it can be increased up to 200 mg. But, overdose can damage nerves and can cause muscle and joint incoordinations and restrictions in muscle and joint movements. If higher doses for long term are required as under the control of your doctor, daily dose as 100 mg can be taken.

If you are the one who use regular alcohol and alcohol containing beverages, contraceptive medicines or if you are suffered with renal failure (kidney dysfunction) then you have to know that you are very close the risk of vitamin $B_6$.

Cereals and especially wheat and wheat germ are rich sources of $B_6$ and betain which is exist in cereals, wheat, wheat germ and flours which are produced from cereals and spinach can decrease homocyteine as synergistic with $B_6$. **Note that, it is always better and very effective if you take $B_6$ and magnesium as combined in the use of tablets. If you will consume $B_6$ rich foods, be sure that there should be magnesium rich foods as combined in your diet.**

# FOOD FOR GOUT DISEASE AND URIC ACID CONTROL

The most important attribute of gout is the increase in uric acid amount in blood. Aging and unconscious food intake, lack of exercise and the domination of animal origin food consumption are the most important predisposed factors causing uric acid increase and finally gout.

The main substances as the main causative agents of the disease are purin substances. Some of the purin bases are produced by the cell and they are called as endogen purin bases. Other purin bases are taken into body from out by the means of foods.

Followed by the consumption of the foods rich in purin base, purin bases are converted into harmless substances by an enzyme of the body. This enzyme is called as uricase. In the case of excess amount of purin intake into your body, uricase which is produced by your body may not be sufficient enough to excrete these substances. Under these conditions, these substances are converted to the uric acid and accumulate in blood. The result is the increase of uric acid amount in blood.

Purin bases are decomposed in liver and converted into uric acid in liver. This uric acid enters into the blood stream and comes to kidneys and converted into urine. Finally, they are excreted as in the form of urine by kidneys out of metabolism. Some of uric acid which is absorbed through bowel mucosa from blood is decomposed and utilized by native bacteria flora of bowel and excreted out of the metabolism as in the form of feces.

Using all the mentioned mechanisms above, blood uric acid level is kept $\leq$ 6.8 mg/ml. Unfortunately, under some conditions, uric acid production from purin bases may be too much and kidneys and bowel may not capable to excrete these high amounts by the means of urine and feces. Under this occasion, excess of the uric acid accumulates in blood and uric acid amount exceeds 6.8 mg/ml border, even may reach to 7 mg/ml and higher levels. The excess amounts of uric acid above 7 mg/ml form uric acid salts and crystals, especially monosodium urate salts. Monosodium urate salts may accumulate in joint capsules, cause joint degeneration and arthritis which may often be painful.

The most common types of gout are acute form and tophi. Acute form is inflammatory, painful and characterized by the degeneration of joint and joint capsule. The main difference between acute gout and tophi is the uric acid crystal size that in tophi, size of these crystals are much bigger than in acute form. Tophies, in other words, these crystals accumulate in joint capsule which may result in arthritis but also may come just beneath skin and form white and yellow nodules. The incubation to form these nodules may sometimes extend to 3-42 years. But, the most dangerous risk at this stage is the transfer of these crystals into the kidney tissue. There are very thin and fragile vessels in kidneys that filters blood and convert it to urine. The accumulation of tophies on the walls of these filtering vessels in kidneys can close diameter of these vessels which results in renal failure (dysfunction or poor function of kidneys). Uric acid accumulates much more than ever in case of renal failure because of dysfunction of filtering vessels of kidneys and lack of urination. Excess amount

of uric acid in kidney tissue also forms uric acid crystals in kidneys. Briefly, uric acid increase in blood may result in two dangers; renal failure and kidney stones. Both may be dangerous and life threatening if not taken under control.

According to the mentioned explanation above, one of the most important factor which results in high uric acid amount in blood is the excess amount of purin base intake by the means of foods. But, also radio and chemotherapy agent applications during cancer treatments may also result in uric acid accumulation and increase in blood since these agents not only kill cancer cells but also kill healthy cells and cause release of uric acid from cell into the blood. High velocity exercise can trigger the increase of uric acid because of too much sweating. The loss of water by the means of sweating increases the density of blood but at the same time uric acid. That is why, during high velocity exercise and too much sweating, dehydration (loss of water from metabolism and lack of water of the body) should be taken under control by consuming high amounts of fluids especially water. Corticosteroids used for the treatments of allergy, antiepileptic and anti-inflammatory agents and medicines can also cause the formation of monosodium urate crystals and gout disease.

Briefly, wrong and unconscious nutrition and life style, high velocity exercise and training with insufficient water and fluid intake, cancer treatments, anti-allergic, antiepileptic and anti-inflammatory medicine use may result in uric acid amount increase in blood. In today's modern world, you should always keep in your mind that the mentioned factors below may be a causative factor to gout, uric acid and renal failure risks. These are;

- High amount of cholesterol, too much cholesterol rich food consumption, too much animal origin food consumption rich in cholesterol,

- Obesity; you should always remember that fattening begins from cell and a fatty cell cannot produce uricase enzyme. So, excess amount of purin base taken by the means of foods cannot be converted into the harmless compounds. Under these conditions excess amount of purin bases comes into liver by the means of blood stream and converted into uric acid and pass back into blood. By using this mechanism, uric acid begins to accumulate in blood which may result in gout or renal failure. Always, gout is concerned in case of excess uric acid concentrations. But, also renal failure risk should be remembered. One of the weapons for anti-aging, one of the important must to prevent fast aging is diluting blood in every period of your life. Blood is composed of two phases; solid part that contains cells, nutrients, vitamins, minerals and microorganisms and also liquid part, mainly water with soluble particles. The more the liquid part and the less the density of the solid particles is, the easier blood circulation, cell nutrition and excretion of dirty metabolites out of the metabolism are. This rule should always be kept in mind and should never be neglected. Think about some people at 90s who seem healthy although they are too old. When we ask the secret, many of the answers are the same, high amount of food consumption rich in vitamin C which is a strong anti-clotting (dilute blood). Vitamin C, in other words, ascorbic acid, is not the only vitamin to boost immune system and make our body resist against inflammatory diseases and disorders, or it is not only used to decrease cholesterol. It can dilute blood density and therefore can ease urination and urine formation by kidneys. High density of urine, the solid particle increase in urine naturally makes urination much more difficult since these solid particles can always accumulate on the walls of the filtering vessels of kidneys. By the time, kidney vessels may be calcified and

cannot filter urine and give the solid particles back to the blood stream. This is the worst of all conditions because this means kidney failure (renal failure) that kidneys are always liable to the accumulation of uric acid crystals and other solid particles in blood. For all these reasons, **plenty of water and fluid consumption with vitamin C rich food consumption are the most important protective actions against uric acid, gout and renal failure risk.** Note that, some people, although they are suffered with high amount of uric acid in their blood profile, they do not know it until a blood check is performed and it is always a long time period. They continue to the same life style and nutrition style, increasing their uric acid concentrations year after year. Renal failure, gout and aging comes after these years but the person still does not have any idea about the causative agent as the responsible factor of his/her disease or the person always complains and grieves but never questions and never looks back and criticizes.

- Too much flour and sugar rich food consumption since they cause fattening and obesity.

- Too much fat consumption and margarine use in recipes. Margarine because of its rich trans fatty acid concentrations is indicated many times to be avoided in many parts of the book.

- Processed food consumption rather than natural one. I have just underlined the importance of vitamin C rich food and fluid consumption with water to prevent body against dehydration, gout, renal failure and uric acid risk. I have also added that this approach will help you from the side of your anti-aging target as slowing aging process. Vitamin C is not the only vitamin which decreases toxic radical production, protects against cholesterol risk and inflammation, boosts immune system and dilutes blood. The same functions may also be obtained by other vitamins A, B, D, E and K. Especially, B vitamins are soluble vitamins like vitamin C and therefore, they can be dissolved in blood, excreted by the means of urine, far from the risk of accumulation on blood vessel walls and in tissues except their mega dose intakes. But, both vitamins B and C are water soluble and can be evaporated during heating process such as pasteurization, sterilization, canning, grilling, thawing, cooking, scalding and simmering. Because of the heat applications, during these types of process techniques, significantly important amounts of vitamin B and C are lost from the nature of foods. Most of the processed foods are treated especially with heat applications since heating is an important and basic mean to kill harmful microorganisms responsible for food infections and poisonings such as bacteria, virus, yeast and mold. Heating, because of its mentioned microbial quality improving effect, is one of the most accepted and commonly used applications in food hygiene and technology platform. But it has got an adverse effect such as significant vitamin loss. This disadvantage is the only one disappointing side of processed food consumption. Also, for many of the processed foods are treated with frying process which transfers great amounts of trans fatty acids and heterocyclic amines from frying oil into the fried product. These trans fatty acids are much more responsible for vessel calcification, hypertension and cardiac failure when compared with cholesterol. Many of the fried packaged and fast food products contain less or high amounts of these fatty acids and heterocyclic amines. Nitrite and nitrate addition to meat products, benzaldehyde and polycyclic aromatic bases which are transferred from smoke during fuming application of fumed food products increase cancer formation risk. Therefore, many scientific studies confirm that, the increase of processed food consumption may increase the risk of cancer, vitamin loss, inflammation, fattening and obesity and aging. Briefly, we should minimize the consumption

amount of processed food, not only to be protected against uric acid increase, gout and renal failure risk, but also against the mentioned risks; obesity, hypertension, cardiac failure, inflammation, important metabolic diseases such as cancer.

- Exercise is a must to get rid of excess amount of fat from body. Lack of exercise and an inactive life style always cause fattening. The membranes of the cells become fatty and these types of cells cannot produce uricase enzyme. Especially, the cells in liver are responsible for uricase enzyme production. As mentioned above, uricase enzyme production is deathly important in prevention against uric acid danger, gout and renal failure since this enzyme decomposes purin to the harmless compounds but not uric acid. The absence or the decrease in the concentration of this enzyme and purin bases in foods increase uric acid concentration in blood. The cell membranes should be avoided from fattening including the cell membranes of liver cells which produce uricase enzyme. The healthiest lifestyle is with regular exercise and is a dynamic, active life style. This kind of life style will not only prevent you from fattening, obesity and cholesterol risk, but at the same time, by preventing obesity and fattening, it can help for controlling uric acid levels in blood by preventing obesity and fattening. By the means of sport and exercise, liver cells can produce uricase enzyme without fattening and purin bases are not converted into uric acid, instead, harmless compounds.

- Hypertension is another important predisposed factor which may result in uric acid risk. In the progress of hypertension, toxic radicals, fat, uric acid, excess calcium vitamin C, trans fatty acids, saturated fats, cholesterol and bad cholesterol stick on the wall of vessels and decrease diameter size of the vessel by accumulating there. Blood takes too much difficulty in passing through the cavities of these types of calcified cells and naturally slows and makes a pressure against to the walls of calcified vessel. This increase of blood pressure on the wall is called as 'hypertension' in Latin, which means 'higher blood tension' in English. As it can be easily understood from this explanation, calcified vessels which face with hypertension are always liable to the solid particle accumulations on their walls including uric acid. Opposite, diluted blood and a healthy vessel which is not too calcified, transfers blood comfortably and because of the motion of blood and because of its mechanical stream, solid particles cannot find opportunity to stick on the wall of vessel. They are also transferred by the means of liquid phase of blood. Hypertension is always an indicator that your vessels which supply blood, in other words, nutrients to the cells, tissues and heart are calcified and cannot do this function properly anymore because of their lower diameter due to calcification. Therefore, always there are other risks like cardiac failure (heart failure) and other organ failures including renal failure. The worst risk of all is the interruption of blood supply to the brain because of the calcification of brain vessels or cardiac vessels that go into brain tissue during hypertension. In this case, brain cannot supply blood and cannot be in function which is called as stroke. Briefly, hypertension is a threatening factor for life since it interrupts or decreases the nutrition level of cells and organs. Higher uric acid levels can cause hypertension but hypertension can also cause uric acid risk. Because calcified vessels of liver cannot transfer enough blood volume into liver cells which produce uricase enzyme. These cells begin to die, decrease in number which results in liver failure and finally uricase enzyme concentration decrease in blood. Because of insufficiency of the enzyme, purin bases coming from foods are converted into uric acid in liver. Finally, uric acid begins to increase in blood. Briefly,

hypertension should be taken under control or avoided, not only for the protection of renal, liver and cardiac failures but also gout disease and uric acid danger.

The indicated data above underlines the importance of nutrition style and life style in prevention from gout and uric acid risk. But, this does not mean that gout and uric acid risk may be prevented or taken under control definitely by the regulation of nutrition and life style. The regulation of life and nutrition style and avoidance from purin rich food intake all through life time are very effective protective actions against gout and uric acid risk but unfortunately not for the late periods. In some conditions, some persons insist on consuming too much purin rich foods and they neglect sport and exercise at the same time and run a very inactive life style. In addition, aging comes as a negative factor and when all these factors come together; uric acid may increase exaggeratedly too high. These types of abnormally high uric acid levels above 7 mg/ml are hardly taken under control by the regulation of nutrition and life style. The regulation of life and nutrition style may not be sufficiently enough to be able to decrease and control uric acid levels. Under these conditions, some drug prescriptions under the strict control of doctor is addressed. I am a food scientist, not a doctor. Therefore, I want to pass the medicine alternatives directly, they are belong to doctors. But, for only having an idea, most common medicines prescribed by doctors are; non-steroid inflammatory medicines such as indomethasine, colchicines which should be avoided during pregnancy and in renal failure and diseases, corticosteroid injections into the joint capsule to relief pain. Additionally, there may be used some medicines such as Allopurinol and Uricosuric to stop uric acid production of metabolism.

I have underlined the importance of fibers as a cornerstone of a healthy life style and nutrition in many parts of the book again and again. I will never get tired to repeat the importance of these compounds because they are some kinds of filtering of our metabolism. First, they were described as the insoluble parts of plants such as seed, leaf, root, skin and because of their insoluble character, we did not give any importance to these compounds and even, we tried to eliminate fibers from food product in many food processes. Then, we realized the importance of them that, they were capable to bind many toxic compounds and excreate them out of metabolism. Detailed data as related to these compounds was given in related part. In this part, I have to indicate that, these compounds bind many toxic compounds such as cholesterol, saturated fat, bad cholesterol, salt, carcinogen, allergen, sugar, homocystein, benzapyren, nitrate, nitrite but also, they can bind uric acid! and help significantly to decrease and control uric acid level in blood. Briefly, in every step of your life, always remember the importance of fiber rich food consumption. The more fiber you consume the more you will be able to get rid of excess cholesterol, sugar, trans fatty acid, carcinogen, allergen, salt and you will be protected against cancer, hypertension, diabetes and similar important metabolic diseases and disorders. But, the same compounds will be able to bind excess of uric acid at the same time and excrete it out of metabolism and you will also automatically be protected against uric acid and gout risk.

While fiber rich foods are the important protectors against uric acid and gout risk, fiber free foods, that means animal origin foods as free of fiber fiber will always be a risk since they will not be able to bind uric acid and they will not be able to excrete it out of the metabolism. Opposite, they are very rich sources of purin bases. In spite of their incomparable and superior protein quality as in comparison with plant origin products, unfortunately, with their rich purin content,

they always make a great risk from the point of uric acid and gout risk. For the same reason, these food products below should be avoided especially in case that you think you are old enough, suffered with hypertension, genetically liable to gout, suffered with an important metabolic disease which can easily be complicated with gout such as diabetes and renal failure;

- Milk
- Yogurt
- Cheese
- Whey proteins
- Red meat
- Sausage
- Salami
- Pastrami
- Ground meat
- Fish meat
- Poultry meat (chicken, turkey..)
- Mussels
- Egg and egg products
- Yeast and yeast added products
- Legume
- Offal especially spleen and kidney
- All alcoholic beverages
- Beans

What should be eaten in rich amounts to decrease or control uric acid level? You can use 4 alternatives all of which were proven as very effective in decreasing uric acid; cherry, black cherry (morello), black mulberry and strawberry. These are the most effective in decreasing uric acid levels in blood but also you can consume;

- Tomato
- Artichoke
- Celery
- Banana
- Cabbage
- Kale
- Green leafy
- Parsley
- Pineapple
- Mandarin

- Orange
- Grapefruit
- Green paper
- Potato
- Red pepper

Red pepper, orange, grapefruit, green pepper, cabbage, mandarin, parsley, potato, lemon are the rich source of vitamin C which dilute blood and help to the excretion of excess amount of uric acid as in the form of urine by kidneys.

Tea and coffee should be avoided definitely. Especially, there is a strong relation between black tea consumption and uric acid increase. Instead, green tea should be preferred. Note that, tea and coffee, opposite to common belief and information, are not nutritious. Cafeic acid and caffeine in coffee and tannin in tea are fibers and bind iron, magnesium, essential amino acids, omega 3 fatty acids, B complex, vitamin C. Therefore, too much coffee and tea never gives you a nutritional content, opposite, decrease the nutritional value of other foods. You can avoid from this by drinking these beverages 2 or 3 hours after digestion, after you digest all your nutrients, not just after mealtimes. Too much tea and coffee consumption indirectly trigger oxidation and increase the production rate of free toxic peroxy radical compounds. Tannin and caffeine also contract vessel and may cause hypertension. I had mentioned the great relation between hypertension, uric acid increase and gout disease. Instead of tea and coffee in low nutrition capacity, you can prefer a fresh orange juice or a fresh carrot or tomato juice added one or two drops oil and by this way, you can benefit from vitamin C and beta carotene, deplete oxidation, decrease free toxic peroxy radical production rate, dilute blood that all will be effective beneficially in decreasing uric acid level in blood. All fresh fruit and vegetable juices are the rich sources of vitamins, isoflavones and minerals. They protect you against harmful effects of free toxic radical compounds, dilute blood and protect you from renal failure risk, decrease cholesterol and bad cholesterol and protect you against cardiovascular diseases and disorders such as hypertension, cardiac failure and stroke and also decrease uric acid and protect you against gout disease and renal failure.

You should never neglect minimum 1.5-2 L water consumption every day. You can assume it as a medicine rather than a drink. We always drink water whenever we are thirsty but this alarm is very late. Without being thirsty, within intervals, all through the day, you should take plenty amount of water and fluid into your body. As I have indicated above, the dilution of blood is an important must to eliminate excess amount of uric acid by kidneys by the means of urine. Kidneys are naturally incapable to produce urine from a dense blood. Under this occasion, urination can not be maintained properly and toxic compounds including uric acid are given back to blood from kidneys.

From all the details I indicated above, uric acid increase should be taken under control by the regulation of life and nutrition style. Uric acid, like cholesterol, saturated fat, sugar and salt, increase in blood and stick to the walls of the vessels and be responsible for the calcification of blood vessel as long as food and nutrition style are not regulated. Therefore, time is important. There is always risk for being late! You have to act immediately and you can not postpone it later. Because, every day and every time, the excess amount of uric acid goes to vessel walls and stick. This calcification of

blood vessels including kidney, liver, brain and cardiac vessels do not give a clue! Many times person can not understand anything as clinic symptom. Daily activities and metabolic activities may be normal. Only, in very rare conditions, in case of severe calcification of vessels, hypertension may appear and person may complain for hypertension. But, not in all cases. So, we face with an important risk. The calcification of vessels due to the accumulation of excess amount of uric acid, cholesterol, bad cholesterol, salt, sugar and homocystein may go spontaneously, secretly, without giving a clue in many of the occasions. If it does not show itself clearly, how we will be able to understand it? The best way, the most effective control mechanism today, appears as tension control periodically, weakly or monthly at least and blood check that shows triglyceride, cholesterol, keratin, uric acid, low density and high density cholesterol amounts. In case of their high amounts, a new nutrition and life style that is given in the book should be followed.

# FOOD FOR SCHOOL AND EDUCATION

You will be able to remember from the related part about calcium and bone that human being and all other mammalian can only store calcium when they are young. Female can store calcium in bone until 18-20 and male can store calcium at maximum rate until 22-24 years old. It becomes much more difficult and less in later years step by step because of aging that bone cells also become older and loose calcium binding capacity. If you are the one who did not give importance to calcium rich food consumption in youth, do not repeat it in the nutrition of your child. Being taller, being stronger and more resist to osteoporosis in elderly can only be possible by calcium rich foods especially when you are young.

Because of the domination of youngest form of bone cells which bind calcium into the bones at the highest rate, the period until 18-25 is deathly important for young individual. The more calcium rich food consumption until 18-25, the healthier the individual will be in elderly. Briefly, youth nutrition determines the wellness in elderly.

Only your young bone cells, osteoblasts, until 18-25, can bind calcium from food in blood and store it in trabecular bone. Trabecular bone is consisted of many trabecules which are separated from each other with very thin walls. These thin walls are made of calcium. The thicker these bones are, the harder they are in structure and harder against defects and external factors such as pressure and mechanical defects. You can make these walls thicker, other words by making calcium stores greater in these walls, you can make trabecular bone much more resist against the risk of fracture. Liability of bone to defects and fractures is called as 'osteoporoses'. Because of your youngest bone cells which are capable to bind calcium into your bones and which are dominant in bone structure until 18-25 years old, consuming plenty of calcium rich foods in youth is a determining factor for the wellness quality of your elderly period and for being resist against osteoporosis. You should think your elderly period from early ages, otherwise, that may be too late since osteoporosis is a one way destination. Once it starts, it continues. You can only slow the progress or make it faster which depends on your nutrition and life style, but you can never stop it. Osteoporosis will definitely form. It is unavoidable because your bone cells and young bone cells will get older like all your cells, tissues and organs. Therefore, it is very natural for our bones to lose their calcium binding capacity, earlier or later, but definitely they will lose this capability because of aging of our body. But, one person may be suffered with osteoporosis and osteomlacia (decrease in muscle volume and function), ten or twenty or even thirty years later than a person who did not store calcium in the walls of trabecular bones. Here, the difference is in fact, not the compositions or structures; rather, the main difference between two person is their youth nutrition. For all these reasons, youth nutrition has got a unique period in life since its nutrition can contribute to the quality of wellness in later periods of life.

I always tried to teach to my students in my lessons 'Early Childhood Education & Nutrition' lessons, the importance of calcium rich nutrition during elementary and high school periods. Teachers and parents should provide enough food education to child and youth so that young individual should know the importance of youth nutrition and should know that it is the only period to affect the quality of next periods. Otherwise, their young bone cells will have matured and lost their calcium binding capacity. All stores should have been built and completed with great concentrations of calcium. If not, that may be too late!

The easiest supplementation of highest quality of calcium in highest amount appears as milk and dairy products. Yogurt, cheese, ice cream, kefir, desserts in milk origin and drinking milk should have been dominated in youth kitchen.

Why does calcium deficiency progress with aging? There are initially two important factors. First, young bone cells become older and are converted into mature form which is called as osteocytes. These mature cells are no more able to bind calcium. But, also mucosa cells (surface cells) of bowel and stomach which are responsible for secretion of enzymes in intestines and stomach acid become older like all other cells and tissues with aging. Therefore, individual has got more and more digestive problems due to aging. Each year, each cell on mucosa of bowel and stomach becomes older and some of them die which results in less enzyme and stomach acid production. Insufficient amount of stomach acid secretion by mucosa cells of stomach and enzyme production by bowel cannot digest and convert complex proteins, carbohydrates, fats and oils into simple compounds. Some of them is excreted out of body without absorption through bowel mucosa as in the form of urine and feces. That is why, many important minerals such as calcium, iron, many of important antioxidant vitamins such as $B_{12}$, folate, folic acid, also some essential amino acids, essential fatty acids like omega 3, are not absorbed and they are excreted out of body in elderly. Opposite, a young individual has got young stomach cells which are capable enough to secrete enough amount of stomach acid. Surface cells of intestine (bowel) in young individual are also young and therefore capable enough to produce enough enzymes. No matter how complex the nutrients are, most of these nutrients in young individual are converted into simple compounds by the effect of enough stomach acid and enzyme concentration. Older bone cells which are not capable to bind calcium to bones and also aging of stomach and bowel cells that are responsible for the production of acid and enzyme are the initial factors which cause digestive problems. These problems are not only the deficiencies of nutrients but also the formation of some toxic metabolites of incomplete digestion which are characterized by gas, allergy, diarrhea and stomach pain. For all these reasons, young individual should be conscious about all these realities. Many young people consume only some types of important nutrients such as animal origin proteins, omega 3 fatty acids because their parents recommend and make pressure on them. We should no more need to force the child as parents to drink or consume this or that food. If we can succeed to make them believe to the importance of nutrients for their growth and wellness, every young individual and child consume these healthy foods rich in nutrients. When we force them by saying 'eat', 'clean your plate', 'drink this milk', you may see that your child may not want to consume and may reject your obligations. But, if you tell the importance of drinking milk because of its incomparable protective effects on bones and muscles against osteoporosis and osteomalacia and if you can tell them that they can be much taller and have got stronger muscles by consuming milk and dairy products, you will see that they will begin to consume them. If you can convince them and make them believe how important vitamins and minerals in energy production and inhibiting inflammation, then you will see that they will consume vegetables and fruits more than ever. First, they should know and conscious about all these important healthy foods in their healthy aging, growth and being stronger. Briefly, you are the first and the main person in their life which will give food education. You are the only guy to educate your child about harmful effects of trans fatty acids, saturated fatty acid, cholesterol, bad cholesterol, food additives in fast food products. Child or young individual should know what a bulk food means. A child likes ice cream. Rarely, very few does not. Therefore, you may not need to force a child to eat ice cream. Let them consume ice cream. You and your child should know that it is rich in calcium. But, it is very difficult for drinking milk. It is not sweet, not delicious for most of child. But, when you tell your child that

drinking milk is the richest in calcium in highest quality with greater amounts that it will cause growing faster, being taller and stronger than others at the same age, you will see the difference. Your child will begin to consume more and more milk and dairy products, meat and meat products than ever.

**Unfortunately, youth nutrition has got a conflicting platform. In fact, it is not, but it may seem you a little bit conflicting. Your child or young individual should consume animal origin proteins especially meat and meat products with milk and dairy products. Because child or young individual has got young bone cells which can bind calcium into bone and young muscle cells which can proliferate and increase in number while they are young. That is why it is always a rule that child and youth nutrition is based on animal origin proteins. Your child should take essential amino acid called valin which improves and complete nerve system, histidine and phenyalanine for blood cell proliferation, methionin for muscle growth and strength, lysine as another essential amino acid for bone growth, threonin, tyrosine and triptophane for liver function, hair, nail and connective tissue production. All these essential amino acids are completely in higher concentrations in animal origin food products. Fiber components in plant origin as in vegetables, cereals, fruits and legumes bind some of these essential amino acids and decrease their bioavailability. But animal origin products including egg, poultry and their products, red meat and its products, milk and dairy products and fish and marine origin products are free of fiber. All these foods are complete without any missing in essential amino acids with greater ratios within higher bioavailability. Boy or girl or student until 18-24 years old need growth of bone, blood, nerve, connective tissue, hair, nail and skin cells. The food for their growth is mainly high quality proteins which are consisted of high quality essential amino acids that are completely exist in animal origin products. Therefore, your child or a student until 18-24 years old should consume animal origin food products as much as possible. Here, the conflicting argument may arise as high cholesterol, saturated fat, bad cholesterol, trans fat, biogenic amine and homocyteine risk coming from these types of animal origin products. Most of these compounds cause cancer, diabetes and hypertension. We need animal origin proteins in youth nutrition but they are closely integrated with fat, cholesterol, bad cholesterol and homocyteine. In case of animal origin food consumption rich in these harmful compounds, although child or young growth will improve by high quality proteins and essential amino acids of these foods, will young individual face with important metabolic diseases and disorders such as hypertension, cancer or diabetes.?**

A young individual is active, works or studies harder, makes sport and exercise in higher velocity and in higher frequency. Brain activity, muscle activity, blood and hormone reproduction can never be compared with older. Hence, young individual needs much more energy. Basal metabolic rate is the energy requirement for essential metabolic functions of body such as heart beat, stomach, lung and bowel movements, blood proliferation, hormonal reproduction. It is the amount of required energy that is only used for the mentioned essential metabolic functions. It does not include the energy required for work or sport. Basal metabolic rate in young individual is also greater than older because heart beat, lung, stomach, bowel movements, reproduction of bone, blood and hormone are always greater in young individual because of younger cells and younger metabolism in a younger body. In the case of higher rate of sport, exercise, game, play, social activities which requires additional energy, it is very clear that younger needs much more energy than older. Energy is made from first carbohydrates and then fats and oils. Briefly, younger can tolerate against fats and oils more than older ones

because they require much more energy. This does not mean that every young person until 18-24 years old can consume whatever they want to consume. This does not mean that they can consume fats and oils as much as they want. Of course they and their families should be educated to regulate fatty food intake as in accordance with their life style, activity, sport and exercise. I am over forty and I still consume kebab, grilled red meat, sometimes fried products and I do not hesitate even though I am over forty because I never neglect to make sport and exercise in high velocity, five days a week, as long as I am healthy. I know that fat and oil and sugar excess coming from food can be converted into energy and spent for sport and exercise. But I know that I have got no right to consume these types of fatty or candy foods if I neglect sport and exercise in the day. Because I know that the fat, oil and sugar excess coming from food will go directly on the wall of blood vessels, accumulate there and decrease diameter size and cause calcification (atherosclerosis) or they will be able to accumulate among muscle fibers and cause fattening. First, you have to inspect your child whether it is active. If the young person or child in family enjoys from sport and exercise, very familiar with sport and exercise and has got a very active life style, then you should not exaggerate the situation. Leave them free and be sure that fat, oil and sugar in those food products in animal origin will be tolerated in their bodies because they will be converted into energy and spent for their activity, sport and exercise. Similarly, the main food of brain is sugar which is also rich in animal origin products. It is very natural and expected that a child or young person who studies very hard most of the day spends sugar coming from animal origin foods and tolerates it. In conclusion, a young person or child can show much more tolerance to sugar, fat and oil excess coming from animal origin foods as long as they make sport and exercise, have got an active life style and study. Most of them are such individuals that I tried to mention, but not all of them. First, you have to inspect and determine the life style, activity and performance level of your child or younger. But if the young individual has not got an active life, does not study hard, always inactive, not familiar with sport and exercise.. then you have to educate and tell the dangers waiting for. You have to tell the risk of fat, oil and sugar excess that can cause calcification and fattening and also cancer, diabetes or cardiac failure, hypertension and many other important metabolic diseases and disorders no matter how younger they are. But, you have to educate and tell them that they can suffer with all these risks if they do not pass into an active life style, sport and exercise. Whether they are close to fattening and inactive life style or slim and active, we have got an important reality about the proteins in animal origin that these proteins in animal origin is the first main nutrient group for child and younger. Whether fatty or low fatty animal origin food products have got these high quality animal origin proteins does not change the reality. But of course, it is very natural that the increase in fat contents causes significantly important decreases in protein content in animal origin foods. Therefore, you have to be very careful during marketing that you buy not fatty or low fatty animal origin food as much as you can. This approach will gain you two important incomes. First, you will protect younger or child in your family from the risk of saturated fat, a wrong nutrition and life style due to animal origin food consumption which may always be accompanied with fat and cholesterol problem. Secondly, your child or young individual will meet with a healthy life style and nutrition style and benefits of animal origin foods in low fat content. They will get used to consuming non fatty or low fatty animal origin foods as combined with sport and exercise and school activities including studying. No need to tell you but I cannot help saying that traditions always pass from generations to generations including life style and nutrition style and they are very effective.

Because cholesterol and saturated fat can be converted into energy and beneficial substances in body at a higher level than older and because animal origin proteins are less or high accompanied with cholesterol and saturated fat in animal

origin food products, do not hesitate and afraid of dominating animal origin foods in kitchen for your child. Only you have to do is to prefer and select low fatty or fatless animal origin food products, not only for your child, but also for you and other family members.

Child health begins from pregnancy period. **Spina bifida** is one of the most important risk and defect which may be in newborn due to malnutrition of pregnant women. In the case of poor nutrition of pregnant in folate, folic acid, B complex and $B_{12}$, nerve and skeleton of new borne cannot be completely form. Such infants are very liable to infections, edema and fluid retention in body cavities because of the defects in skeleton, vertebrae and nerve system due to the deficiency of members of B complex with $B_{12}$, folate, folic acid. $B_{12}$ has got one important and beneficial benefit which differentiates it from folate and folic acid. Folate and folic acid are very close to vitamin $B_{12}$ in structure and it is very difficult to separate these vitamins from each other in structure. All of them take place in the production of enzymes which regulate blood cell proliferation. For this reason, nutrition of pregnant poor in folate, folic acid and $B_{12}$ can cause anemia (low number of blood cell) which can increase the risk of spina bifida. Vitamin $B_{12}$ has also got an additional benefit that it acts importantly in the production of myelin coat. Myelin coat is a protective layer which surrounds nerve cells. The thicker myelin coat is, the more nerve cells can be protected against harmful effects of free toxic peroxy radical compounds, carcinogens, allergens, homocyteine, microorganisms such as virus, bacteria, mold and yeast because, myelin coat creates an additional second barrier after cell membrane. The main function of cell membrane is the protection of cell but it can be enhanced by the protective effect of myelin coat. Nerve cells poor in myelin coat are always more liable to defects and harmful effects of extrinsic factors. One of the theories commonly accepted about the reason of Multiple Sclerosis claims $B_{12}$ deficiency as one of the main causative factor. Another reality we face is about youth nutrition. Only animal origin foods are very rich in $B_{12}$ while many plant origin food products are deprived of the vitamin. Number of red blood cells in blood is important for all of us but especially for young individuals since they continue bone and muscle production. You may ask the relation between red blood cell, bone and muscle production. Only red blood cells are the carriers which transfer nutrients and especially proteins to muscle and bone cells which are required for their proliferation. In case of decrease in red blood cell number, less sugar and protein are carried into these cells by low number of red blood cells which means that bone and muscle cells cannot supply enough nutrients for their proliferation and begin to decrease in number. For all these reasons, red blood cells should have been proliferated and reached up to higher levels in order to carry the required amount of sugar and proteins which are required for their proliferations. Otherwise, young individual cannot enhance bone and muscle structure, cannot be taller or stronger or cleverer. Note that the food required for brain activity, IQ and nerve cells are also carried by red blood cells. Today, we definitely know that one of the important reasons of Alzheimer, Parkinson and amnesia (forgetfulness) is also $B_{12}$ deficiency. As I already mentioned, nerve cells can only be healthy and survive by having got a thicker myelin coat otherwise they can be easily defected. Defects on nerve cells opposite to other cells need longer time periods, may be years and years. Most of the neurological disorders such as Alzheimer, Parkinson and also amnesia is closely related to such defects in nerve cells due to $B_{12}$ deficiency. We have to enhance bone and muscle progress in young family members and also protect them against the risk of Multiple sclerosis, Alzheimer, Parkinson and amnesia from young ages. Again the address is the same; animal origin food products, rich in vitamin $B_{12}$, but of course fatless or low fatty ones.

Red blood cells which carry the required food into bone and muscle cells and all others for their proliferations and functions should be maintained properly. Red blood cells are produced by hemoglobin which is a kind of protein containing iron in its center. Hemoglobin cannot be produced in the case of iron deficiency since iron is the structural component of hemoglobin which produces red blood cells. Briefly, iron deficiency causes significantly important decreases in red blood number as combined with $B_{12}$ deficiency. Here, the main factor which may cause anemia, in other words, red blood cell number decrease is not the only $B_{12}$ and iron deficiency. Enzymes required for the proliferation of red blood cells are produced by folate and folic acid and also $B_6$. Magnesium is the essential mineral which also acts importantly in the production of enzymes which are required for red blood cell proliferation. That is why; the liability of individual to anemia is determined by all the mentioned vitamins and magnesium. Deficiency of any of these mentioned vitamins and minerals can cause anemia. Decrease in red blood cell number, anemia, is much more serious for young individuals and child since they are in body progress and maturation period. They should carry enough nutrients into their bone, skin, hair, muscle, brain and nerve cells by using sufficient numbers of red blood cells. Production of sufficient number of red blood cells can only possible by consuming magnesium, folate, folic acid, $B_{12}$, iron and $B_6$ rich food products. Therefore, youth kitchen should also dominate magnesium, $B_6$, $B_{12}$, folate, folic acid and iron.

Fish meat is not only an animal origin food product rich in high quality animal origin proteins but also it is rich in $B_{12}$, $B_6$, folate, folic acid, magnesium and iron. But it has got an incomparable advantage among other meat options. Only fat in fish meat, Omega 3, has got various kinds of beneficial effects and protective effects against many metabolic diseases and disorders in metabolism. All other fats, saturated, unsaturated, trans, omega 6, have got many important and hazardous effects on metabolism. I want to remind you the beneficial effects of omega 3 fatty acids once more that they are anti-clotting so they dilute blood and give an ease to blood circulation. These fatty acids decrease cholesterol and bad cholesterol and protect against calcification and hypertension. They increase serotonin, relaxing hormone and protect against stress, depression and Alzheimer while increasing the production rate of dopamine. The dilution of blood by the effect of omega 3 in young individual is much more critic and important than an older metabolism because red blood cells can reach into other cells and transfer the required food for their proliferation and energy reproduction faster than in a less condensed blood. Especially, omega 3 fatty acids integrate as in triangular shape in front of red blood cells which creates a torpedo shape and like a torpedo, this structural adjustment increases the speed of red blood cells. Red blood cells move faster and carry the nutrients into other cells faster which results in rapid growth, reproduction and progress of blood, bone, hormone, IQ, muscle, nerve, connective tissue, hair, nail, and all organs and other tissues. In conclusion, Omega 3 fats with their cholesterol and bad cholesterol decreasing effect can also help for enhancing reproduction and maturation of young individual. I want to remind you once more, this time for youth nutrition. Low fatty food consumption is an important tradition you have to gain while you are younger. Because the earlier you can adapt to low fatty food consumption, the healthier you will be in your elderly period. If you are the young one, you have to dominate animal origin food products in your kitchen and life style in spite of their high saturated fat, trans fat, omega 6 fat, cholesterol and bad cholesterol content. You have to choose and prefer buying low fatty or fatless animal origin food products during marketing. But as a young person, you do not need to worry about cholesterol, bad cholesterol,

homocyteine, omega 6, saturated fat, unsaturated fat and trans fat of only one group of animal origin foods. They are fish meat and its products. Because they are rich in folate, folic acid, $B_{12}$, $B_6$, magnesium, vitamins A, D, E, K, B complex, Coenzyme Q10 and especially omega 3 fatty acids which decrease cholesterol and bad cholesterol while inhibiting inflammation and free toxic peroxy radical compound production. Once more, I want to repeat my own advice that the fattier fish meat, the healthier it is while the fattier the other meats, the more hazardous and harmful they are.

Milk and dairy products have got two important attributes in youth nutrition. First, they are one of the richest sources of high quality proteins as I mentioned above and second is the rich fat soluble vitamin content and B complex content as water soluble. I have to advise you to select drinking milk and other dairy product as low in fat but never fatless. Skimmed milk and other dairy products free of fat are always deprived of fat soluble antioxidant vitamins A, D, E and K as long as they are not enriched with these antioxidants. Vitamin A is a strong anti-infection vitamin and protects your child against infection by boosting immune system and reduces the risk of internal bleeding risk. Vitamin A is also an essential vitamin required for visual function and eye health. It is also one of the vitamins which enhance calcium into bone from blood.

Vitamin E is a strong anti-inflammatory agent that inhibits inflammation and protects against oxidative stress. The antioxidant effect of vitamin E is especially very important on sperm quality in men since it is the essential vitamin which protects sperm against harmful effects of free toxic peroxy radical compounds. Sperms are very fragile and can easily be defected and killed by microorganisms, free toxic peroxy radical compounds. But vitamin E protects sperm from free toxic peroxy radical compounds by decreasing the production rate of these harmful compounds. Therefore, vitamin E is commonly known as anti-sterility factor. Vitamin D and especially $D_3$ is a key vitamin that acts importantly in binding calcium into bone. You should pay attention whenever you intent to buy a calcium supplement that it should have got also vitamin D or $D_3$. Vitamin D and calcium is a wonderful combination since calcium is most bounded into bones by the effect of vitamin D and $D_3$. Especially $K_2$ enhances calcium binding into bone. Vitamin K also regulates clotting and scar formation which stops bleeding. All these important antioxidant vitamins have got important mentioned metabolic functions on young metabolism while they inhibit oxidation and decrease the amount of free toxic peroxy radical compounds. All these vitamins are in rich amounts in drinking milk and also other dairy products. But, they are fat soluble and they should be exist in food and should have been taken into body as combined with fat particles since they can only be absorbed through bowel into blood as they are soluble in fat. Therefore, I cannot recommend you to consume skimmed drinking milk and dairy products since you cannot benefit the fat soluble vitamin content of milk and dairy product if they are free of fat. On the other hand, fat in drinking milk and other dairy products are in the form of saturated and trans form. Saturated fat and trans fat have got two important harmful effects on metabolism. In case of their consumptions in excess amounts, both of them can be converted into carcinogens that increase the risk of cancer in bowel and stomach origin. Another harmful effect is the risk of calcification. They can go beyond of the walls of blood vessels and stick and accumulate. Accumulation of them with cholesterol and bad cholesterol exist in the same food products decreases diameter size of blood vessels which results in hypertension, Alzheimer, renal and liver failure, cardiac failure, Parkinson and many other diseases because of interruption of blood supply into healthy tissues and organs due to calcified vessels. Additionally, cholesterol, bad cholesterol, homocystein, saturated and trans fat are

not the only harmful compounds which increase the risk of calcification and cancer but also omega 6 fatty acids directly increase oxidative stress and production rate of free toxic peroxy radical compounds. Fattier milk and dairy products are also richer in omega 6 fatty acids.

We have got an important problem. Although we should not exaggerate the harmful effects of high content of cholesterol and bad cholesterol in milk and other dairy products because a young body is much more capable to convert them into beneficial compounds as I previously indicated, we have to know and concern the harmful effects of the same products. We should always concern about omega 6, saturated fat, trans fat, cholesterol, bad cholesterol, homocyteine and biogenic amines which can be converted into carcinogens and can accumulate on the walls of blood vessels and cause calcification, hypertension and other diseases and disorders in calcification origin. In fact, vessels in a young body are also much more elastic and less calcified when compared with the vessels of an old body. But calcification itself is a metabolic progress which forms naturally by aging. It directly depends on aging. The concentration of bad cholesterol, cholesterol, salt, sugar, saturated fat, trans fat, homocyteine, allergens, biogenic amines and omega 6 fatty acids on the inner layer of walls naturally increases as in accordance with aging. Younger or child should be conscious of it. The consumption of foods rich in the mentioned harmful compounds always can shorten this period. Calcification of vessels and diseases in calcification origin can form in these early ages due to nutrition of child or younger rich in these harmful compounds. But a person who cares for nutrition and life style from early ages can be protected against these harmful compounds of foods and the progress of calcification (atherosclerosis) can be much slower. Sport and exercise, plenty amount of fluid intake, antioxidant rich food consumption, especially fruits and vegetables can protect and slow the progress of calcification in vessels. Young or old, every human metabolism and also all other mammalians, exposure to less or high calcification as long as they live. The reason is that we constantly consume food and inhale oxygen. Oxygen is absorbed from lungs and transferred into blood and passes into each cell of our body while foods are transferred into blood and cell followed by their digestion in bowel and stomach by the effect of stomach acid and enzymes in bowel. Oxygen combusts food in each cell and energy is produced. We need energy to survive and utilize all kinds of metabolic functions. For this reason, we inhale oxygen and we consume food all through our life. I had mentioned in several parts of the book that some kinds of harmful compounds that are called as free toxic peroxy radical compounds are also produced besides energy in each cell. But, an important point is the less oxidation potential of foods rich in antioxidant vitamin and mineral. Because these antioxidant vitamins and minerals are combusted instead of fats and oils but their end products after this combustion are not free toxic peroxy radical compounds. They are not harmful and can be excreted out of metabolism as in the form of feces and urine. Therefore, I can clearly express that the less fat and oil content but more antioxidant in the concerned food, the more you can be protected against oxidation and its harmful toxic radical compounds which are responsible for calcification. Young body has got an advantage at this point. The more elastic vessel structure, less calcified structure because of less aging and much more diluted blood because of less aging. But it does not mean that younger will not get older and have got matured and older vessels and blood. Every second and every hour, more and more free toxic peroxy radical compounds, cholesterol, bad cholesterol, homocyteine, biogenic amines, trans fat, unsaturated fat, salt and sugar will stick on inner surface of vessel walls and decrease diameter size of the vessel. It is very natural and expected that the protection of young body against harmful effects of free toxic peroxy radical compounds by increasing antioxidant rich food consumption, decreasing fat and oil rich food consumption can significantly decrease the concentration of

all the mentioned substances in calcified layers of vessel walls. For all these reasons, younger or child should have been taught and conscious about harmful effects of heavy oxidation stress due to free toxic peroxy radical compounds which are produced from fat and oil. Younger or child should minimize oil and fat while dominating animal origin proteins low in fat and oil content. Vegetables, legumes and fruits rich in antioxidant vitamins and minerals should always have been included into youth nutrition and kitchen. Calcification as the base of all kinds of metabolic diseases and disorders begin from early ages to be protected. Protection of young body from early ages can significantly decrease the progress rate of calcification and thus, can protect the body against a severe oxidation and calcification in later years in elderly.

Milk and dairy products in low fat content is a wonderful nutrient complex especially with their two important protein sources. Casein and whey proteins. Casein is the milk protein itself. It is exist in the structure of clot of cheese and yogurt. The supernatant, water part of yogurt and cheese also contain wonderful high quality proteins which are called as whey proteins; alpha lactalbumin, beta lactoglobulin, immunoglobulin and lactoferrin. Lactoferrin enhances the absorption of low quality iron from the mucosa of bowel and transfers it into blood. I indicated to the importance of iron in youth nutrition above that since iron enters into blood cell structure, the nutrition of cells in body depends on blood enrichment. That is why, iron rich food nutrition and especially high quality iron rich nutrition has got a key role in youth nutrition. Because of fiber containing structure of plant origin foods, a significantly important amount of iron with calcium is bound these fibers. Therefore, bioavailability of both iron and calcium is lower than in food products in animal origin. In the consideration of milk and dairy product, we face with an important disadvantage of these products from the point of iron in spite of their rich nutrition profile. Milk and dairy products as a wonderful high quality protein, fat soluble vitamins A, D, E and K, B complex and sugar, they are very poor in iron. Iron exists in trace amounts in these products. **For this reason, anyone can not be protected against anemia by milk and dairy product consumption. But it does not mean that you should not consume them anymore. You and especially younger should consume these products in plenty amounts because of their other advantages such as high quality proteins; whey proteins, casein, fat soluble vitamins, high quality calcium and B complex. Only you have to know that you cannot be properly protected against anemia, other words your main diet and nutrition style cannot be milk and dairy products if you are suffered with anemia.**

Iron exists in foods in two forms as three values (ferri) and two values (ferro). Ferro form can easily be absorbed from the mucosa of bowel and transferred into blood opposite to ferri form. Thus, ferri iron rich spinach does not mean anything in protection against anemia. But, meat and meat products including red meat and its products such as pastrami, bacon, sausage, salami, red meat, ground meat, fish meat, marine origin products, poultry and egg and their products are all rich in high quality iron other words ferro form of iron. Another advantage of meat and meat products at this point is that they have got a special protein substance which carries high or low quality iron through the mucosa of bowel and transfers into blood. That is why it is always a clever approach to consume meat and plant origin products as combined in youth and elderly kitchen and life style. The protein carrier in meat and its products can bind the low quality iron (ferri form) in plant origin food and carries it from the mucosa of bowel and transfers it into blood. By the consumption of plant origin foods alone such as legume, vegetable, fruit or cereal, low quality iron (ferri form) of these products cannot be absorbed because these food products are free of the protein carrier. Thus, low quality form of iron, absence

of protein carrier and existence of fiber compounds are the major factors which decrease the absorption rate of iron and decreases its bioavailability in plant origin foods. Young individual or child should learn to consume meat and plant origin food products as combined. Is there any way to enhance low quality form of iron (ferri form) in plant origin food products? Yes, the answer is whey proteins. Lactoferrin as a whey protein enhances the absorption of low quality iron in plant origin foods. If you do not enjoy from meat consumption, your alternatives may be whey proteins. As indicated in the related part, you can buy it from market as in powder form. Whey protein isolate or whey protein concentrate can be mixed into skimmed milk, shaked properly and consumed after plant origin food consumption. Alpha lactalbumin and beta lactoglobulin the other two proteins of whey enter into structure of antibodies which protect our body against diseases and disorders. Boosting immune system is very important in a young metabolism since any disease or disorder can retard the progress, maturation and gaining power of young individual or child. Thus, younger or child should be properly protected against microorganisms that cause diseases and disorders. Whey proteins are great sources boosting immune system in young or child metabolism. Whey proteins can be included into youth nutrition as in with its one-two measure into two glasses of skimmed milk a day. Younger or child can have supplied calcium, whey proteins and casein by this approach. Note that, whey protein isolate is free of calcium since it is produced from only whey whereas whey protein concentrate also contains trace amounts of calcium and lactose (milk sugar). Whey proteins can never be concerned as rich sources of calcium. But, normally, they are added into milk and consumed as soluble in milk. The consumption of whey proteins as added into milk and dairy products can replace the missing calcium amount as well.

Calcium, as the most important mineral of youth nutrition, milk and dairy products, fish, red meat and nuts up to an extend should not be neglected. But nuts should always not have been taken into body in excess amounts since they are not only rich in omega 3 but also inflammatory omega 6 fatty acids. Vitamin C, like vitamin D, is an important vitamin which enhances calcium binding capacity of bones. Two sources are green leafy vegetables and citrus fruits which are sour and juicy fruits should never be neglected in youth nutrition. Vitamin C is the most multifunctional vitamin among others. As you remember from the related part, it does not only boost immune system but also act as anti-aging by increasing the concentration of glutathione, the protective antioxidant layer, around cells. Child or younger can have thicker glutathione layer so stronger cells which are much more resist against free toxic radical compounds and all other toxic compounds by the means of vitamin C rich foods. You should remember two criteria which indicate vitamin C content of foods. The sourer the taste is, the more the ascorbic acid (vitamin C) content is and the darker the green color tone in green leafy, the more vitamin C content is.

Fiber rich nutrition makes a difference in youth nutrition since it should be definitely consumed by younger separately, not as combined with meals. I had mentioned it for all ages as you remember from various parts of the book that fiber rich foods should have been consumed separately, not during meals with other foods but 1-2 hours after or before meal times. They can bind harmful compounds such as cholesterol and bad cholesterol but they can bind beneficial important compounds such as vitamins, minerals, proteins, omega 3 as well. The main nutrient group which enhances growth and maturation in young body is proteins, especially animal origin proteins because of their high bioavailability and essential amino acid content. Fiber existence in plant origin food products accompanied with proteins may be a disadvantage but an advantage at the same time. Fibers in these products can lower cholesterol and bad cholesterol and other toxic

and harmful compounds but they can bind important essential amino acids, high quality proteins of animal origin proteins. A young individual should have consumed plenty amounts of fiber rich foods of course, to be protected against hemorrhoid, constipation, diabetes and cardiovascular diseases and disorders such as hypertension. But, the first target in this group is the rapid growth and maturation, body length, resistivity against diseases, hair, nail and bone growth, hormone and blood reproduction, all of which can be supplied and enhanced by mainly high quality proteins in higher bioavailability and essential amino acid content. Briefly, the only address is animal origin proteins. They are free of fiber and their high quality proteins and essential amino acids are absorbed and transferred into blood circulation through bowel mucosa without the risk of binding by fibers. **Motivate your child to consume fiber rich foods and high quality protein sources at different times rather than combined. Fibers coming from plant origin foods may bind important essential amino acids and high quality proteins coming from animal origin foods. Briefly, a constant approach like consuming high quality animal protein sources with fiber rich plant origin foods can cause significant decreases in bioavailability of high quality proteins in animal origin foods. The result may be the slow progress of growth and maturation. If a rapid growth and maturation is desired, animal origin food products should have been dominated in youth kitchen and nutrition but as free of fiber as much as can be.**

# CELLULITE AND FOOD

Another disease which is formed because of nutrition and life style is cellulite. But, life style and nutrition style may not be the only causative agent since hormonal metabolism and genetic factors act importantly in the progress of cellulite. Cellulite is the accumulation of salt, fat and water in connective tissue. This definition is very simple, but the progress and complication of cellulite may not be so simple. Unless it is not taken under control, it can cause cardiovascular problems, neurological disorders and even renal failure.

Connective tissue is the tissue which is formed by billions of cells like other tissues but it has got a special function. It connects other tissues and other organs to each other. It takes place around vessels, around cells and near bones. It may be assumed as a kind of media of metabolism. In the case of too much salt and fat intake, especially fat and salt increase combustion rate of fat and sugar by oxygen in cell. As I already mentioned it in oxidation and cardio part, the combustion of fat and sugar by oxygen in cell does not yield only energy that we need for all our metabolic functions, but also some toxic compounds which are called as free toxic peroxy radical compounds additionally form. I underlined the importance of these radical compounds in different parts of the book that they are the substances which determine aging or anti-aging. In other words, their production level and their amounts in metabolism determine whether the body will be healthy or suffered with a disease or disorder. Too much fat and sugar intake with high amount of salt always triggers the rate of oxidation and as a result, so much energy may be produced. We like energy and to be energetic but too much free toxic peroxy radical compounds are also produced. Excess of these compounds accumulate around vessels and cause calcification of vessels and decrease the diameter size of the vessels. You will directly say that, I am repeating these details. I know, but I have to repeat to be able to remind you the danger of free toxic radical compounds and also too much fat, salt and sugar rich food consumption. I have to make a repetition about these compounds because they are always related to the progress of cellulite, like they are the causative agents for many other diseases and disorders. Because, these compounds do not only accumulate on the walls of vessels, but they also accumulate just beneath skin and around cells. Their accumulation on walls of vessels decreases the diameter size of vessels and blood can not pass through these calcified walls because of the narrow cavity. It slows in these calcified regions and naturally applies a mechanical pressure against the wall of vessel and increases the pressure on vessel wall which is called hypertension. Many people may know that the toxic radical compounds can cause hypertension with the mentioned mechanism but very few know that they can be the main reason for cellulite progress after calcification of blood vessels. Because calcified vessel is not a normal and healthy vessel any more. It is the area where hypertension exists. Also, the pressure applied onto the wall of vessel by blood may be too high which can even rupture the wall and cause internal bleeding risk. This is a possibility which depends on the level of the pressure of blood on the vessel wall. Another possibility is thrombosis and emboli risk. The interruption of blood circulation through calcified cavity of vessel causes blood accumulation in these regions. Blood slows and can not pass. In this slow motion of blood, blood cells can find an opportunity to stick to each other, fat, salt, cholesterol and sugar. In other words, because of the decrease in speed of blood in these calcified regions, blood density increases and solid particles of blood including fat globules, sugar, cholesterol, excess amount of vitamin C and calcium, saturated fat, trans fatty acid, homocystein can not be rinsed by the speed of blood and they begin to stick to the calcified wall of the vessel. The calcification degree and severity increase if it is not taken under control by medical,

nutritional and life style enterprises. The sticky calcified particles and nodules on the blood vessel wall may be too thin, medium but sometimes may be too thick which differs as depending on the severity of calcification. The big scale calcified sticky particles may be decomposed and participated by the effect of the blood stream and the small particles separated from the main calcified particle may enter to the blood circulation and can even close the diameter of the further vessel which is called emboli. The complete calcification and close of diameter of the vessel by the sticky calcified particle is called thrombosis. Both thrombosis and emboli may not be too dangerous if they belong to the vessels which are not too important or too functional but not every time. If they form in the main vessels with important functions such as coronary vessels (vessels feeding heart tissue) or brain vessels the result may be life threatening such as stroke. You may ask the necessity of all these details and their relation with cellulite. I am only trying to indicate very harmful life threatening potentials of free toxic radical compounds, excess amount of fat, salt and sugar particles. No one can say that the person will definitely be suffered with thrombosis, emboli, or hypertension or internal bleeding but it can definitely be expressed that one of them will definitely be unavoidable as long as they are not taken under control with the protective actions. At this point I want to explain the relation of this calcification with cellulite progress. The calcified cavity and decrease in diameter size of vessel in calcified region naturally slows blood stream as I have just mentioned. Liquid phase of blood with fat soluble particles, salt, cholesterol and even saturated fat and sugar particles can find a chance to pass through the wall into the around connective tissue. Followed by their penetration into the connective tissue, they begin to accumulate here and form a tissue layer consisted of water and salt, cholesterol, sugar, soluble and saturated fat particles. This layer which is formed beneath skin is called 'cellulite'.

According to the detailed mentioned explanation above, the main structure of cellulite is fat, salt and sugar particles with water. This indicates that too much fat, salt and sugar rich nutrition may always cause cellulite progress or initiate it. Fat, salt and sugar rich foods are not only causative agents for cellulite, but also for hypertension, emboli, thrombosis, internal bleeding risk and stroke as mentioned above. These are all possibilities and no one can predict which one will form, but one of these possibilities will definitely form as long as the calcification and too much oxidation due to too much fat, sugar and salt rich nutrition can not be taken under control.

Women are always much more liable when compared with men. Although not completely correct as scientifically, there is a common belief that cellulite is a feminine disease. The main reason is the female sex hormone estrogen. Opposite male sex hormone testosterone, estrogen is anabolic (means accumulating fat and sugar deposits in muscle and connective tissues). The dominance of this hormone and its anabolic character makes women much more liable to cellulite. But, this does not mean that there are no men who may be suffered with cellulite. Estrogen is also secreted by men in lower amounts than women. In rare conditions, in case of hormonal imbalance, estrogen secretion of male may be in higher concentrations which may result in cellulite. But, probability of the risk is very low when compared with women.

Obesity and weight gain is one of the most important causative agents of cellulite. There is no rule that every obese people are definitely suffered with cellulite or fit people are never suffered with it. But, the probability of an obese person when compared with fit people unless there is no hormonal problem is always very higher. Women suffered with cellulite often consider about operative applications, medicine use, but what I observe in my close environment is that,

very few of them consider enough how they can get rid of their excess fat deposits in their thigh or abdomen regions by sport and exercise. Many women and also men approach to sport and exercise as a very difficult activity to perform because they will get tired, spend energy, time and effort. On the other hand, the best way to eliminate fat from body is sweating. Sweat not only contains water, but some amount of soluble fats also can be eliminated by sweat. Therefore, high velocity exercise followed by gaining condition after qualification in sport and exercise is a very effective way in loosing fat deposits and weight control. But also low or medium velocity exercise can help to weight control since you will have spent your calories which you gained from foods. Do not forget and always remember that foods and the nutrients in these foods; fats, oils, carbohydrates (sugars) and proteins form energy in body followed by their consumption and digestion by entering into the reaction with oxygen in each cell of our organism. This released energy which is produced followed by this combustion is called 'calorie'. If the calories taken into body by the means of these nutrients are more than the eliminated calories from body by the means of daily activities, metabolic activities, physical activities, mental activities, sport and exercise, this excess calorie begins to accumulate in body. Here is the most dangerous point. This accumulation of the excess calorie that is not eliminated but kept inside the body is only in one form. Fat. This means that, as long as you are inactive, as long as you are not familiar and close with regular sport and exercise and at the same time you consume too much fat, sugar and salt rich foods, you will form too much calorie more than you can eliminate and you will accumulate it as in the form of fat. In other words, you will be fattening. You will be an obese person. Your vessels will be calcified. Your organs will not be able to supply enough blood, in other words they will begin to die or will get older (that is what we call is 'aging', opposite of 'anti-aging'). While forming all these harmful tragedies, many important organs especially liver, kidneys and heart will be fattier and will begin to lose their function. Cardiac failure, liver failure, cirrhosis, hepatitis or renal failure will not be too far possibility. The fattening may not be only in the tissues of organs. If a fattening begins to form, it is first formed in connective tissue and than spread from connective tissue to organs. The fat deposited in connective tissue starts the initial phase of cellulite formation and its progress by the time. For all these reasons, it is a general rule that one of the most effective way to prevent or avoid from cellulite risk is to keep fit and avoid from fattening. Of course training in sport and exercise in every day, making regular sport and exercise will take time, effort and energy. Of course you will get tired. I know that you are one of them having got troubles with life, family and business. But always remember that, 'more pain, more power'. This idiom is the one I like most because it always reminds me that important targets and gains are not achieved by sitting. We have to sweat, we should get tired and briefly we should pay the price. Media is often showing us the best female and male models and we continue to dream to be like them in our minds. But media often neglects how long they spent their life in sport centers and how they give too much from their pleasure when they follow strict and though diets free of fat or sugar. Many of us do not know but in fact they are like soldiers. In fact, very tough life in a hard discipline. Too long hours in sport centers and a constant control of diets should not be so easy but what they know definitely is that their appearance makes money, so they have to do. You also have to do like them, not because your appearance makes money of course because you are not a model but because of your health. Your health is the most important and that is why you have to get rid of your excess fat deposits and therefore you have to begin sport and exercise immediately, without wasting any more time. You have to begin to control and check your foods and nutrition style once more from the beginning. You will realize that there are many thinks you can do about loosing fat and keeping fit. Each time you lose fat, then you will feel better, you will feel healthier. You will be far from the risk of cardiac failure, liver, heart, kidney fattening,

thrombosis or emboli, cardiac spasm, stroke, atherosclerosis (calcification of vessel), hypertension, cirrhosis, hepatitis, immune system disorders and cellulites.

There is a very strong relation between cardiovascular health and cellulite. Some of the cardiovascular diseases and disorders, especially hypertension, in many of the occasions, may result in cellulite. Vessels which supply blood and feed to heart are called as coronary vessels. They can also be calcified like all other vessels in metabolism because of excess amount of saturated fat, unsaturated fat, cholesterol, bad cholesterol, trans fatty acid, allergen, carcinogen, biogenic amine, salt, sugar, toxic radical, uric acid and homocyteine. The calcified vessel does not transfer blood in sufficient volume properly because of the decrease in diameter size of vessel due to calcification. Women should always consider that obesity and cardiovascular disorders may act as an important causative factor for cellulite as closely linked to each other. Weight control and loosing weight and protection against hypertension are the main protective actions. These protective actions do not protect person from cellulite but they also protect from cardiovascular diseases, hypertension, diabetes, cancer and other metabolic diseases. Excess amount of oxidation yields too much energy but also toxic radicals as I indicated before. Excess amount of toxic radicals can be converted to fat and this fat can cause hypertension by decreasing diameter size of vessel and increasing blood pressure applied to the walls of the vessel. Hypertension increases the risk of thrombosis and emboli as it was indicated above. The slow transfer and stream of blood through vessel increases the penetration of fat particles from blood into tissue through vessel wall which may result in cellulite. Cellulite, hypertension, thrombosis, emboli, diabetes and many other metabolic diseases and disorders are all in the same origin; 'excess amount of fat and toxic radicals'. Excess amount of toxic radicals and fats can also be converted into carcinogen agents which can rupture the cell membrane, enter into cytoplasm, mutate genetic material of cell and may cause cancer. Briefly, there may be more than one complication of excess amount of high oxidative stress and fat deposits in the body and cellulite is the only one complication among them.

Alcoholic beverages are often advertised as anti-clotting (diluting blood), decreasing hypertension, decreasing thrombosis and emboli risk. These types of advertisements always evaluate the situation from one side. Considering a food should always be made by taking various attributes and effects of the food concerned. Because, there is no perfect food since every food has got its own benefits and hazards. Therefore, what I always suggest you is; before you consume any food product, consider about your metabolism, your age, your sex, hormonal and blood profile, your culture, profession (whether your profession requires activity or it is a desk job) or disease if you are suffered with. Some foods are beneficial for some diseases while some others are harmful. I always give the same example, because it tells the situation clearly. Anemia is the lack of iron and insufficient amounts of blood cells. The prevention against anemia should be supplied by the high quality iron of proteins in animal origin as combined with medical treatment. Iron of plant origin proteins is not beneficial and effective because plant origin iron is in a very lower bioavailability when compared with animal origin iron. Therefore, meat and meat products, fish and marine origin products or poultry meat and egg can be advised. But, the same products and especially fatty forms of them should be avoided in hypertension and in all other cardiovascular diseases and disorders, diabetes and cancer since the high fat content and cholesterol may act hazardously and can cause the progress of these important metabolic diseases. Similarly, goitrogen substances in strawberry, cauliflower, tomato, Brussels sprout, soy and soy products can bind thyroid hormone and trigger the decrease of this hormone and can worse the prognosis. But the same food products with their high amounts of goitrogen contents may be good sources to deplete thyroid hormone production

which is abnormally high in hyperthyroidism. Briefly, there are specific foods for each disease and metabolic condition and these foods always change because of many different disease and metabolic disease and disorder. If you are women, you should know that your female sex hormone is dominant in your metabolism which increases the progress of cellulite. If you are not active, if you are depended on desk in your profession, if you are not too close to regular sport and exercise, the risk of cellulite you may face in a very near future is high near other important metabolic diseases and disorders. Taking all these important factors into consideration, starting regular sport and exercise without wasting any more time, decreasing saturated fat amount in the preparations of foods, elimination of trans fatty acids (margarine) from daily food consumption, avoidance from fast food, avoidance from alcohol and nicotine, avoidance from excess amount of salt and sugar are very beneficial and these protective actions can protect you against cellulite risk. If you are already suffered with cellulite, the same protective actions can slow the progress and beneficially support medical treatment of cellulite.

As it can be clearly understood from the progress mechanism of cellulite, cellulite forms because of the penetration of water, fat and salt from blood into tissue below skin and accumulation of these substances below skin. The layer which consists of salt, water and fat is called cellulite. Our enemies are clear and net; they are fat and salt, like in many other metabolic diseases and disorders. Especially, salt is one that attracts water and binds it and accumulates it in metabolism. Salty foods, cured foods which are produced by the additions of huge amounts of salt and dried foods which are produced by salt additions are always risk from the point of cellulite progress. But, salt is not the only one substance which attracts water and accumulates it in tissue. The others are alcohol and sugar. Sugar and alcohol also attract water, bind it and accumulate it in tissue. At this point, I do not neglect to say that alcoholic beverages although they might be beneficially effective for the protection against cardiovascular diseases in moderate amounts, it will be completely harmful and a disaster since minute amounts can bind and accumulate water in tissue in case of cellulite. Sugar acts in the same manner. Therefore, a person who worries about cellulite risk should avoid from 1. Salt, 2. Sugar and 3. Alcohol. Do not forget that they bind water and accumulate it in tissue and increase the risk of cellulite. Water binding capacity of these substances is not important for only cellulite. During menopause, water binding capacity of body increases because of the increase in production rate of prostaglandins which have got harmful effects such as clotting (thickening of blood), allergy, anxiety and decrease in prostaglandin hormone production which are very beneficial with their effects such as anti-clotting, tension decreasing and vasodilating (increasing the diameter size of blood vessel). The avoidance from too much fat, salt intake and alcohol should also be taken into consideration during menopause.

Fatty food consumption is one of the important factors that cause cellulite. I indicated its importance above. But, this does not mean that only fat increases the risk of cellulite. Unsaturated fatty acids and oils that are produced from plants and rich in unsaturated fatty acids can also be converted into saturated form in body and may stick to the surface of vessel wall. Therefore, unsaturated fatty acids and oils may also be the causative agents for hypertension, vessel calcification (atherosclerosis) and cellulite. But, there is one extraordinary fat group in nature which has got very beneficial protective effects against various kinds of metabolic diseases and disorders which are called as omega 3. These fatty acids were written in detail in related part, but I want to remind about the importance of these fatty acids because of their relation to cellulite. The most hazardous effect of cellulite is for vessel and blood circulation. Because cellulite is the formation of a thick and tough salt-fat and water substances, this solid formation may make a mechanical pressure on the walls of

cells by surrounding vessels or may even apply this pressure on nerves and cause too much pain. Only omega 3 fatty acids among all other fatty acids increase diameter size of blood vessel while other fats and oils and the fatty acids decrease diameter size of vessel by their accumulation inside of blood vessel. Omega 3 fatty acids also integrate with the front part of red blood cells as in triangular shape which increases the speed of red blood cells. That the structural integration increases the speed of blood stream can supply blood easier and faster. As a result, oxygen and nutrients can enter into cell easier and faster which results in faster energy production. That is why these fatty acids began to take part in nutrition plans against chronic fatigue syndrome. The increase of diameter size of vessel is deathly important in prevention against cellulite since blood in these types of vessels with larger diameter size does not slow and blood can not find opportunity to penetrate out of vessel wall into the tissue because of constant blood stream. Opposite, poor omega 3 intake but the domination of saturated fat, unsaturated fat and especially omega 6 fatty acids which are completely opposite of omega 3 in effect may decrease diameter size, slow blood speed and increase the risk of cellulite.

I had mentioned above that excess tea and coffee drink may adversely be effective in cellulite. One of the reasons for this adverse effect is the loss of antioxidant content in metabolism due to fiber content of tea and coffee. Tannin in tea and caffeine in coffee binds harmful compounds such as cholesterol, bad cholesterol, salt, sugar, fat and many others and may be helpful to protect you against metabolic diseases. But, also the fibers in tea and coffee bind important and beneficial nutritional compounds such as iron, omega 3, calcium, essential amino acids and antioxidant vitamins and minerals namely; zinc, selenium, A, B, C, D, E, K vitamins, folate, folic acid and magnesium. Free toxic radical production should be depleted and taken under control as I indicated in this part to be protected against cellulite and also many other metabolic diseases and disorders such as cancer and diabetes. Remember that toxic radicals in the case of their excess amounts accumulate around vessels and inside vessels, cause hypertension, slows blood and cause penetration of it out of vessel into the tissue beneath skin and form cellulite. Therefore, oxidative stress, in other words, excess amount of free toxic peroxy radical production, should be avoided. One of the most effective actions to deplete oxidative stress is the use of plenty of antioxidant vitamins and minerals in your daily nutrition. They are very similar in their chemical structure with fatty acids. Using this similarity, they are oxidized by oxygen instead of fatty acids but this combustion or oxidation does not yield toxic radical. Therefore, as long as you dominate antioxidant rich foods in your daily nutrition, you will directly be protected against harmful effects of toxic radicals by minimizing their production rate. You will also be protected against cellulite which may also form due to excess oxidative stress and its toxic radicals. For all these reasons, antioxidants and their intake into body in sufficient amounts are seriously important factors in protection against cellulite and other metabolic diseases and disorders. But, too much tea and coffee drink, because of their fibers, may bind important antioxidants coming from other foods which may trigger oxidative stress. On the other hand, thiofilline in black and green tea and theobromine in cocoa stimulates lipolysis (decomposition of them into fatty acids) of fats and oils which ease their elimination out of body as in the form of feces and urine. Thiofilline and theobromine of tea and cocoa may be beneficially effective in decreasing fat deposits of body due to the concerned effect. Because of this important beneficial effect, the elimination of tea and coffee may not be advised. Moderate amounts less than 4 mugs totally a day should never be exceeded. Otherwise, antioxidant binding effect of these drinks may be much more dominant than lipolytic effect of them. My advice is to select and use of antioxidant supplements which contains thiofilline and theobromine. All you have to do is to notice these two substances on the label's ingredients part. Do prefer the antioxidant formulas which also contain these two substances.

The most important biochemical reaction of universe, oxidation, the reaction between oxygen in our cells with nutrients to yield energy is the reason of our living and all our metabolic functions. Using this energy followed by combustion of lipids and carbohydrates in each cell of our body, we utilize our metabolic functions. Cardiac pump, blood circulation, upper respiratory track and intestinal movements and all others are utilized by this energy. The same energy is also used in our daily activities such as walking, running, sport and exercise. Unfortunately, energy is not the only product which is produced at the end of the reaction, but also free toxic radical products are additionally released. I mentioned them in many parts of the book. They are called as toxic since they have got various harmful effects on metabolism from cardiovascular diseases to cancer, from diabetes to Alzheimer. The excess oxidative stress, in other words, excess rate of oxidation which means the combustion of fats, oils and carbohydrates with oxygen releases a high amount of energy which is called calorie, but also releases these toxic compounds in high amounts. At this point, feeling energetic by eating delicious foods with rich amounts of fat, oil or sugar seems an easy way or an important and effective enjoy for us. We feel energetic by this way. But we can decrease the life span with the high oxidative stress and with its high energy because of inflammatory free toxic radical end products of oxidation.

Oxidation is a must since it is the only energy production pathway of metabolism. But, it is also the only production center of free toxic peroxy radical compounds of metabolism. High oxidation rate or excess oxidative stress, besides energy, may contribute to many important metabolic diseases and disorders with its free toxic peroxy radical compounds. Human and animal bodies get older every second because of free toxic peroxy radical compound production in every second as long as the organism has to produce energy to live. The body of human and animal faces harmful effects of these compounds while using the benefits of energy which is produced by oxidation. Every second of our life, they accumulate around membranes of our cells and wound them. Wounded cells come together and form wrinkles on skin, hair loss while decreasing metabolic rates of organs which are produced by these wounded cells. This is one of the main reasons in progress of metabolic diseases and disorders such as renal failure because of the failure in activity of wounded kidney cells, atherosclerosis, calcification of vessel because of accumulation of free toxic peroxy radical compounds, hypertension, the increase in mechanical pressure against the wall of atherosclerotic vessel, cardiac failure because of the failure in activity of wounded cardiac cells, liver failure because of wounded liver cells. The examples may increase that each of the metabolic disease or disorder take its origin from these toxic compounds. Excess amounts of these compounds sometimes may be converted to cancerogenic substances, rupture the cell membrane, enter into cell and mutate genome of the cell which may result in cancer. Excess of these compounds may be converted into sugar which results in Diabetes type II by increasing blood sugar concentration.

Our present data as in the highlight of scientific researches claim an important point. Depletion of oxidative stress, controlling it and suppressing free toxic peroxy radical production decrease the risk of the mentioned metabolic diseases and disorders. In other words, protection of cells, tissues and organs against defects made by free toxic peroxy radical compounds of oxidation slows aging process. Aging and metabolic disease and disorder problems are unavoidable since

we have to produce free toxic peroxy radical compounds to run energy. But here, the amount of the production is the main determiner.

Genetic liability and gene mutations are the most effective factors in the progress of cancer, like many other metabolic diseases and disorders. Some metabolisms may resist against cancer and carcinogens in spite of high oxidative rate. On the other hand, nutrition and life style is the second most effective determiner for cancer formation and progress of many metabolic diseases. **We could succeed to find only a few protective actions after many years against metabolic diseases including cancer. 1. Antioxidant 2. Fiber 3. Glutathione enhancers 4. Isoflavone and 5. Lifestyle which dominates sport and exercise, vegetable, fruit and plenty amount of water with fresh fruit and vegetable juices.**

**Salt, sugar, iron, nitrate, nitrate, phosphate, Aspartame, sakkaroz, acesulfame K, formaldehyde, polycyclic hydrocarbons, heterocyclic amines, trans fatty acids, excess cholesterol, bad cholesterol and saturated fat, uric acid and purine bases, tannin and caffeine, alcohol and nicotine exist in our life style in various amounts which increase oxidative rate directly or indirectly.** High amount of free toxic radical compounds caused by them may accumulate around cell membranes, enter into cell, mutate genome and cause cancer. The probability depends on the rate of oxidative stress, in other words, production rate of toxic radical compounds. On the other hand, the mentioned substances can directly mutate cell genome without free toxic peroxy radical production. Margarine, salad dressings, corn flakes, biscuits, crackers and chips in packaged form with their trans fatty acid content, many of the dietetics which use sweeteners namely Acesulfame K, Aspartame and sucrose, fatty meat and meat products with milk and dairy products with their high saturated fat, cholesterol and bad cholesterol amounts, fumed and cured products such as fumed salmon, sausage, salami and pickle because of their rich amounts of nitrate, nitrite, formaldehyde, polycyclic aromatic hydrocarbon contents, excess tea and coffee consumption with their tannin and caffeine, consumption rich in animal origin with its uric acid and purine bases increases not only the risk of cancer but many other metabolic diseases such as diabetes, Alzheimer, hypertension and rheumatoid arthritis. Although there are some of the mentioned protective actions against cancer and many other metabolic diseases, there is still no cure in food or anti-aging origin after tumor formation. Present scientific data shows significantly important protective effect of nutrition and life style against cancer and other metabolic diseases prior to tumor formation with a very little support relating to anti carcinogenic effects of food substances during or after tumorogenesis. Protection by the means of nutrition, food and life style which seem the initial scientific reality against cancer will continue to be promising as the initial protector against rapid aging and as one of the most important cornerstone of anti-aging.

**The mechanism in protection against cancer in food and anti-aging origin:**

Food has got its protective effects in three mechanisms against cancer.

1. Binding of carcinogens and decreasing bioavailability of carcinogens.
2. Depletion of carcinogen entrance into cell and hormonal change to suppress tumorogenesis.

The progress in food science and technology has served for years to improve food quality such as texture, tenderness, taste, aroma, flavor, color and microbial safety. Thousands of food additives were added consciously and extensionally to increase shelf life and meet consumer demands. It can be expressed that all these applications aimed for human benefits such as microbial safety and sensory improvement of the product. Salt and sugar as the two of many food additives bind water and decreases water activity. Many microorganisms do not live, proliferate and show their activity without water. But, the common use in many food products in food technology caused excess salt and sugar intakes into body by the means of sugar and salt added processed foods. Sugar directly and salt indirectly by its water binding capacity increase oxidative stress and free toxic peroxy radicals. The excess of free toxic peroxy radical compounds can directly be converted into carcinogen agents. Aspartame, acesulphame K and sucrose are proven to cause cancers which are used as sweeteners in dietetics with their indigestible structures. Trans fatty acids of margarine, saturated fats, cholesterol, bad cholesterol, oxidized bad cholesterol and very low density lipoprotein of animal origin and many processed foods which are exist naturally or produced during process, increase cancer risk by increasing the rate of oxidative stress and free toxic peroxy radical production.

Nitrate and nitrite are food additives which are added into meat products and pickles. Especially products and canned meats are the main application platforms of these additives. These additives have got four functions. First, they improve meat color. A healthy meat color is cherry red and bright. The bright and cherry red color due to oxymyoglobin formation disappears through the shelf life by reduction of oxymyoglobin to metmyoglobin by microbial activity. This reduction and the new pigment, metmyoglobin, gives brown color which is encountered as one of the most important indicator for microbial quality and shelf life that older meat and meat products loose their red color while becoming brown. Nitrate is converted into nitrite by microbial activity followed by its addition in concerned product. Nitrite fixes oxymyoglobin and postpones the conversion of oxymyoglobin into metmyoglobin by forming nitrosooxymyoglobin which has got longer shelf life. The mentioned effect of nitrate and nitrite increases the shelf life of desirable bright cherry red color of meat and canned product. Nitrate and nitrite also improve texture and tenderness by their water binding capacities. Finally, these additives have got bactericide effects (killing bacteria directly) on some of bacteria species especially *Clostridium botulinum*, as one of the most harmful bacteria which causes paralyze by blocking acetylcholine in neuromuscular junctions during its food poisoning. But, excess of nitrite and nitrate, in the case of their constantly high intakes into digestive track in a nutrition style based on meat, canned and pickle products rich in these additives, becomes free by acid and enzyme activity. Free nitrite combines with amine compounds of digested proteins to form 'nitrosamine' compounds which act as carcinogen. Scientific researches claim a close and important relation with nitrate and nitrite rich food consumption and cancer in gastrointestinal origin such as intestine, colon, rectum, anus, pancreas, stomach and liver cancer. There are also literature findings that heat process above 100 °C under humid conditions cause production of heterocyclic amines which are in carcinogenic effect. Fuming technology is one of the initial technologies in food production to increase sensory and microbial quality of food product. Formaldehyde which penetrates from smoke of hard wood material such as hornbeam and oak by the means of fume is one of the strongest bactericidal agents that kills both bacteria, virus and spore forming (spore means the resist form of bacteria against hard conditions with its special wall structure) but acts as carcinogen in the case of higher intakes than 1 ppm concentrations in food products. Therefore, nutrition rich in fumed products which have formaldehyde may also cause cancer. Nitrate, nitrite, phosphate, salt, sugar,

saturated fat, cholesterol, low density lipoprotein (bad cholesterol), very low density lipoprotein, heterocyclic amines, formaldehyde that all directly or indirectly act as carcinogenic are consumed if nutrition style is based on processed rather than natural. Natural foods, especially fresh fruit and vegetables contain many anti carcinogenic substances which will be indicated latter. **Preference of natural than processed in nutrition style can make a significant protection against cancer by decreasing the total amount of the mentioned harmful substances of processed foods.** Natural, in other words, non processed foods in plant origin appear as important protectors against cancer with their rich fiber contents. Fibers, the tough structures such as seed, root, skin and leave of legumes, vegetables, fruits and cereals, are not absorbed since they are not properly decomposed by stomach acidity and intestinal enzymes. Therefore, they have got very low bioavailability. Very few of them can be absorbed and pass into blood stream in very minute amounts which are called soluble fibers. Most of others are very hard in texture and therefore can not be digested which are called insoluble fibers. Both soluble and insoluble fibers act beneficially in protection against various cancer occasions. They are insoluble or poorly soluble but they also bind the mentioned harmful food substances which often participate in processed food compositions and excrete them out of body by the means of urine and feces. They may be assumed as the filtering of body that binds many toxic compounds including cancerogens before their absorption through intestine. In case of comparison of soluble and insoluble fibers from the point of cancer prevention, although insoluble fibers are very effective, soluble fibers seem superior since they can also be absorbed up to an extent and pass into blood circulation. For this reason, soluble fibers can bind and excrete the mentioned toxic metabolites and carcinogens not only from the cavity of stomach and intestine, but also from blood circulation whereas insoluble fibers can only clean gastro digestive system. The consumer can understand soluble rich and insoluble rich food product during marketing from texture and tenderness that soluble ones are always in smooth and juicy texture which can be pressed by finger easily with palpation while insoluble fibers are too hard and tough in texture. The nutrition and life style which dominates tomato, peach, strawberry, blackberry, apricot, plum, kiwi and raspberry may be very helpful in cancer prevention with its rich soluble fiber content by binding carcinogen food substances before their absorption.

Until 1990s, food industry wanted to separate fiber content of cereals in bread and pasta products to meet consumer demand. One reason was the lack of data as related to the importance of fibers and food education. Especially, at the beginning of 2000, anti-aging and fibers have gained an unbelievable popularity and importance as important weapons for a healthy life style and aging. Until 1990s, food producers produced bread and pasta products by separating fiber part to avoid from the brown color of the end product. A wheat germ as the main raw material of bread and many other pasta products is consisted of three parts as bran (the surface skin parts, a fiber, which protects embryo by covering surface of germ), endosperm and nuclei. Unfortunately, the removal of skin part (bran) from the product prior to milling process of wheat, wheat germs became deprived of folic acid, folat, protein, some vitamins B and especially fiber. Bran layer in all cereals and legumes is the rich source of the mentioned antioxidants and anti-carcinogens. Therefore, you, the consumer, should always not to neglect the consumption of fiber rich foods, in other words, it will be always beneficial to consume whole bread and pasta products which are darker and browny. But, remember that do not consume these pasta and bread products during meal times to be able to avoid vitamins, minerals and proteins from binding with fibers. 2-3 hours after meals as a separate consumption of these products will be much healthier.

**Meat and iron matters in cancer nutrition:**

Excess amount of lipid, whether in plant origin (oils) or animal origin (fats), should be restricted in cancer nutrition. Not only for cancer, but in prevention of many other metabolic diseases and disorders such as Alzheimer, hypertension, cardiac failure and renal failure, the avoidance from fat is a must. The toxic radical compounds which are produced followed by oxidation of fats and oils briefly lipids may bind to the vessel wall decrease the diameter size of blood vessels which is the main factor in hypertension and cardiac failure. Blood interruption or decrease in blood supply by these types of vessels into brain, kidney and liver may result in renal failure, kidney failure, stroke, Parkinson, Alzheimer and many other neurological diseases and disorders. Therefore, cancer prevention and the prevention from many other metabolic diseases and anti-aging first requires the depletion of toxic peroxy radical production and avoidance of vessel walls from calcification with these radicals. The more fatty food products consumption means the more free toxic radical consumption which may bind to vessel wall and result in hypertension and organ failures. These types of calcified vessels can not supply enough blood volumes into the cells and cells can not be fed by enough nutrients. They begin to die or can not recover their wounds. The result is decrease of healthy cell ratio but increase in wounded cell ratio which means wrinkles, hair loss and organ and tissue failures, briefly aging and disease. The main problem in cancer is the additional and extensional cell formation in body. A body can supply a definite volume of blood for a definite amount of cell. In case of cancer, the same amount of blood volume is naturally not sufficient for the increased amount of cell which is above of normal body capacity. Therefore the blood supply, in other words, nutrition of healthy cells becomes much more difficult than other times. This means that calcification of blood vessel is the main cause for many metabolic diseases. But it may definitely not be tolerated, especially in case of cancer since there are less healthy cells and blood vessels. A healthy metabolism can tolerate calcification of vessel and low volume of blood supply up to a level by using its healthy blood cells and vessels which are not calcified. But a metabolism with cancer can not. Therefore, all individuals should be protected from excess fat and its radical compounds which cause vessel calcification. Especially, individuals with cancer in lower tolerance should be sensitive in fat and oil consumption and should keep the consumption levels of these lipids as low as possible. Sugar, much more scientifically, carbohydrates are also dangerous with their high free toxic radical compound production. But, the calorie production rate of carbohydrates is much lower than lipids, fats and oils. A carbohydrate gives 4 Kcal energy per gram while fats and oils give 9 Kcal per gram. Low amount of energy can be spent with activity, walking, exercise and similar efforts, but big amounts of calorie productions may not be spent and eliminated out of body with physical activity. This excess energy is accumulated in body and its accumulation is very dangerous since excess amount of calorie if not spent and excreted out of metabolism can accumulate only in the form of fat in body. Fattening does not only for in abdomen region and thighs, but the most dangerous fattening is for the vessels which do not give any clue and progress spontaneously. If it forms in cancer metabolism, it can decrease blood supply to the healthy cells which are already in decline. Carbohydrates as in comparison with fats and oils can be excreted out of metabolism as in form of energy with daily activities much easier since its oxidation rate, in other words, energy giving capacity is lower. 4 Kcal can be excreted out of metabolism easier than 9 Kcal. Another important reason that makes oils and fats much more dangerous in cancer nutrition is their more complicated metabolism than carbohydrates. Carbohydrates are decomposed into simple sugar, glucose, fructose and galactose by the effect of stomach acid and enzymes in intestine, then absorbed and transferred into blood circulation directly. Energy can be produced

rapidly because of this easy metabolism and the rapid energy production in low amounts can be excreted easier out of metabolism. But, this does not mean that exaggeratedly high amounts of carbohydrates can be consumed. The most important determiner at this stage is the amount of the released energy. If the total amount of energy can be excreted out of metabolism or used for metabolic functions, if the energy does not accumulate in body as in form of energy, there is no risk. The comparison is only for normal amounts and the normal amounts of carbohydrates are much more tolerated and excreted out of metabolism as in form of energy with daily activities and metabolic functions much easier than fats and oils. The same amounts of fats and oils, unfortunately because of their very complex metabolism, produce energy in bigger amounts, but also very lately. Fats and oils are decomposed into simple compounds as fatty acids and three value alcohol, glycerin, and than fatty acids are absorbed but need special carriers. Lipoprotein carriers bind them and carry them through the mucosa of intestine, then transfer into blood stream. Fatty acids are carried by red blood cells and transferred into cell from blood circulation, but they are transferred into mitochondria (the energy production organelles of cell), this time by amino acids; amine and carnitine. Briefly, their transportation through intestinal mucosa, blood and mitochondria requires different carriers which cause longer time and complexity of its metabolism. Because of this complex metabolism which requires longer periods of time, energy production from fats and oils may take too much time even during sleeping. A metabolism in sleeping mode can not excrete the produced energy out of metabolism and therefore this energy accumulates in body, of course, as in the form of fat. Sometimes on the wall of vessel, sometimes around cells, but this fattening always disrupts or decreases blood supply and nutrition into healthy cells. Briefly, during cancer, healthy cells are always under threat because of cancer cell attacks or radio and chemotherapeutic agents but also fat and oil. The aim of cancer nutrition should be the protection of these healthy cells while destroying tumor by the means of medical administrations. Solutions are; avoidance from fat and carbohydrate (sugar) rich foods, often consumption of rich nutritious foods, but in lower amounts and antioxidant rich food consumption which help to suppress free toxic radical production.

**Fat for and against cancer/Omega 3 factor:**

All fats and oils in nature increase toxic radical production in case of their excess consumption and lack of sport and exercise. Although all of them effect harmfully in case of their excess intakes into body as combined with inactive lifestyle and lack of sport and exercise, only one group which is called as omega 3, may effect metabolism beneficially as long as they are consumed as combined with a fat soluble antioxidant and consumed in moderate amounts. These fatty acids show their initial protective action by decreasing TNF (Tumor Necrosis Factor), a protein factor which increases the risk of tumor progress. On the other hand, these fatty acids are anti-clotting. Diluting blood by these fatty acids protect blood vessel walls against calcification. They integrate as in triangular shape in front of red blood cells which increases the speed of these cells. The integration of these fatty acids as in triangular shape in front of red blood cells increases the speed of red blood cells. The increase in speed of these cells means rapid cell nutrition since blood cells may carry oxygen and nutrient into cells faster for energy production. Rapid energy production and faster nutrient transport into cell is much more important than ever in cancer prevention. Omega 3 fatty acids also increase diameter of vessel and ease blood flow through vessel. Briefly, these fatty acids supply cell nutrition while easing blood stream. There is also another protective effect of these fatty acids. The domination of these fatty acids in nutrition and the nutrition rich in

omega 3 fatty acids increases the production rate of prostaglandin type 1 hormones which are beneficial in effect while depleting production of prostaglandin type 2 hormones. Prostoglandine type 2 hormone depletion is important and very beneficial in cancer and cancer prevention because these hormones increase free toxic peroxy radical compound production, increase the production rate of TNF, clot blood, decrease the diameter size of blood vessel and therefore increases the risk of cancer, calcification and oxidative stress. Prostoglandin type 1 hormones are completely opposite of type 2 hormones in effect. They increase diameter size of vessel, ease blood flow, decrease cholesterol and bad cholesterol, decrease the amount of TNF, briefly they decrease the risk of calcification, cancer, hypertension, oxidation and cardiovascular diseases. Omega 3 fatty acids are protective in cancer and cancer prevention by suppressing harmful prostaglandin type 2 hormones, while increasing beneficial prostaglandin type 1 hormones. The most important effect is the antioxidant character of prostaglandin type 1 hormone production which is triggered by the effect of omega 3 fatty acids. Controversially, prostaglandin type 2 hormones are oxidant and they increase the production rate of free toxic radical. Briefly, omega 3 fatty acids can decrease the amount of free toxic peroxy radicals because of their triggering effect on prostaglandin type 1 hormone production. Prevention from oxidative stress and decrease in free toxic peroxy radical compound production decreases cancer formation risk and cancer progress since excess of free toxic radical can not be converted into carcinogen agents due to inhibition of oxidation. Omega 3 fatty acids are rich in fatty fish such as mackerel, sardine and salmon. The fish species and their omega 3 contents are shown below.

| | Fat content (g/100g) (g/100g) | EPA+DHA (g/100g) | Fat content/EPA+DHA |
|---|---|---|---|
| Eel | 24.5 | 0.83 | 29.51 |
| Herring | 17.8 | 2.72 | 6.54 |
| Sprat | 16.6 | 3.23 | 5.14 |
| Tuna | 15.5 | 3.37 | 4.60 |
| Salmon | 13.6 | 2.86 | 4.76 |
| Mackerel | 11.9 | 1.75 | 6.8 |
| Carp | 4.8 | 0.30 | 16 |
| Sardine | 4.5 | 1.39 | 3.24* |
| Swordfish | 4.4 | 1.79 | 2.45* |
| Trout | 2.7 | 0.59 | 4.58 |
| Halibut | 1.7 | 0.51 | 3.33* |
| Cod | 0.6 | 0.18 | 3.33* |
| Haddock | 0.6 | 0.16 | 3.75* |
| Lobster | 1.9 | 0.20 | 9.5 |
| Shrimp | 1.4 | 0.30 | 4.66 |
| Mussels | 1.4 | 0.15 | 9.33 |
| Anchovy | 2.3 | 0.50 | 4.60 |
| Sardine | 13.9 | 2.44 | 5.70 |

| | Fat content (g/100g) | α-linolenic acid (g/100g) | Fat content/ α-linolenic acid (g/100g) |
|---|---|---|---|
| Butter | 83.2 | 1.20 | 69.3 |
| Lard | 100.0 | 0.98 | 102.04 |
| Linseed oil | 100.0 | 54.2 | 1.84 |
| Soybean oil | 100.0 | 7.70 | 12.98 |
| Rapeseed oil | 100.0 | 9.15 | 10.93 |
| Walnut oil | 100.0 | 13.5 | 7.40* |
| Olive oil | 100.0 | 0.86 | 625 |
| Vegetable oil | 80.0 | 2.40 | 33.3 |
| Almonds | 54.1 | 0.26 | 208.07 |
| Hazelnut | 61.6 | 0.15 | 410.6 |
| Walnuts | 62.5 | 6.80 | 9.19 |
| Kale | 0.90 | 0.35 | 2.57* |
| Lettuce | 0.22 | 0.07 | 3.14* |
| Parsley | 0.36 | 0.12 | 3.00* |
| Potato | 0.11 | 0.02 | 5.5* |
| Cauliflower | 0.18 | 0.10 | 1.8* |
| Spinach | 0.30 | 0.13 | 2.31* |
| White cabbage | 0.20 | 0.09 | 2.22* |
| Wheat bran | 4.65 | 0.16 | 29.06 |

Sauci; Fahman & Kraut(1994).
*: food which appears as perfect from the point of omega 3 content.

**Diagram 7**

## Which fish species for a rich omega 3 content?

White fish meats after heating process like haddock are poorer than pink and grey-brown colored fish meats after heating process. Fish species having got white color after heating process lose most of their omega 3 content during

evisceration (cleaning of bowel and intestine) process. Because of deposition of fats in abdomen region in these fish species, a significantly important amount of omega 3 content with significantly important amounts of fat soluble vitamins are lost during evisceration. Fish species especially members Salmonidae such as Norway salmon, mackerel and sardine deposit their fat including omega 3 not only in their abdomen, but also in other tissues and muscles. Therefore, it may be useful for consumer to inspect abdomen region of fish during marketing that if it seems fatty and full they are not rich in omega 3. If abdomen region seems flat it is rich in omega 3. Also depth of water where fish is hunted from is an important indicator for omega 3 content of fish meat that Norway salmon is richer than Black Sea salmon. The deeper the water where fish lives, the colder the temperature of water results in more fat deposition in fish body to be able to heat its body. For this reason, deep water fish is always richer in omega 3 content.







Nuts are also rich from the point of omega 3 fatty acids up to a level but they should be avoided in cancer nutrition because they also contain high amounts of omega 6 fatty acids. Media and public have got misinformation as related

to nutritious effects of nuts. They claim only omega 3 benefits of these foods without considering omega 6 fat potential and high glycemic index risks. Omega 6 fatty acids are completely opposite of omega 3 fatty acids because they increase production rate of harmful prostaglandin type 2 hormones. Clotting, decrease in diameter size of vessel, increase in TNF, triglyceride, cholesterol and bad cholesterol increase and free toxic peroxy radical production increases are the harmful and adverse effects of these fatty acids. Because of the rich omega 6 content near omega 3 content, nuts should not be consumed in plenty amounts for every period of life. Especially in cancer and cancer prevention, omega 6 fatty acids with their carcinogen effects should be avoided. The carcinogen conversion from excess free toxic radical by the effect of omega 6 should always be taken into consideration. On the other hand, **another parameter which makes nuts harmful in cancer nutrition and cancer is the high glycemic index potential of nuts. High glycemic index is the sugar increasing potential of carbohydrate consumed and absorbed followed by digestion. This potential is the highest in nuts among all foods. For all these reasons, nuts should be carefully considered and should be consumed in a handful amount but not more. Red meat and meat products, poultry meat and its products, nuts, fried products, margarine, fast food products, chips, crackers, nut oils except walnut, milk and dairy products are the rich sources of omega 6.** Therefore, these products should be avoided and restricted in cancer and cancer prevention. Red meat and its products should be avoided not because of only trans fat, saturated fat, omega 6 fat, cholesterol and bad cholesterol, but also hetero-cyclic amine compounds. **These amines are carcinogen and they form during heat application above 100 °C under high humidity levels. Therefore, red meat, poultry and fish meats should not be cooked above 100 °C and heating process should be in dry conditions. Oven may be advised heated less than 100 °C.**

**High quality protein without adverse effect in cancer and cancer prevention:**

The conflicting point at this stage is that many of cancer patients are suffered from wounds and defects because of operative administration for tumor removal. Healing of these wounds and defects are maintained by high quality proteins, in other words, animal origin proteins. The healing and recovery of these wounds and defects may not form properly because of low quality and bioavailability of plant origin proteins. On the other hand, animal origin proteins are closely integrated with high or less amount of saturated fat and omega 6 which increase the risk of cancer progress. On one hand, high quality animal origin protein requirement of wounded tissues and cells, but on the other hand, cancer increasing factors in these proteins such as saturated fat, omega 6 and trans fat. Later factor necessitates the avoidance of animal origin food products. One exception to meet healing and recovery demand of wounded and defected cells appears as fish meat and whey proteins. Fish meat proteins have got the highest biologic value, in other words, highest bioavailability followed by egg albumin and omega 6 fat ratio, saturated fat ratio and trans fat ratio is lower than other meat and meat products. Omega 3 is the main dominant fat in fish meat and fish meat products which makes it incomparable and superior protein alternative. Apart from high saturated fat, trans fat and omega 6 contents, but also higher connective tissue (collagen) amounts which are not digestible lower the bioavailability of red meat and poultry meat as compared with fish meat which has got very low amount of collagen and hydroxyproline. This attribute makes the reason for the higher bioavailability and more digestion capability of fish meat proteins.

Another important protein alternative for cancer patients during cancer or people who targets protection against cancer

is whey proteins. Dairy technologies are based on fermentation of milk sugar lactose. The addition of starter culture (probiotics) into milk increases acidity by decomposing lactose into lactic acid as I had mentioned in the related part of the book. Acidity increase coagulates milk protein casein and separates it from liquid phase by forming phospho paracalciumcaseinate. The supernatant above which is liquid is called as whey and consisted of water, proteins; alpha lactalbumin, beta lactoglobulin, immunoglobulin, lactopherrin, calcium, lactose and phosphate residues. Until the end of 1990s, the main milk protein, casein, was known as one of the most important protein of milk. The research findings at the beginning of 2000 and following years have indicated to the important beneficial and protective effects of these proteins. Whey proteins have appeared as the only animal origin proteins that do not increase cholesterol but decrease it. Lactoferrin has been claimed to enhance iron absorption through the mucosa of intestine. Alpha lactalbumin and beta lactoglobulin are the two proteins which are used in antibody production. Therefore, the immune system and its performance depend on these proteins. But, the most important effect of these proteins was observed for cancer. High intakes of these proteins during cancer treatments such as radio and chemotherapy were claimed to lessen the adverse effects of these applications. Radio and chemotherapeutic agents are commonly applied to kill tumor cells, but unfortunately they also kill healthy cells since healthy and cancer cells are closely integrated to each other in tumor body. Fatigue, nausea, vomiting, loss of appetite, dizziness and liability to infection due to the defect of immune system cells in these applications appear as severe side effects. Whey proteins, in case of their intakes prior to these treatments, increase protective layer which is called as glutathione around healthy cell but decreases the amount of the same protective layer around cancer cell. The decrease in glutathione in cancer cell and its increase in healthy cell decreases the entrance of radio or chemotherapeutic agent into healthy cell while increasing its entrance into cancer cell. This attribute makes whey proteins as one of two important protein sources besides fish meat. First, they decrease the amount of cholesterol in spite of their animal origin and second, they increase glutathione antioxidant layer in healthy cell which makes healthy cells much more resist against harmful effects of cancer treatments. Note that, in spite of their important anticancer effects, they should not be supplied during cancer treatments since they may decrease the penetration rate of therapeutic agents not only into healthy but also cancer cells.

Nutrition alone which is mentioned with its initial details alone may not be completely enough in prevention cancer or during cancer treatments. Life style is also important and should be free of any kind of stress factor. Stress known by public as physiological stress but since it scientifically means distortion from normal, any kind of microbial disease, humidity, sound, light, pressure, heat with many other factors that may appear as physical, biochemical and microbial origin may be a stress factor. One or some of these factors, in case of their combination with wrong nutrition style (malnutrition) cause oxidative stress. Important point at this stage is that oxidative stress, free toxic peroxy radical compound production, is not formed by only wrong nutrition style or only life style. The combination of malnutrition and wrong life style causes oxidative stress and free toxic peroxy radical compound production. Because fat and sugar consumption at higher levels in malnutrition are combusted by oxygen to yield energy and free toxic radical compound by the effect of stress factor. Stress factor acts as initiator and stimulant for the concerned biochemical reaction. Therefore, stress should be taken under control by the means of music, art, exercise, work or any kind of activities while arranging nutrition style.

Since processed food products contain nitrate, nitrate, polycyclic aromatic hydrocarbons, salt, sugar, hetero-cyclic amines, formaldehyde, saturated fat, trans fat, low density lipoprotein, potassium, phosphorus, sucrose, aspartame, acesulfame K

and various food additives more than their natural forms, they increase the risk of cancer or increase the progress of cancer in case of its existence. The mentioned substances may trigger oxidation and can initiate oxidation reaction but sometimes they may directly be converted into carcinogenic agents, can enter into cell and mutate its genome and result in cancer. For all these reasons, processed foods should be avoided and natural ones should be preferred. The consumer should be conscious that processed and animal origin food consumption always increases the risk of cancer and cancer progress. On the other hand, natural foods especially raw green leafy vegetables and citrus fruits decrease the risk of cancer and cancer progress since they are both rich in vitamins B and C as strong antioxidants against cancer. Vitamin A and its precursor beta carotene is another important antioxidant in decreasing free toxic radical compound production. Foods naturally in green and yellow color indicates the rich content of vitamin A and its precursor beta carotene such as broccoli, Brussels sprout, spinach, grape, lemon, banana, pineapple and green apple. But, foods naturally in red color also indicate beta carotene and vitamin A existence as in the examples of red chili pepper, apple, tomato and purple grape. Ascorbic acid, the precursor and main substance of vitamin C, is an organic acid and therefore sour in taste. The clearest indicator for rich vitamin C content is the sour taste whereas the sweet taste indicates opposite. The sourer the taste is, the more vitamin C content exists in the concerned natural food. Green apple is richer than sweet and matured red apple because of its sour taste since this sour taste is ascorbic acid itself. All foods rich in ascorbic acid should be avoided from heating process if the aim is to benefit the antioxidant cancer fighting effect of rich antioxidant content of food. Cooking, simmering, scalding, oven, frying and grill process above 55 °C decreases vitamin C content in significantly important amounts. Controversially, vitamin A and its precursor beta carotene are activated by the same heating procedures. **A ketchup process by its heat and concentration procedures 11 times more activates antioxidant vitamin A and its precursor beta carotene.** Briefly, heating should be avoided to protect antioxidant capacity of vitamin C while the same process should be applied to increase the antioxidant capacity of vitamin A. Therefore, cancer patients and person who wants to be protected against cancer should consume foods both rich in vitamin C and vitamin A by dividing into two equal portions as one half should be consumed as raw while the other should be cooked. Similarly, 0.5 Kilogram tomato should be consumed as raw while 0.5 Kilogram should be consumed as cooked of totally 1 Kilogram of tomato to be able to benefit antioxidant effects of both vitamin C and A against cancer. The same approach may be applied for kiwi, apple, spinach, broccoli, Brussels sprout, parsley, banana, pineapple and all other similar products rich in both vitamin C and A.

A life style which protect person against cancer should always free of stress, nicotine and alcohol. In spite of alcohol's beneficial effects in moderate amounts on cardiovascular diseases and disorders such as hypertension, cardiac failure and stroke, there are important scientific claims as related to the very significantly important adverse effects of alcohol on liver and brain tissue. On the other hand, alcohol is a strong stress factor to initiate oxidation and increase free toxic peroxy radical compound amount. Because of the risk of free toxic radical compound into carcinogenic substances, alcohol and alcoholic beverages should definitely be avoided in cancer protection and during cancer.

Nutrition rich in fat and sugar increases oxidative stress and free toxic radical production which may then be converted into carcinogenic substances. Nutrition rich in fat and sugar should be avoided as previously mentioned. Nutrition rich in fat and sugar may sometimes show itself with fat depositions in abdomen and thigh regions. The main hazardous effect of these deposits is considered by many people with only its inappropriate physical shape. More important adverse

effect is the spontaneous oxidation risk that fat particles from these deposits can enter into blood circulation and reach into cell, be oxidized and converted into free toxic radical. The mentioned mechanism form spontaneously, many times without giving a clue. The increase in oxidative stress increases the amount of free toxic radicals while individual still focuses on physical shape. The most irritating is the interest of many people with nutrition just because of the relation between nutrition and fit appearance while there is a very few people who knows the close and strong relation between nutrition and cancer and other important metabolic diseases and disorders. Body Mass Index (BMI) which may be defined as the ratio of body length square to the total body weight may help to understand how close is metabolism to cancer, hypertension and similar metabolic diseases and also fit appearance. BMI is always advised as lower than 27 for men and 24-25 for women and should never exceed these levels for cancer prevention.

Cancer likes sugar!. Sugar, more scientifically carbohydrates, in case of their excess intakes into body, increases oxidative stress and increases free toxic peroxy radical amount which may then be converted into carcinogenic substances. Cereal products and grains are the rich sources of sugars. They may increase oxidative stress and increase free toxic radical production. But, fibers, germ and bran parts, of cereal products and germs bind significantly important amount of sugar in these groups. Therefore, whole cereal and grain products should be preferred. Because of fibers binding potential, not only harmful sugars and fats, but also important and beneficial nutritious compounds, these whole products should be consumed 1 or 2 hours after meal consumptions, but not during meal times as previously indicated. Sweet taste indicates sugar free fiber which has got a big potential for cancer and tumor progress. For this reason, sugar rich products should be avoided, in other words, sweet products although desirable and tasteful should be avoided as much as possible in cancer prevention and during cancer.

**Isoflavone factor and cancer:**

Isoflavones, the substances which are very close in function and structure to vitamins, are claimed to decrease cholesterol, low density lipoprotein (bad cholesterol) and homocyteine which may be converted into carcinogen agents. They also have got strong antioxidant and anti-cancerogenic effects. **Leukopen** in tomato, **Sulpharofen** in broccoli, Brussels sprout, **Indol 3 carbinol** in white cabbage and broccoli, **anyl** derivatives in garlic and onion, **capcaisin** in red pepper, **falcarinol** in carrot, **daidzein** and **genistein** in soy and soy products, **monoterpenes** in grapefruit, **resveratrol** and **ellagic acid** in grape and purple grape, **anthocyanines** in strawberry, **folasin** in papaya, **limonen** in orange and lemon, **chlorophyl** in Spirulina are the important isoflavones against cancer. These foods should be dominated in cancer nutrition, during cancer and against cancer progress.

Mushroom contains lentinan, a polysaccharide, which is claimed to boost immune system in cancer patients. Also it contains **beta glukan** which has got the advantage of insoluble fiber which can pass into blood and bind the carcinogens, not only in the cavity of stomach and intestine, but also in blood. Medicinal mushrooms stimulate the production of **interferon**, an important immune booster. Finally **lektin** is claimed to fight with tumor cells. Especially, medical mushrooms should be consumed in rich amounts in cancer prevention and during cancer with its mentioned protective effects.

The members of family allium such as garlic and onion are rich sources of isoflavones called **sulfide dialyl.** Sulphide dialyl decomposes carcinogen agents in liver and inactivate these compounds (American Journal of Clin. Nutr. Oct 2000, Arab, L.). Garlic and onion are known as food compounds which increase appetite with their aroma and flavor. More than that is their mentioned anti-carcinogenic effects. They also decrease bad cholesterol and increase good cholesterol, decrease total triglyceride amount in blood profile and dilute blood. Dilution, in other words, anti-clotting effect of these food products should be considered very carefully. Anti-clotting is desirable up to an extent all through the life since stroke, emboli and thrombosis and also hypertension are the results of clotting in blood. Diluted (thin) blood can flow in vessel with a constant speed. Therefore, the constant flow of diluted blood with a normal speed decreases the risk of blood to slow down and apply mechanical pressure against the wall of vessels. Hypertension risk is minimized, so other diseases which take origin from hypertension are also avoided. Briefly, onion, garlic and all other dialyl sulphide containing foods decreases hypertension risk by diluting blood in addition to their anti-carcinogenic effect. The reason for the careful consumption of these foods is due to their mentioned anti-clotting effect. The excess consumption of these products or their intakes in tablet forms with other anti-clotting agents such as the tablets of parsley, coriander ginger, cauliflower, strawberry, aspirin, coumadin, tabochan, omega 3, Co enzyme Q10 and Ginkgo bloba can increase anti-clotting level of blood too much which may increase the risk of internal bleeding. Therefore, in the case of their use with cholesterol, hypertension, triglyceride decreasing aims, only one of these tablets should be selected and taken. Their combined use in the same day should be avoided.

**Nuts and cancer relation**

Nuts such as walnut, peanut, hazelnut and almond contain quercetin and campferol as the important anti-carcinogenic agents which decrease cancer risk and help medical treatments by controlling tumorigenesis (tumor spread into health tissues). They are also rich sources of A, D, E and K fat soluble vitamins and especially B complex which all decrease the risk of cancer. On the other hand, some nuts are rich in $B_1$, some others rich in $B_2$, others rich in $B_5$ and $B_6$. Different nuts are rich in different members of B complex. Therefore, individual in healthy nutrition or in cancer nutrition should consume a mixture of these nuts rather than one type of nut to supply all members of B complex. The amount consumed should not exceed 7-8 nuts a day since they are also rich sources of fat, sugar and omega 6 which increase the risk of cancer and other diseases as mentioned above. For example, almond does not contain omega 3 which are strong anti-carcinogenic agents but contains 17 % omega 6 which increases the risk of cancer by triggering the production rate of TNF. One exception is walnut which is the richest source of omega 3 among others, but the excess consumption of the nut should also be avoided since it can cause excess omega 6 entrance into body. Walnut oil besides winterized olive oil, soy oil and canola can be administered for cooking process with its high omega 3 content.

**Liver-sulfur rich nutrition, P-450 cytochrome and cancer relation:**

**Other individuals can show a resistance against carcinogenic effects of these compounds with their strong immune systems but it may not be possible because of the weak immune system of cancer patients.** In fact, banana with its high magnesium, beta carotene and fiber content, cumin with its rich isoflavone content and grapefruit with its high folate,

beta carotene, vitamin C and monoterpenes are some of the most important healthy foods. Unfortunately, grapefruit weakens P-450 cytochrome enzyme system of liver which detoxify radio and chemotherapeutic agent residues followed by cancer therapies with its substance called bergamottin. The residues of radio or chemotherapeutic agent should be decomposed and inactivated followed by their application during cancer treatments. Otherwise, they accumulate in blood and can reach into other healthy cells and tissues by the means of blood circulation and damage or even kill them. For this reason, radio or chemotherapeutic agent residues should be eliminated out of body by the means of feces and urine. This detoxification process is made by the most important detoxifying enzyme system called p-450 cytochrome of liver tissue. Not only radio and chemotherapeutic agent residues, but also other harmful compounds for healthy cells such as trans, saturated and unsaturated fatty acids, hetero-cyclic amines, nitrite, nitrate, polycyclic aromatic hydrocarbons and homocystein that are all carcinogen are also detoxified by the same enzyme system. The Brown skeleton inside banana tissue, bergamottin in grapefruit and kumarin of cumin weaken this important enzyme system and inactivate it. One of the strong defender of metabolism against cancer, P-450 cytochrome enzyme system, should be protected against such harmful compounds. Therefore, these foods should be avoided during cancer and especially cancer therapies. Healthy individuals can consume these foods and they should consume with their strong immune systems since bergamottin and cumarin can be decomposed and inactivated immediately by the enzyme system and immune system of healthy individual. These people can also use the benefit of high fiber, magnesium, beta carotene and folic acid of the mentioned foods.

Liver defense is the most important factor in protection against cancer, fighting with cancer and during cancer therapies because of two factors. These are hepatocytes as the important liver cells which fight against cancer cells and other harmful microorganisms, and P-450 cytochrome enzyme system. Any kind of damage to liver tissue can result in spread of cancer into healthy cells, hypertension, cardiac and renal failures, oxidative stress, stroke, Alzheimer and Parkinson with many other important metabolic diseases. The causative agents of the mentioned diseases such as cholesterol, fat, trans fatty acid, homocyctein, nitrate, nitrite, toxic radical, salt, sugar, phosphate, potassium, polycyclic aromatic hydrocarbon and saturated fat are all detoxified by liver tissue. Liver with its mentioned detoxifying process and kidneys with their filtering vessels are the two critical organs for immune and defense mechanism of metabolism. The mentioned toxic and harmful substances are detoxified in liver tissue but up to an extent. The same toxic substances defect liver tissue while they are detoxified. The more free toxic radical reduction and intake of nitrate, nitrite, nitrosamine, hetero-cyclic amine, polycyclic aromatic hydrocarbon, saturated fat, salt, sugar, potassium, phosphate, allergen, trans fatty acid, homocyctein and microorganisms into body means the more detoxification of the same compounds, but the more defect on liver tissue and P-450 cytochrome enzyme system. For all these reasons, a nutrition and life style should be accomplished with daily life to support liver health. Detox process made by liver against the mentioned harmful compounds are in three types; sulfur adding, oxygen adding (oxidation) and hydrogen adding (hydrogenation). Liver tissue adds sulfur into chemical composition of a wide range of toxic substances and cells. Addition of sulfur into the chemical composition of the toxic and harmful compounds and substances inactivate them and converts them into metabolites which are not harmful for the metabolism. Liver can make sulfur adding detox process in the existence of sulfur in metabolism. For this reason, sulfur rich food intakes in rich amounts either in cancer or in other circumstances can ease sulfur adding detox process of liver tissue. It should be noted that cancer patients have not any tolerance to harmful carcinogens and toxic compounds because of their depleted immune systems. They need liver health more than other individuals to detoxify carcinogens

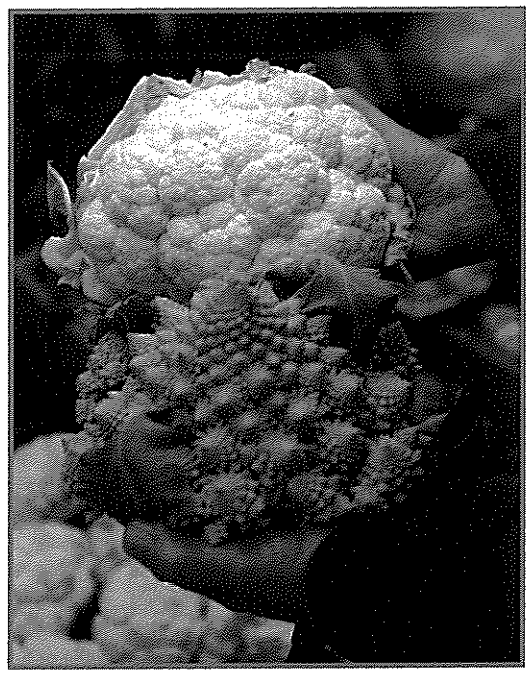
and other harmful compounds. The absence of sulfur or sulfur intakes in lower amounts into body can obstruct the sulfur adding detox process of liver and liver can not decompose and inactivate enough carcinogen and toxic compound. These compounds can accumulate in liver tissue and defect it. Briefly, sulfur rich nutrition is another cornerstone of cancer nutrition since sulfur is the initial important mineral to supply liver tissue in inactivating carcinogens and toxic compounds by adding sulfur detoxifying process. The foods richest in sulfur are; mushroom, cauliflower, onion, garlic, tomato, carrot, apple, spinach, celery, artichoke, white cabbage and fish meat. Fish meat which appears as a good alternative as animal origin high quality protein supply without high amounts of cholesterol, bad cholesterol and saturated fat and with many anti carcinogenic such as omega 3, selenium, zinc, magnesium, folate, folic acid, vitamin A, D, E and K, $B_{12}$ also can trigger detox process made by liver tissue against cancer. This nutritional profile of fish meat strengthens the position of fish meat proteins as the initial meat proteins which also support the defense of liver against cancer. The mentioned sulfur rich foods should be dominated and consumed in rich amounts not only in cancer but in protection against cancer.

**Foods which fight against cancer:**

Following foods with their isoflavones should be dominated and consumed in rich amounts with their important cancer fighting isoflavone contents.

| | |
|---|---|
| Papaya | ascorbic acid (vitamin C) and folasin |
| Strawberry | anthocyanine |
| Blackberry | anthocyanine |
| Spirulina | $B_{12}$, chlorophile, fiber, beta karoten, magnesium |
| Tomato | leukopen |
| Orange | limonen, vitamines B and C |
| Lemon | limonen, vitamines B and C |
| Sweet potato | beta karoten |
| Purple grape | resveratrol, ellagic acid |
| Flax seed | omega 3, lignin (fiber) |
| Red pepper | capsaicin |
| Broccoli | Indol 3 carbinol, quercetin, sulpharofen |
| White cabbage | Indol 3 carbinol, sulpharophen, quercetin |
| Brussels sprout | Indol 3 carbinol, sulpharofen, quercetin |
| Cabbage | lutein, zeaxanthin (precursors of beta karoten), magnesium, fiber |
| Kale | chlorophile, lutein, zeaxanthin (precursors of beta karoten), magnesium, vitamines B and C, folate and folic acid |
| Figs | derivate of benzaldehyde |
| Carrot | falkarinol |
| Soy products | daidzein and genistein |
| Citrus fruits | vitamines B and C |

| | |
|---|---|
| Pineapple | bromeline |
| Spices | anthociyanines |
| Parsley | ascorbic acid |
| Apricot and peach (Seeds) | leatril |
| Mushroom | beta glukan, lectin |
| Fatty fish meat | omega 3, selenium, folate, folic acid, ; vitamines A, D, E and K, zinc. (Salmon, mackerel, sardine..) |
| Whey proteins | alpha lactalbumin, beta lactalbumin, immunoglobulin, lactopherrin |



**In conclusion:**

Nutrition during cancer and nutrition for cancer protection should be made as complementary with medical treatments by domination of isoflavone, antioxidant, sulfur, fiber rich foods and foods which increase glutathione. On the other hand, processed food because of its various process techniques which form cancerogenic substances in food composition and food additives some of which are carcinogen should be avoided and replaced with raw and natural foods. Fresh fruit, vegetable and legumes as combined with fish meat and whey proteins as the initial protein alternatives with plenty amount of water consumption appears as the base of cancer nutrition. It should be noted that the mentioned nutrition style should be accomplished with a life style which is free of alcohol and nicotine but close to regular sport and exercise

# A FOOD GUIDE FOR THE PERSONS WITH ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

Human Immunodeficiency Virus (HIV), the causative agent of Acquired Immunodeficiency Syndrome (AIDS), like all viruses, reproduces by hijacking the molecular machinery of the cells after it invades them. The virus targets CD4 cells which fight with infectious agents and protect body against infections. The virus use a receptor on the cell wall, invades the cell by using the receptor on the cell wall, leaves the cell after killing it. The destruction by HIV on CD4 cells is the major reason for the immunodeficiency since CD4 cells are the primary sources of body against infections. Therefore, the persons with HIV are always susceptible to many variable diseases, disorders and infections. Such persons often succumb to diseases such as diabetes type 2, tuberculosis and pneumonia. There is no any clear and very effective medical procedure while most of the treatments base on prolonging life expectancy. The future of the disease strongly depends on immune system since the main problem is immune deficiency and there is no a very clear and effective treatment for the disease. For these reasons, such persons should target two goals;

1. Boosting immune system as much as possible.
2. Protection of body against all kinds of intrinsic and extrinsic threatening factors including pathogens, allergens, particles which may be contaminated by the means of air particles and pollution, environment, equipment surfaces and devices and especially foods.

Foods are one of the major threatening factors for a person with AIDS since food is a perfect media for all kinds of microorganisms including yeasts, molds, viruses and bacteria which are responsible for diseases, disorders and infections. A person with AIDS has not the same tolerance against these microorganisms and infections, diseases or disorders which are formed by these microorganisms opposite to a normal person with a normal immune system. They are already more susceptible to such threatening factors with their immune deficiency. A food is a perfect media for all these microorganisms because it contains all essential nutrients, proteins, carbohydrates and fats and additionally water. The macronutrients; proteins, fats, oils and carbohydrates in foods, the micronutrients; vitamins and minerals and finally water are the all required essential components for a microbial growth. The mentioned attributes of foods make them as a perfect host or a media for many pathogen microorganisms. Millions of people around the world face with food poisonings and infections every day due to the pathogen microorganisms which are transmitted by the means of foods. In fact, one can predict which kind of food is more susceptible to microbial contamination and may be at the top of the high risk category. Here are the clues for you and they are very simple to remember;

The texture, the appearance and the type of food may inform you that it is in lower or higher risk group. If there is a juicy layer covering the surface, if its juicy when you press with your finger, if the texture is soft, such food products may have got higher microbial loads or may be more susceptible to microbial contamination since they have got more water content. All the mentioned attributes are the indicator for a higher water content which always attracts microorganisms.

**The origin of the food:** Although it is not always a general rule and there are some exceptions, animal origin foods; red meat and red meat products, milk and dairy products, fish and marine origin products, egg and poultry and their products are always at the top of the high risk category. Because these foods have got more water content and more protein, fat, oil and many essential vitamins and minerals which support microbial contamination and growth. Of course, there may always be some exceptions that crushed, injured vegetables and fruits under poor hygienic and storage conditions are also at the higher risk category. But, normally, many people know that fruits and vegetables have got a very lower shelf life even in fridge conditions when compared with the shelf life of many animal origin products. The reason is the same, high water content, rich vitamin and mineral composition. But animal origin foods also contain a very superior protein and essential amino acid composition and content besides rich vitamin, mineral and water contents. Most important factor is the cross contamination at slaughtering point that there may always be a contamination from the content of bowel to the meat cuts during slaughtering. Therefore, the slaughtering process should have been performed without any injury and defect of bowel. The equipment, personnel, abattoir all should be under high quality hygienic conditions. Not for only red meat but the same risk is also exist for poultry and animals in dairy industry that mammary region of animal is the nearest region to the ground where it is already contaminated with feces. A cross contamination between mammary region of the animal and the ground always happens in lower or higher degree which depends on the hygienic conditions of integrated company.

Because of the mentioned risks above, most of the animal origin foods are pasteurized or sterilized. Briefly, most of them are consumed after a heat process. Heat above 54 °C kills many pathogens. Some of the animal origin foods are pasteurized by heating at 72 °C for 15 sec while some others pasteurized by heating 62.8 °C for half an hour and some others are cooked at 80-90 °C for 3-4 sec. All the mentioned pasteurization methods are very effective in reducing the microbial numbers of the concerned foods and therefore these types of pasteurized foods are always safer from the point of immune deficiency. A healthy pasteurization which is in the limits of shelf life always makes a food product safer regardless their origin, animal or plant.

**Process type:** Another important clue is whether the food product is sterilized or none sterilized. Like pasteurized ones, sterilized food products are also very high in microbial quality and their microbial contamination level is the lowest as long as they are preserved under cool temperatures (at least 7 °C) all through their shelf life. Food sterilization means the application of heat higher that 90 and 100 °C which differentiates the application from pasteurization. Occasionally, 120, 130 and even 140 and 150 °C heat levels are applied to meat and dairy products. These heat levels are very higher than the pasteurization levels. The advantage of these higher heat levels is that more and more bacteria, virus and even the bacteria which can produce spore form of bacteria which is very resist against threatening factors like heavy humidity, pressure and heat are eliminated by these extremely high heat levels. In other words, sterilized foods such as sterilized milk are at the top of the lowest risk category and then come pasteurized milks. The higher heat applications in sterilization directly extend the shelf life of these products while increasing microbial quality and safety. The only disadvantage is the minute losses of some vitamins such as B complex, C and minerals such as Mg, Ca, P, but these losses are in a very low quantity which can be disregarded.

**Salt level:** Curing process of the food by using salt, phosphate or other curing agents may indicate that such products are more resist against microbial contamination and therefore safer for the persons in immunodeficiency like the persons with AIDS. Salt, phosphate, sugar, briefly curing agents decrease water activity by binding water. Water is a must for microbial activity and growth. One of the initial food protection methods for centuries is curing since curing agents decrease water content in food and many of microorganisms can survive. Ham and pastrami (a kind of ham, a cured meat product commonly consumed in many countries of Asia, Turkey and Middle East) are some of the cured meat products which have got very low water content that is why they are very resist against microbial contamination and growth and have got longer shelf life than many other food products. Most of the curing agents like phosphate and salt make the food product dried by binding water and decreasing its amount in the product. Ready to eat soups have got longer shelf life and more resist against microbial growth and contamination with the same reason. Although resistivity against microbial growth and contamination is one of the important attribute which makes such products safer especially for the persons in immunodeficiency, it should never be understood that these kinds of food products are healthy options for people from the point of nutrition quality because of some adverse effects of curing agents on health. Salt, phosphate and sugar are the components which directly increase the oxidative stress and free toxic peroxy radical production rate in body. A person who consumes these types of products regularly may face with a high rate of oxidation and free toxic peroxy radical production rate. Free toxic peroxy radicals may be converted into cholesterol and bad cholesterol. They can also bind to the walls of inner surfaces of vessels and cause atherosclerosis (calcification). On the other hand, these compounds may directly accumulate on the walls of the vessels and decrease the diameter size of the vessel. Briefly, they are the causative agents of calcification directly or indirectly. Sodium and chlor of salt triggers oxidation and starts free toxic peroxy radical production. What I mean here is the strange status of cured products in persons with immunodeficiency. They have got an advantage for such persons since they are more resist against microbial contamination and growth and safer for these persons because of their lower water contents but they may have got some adverse effects because of their higher salt, phosphate and sugar contents which may trigger oxidation. So, what will our decision be ? We should make an order according to their importance of these factors. First, the most important factor and must for the persons in immunodeficiency is the safety of food since such persons are very prone to the infections, diseases and disorders caused by these microorganisms. For this reason, cured products which may not be a healthy option for many people because of their high amounts of salt, sugar and phosphate and high oxidative capacity may be safer food options in case of AIDS or immunodeficiency because of their lower water contents which is in the first priority of such people suffered with the mentioned diseases. But, please not that, consuming such products regularly and in plenty amounts by only concerning the mentioned priority may bring some adverse health effects to such people like calcification, diabetes, coronary heart disease and excess oxidative stress. I only want to mean that they may be included to the diets of such persons because they are at the top of the list of safe food products from the point of microbial safety as long as they are consumed in moderate amounts.

Other group of safer food products for the persons with immunodeficiency and AIDS like cured products is the fermented food products. In hypermarkets, you can prefer these food products like cured products if you are the one who suffers with immunodeficiency or AIDS, but of course in moderate amounts and rarely. Fermentation is the conversion of sugar compounds in foods into some organic acids such as lactic acid by the microbial activity during production. These

small creatures use sugar, the glycogen in animal origin flesh foods (meats), lactose, the milk sugar in dairy products and starch, the sugar in plant origin foods, for their microbial activity and growth. But, when they use these complex sugar compounds, they convert them into propionic acid, butyric acid, lactic acid and many other organic acids. The initial organic acid which is produced in the heaviest concentration is lactic acid. Not only the organic acids, but also ethyl alcohol and carbon dioxide may be produced by the microbial activity. The accumulation of such organic acids especially lactic acid in fermented meat and dairy products increases acidity. Higher acidity is an important factor which kills microorganisms and lowers their proliferation rate. In conclusion, the more acidic the food product is or in other words, the fermented the food product is, the safer the food product is with its higher microbial quality. Fermented sausage, yogurt, pickle and many others which are fermented food products have also got lower water content since the increase in acidity causes the loss of water and an increase in salt concentration. Briefly, first higher acidity and then higher salt concentration and lower water activity make these food products very resist against microbial contamination and growth. For these reasons, the persons in immunodeficiency or AIDS may consume this food group but I should remind the same factor which should strongly be taken into consideration that like cured food products, they are richer in salt. Therefore, although they can be consumed by such persons with their higher microbial quality, the consumption should always be limited.

**Handling and marketing:** Opposite to dry, cured and fermented foods, fresh foods like fresh fruits and vegetables should always be handled and preserved carefully by such persons since they are always in lower microbial quality when compared with dry, cured and fermented food products because of their higher water contents, vitamin and mineral concentrations. You may surprise when I advise the consumption of cured, dry and fermented food products as in the first priority and the fresh fruits and vegetables in the second order. You may think that fresh fruits and vegetables are very healthy options for many of the people but for the people with a normal immune system. Yes, definitely, the fresh fruits and vegetables are very healthy since they are lower in sugar concentration, higher in water content which makes them lower in calorie and safer in protecting against many metabolic diseases and disorders like stroke, hypertension and diabetes type 2. But, here, in this part, our problem, our disease is different. We are talking about immunodeficiency and AIDS. Any microorganism entrance may be a disaster for such persons since they are too weak in immune system. That is why our first priority is the higher microbial quality, higher resistivity against microbial contamination and growth in food preference and selection rather than concerning too much about cholesterol, bad cholesterol, salt and other harmful compounds of the food. This should never be understood that cholesterol, fat, salt, bad cholesterol, homocyteine and many other harmful compounds are not important and not necessarily taken into consideration. I have been constantly writing about the mentioned harmful compounds in the foods and trying to mention the protection against such harmful compounds and foods all through the pages of the book. But, here, the disease and disorder we are analysing is very different than others. This group of diseases is immunodeficiency disorders and therefore microorganism entrance into body is the first priority. Thus, the persons with such disorders should first require how the food is safe in microbial quality and how it is resist against microbial contamination rather than its vitamin, mineral content or lower calorie.

**The status of lower calorie and vitamin-mineral rich foods in AIDS:** Should lower calorie and vitamin-mineral rich foods according to the explanation above be limited? Of course, never. But, fresh foods and vegetables are commonly

sold in the markets unfortunately under poor hygienic conditions in many countries. Also, they can easily be crashed and their roots, leaves and skins can easily be defected. The water penetrates out of skin and it can easily be a media which attracts microorganisms. Thus, fresh fruits and vegetables are always in lower microbial quality and shorter shelf life when compared with dry, fermented and cured ones. The persons in immunodeficiency and AIDS should of course consume fruits and vegetables, but as properly cooked rather than fresh. Salads should not be administered unless they are properly handled and washed especially by using chlor added water. Many times, properly cooked fruit and vegetable dishes should have been preferred as properly cooked since heat above 54 °C will have eliminated most of the microorganisms in the fruit. Especially 74 °C as the inner heat level of food when maintained, you can consume it safely.

**Prefer the properly cooked ones:** If you are the one with immunodeficiency or AIDS, prefer to consume properly cooked meat and vegy meals out of home, in restaurants or similar places, where food is served and consumed. As I mentioned above, raw vegetables or fruits and the mix salads of raw fruits and vegetables are always at the top of the high risk category. Be sure that vegetable or fruit is properly cooked, otherwise do not consume it in such places. Instead, prefer properly cooked meat and meat products or cured and cooked or cured, fermented and cooked or fermented and cooked foods in similar places. This approach may significantly decrease the probability and incidence of food poisonings and infections which may form due to microbial contamination by the means of contaminated foods.

*Salmonella, Campylobacter jejuni, Listeria monocytogenes, Streptooccus pyo*genes and *Staphylococcus aureus* are the initial microorganisms and threatening microbial pathogens for all consumers, but especially for the persons with immunodeficiency or AIDS as the most common food infection and poisoning agents.

*Salmonella*, the most common causative agent of food borne illness all over the world, is contaminated by the consumption of raw and undercooked meats and especially poultry and egg and their products. It is still not clear why especially poultry, egg and their products are most susceptible one to *Salmonella* contamination but the thinner tissue, hatching, the higher temperature levels like 39 °C, the easier cross contamination during slaughter may be the main reasons for the ***Salmonella*** contamination to poultry meat and egg. The first contaminant and risk should always be concerned as *Salmonella* in case of egg and poultry meat consumption. Prefer to buy them from famous and well known companies. When you bring eggs and place them into refrigerator, do not clean them. Many people first clean them with water and then dry and finally place them into refrigerator. The cleaning process of egg crust removes an albumin-cutin protective layer from the surface which may protect against microorganisms and prevent microbial entrance from crust. Pay attention that egg should be properly cooked. Be sure that all the contents of egg including egg white (albumin) and egg yolk (vitellin) should have been completely solid.

***Campylobacter jejuni*** which is another common causative agent for food infection prefers poultry and egg most, like *Salmonella*. The difference between *Salmonella* and *Campylobacter* contamination to poultry meat and egg is that *Salmonella* is contaminated from environment to poultry meat or egg whereas *Campylobacter* prefers bowel of poultry and contaminates poultry meat as a result of cross contamination while oviduct, the duct which carries egg, can also be

contaminated by the bacteria as a result of a direct cross contamination from bowel and abdominal cavity. Person with immunodeficiency or AIDS is 35 times more in risk from the point of the risk of *Campylobacter* food infection. Raw milk can easily be contaminated by the mammary gland which is the closest organ of husbandry animal to the ground which is covered with feces. Prefer only sterilized (UHT; Ultra High Temperature) milk to consume. As you remember from above, sterilized and pasteurized milk technologies make milk and dairy products very safe from the point of microbial quality. But, sterilized milk and dairy products such as milk powder and UHT milk are at the top of the safe foods since the temperature levels applied in sterilization is much higher than the heat levels applied in pasteurization.

Listeriosis, the disease which is caused by ***L. monocytogenes***, may be contaminated by many foods from milk to poultry, red meat, vegetables and fruits. Listeria infections are more common in persons with immunodeficiency and AIDS like in *Salmonella* and *Campylobacter*. Soft cheeses, unpasteurized ready to eat foods such as hot dog or delimeat or the products such as pate which is not treated with any heat application prior to consumption are the initial foods which have got a higher risk level in contamination of Listeria.

The symptoms in *Campylobacter* and *Salmonella* infections are similar. Fever, diarrhea, low of weight and appetite, abdominal pain and cramps, dehydration, dizziness and nausea are the main complains while the pathology of Listeriosis is much worse. *L. monocytogenes* as the initial causative agent of Listeriosis may cause to inflammation of brain membranes which is called as meningitis. The bacteria may contaminate the whole blood system, proliferate and increase in number in blood and may contaminate all other organs and tissues by using the blood circulation system which is called as septicemia. Abort (miscarriage) and stillbirth may also be possible.

**Proper refrigeration is a must:** One other protective action to be able to control microbial growth and prevent their increase in number is an immediate refrigeration. No matter what the source of the food is fruit, vegetable or animal origin, should directly be taken into refrigerator just after coming home from market. Refrigeration is commonly between 4-7 °C and your food should have been stored under these cooling conditions all through their shelf life. But of course, some types of foods are stored out of refrigerator like cereals and dried foods, in tightly closed and colored boxes. Cooling, the preservation by the low heat levels above 0 °C, never kills the microorganism or decrease their amount. Briefly, cooling is not a destruction procedure. Many of the microorganisms except cold loving ones can not grow and increase in number in cold temperatures. Proliferation is taken under control since metabolic activity decreases and bacteria can not multiply at such cold temperatures. The heat levels above 10 °C are always suitable for many of the microorganisms and they can easily grow, multiply, show metabolic activity and make a risk for consumer health. If you freeze which is another preservation method, but at much lower heat levels than cooling below 0 °C like -12, -18, microorganisms stop their metabolic activity. The big difference between freezing and cooling is the degree of metabolic activity in microorganism that metabolic activity completely stops in freezing while it decreases in some levels as depending on the level of heat in cooling. Because of this important difference, microorganisms in frozen foods are the same after in microbial loads after long periods, just like in their stage before freezing, while there is always a slight increase in microbial load at lower speeds in cooling. For this reason, the shelf life of the foods in refrigerator prolonged but the extension of the shelf life has always a limit. Poultry meat offal should have been preserved just under freezer and

consumed within 2-3 days while fish should be consumed within 1-2 days. Red meat may be stored in the refrigerator as long as 4-5 days and should have been consumed within 4-5 days. Vegetables and fruits should have been consumed within 2-4 days under the same conditions.

Another protective action to avoid microbial threatening factors is the packaging. Never choose packages which are torn or leaking.

Cross contamination is a risk for every food group. It may often be possible from bowel to meat during slaughter, from bowel to egg, during hatching but also may be from meat juices to fruits and vegetables if they are put in the same packaging or place. Placing vegetables and fruits far from meat, poultry and fish always decrease the cross contamination from meat juice to fruit and vegetable.

Veal, beef, lamb steaks, roasts and chops should be cooked at min 63 °C (145 °F).

All cuts of pork meat should be cooked at min 71 °C (160 °F) internal temperature. Keep on your mind that pork meat is a natural host for a common parasite *Trichinella spiralis*. Pork meat is also richer in fat, saturated fat, cholesterol, bad cholesterol and homocyteine that can make immune system weaker. For this reason, prefer lamb, poultry, fish and lean red meat lower in fat rather than pork meat. The reason for the necessity of higher internal temperature for pork than veal, beef, poultry and lamb is the higher fat and water content of pork.

Especially, cutting and grinding of meat increase surface area and also increase free water content which may attract microorganisms.

Egg should be cooked properly at 71 °C (160 °F), especially to destroy *Salmonella, C. jejuni* and *Listeria.*

I had mentioned above that one of the most important microbial threatening factors for human especially for the ones with immunodeficiency and AIDS is Campylobacter jejuni. The bacteria are also one of the reasons for an acute flaccid paralysis due to an autoimmune disorder in human which is called Guillain-Barre syndrome. The rate of the syndrome has been increasing rapidly especially in developed countries which has been emerging a public health concern. Other pathogen bacteria species from the same genus are *Campylobacter lari* and *Calmpylobacter fetus*. Unlike other food borne enteric pathogens such as *Salmonella* and *Shigella*, the bacterium requires a microaerobic atmosphere (5% oxygen) for growth while they can recover their wounds especially at an elevated temperature (42 °C). The bacterium is taken into body by the means of contaminated foods, penetrates and colonizes on the mucosal layer, the cells of stomach and bowel which results in inflammation called gastroenteritis. The bacteria is motile, meaning that it can move far distances along the bowel and can contaminate and cause infection in many parts of the bowel. Another dangerous attribute of the pathogen from the point of consumer health is its toxin secretion that the toxin can even disrupt cellular processes and therefore very harmful. The patient may show clinical symptoms 2-4 days after ingestion of *Campylobacter* contaminated food or drink. Low grade fever and diarrhea accompanies abdominal cramp and pain. Bloody diarrhea as depending on

the destructive effect of inflammatory *Campylobacter* toxin on mucosal cells of bowel may also be seen. Severe conditions may be inspected especially in target groups with immunodeficiency syndrome, AIDS, pregnant women, elderly and child. Most infections of *Campylobacter* are self limiting and adequate supportive treatment may be sufficient for full recovery. But, in severe inflammatory conditions, your doctor may need to administer antimicrobial therapy in case of fever, bloody diarrhea and prolonged duration of clinical symptoms.

The initial contamination factor in food poisonings and infections is the insufficient packaging. The problems in packaging and improper packaging are an opportunity for the food surface to contact with air. Bacteria, virus, mold and yeast in huge numbers can easily contaminate the food surface and begin to proliferate. One of the packaging processes is the prevention from air contamination. Packaging material is a barrier which interrupts the microbial contamination from air and decrease the contamination level in air origin. Especially the juice of red meat, poultry meat, pig meat and fish is very rich in proteins, carbohydrates, water, vitamins and minerals which make it a very suitable media for microbial growth. For this reason, never choose packages which are torn or leaking!

Process is another factor which determines how the food is susceptible to food poisonings and infections. We have got many food processes to increase the shelf life, sensory quality and safety of food products. Fuming (smoking), curing, fermentation, cooling, heat application, canning, drying, concentration, High Hydrostatic Pressure (pressurization=non thermal pasteurization) and evaporation are the initial food process applications. As I have tried in many parts of the book, although all food process techniques intent to increase microbial and sensory quality of food products, many of them like curring, fuming, fermentation and canning may cause some adverse effects on human body with the end products which naturally form during their application. Many times, some additives are applied to food during their applications which may also be harmful for our body. Nitrate and nitrite, the two additives which are strongly bactericide (killing bacteria) are added during canning, fermentation and curring. These additives are so strong bactericide agents that they can even kill ***Clostridium botulinum*** which is the most resist bacteria to fermentation. But, both additives may increase the risk of cancers in bowel and bowel origin, in case of the food consumption which contains these additives. Formaldehyde is another additive which naturally contaminates the food by the means of fume (smoke) in smoking application. It is one of the most effective, strongest microbicid agents which kills bacteria, virus, mold and yeast. Formaldehyde, polycyclic aromatic hydrocarbons and benzopyrene which are all contaminated from smoke during filming may increase the risk of cancers in bowel and bowel origin in case of their regular and long term consumptions. Curing agents are salt, sodium ascorbate (vitamin C), nitrite and nitrate and all of them can bind to the surface of blood vessel and decrease the diameter size of the blood vessel and cause calcification. Therefore, the regular and long term consumption of cured products may be a reason for the progress of calcification in addition to cancer in bowel and bowel origin. Similarly, cured and fermented, fermented and fumed products and the food products which are produced by using the other process combinations may have got beneficial compounds in increasing the shelf life of the product, increasing the microbial quality of the product and decreasing the risk of food poisonings and infections but unfortunately, they may increase the formation risk of some important metabolic diseases and disorders. The reason to make this explanation once more is that we should know an important fact about foods and their processes. Process techniques may bring some harmful effects to our body and health while they are applied to many foods and many food

products that we consume. All of them increase the shelf life of the products, increase their microbial quality and safety although some additives in processed foods are harmful for us. You will easily remember that I have just mentioned the first priority in food for a person with AIDS or immunodeficiency that is microbial safety and high microbial quality. Therefore, processed foods may be a good option as long as they are not consumed in plenty amounts. Another important fact which should carefully considered by the persons with AIDS and immunodeficiency is the non processed, raw foods. There is an opposite fact about them which also differentiates their basic nutrition from others without immunodeficiency. Raw foods, in other words non processed foods are very healthy and in the first priority since they do not contain the harmful compounds mentioned above. They are also richer in vitamin and mineral content since fume, heat, curing, the process techniques which decrease vitamin and mineral content are not applied to them. But, as I have mentioned above, they are very susceptible to microbial contamination since they are richer in water, mineral and vitamin contents and they do not contain the mentioned harmful compounds which increase the shelf life, microbial quality and safety of the food products. I wanted to remind you the two opposite facts which also differentiate processed and raw foods because these facts are really very important in the nutrition of persons with AIDS and immunodeficiency. Since raw foods are much more liable to microbial contamination and their juice can be a source for microbial growth and contamination, processed foods and raw foods should never be placed into the same place, in the refrigerator, in carriers in markets. Raw red meat, fish meat, raw pig meat and raw poultry meat should be placed into a plastic bag tightly that meat juices should not drip on other foods and contaminate them. Meat juices should always be considered as microbial source and their microbial growth may be triggered when these juices reach to fresh fruits and vegetables and meet with the rich water, vitamin and mineral content of fruits and vegetables.

Vegetables and fruits should also be placed in different places at a far distance with animal origin foods especially they should be separated from non processed meat and meat products, fish and marine origin foods.

When you order a food from a food store, be sure that the personnel should have washed their hands and should have used plastic gloves.

Do not purchase cans that are dented, leaking or bulging, avoid the foods in cracked glass jars or food in torn packaging. Especially, whenever you see a bombage in the packaging material of canned food products, it is an indicator for *Cl. botulinum*, one of the most harmful bacteria and the causative agent of Botulism disease. Botulism is caused by the harmful toxin of *Cl. botulinum* which causes paralysis in neuromuscular system and the mortality is high due to the paralyse in upper respiratory track.

Be sure that tamper-resistant safety seals in the food product should be intact.

Your fridge conditions should be at 4 °C while freezer should be minimum at -18 °C. Although freezing and cooling in refrigerated circumstances are very inhibitory and can control microbial growth. Both storage do not kill microorganisms but decrease or stop their activities and proliferation. Unfortunately, some microorganisms which like cold temperatures may continue to their activities and growth. One important example is the cold loving stereotype of *Staphyloccocus*

*aureus* which is also very resist against most of the antibiotics especially methicillin. The bacterium is responsible for the inflammation on nose mucosa, upper respiratory track, inflammation of skin and the tissue under the skin. *Staphylococcus aureus* also causes pneumoniae (the inflammation of lungs) and renal failure with its toxin. The toxin melts the lipoprotein structure of the cells in body and causes to death of body cells. Another harmful bacterium which may be contaminated by the means of contaminated foods is *Streptococcus pyogenes* which has got similar harmful effects. Both bacteria is called as 'flesh eating' and may have got severe complications. Not only these two bacteria, but also some other harmful bacteria species like *Clostridium botulinum* has got a group which can live and show metabolic activity under fridge conditions. Briefly, many microorganisms may be taken under control and their activity and proliferation may be inhibited but some of them has got cold loving character at the same time and can continue to live and show their activity at the same conditions. For all these reasons, the inner and outer surfaces should always have been kept clean.

***Do not forget that food storage at -18 °C is always the safest from the point of microbial quality.**

***Once you thaw the frozen food, use it immediately and thaw it in the refrigerator or directly cook it since thawing juice is a good source and a microbial reservoir with its rich water, protein, vitamin and mineral content.**

One of the most important threats for the persons with immune deficiency and AIDS is Campylobacterisosis which is caused by the bacteria *Campylobacter jejuni* which was also mentioned above. It is one of the causes of acute flaccid paralysis due to an autoimmune disorder in human which is called Guillain-Barre syndrome. The rate and the severity of the syndrome has been increasing especially in developed countries as an emerging public health concern. The bacterium also causes a food infection which is characterized by diarrhea and fever. Guillain-Barre syndrome is not the only risk sequelae, but also arthritis (inflammation of joints) and Reuter's syndrome may be other consequences followed by Campylobacter infections. **Reiter's syndrome** is characterized with arthritis, redness of the eyes and urinary track infections.

**Guillain-Barre syndrome** is an acute inflammation including joints and peripheral nervous system and also motor paralysis. Rarely, weakness of limbs and respiratory muscles may be inspected. Actually, Campylobacter is a part of the normal bowel flora of food producing animal species like chicken, turkey, swine, cattle and sheep. Especially, unpasteurized milk products, meat products, poultry meat and its products are the highest risk group as a strong vehicle to transmit the bacteria. This bacterium can continue to live and show metabolic activity under refrigerated conditions. Under these conditions, the only protective action to avoid the bacteria seems to cook the frozen or refrigerated food directly and properly. The persons with AIDS or immunodeficiency should know and consider that some species of the bacteria can survive at even lower temperature levels like -18 and -36 °C. But if you cook the food properly to 160 °F (71 °C), the bacteria can be eliminated. Briefly, hygienic storage and cooking properly is a must to eliminate the risk of Campylobacteriosis, Guillain Barre syndrome and Reiter's syndrome.

Let's remember the initial protective actions to avoid from food poisonings and infection and for healthy food consumption;

- Thoroughly cooking raw food in animal origin such as beef, pork, poultry, lamb, milk.
- Washing raw vegetables thoroughly before eating.
- Keeping uncooked and raw foods from cooked and processed ones.
- Avoiding raw milk and unpasteurized dairy products.
- Washing hands, knives and cutting boards after handling uncooked foods, consuming perishable and ready-to-eat foods as soon as possible. You can add one teaspoonful chlor into one L water and use this water for the cleaning process of fruits and vegetables, especially if you are the one with immune deficiency or AIDS.
- Overcooking the highest risk foods such as deli meats.
- If you are the one with AIDS of immunodeficiency, prefer pasteurized and sterilized food products. For example, cream cheese is produced from pasteurized milk.
- Avoiding from foods at the highest risk like pates and meat spreads.
- Cleaning the refrigerator.

The 'aging' and 'disease' are caused by atherosclerosis; the calcification of blood vessels. You may assume them as the water pipes of washing machines. Once they are plugged with lime, the water can not pass through and the machine stops its function. The pipes are vitally important to transfer water in the machine like the blood vessels in our body. Once they are plugged with cholesterol, bad cholesterol, homocyteine, excess salt, nitrite, nitrate, polycyclic aromatic hydrocarbons, sugar, saturated and unsaturated fats, the blood can not pass inside and begins to slow. It makes a pressure on the wall of blood vessels that is what we call 'hypertension'. Once a plug formation or the accumulation of the mentioned hazardous compounds inside the walls of blood vessels forms, it does not only in one part of blood vessels. If atherosclerosis, the calcification of blood vessels forms in the body, it exists for all kinds of blood vessels. Coronary vessels, brain vessels, vessels which support blood to kidneys, liver and lungs are all affected and become calcified. Hence, the calcification of vessels by the mentioned hazardous compounds should be limited. In case of atherosclerosis (blood vessel calcification), many of us concern about the calcification of only coronary vessels, the vessels which supply blood to heart. The calcification of these vessels is also an indicator for the calcification of brain vessels and all other parts of other vessels. But, the severity of calcification may differ from vessel to vessel which depends on the diameter size of the concerned vessel, the importance of organ (that although every organ and tissue is vitally important, some of them like brain, heart and lungs play the most important role), the calcification of vessel may be more or less important. When the calcification of brain vessels is concerned, the most dangerous point of such calcification is that it is invisible many times. You may not realise even for years that your brain vessels are calcified until you become suffered with dizziness, nausea or a severe hypotension or low body temperature. Then you consult a doctor who tells you that you are suffered with the calcification of brain vessels. But, many times, the diameter size of the calcified brain vessels are still small that some amount can pass inside these vessels. It means that your brain tissue still supplies some amount of blood to the brain and brain still continues to live and show its function. But, some minute, pin spot areas die because of the mentioned insufficient blood supply. Because they are very small in diameter size, these pin spot dead areas may not be a problem since other healthy areas can take the function and brain tissue can continue its function. Days and years increase the amount of these dead areas and although they are very small in diameter size and pin spot areas, these many dead areas come together to form a significantly large area in diameter size. If these dead areas which are formed by these dead pin spot points are responsible for the secretion of serotonin, this neurotransmitter hormone can not be produced and the person may be suffered with manic depression or depression or anxiety since serotonin is the relaxing hormone. If the dead areas are responsible for the secretion of dopamine which utilizes sleeping process, dopamine can not be produced in enough amounts and sleeping irregularities or insomnia may form. Finally, dopamine, the hormone which is responsible for the coordination and control of muscles and bones can not be produced enough followed by necrosis of the tissues in brain and tremors of muscle can not be taken under control, the result may be Parkinson. Briefly, the blood supply to brain tissue is deathly important and the calcified brain vessels can not supply enough blood and may cause to death of many small pin spot areas. The process is invisible and may not give you a clue. For all these reasons, Parkinson or Alzheimer, both should be concerned as an end point, end stage of a wrong life style and nutrition which causes to the accumulation of the mentioned hazardous food compounds on the walls of brain vessels. They should be concerned as a result of the wrong life style and nutrition rather than a disease. Many of us may think that the disease

formed suddenly, in the morning or at night. But, that is wrong. The process is not formed suddenly, opposite; it is formed for days, months or even years. We may not understand because it is invisible and spantenous.

I did tell all the details mentioned above because I wanted you to know the mechanism of the disease formation. If we know the mechanism of the disease how it forms and which parameters and predisposed factors increase the risk of these diseases, then we can take our protective actions. If you know that the calcification of your brain vessels forms due to the excess amount of cholesterol, bad cholesterol, homocyteine, nitrite, nitrate, hormone additives, coloring agents, salt, saturated and unsaturated fat, sugar, biogenic amines, trans fatty acids, salt and polycyclic hydrocarbons, then you can avoid them and decrease the risk for the formation of Alzheimer and Parkinson. The protection against these diseases is possible. The answer is clear and net. A correct and conscious nutrition and a good life style free from alcohol and nicotine. Let me remind you the ways to decrease the risk of calcification on the walls of brain vessels and other vessels.

Either soluble or insoluble, both types of fiber can bind the excess amounts of the mentioned harmful compounds such as salt, cholesterol, sugar and fat and excrete them out of the body by the means of urine and feces.

Plenty of antioxidant intake: Every time it is a must for all periods of your life. Oxygen which is inhaled through upper respiratory track and absorbed by lungs enters into the reaction with fats and carbohydrates in each cell to yield free toxic peroxy radical compounds. These free toxic radical compounds as additional to the mentioned harmful compounds above can accumulate inside vessels, on the walls of them and may decrease the diameter of blood vessels and cause calcification. Antioxidants, vitamins A, B, C, D, E and K, Coenzyme Q10, Ginkgo biloba, Omega 3 fatty acids, minerals selenium, zinc, magnesium and calcium all are very beneficial in reducing the stress of oxidation and production rate of free toxic radical compounds. Vitamin A sources, the best indicator for the vitamin and its precursor beta carotene is the green, red and yellow color tones. Dominate the fruits in yellow, red and green color. You do not need to keep on mind which fruit and vegetable is rich of beta carotene and vitamin A since you can easily forget them by the time. Only you should do is to prefer and buy yellow, red and green colored ones in market.

Do not forget that vitamin C decrease by the effect of heat and vitamin A while its precursor, beta carotene, increases due to heat. Therefore, divide your portion into two and cook and consume half part without cooking while do not cook the other half and consume this part as raw to be able to benefit both vitamin C and vitamin A and beta carotene. This rule is the same for all beta carotene, vitamin A and C rich foods which are in red, green and yellow color tones. Especially, it usually works that all sourish and juicy and red, green or yellow in colored ones are rich in both vitamin C, A and beta carotene. Do not forget this important rule during your marketing.

Do not forget that nicotine and alcohol increase the rate of oxidation and free toxic radical production and hence increase the risk of Alzheimer and Parkinson.

Strawberry, blueberry, raspberry, cherry, sour cherry, onion, garlic, celery, mint, red chili pepper, coriander, ginger and

cumin are rich in isoflavones which dilute blood, decrease cholesterol and enlarge blood vessels. Isoflavones with the mentioned functions are essential to improve your cardiovascular health and hypertension but the same compounds are also strong antioxidants. Isoflavone rich diets do not only protect against hypertension and other cardiovascular diseases and disorders but also protect against Alzheimer and Parkinson and other similar neurological diseases by protecting brain vessels against calcification and diluting blood that circulates brain tissue. Here are the most important isoflavones and their sources;

| | |
|---|---|
| Beta karoten | Dried apricot |
| | Sweat potatoe |
| | Carrot |
| | Potatoe |
| | Green leafy |
| | Melon |
| | Red chilli pepper |
| | Green pepper |
| Leukopen | Tomatoe |
| | Ketchup |
| | Melon |
| | Grapefruit |

An important point! If you apply heat, if you cook, you can increase bioavalibility and the amount of lycopene. Hence, ketchup is richer in lycopene than raw tomatoe. Also, all other heated and processed tomatoe products like tomatoe puree, tomato paste and tomatoe juice are richer in lycopene. As you notice above, one other food component which is activated and show a significantly important increase in its bioavalibility is beta karoten, the precursor of vitamin A. The solution is very simple. Making salads are always healthy and a must for all periods of live as the initial sources which supply us plenty of antioxidant and fiber besides one of the greatest antioxidants, vitamin C (ascorbic acid). But, if you cook the half of vitamin C rich foods and other ones in especially red color, you will have increased not only beta karoten and vitamin A but also lycopene and its bioavalibility.

| | |
|---|---|
| Lutein | Tomatoe |
| | Tomatoe juice |
| | Tomatoe paste |
| | Ketchup |
| | Pink grapefruit |
| | Watermelon |
| | Spinach |
| | Cabbage |

| | |
|---|---|
| | Grape |
| | Legumee |
| | Orange |
| | Green pea |
| | Cucumber |
| | Kivi |
| | Corn |
| | Green leafy |
| Zeaxanthine | Green and red pepper |
| | Corn |
| | Orange juice |
| | Mango |
| | Orange |
| | Purple grape |
| | Melon |
| Anthocyanin | Cranberry |
| | Raspberry |
| | Plum |
| | Purple grape |
| | Cabbage |
| | Eggplant |
| | Radish |
| Anthoxanthin | Potatoe |
| | Onion |
| | Cauliflower |
| Phytoestrogenes | Soybean and soy products |
| | Flax seed |

Plenty amount of isoflavon consumption will not only protect you against Alzheimer and Parkinson, but also the blood diluting, cholesterol and bad cholesterol reducing and vessel dilating (increase of dimater size of vessel) effects of these food compounds will also help for the protection against hypertension and cardiovascular diseases and disorders.

Main problem in Parkinson is the more energy requirement due to the increased metabolic activity because of dopamin deficiency. The insufficient amount of dopamin secreation causes tremors and uncontrolled muscle coordination. This

change is the main energy problem in Parkinson which causes a significant weight loss. For this reason, the nutrition in Parkinson should be based on carbohydrates. I could also advise fats since their energy potential is more than twice of the equal amounts of carbohydrates or proteins. But, their metabolism is the most complex among proteins and carbohydrates while a carbohydrate can easily be combusted with oxygen and converted into energy. The most beneficial attribute in the energy production by carbohydrates is that their energy can easily be spent by metabolic activity and daily life as long as they are not consumed abnormally high amounts. But, fats and oils, briefly lipids, give much more energy and this energy can not be spent easily opposite to carbohydrates since it is produced in longer times when compared with carbohydrates. Therefore, there is always a risk of the accumulation of excess energy coming from fats and oils. I do not need to say why the accumulation of the energy coming from foods is risky because I have mentioned it in many parts of the book. The excess of the energy accumulates in body can be accumulated as only in the form of fat. The result is obesity and fattening and the increase in the risk of hypertension, cardiovascular diseases and disorders and all other metabolic diseases and disorders including Alzheimer and Parkinson due to the calcification because of obesity or fattening. Note that fattening may form separately from obesity while there may be no obesity inspected in the person. But, it should not mean that the person is not suffered with fattening since it may often be invisible, in the inside of vessels or around cells. Therefore, persons with Parkinson should give priority to carbo as energy source rather than fats and oils. A healthy body requires 35 Kcal / Kg but the person with Parkinson or Alzheimer should supply more than 35 Kcal/Kg per day.

**Coenzyme Q10** has become very popular in developed countries as one of the anti-aging preparates. It is an enzyme and often exists in meat and meat products, in other words flesh foods, since it exists in every cell of our muscle. The enzyme is required for energy production. The combustion of fats, oils and carbohydrates by oxygen in each cell of our body is regulated and directed by this enzyme. The concentration of the enzyme decreases significantly in Parkinson and Alzheimer. The decrease of the enzyme is also another contributor to the energy loss in these diseases. The important function of the enzyme in energy production motivated medicine producers to produce Coenzyme Q10 tablets. The same function of the enzyme has also become the main factor in its wide using platform. Unfortunately, Coenzyme intake from out into the body by the means of tablets is useless. If your target is to increase your energy level, it can only make a placebo effect which means that you feel energetic because you want to believe to the effect of the tablet and you need to feel energetic. **Coenzyme Q10 which is taken into the body by the means of tablet does not enter any pathway, any reaction of energy production. Only the native Coenzyme Q10 enzymes of body participate in the energy production. Do not pay lots of money to buy Coenzyem Q10 tablets to be able to increase your energy production level. It is useless! But, if your target is to dilute blood, decrease cholesterol and bad cholesterol, enlarge blood vessel and ease blood circulation, you can benefit from the tablets of the enzyme like Omega 3 and Ginkgo biloba. All I want you to know is that Coenzyme Q 10 tablets may be beneficial in calcification but it has been proven as not effective in increasing energy.** Coenzyme Q10 is naturally found in all meat and meat origin foods and flesh foods including egg, poultry and their products, fish and fish products, red meat and its products. **Unlike media claims, very few plant origin products contain the enzyme. Hence, if you want to supply the enzyme naturally by the means of daily nutrition, do not neglect to consume sufficient amount of low fat meat and flesh foods such as lean.**

Aspartame is a sugar like substance which is added intentionally into the candies and sweats since it is not absorbed through intestines and not transferred into blood. Hence, many consumers with obesity, fattening, diabetes and cardiovascular diseases consume these artificially sweetened products which contain Aspartame, acesulfame K or sorbitol. Many of these artificial sweeteners are claimed as carcinogen. Especially, Aspartame has been claimed not only carcinogen but also as a component which increase the risk of Alzheimer and Parkinson. Under normal conditions, toxic substances and also detoxified ones followed by the process held in liver pass into blood circulation and reach into brain but these harmful and hazardous compounds can never pass the protective layer which covers the surface of brain. It is a very strong barrier which prevents the toxic substances from entering into brain tissue. For this reason, brain can strongly be protected against all kinds of toxic and harmful compounds. Unfortunately, toxic end products which are produced followed by the digestion and decomposition of Aspartame in blood, fenilalanin and aspartic acid, the two important and beneficial amino acids and important structural components of proteins that are also used in bone and muscle production, begin to accumulate in blood in large amounts followed by the regular consumption of Aspartame added foods. Presently, many of us consume these types of food products which contain Aspartame, sometimes to be able to lose weight, sometimes to be able to control blood sugar level. Especially, the persons with Diabetes often consume such products since Aspartame is not absorbed and hence dose not increase blood sugar concentration while it gives the required sweat taste to the food. Unfortunately, during the long periods of Aspartame added food consumption, Aspartame in the cavity of intestine is decomposed into fenilalanin and aspartic acid, the two important and beneficial amino acids, the important structural compounds of proteins which act importantly in bone, blood, hormone and muscle productivity. In case of regular and constant intake of Aspartame into the body raises the concentration of aspartic acid and fenilalanin amino acids in the cavity of bowel. The amino acids are decomposed further and their decomposed residues combine with other residues to form some other toxic compounds. These toxic compounds can even pass from the brain and blood barrier and reach into brain tissue. They are claimed to kill brain tissue especially by degenerating hypothalamus. The mentioned adverse change is the main reason in the formation and progress of both Alzheimer and Parkinson. Hence, the kitchen for Alzheimer and Parkinson should be free of Aspartame added foods. You may ask for what could be done to keep fit or weight loss. Neither weight loss nor being fit can be possible in a healthy manner with Aspartame added foods or similar sweeteners. You can reach your goal and you can lose weight and be fit but not in a healthy way. This type of nutrition as combined with Aspartame and similar sweeteners can always be complicated with Alzheimer, Parkinson and similar neurological disorders and even obesity. The degeneration in hypothalamus is claimed as the base for the progress of new hormonal imbalances which can result in obesity, hyperactivity, anxiety, insomnia and sleeping irregularities. If you are the one with Alzheimer or Parkinson or the mentioned disorders and if you are the one who aims anti-aging and a healthier life style, you should better avoid sweeteners and Aspartame. Instead, regular sport and exercise with a conscious and correct nutrition program will be much more effective without any risk. Today, many of us have a chance to reach to a low calorie diet and sport centers but very few of us interest with them while many of us interest with herbals, herbal tea or some special supplements many of which have got many side effects while supporting weight loss.

One of the main complaints in Parkinson is baldness and hair loss. Many patients with Parkinson and Alzheimer ask for the supplements which support hair growth. First, many of the medicines which are used in the treatment of

the diseases have got hair lose side effect. The medicines which have got the side effect are; Clofibrate and gemfibrozil used for cholesterol decrease, Warfarin and heparin which are used to dilute blood, Allopurinol which is used in the treatment of Gout, Auranofin, indomethacin and naproxen which are used in the treatment of arthritis, lisinopril which is used in the treatment of hypertension, vitamin A and its derivatives, some antidepressants, some medicines that are used in decreasing thyroid hormone, anabolic steroids, stress, thyroid imbalance and the treatments used in cancer like chemotherapy and radiotherapy.

Many people think that selenium, zinc, vitamin B complex, vitamin A and beta carotene, ginkgo biloba are essential and can improve hair growth. Selenium, zinc, B complex, iron, vitamin A and beta carotene, folate and folic acid are all essential in the production of hair follicles. But this does not mean that the extensional use of them as in liquid, shampoo or cream form will be useful and beneficial. All these vitamins and minerals should be supplied as in sufficient daily amounts to supply hair growth especially in youth. We should know that the side effects of the medicines and especially hormonal imbalance in both sex and especially testosterone, the male sex hormone, are the main reasons for baldness or hair loss. In these conditions, no matter how you supply the mentioned vitamins and minerals, in the form of supplements or by the means of nutrition, will not make any sense from the point of hair growth. Briefly, the herbal supplements or the solutions and shampoos are all advertisements which aim to make money rather than be a solution. The most important factors which should be taken into consideration for the persons with Alzheimer and Parkinson should be the avoidance from Aspartame and Glutamate. Glutamate is a natural end product which forms during the fermentation of sugar cane or molasses by yeast. I will not enter into detail since glutamate and its adverse effects on health will be analysed in yeast added foods. But, you should know that aspartame and glutamate can pass the blood and brain barrier and give damage to the brain tissue especially hypothalamus and nerves.

Another important factor which should be taken into consideration by the persons with Alzheimer or Parkinson is the nutrition style. Especially, protein intake in excess amounts should be avoided since too much protein and regular protein intake can bind the effective substance of the medicines used for the treatments of the disease. Levadopa, the main substance of the Parkinson medicines, the precursor of dopamine, can be bound by proteins. Proteins compete with levadopa and are absorbed in front of proteins. Briefly, **proteins can decrease the absorption level of Parkinson medicines through the mucosa of bowel and decrease the bioavailability of levadopa.** Energy is the main problem in both diseases because of the decrease of dopamine and muscle and bone incoordination which requires more energy level than the energy requirement of a healthy one. **Carbohydrate rich foods should be dominated while protein rich foods are restricted in Parkinson disease.** Proteins also exist in animal and plant origin foods as closely integrated with fats. Especially animal origin foods have got significantly important amounts of cholesterol and bad cholesterol. No matter how you pay attention while selecting the lowest red meat, the fat globules are so mixed with protein globules that it is invisible by naked eye and impossible to separate these protein globules from meat particles. Briefly, carbohydrate increase and fat restriction in Parkinson will not only supply energy requirement of the patient without any risk but protect against cholesterol and bad cholesterol risk which is an important contributor to the cardiovascular diseases such as hypertension and stroke.

There are some special foods and their components in the treatments of some diseases as complimentary to the medical treatment. Soy and soy products are one of the example as the main complimentary effect to the menopause treatment with it estrogen increasing effect. Soy and soy products which are very rich in phytoestrogens can help for replacing the missing estrogen level in menopause. Similarly, **Mexican bean is a natural source of the amino acid, levodopa which is the precursor of dopamine. For this reason, the patient with Parkinson should never neglect Mexican bean in the kitchen. Levodopa is also rich in other legumes but the richest one is Mexican bean. Legumes and especially Mexican bean with its rich levodopa content may help for increasing dopamine or replacing the missing dopamine in Parkinson.** I was surprised when many patients with Parkinson who listened to my advice from media came to me and informed me that their tremors were much less after regular Mexican bean consumption.

One of the initial food nutrients which should be avoided by the persons with Parkinson should be the excess amounts of lipids, oils or fats. The patient should know that proteins by competing with the main effective substances of the medicines and lipids, fats or oils, by covering these medicine substances, can decrease their absorption level through bowel mucosa and decrease their bioavailability. Another reason for the avoidance is the high oxidative stress due to the excess amount of fats and oils that if the patient with Parkinson still continues to consume fatty foods or foods rich in oil, free toxic peroxy radical compounds can continue to damage the nerves. The nerves are much more susceptible to such damage in Parkinson but also do not have any tolerance since they have been already damaged by these substances in the past. Therefore, **fats and oils should have been restricted during Parkinson like proteins.** Only one fat group which should not be restricted and which should even be increased is the omega 3 fatty acids. Diluting blood, decreasing hypertension, increasing the elasticity of blood vessels, inhibiting high oxidative stress and free toxic peroxy radical production and diluting the blood and increasing its amount to the brain by dilating brain vessels may prevent from more brain damage during Parkinson. The most important beneficial effect of omega 3 fatty acids in Parkinson is their serotonin and dopamine increasing effect. Omega 3 fatty acids are the ony fat group which may help for increasing dopamine and serotonin levels and thus they should be consumed in sufficient amounts against depression with its serotonin increasing effect in Parkinson and Alzheimer and of course against Parkinson with their dopamine increasing effect.

B complex vitamins are the most important ones for the protection against Alzheimer and Parkinson but also they are essential during these diseases since they prevent nerve cells from toxic radical damage and $B_{12}$ protects nerves by entering to the structure of myelin coat which is the main protective barrier and coating of these cells. But an important member of the complex, $B_6$, should have been avoided in excess amounts in Parkinson and Alheimer dieases. What is the excess amount of it in these diseases and why? First of all, $B_6$ is an essential vitamin which acts vitally in the production of blood cells and also in energy production. Finally, the vitamin acts importantly in the production of nerve cells since it enters into the structure of enzymes, the special proteins which regulate and direct the nerve cell proliferation. The vitamin also enters into the structure of enzymes which regulates and directs the energy production and blood cell proliferation. Thus, this vitamin with the other members of B complex is a must for the protection against anemia, fatigue and chronic fatigue and neurological diseases and disorders such as Alzheimer and Parkinson. I need to remind you once more that, opposite to the wrong claims of some media which are not scientific, the intake of plenty

tablets of B complex and $B_6$ does not mean that your energy will boost or you will get rid of Alzheimer or Parkinson or your anemia will be cured. But, the intake of these vitamins by the means of foods and sometimes supplements will be able to protect you such diseases and disorders and decrease the risk for the formation of the mentioned diseases and disorders. One disadvantage of $B_6$ which is a great antioxidant and protector against anemia, neurological diseases and fatigue in normal conditions, is its adverse effect in Parkinson. I want your attention at this point that a vitamin which is essential, important for life with its great antioxidant capacity and important functions like increasing the number of blood cells, nerves and energy production may be harmful in Parkinson and Alzheimer in case of its intake into the body in plenty amounts. Because, **this vitamin may bind levadopa, the precursor of dopamine, and decrease the bioavailability of Parkinson medicines. Of course, here the important point is the amount which ables to bind levadopa. Higher doses than 10 and 15 mg daily intakes of $B_6$ may bind levadopa and decrease the bioavailability of Parkinson medicines. This means that you can consume or use tablets up to 10-15 mg $B_6$ doses, daily. But naturally, some foods that you daily consume will have got the vitamin. Hence, you should better avoid $B_6$ tablets during Parkinson or Alzheimer or you should pay attention that $B_6$ should below 10-15 mg in B complex tablets.** Remember that Watercress, melon, potato, cacao, cocoa added foods and chocolate, milk and dairy products, meat and meat products are the rich sources of the vitamin. I had advised to reject milk and dairy products high in fat content and also meat and meat products during these diseases. Such approach will have also eliminated the risk of high intake of vitamin $B_6$ into body and the risk of binding levadopa and decreasing the effect of Parkinson medicines. But, these advises are for the period of these diseases, not before. Under normal conditions, a healthy person should supply as plenty as B complex vitamins including $B_6$ by the means of natural food sources. Rejection of $B_{12}$ and $B_6$ and other B complex vitamins which are rich in milk and dairy products, meat and meat products may result in Alzheimer and Parkinson, chronic fatigue or anemia. The mentioned foods are also rich in folate and folic acid. Folate, folic acid, $B_{12}$ and $B_6$ which are completely exist in the mentioned animal origin foods in rich amounts can protect you since they enter into the structures of the enzymes which regulate and direct blood cell, nerve production and energy production which was also mentioned above. Hence, many vegetarians who reject the consumption of all animal origin products will have to face with one of them definitely; Alzheimer, Parkinson, dementia, memory loss, fatigue or anemia. Briefly, complete vegetarianism is not a healthy nutrition and life style which deprives you from the mentioned important vitamins while you will also have been deprived of high quality proteins that will supply and make your bones and muscles stronger while boosting immune system.

When calcification is concerned, cholesterol, bad cholesterol, salt, saturated fat, unsaturated fat, toxic radicals, excess of the calcium and vitamin C and other minerals, vitamins and food additives are remembered. These substances accumulate in the walls of vessels and decrease diameter size and cause calcification. **Homocyteine** is another important substance as it was previously mentioned in the related part, an amino acid which has been claimed to cause calcification of blood vessels. The excess intake of homocyteine like the mentioned substances can cause calcification. This substance exists in rich amounts in fatty animal origin products especially in red meat and its products. The restriction of red meat and red meat products will help for preventing cholesterol and bad cholesterol risk but also homocyteine. Both cholesterol, bad cholesterol and also homocyteine can be reduced by the members of B complex, especially $B_6$ and $B_{12}$ and also folate and folic acid. I want to remind you the most important point. Once you protect your coronary vessels

which supply blood and feed your heart, you will have automatically protected your brain vessels at the same time. Brain vessels should be protected against too much cholesterol, bad cholesterol, homocyteine, salt, trans fatty acids, excess of the minerals and vitamins, antibiotic residues, hormone derivatives, polycyclic aromatic hydrocarbons, carcinogens and food additives all of which accumulate on the wall of brain vessels like on the walls of all other vessels and may slow or interrupt blood supply into brain. This failure is the base, the initial contributor to the formation and progress of Alzheimer and Parkinson and other neurological diseases and disorders. **Folate, folic acid, $B_6$, $B_{12}$, $B_5$, $B_1$ and $B_3$ all helps for reducing homocyctein while decreasing cholesterol and bad cholesterol concentrations in blood.** Folic acid is the synthetic form of folate and can be absorbed easily through the mucosa of bowel. **Do not forget that $B_{12}$ helps for cholesterol and homocyteine decrease but also make your nerve cells stronger by entering into the structure of myelin coat, the protective barrier around nerves.**

One important problem in both Parkinson and Alzheimer is the digestive problems. Stomach is the second brain of human being and all other mammalians since the organ is covered with many nerves which are connected to brain. These nerves on the surface mucosa receive the signals from brain. Hence, whenever you feel unhappy or under stress, you may have some problems related to digestive track such as diarrhoea, constipation, gas or reflux. Because the main reason and contributor to Parkinson and Alzheimer is the damage on nerve cells, not only brains nerves, but also the nerves covering the surface of stomach will also have been damaged. This adverse change is the main reason for the digestive problems inspected during Parkinson and Alzheimer. Regular exercise may help for the action of bowel as combined with a planned nutrition and diet. Fibers can ease the defecation by forming bulk in the cavity of bowel but like proteins they can bind the medicine substances if they are consumed during meal times. But **fibers, soluble or insoluble should never be neglected during Parkinson and Alzheimer.** They should be given to the patient regularly in plenty amounts except meal times. 1-2 hours after or before the meal times may have got lower risk. The best is to take fibers and fiber rich foods 3-4 hours before or after meal times. That may be a mixed salad including all kinds of green leafy or a mix fruit salad rich in antioxidants especially including dark red and yellow colored fruits like strawberry, cranberry, blueberry, peach and apricot. One important parameter which should be taken into consideration should be the use of a vitamin and mineral supplements. Will they be necessary during the diseases? Unfortunately yes. The natural foods and a special nutrition alone may not be sufficient to meet the higher vitamin and mineral demand of the patient with Alzheimer and Parkinson because the surface mucosa which includes nerve cells with mucosa cells will have been degenerated in these diseases. The cells on the surface of both bowel and stomach can not make the optimum function because of the damage. As a result, the surface stomach cells can not secrete enough acid to digest complex food nutrients and the degenerated and wounded surface bowel cells can not absorb the nutrients, vitamins and minerals. For all these reasons, minerals, vitamins, proteins and many other nutrients may not have been absorbed properly. High quality proteins free of cholesterol and bad cholesterol, for example, whey protein powder and whey (lor/curd) cheese free of fat and salt may be administered. Whey proteins are known by only sportsmen and body builders while these supplements are a strong cholesterol and bad cholesterol reducers, ulcer and gastritis healers while inhibiting oxidation. They are the only animal origin proteins that reduce cholesterol.

# FOOD FOR ELDERLY

The main problem which is commonly faced by old people and their families in this period is related to the decrease in metabolic activity. Old person faces with a weight loss up to 30 % by the increase of metabolic activity. All human beings, animals and all living creatures spend energy for essential metabolic activities such as cardiac relaxation and contraction, bowel and stomach activities, upper respiratory track actions. These actions are essential for our living and they continue even we are asleep. The energy amount which is used for only these kinds of essential metabolic activities which run even we are asleep is called as metabolic activity. It also begins to decrease by elderly period. The decrease in metabolic activity is due to two factors. When we become older, also our cells, tissues which build up our digestive track, bowel and stomach also become older. The cells which cover the surface of these organs loose their activity or they can not show their metabolic activities in optimum level. These surface cells are the cells which absorb the nutrients coming from bulk in bowel and stomach cavity. They begin not to absorb these nutrients; carbohydrates, fats, oils, proteins, vitamins and minerals due to aging. Briefly, biologic activity and net protein utilization levels of proteins, in other words, the absorption levels and availability of proteins in metabolic functions and also availability of other nutrients decrease significantly by aging. The decrease in absorbed amounts of the concerned nutrients causes an energy problem since energy is produced by carbohydrates, fats and oils. On the other hand, protein loss causes the use of bone and muscle tissues more than ever because they are protein structures. This factor increases the risk and speed of osteoporosis and osteomalacia due to the protein loss from bone and muscle tissues. Also, calcium will have been one of the essential mineral which will not be absorbed properly through bowel mucosa and its density will decrease in bone and muscle. This factor will also have increased the risk and the speed of osteoporosis and osteomlacia. But, the factor of metabolic activity decrease and decrease in nutrition quality is not the only parameters which form the problems in elderly period. Another important factor is the limitation of physical activities that the metabolic, physical and pathological problems and defects in tissues and organs naturally restrict physical activity. In fact, they are all linked to each other closely that the decrease in nutrition quality and the less absorption of essential nutrients through bowel mucosa cause an energy problem and the insufficiency of energy while decreasing physical activity. Therefore, pathological or biochemical problems as related to tissues and organs are not the only parameters. Briefly, people in elderly period first face with a nutrition problem first, due to the decrease in absorption level of nutrients in bowel mucosa and the second, faces with physical activity restriction due to the aging of tissues and organs and energy loss. All related problems develop due to these negative changes during elderly. Thus, the person should pay attention these two factors and try to improve both that first, sport and exercise should not be neglected and should be included into life style regularly without a day missing and the second, the nutrition quality and style should be concerned carefully more than ever and should be planned and applied consciously.

The restriction in physical activities makes a barrier for making regular sport and exercise, but I do not try to recommend a regular sport and exercise in high velocity. What I mean for a regular sport and exercise for the person during elderly may be a short distance walking, cycling at a very low speed or similar exercises, but always in low density as long as the elderly may suffer with disorders and diseases. But no matter how they are low velocity exercises, they will help for activating osteokalsin cells, the cells which cover the surface of bones. They will be able to bind calcium coming from blood onto the bone surface as long as the elderly will not neglect these types of exercises. Walking or cycling also benefit the elderly from

sunlight. I should underline the importance and life threatening effect of ultraviolet like increasing skin cancer especially in elderly period but three times a week at least that each takes 15 minutes walking exercises will not only help for calcium binding of bones but for the bioavailability of vitamin D as free of cancer risk. Vitamin D is an essential and most important antioxidant which is required for the proper absorption of calcium through bowel mucosa and it's binding onto bone surface. Calcium and vitamin D supplementation from nutrition may not be sufficient for elderly because of aging in gut and bowel mucosa. That is why many elderly needs for calcium and vitamin D supplements under strict control of doctor. Normally, 1000-1200 mg calcium as combined with 400 IU vitamin D will be helpful for bone and muscle health in elderly.

Vitamin E is another strong antioxidant which dilutes blood. Therefore, it is essential especially in the prevention of cardiovascular diseases and disorders. It decreases the risk of atherosclerosis (the calcification of blood vessels) and hypertension while it is also protective against thrombosis and emboli. But also the dilution of blood by the effect of vitamin E and other antioxidants protect the elasticity of brain vessels and prevent brain vessels and tissues from calcification. The main sources are dark green leafy vegetables, nuts, fish meat, whole grains and vegetable oils. Nuts are rich sources of omega 3 fatty acids and vitamin E. They are also rich in selenium and zinc, the important antioxidant minerals, in addition to their rich vitamin B content. In spite of their rich antioxidant and nutrition content, they are also rich in omega 6 fatty acids and saturated fat. Omega 6 fatty acids are the precursors of inflammatory harmful hormones in body as mentioned in the related part and increase the severity and the level of oxidation and inflammation opposite to omega 3 fatty acids. Thus, nuts should be consumed but not in plenty amounts because of their fat and omega 6 fatty acids content. Walnut, almond, peanut and many others should be consumed as mixed and not more than a handful. Do not forget that walnut, almond, peanut and other nuts are rich in different B vitamins. Some of them are rich sources of $B_6$ while some others are rich in $B_1$ and $B_2$. Their selenium, zinc, calcium and omega 3 fatty acid contents differ according to the type of nut. That is why the best approach for the elderly should be the mixed form. Also the excess amounts of more than a handful may increase inflammation rate due to the rich content of omega 6 fat contents of nuts. The elderly may administer nuts as ground to the vegetable salads or fish meat during cooking as roasted. Grinding may be advised since many old people have also got dental problems in addition to digestion problems.

$B_6$, folate, folic acid and $B_{12}$ are the vitamins which enter into the structures of enzymes that are responsible for the production of red blood cell proliferation. But the foods rich in these vitamins can not be absorbed properly from bowel mucosa in elderly period. The vitamins can not pass to the blood stream in sufficient amounts which may result in anemia. For this reason, many old people are suffered with anemia. The foods rich in folate, folic acid, vitamin $B_{12}$, high quality iron, magnesium and $B_6$ are richest in meat and meat products; egg, poultry, their products, red meat and its products, fish and marine origin products. Milk and dairy products are very poor in high quality iron content in spite of their rich nutrition content. So, these foods seem not protective against anemia risk in elderly like in all other parts of life. Unfortunately, red meat, red meat products and especially offal like liver and heart which are the richest sources of high quality iron, folate, folic acid, magnesium, $B_6$ and $B_{12}$, egg, poultry and their products can not be advised to the elderly without any hesitation. Because the same products are very rich in cholesterol, bad cholesterol, trans fat and omega 6. The dark green leafy vegetables are also rich in iron. But it is in low quality. Iron form in plant origin is always in lower quality since it is in ferri form (+3 values) which can not be absorbed through bowel mucosa. Therefore,

plant origin iron's bioavailability is very lower as in comparison with the ferro (+3 value) form of iron in animal origin products. The iron in plant origin is excreted by the means of feces and urine out of body. I do not want to say that it is completely useless to consume plant origin products like dark green leafy vegetables because of their low quality iron. Some iron will have been absorbed but this amount will never be higher like the higher amounts of iron coming from the mentioned animal origin food products. So, what is left as a healthy and rich iron source for the elderly in prevention against anemia when we exclude offal, red meat and its products and egg while we do not satisfy with the iron quality in plant origin? The answer is 'fish meat', like in many other periods of life. The elderly can consume especially fatty fish meat to benefit from the rich omega 3 content, in addition to rich iron content of fish meat. You will remember from the related part about omega 3 fatty acids that darker, more browny and grey colored or more red and pinky ones are richer in omega 3 fatty acids. The marketing should be planned so that fattier fish meat and its products should have been dominated while red meat, poultry and its products should have been restricted and selected as fattless since they are rich in omega 6, not omega 3 fatty acids. You may ask the relation of rich omega 3 content with iron content? **The fattier the fish meat is, the more the high quality iron content is, in addition to richer omega 3 content.** Thus, you will have bought both iron rich and omega 3 rich fish meat when you buy the darker, more grey, browny or red ones rather than white ones in the selection of fish meat. The elderly needs the dilution (thinning) of blood more than ever. The reason is the restriction of physical activities and decrease in metabolic activity. A younger person can tolerate the rich cholesterol, bad cholesterol, trans fat, omega, salt, saturated fat, excess amount of sugar as long as he or she makes regular sport and exercise and runs an active life style. But, the opposite exists for the elderly. Older people after 50s and 60s, although there are exceptions, become unfamiliar with regular sport and exercise. In fact, the factors are all closely linked to each other. The aging of bowel and stomach mucosa decreases sugar and fat content in blood which decreases energy level. The decrease in energy level directly decreases metabolic rate. Energy insufficiency lowers the physical and metabolic activities. On the other hand, the decrease of physical and metabolic activities can not combust fat and sugar with oxygen in blood in desired levels. Thus, fat and sugar molecules begin to stick onto the wall of vessels and begin to decrease the diameter size of these vessels. The result is the calcification of vessels which may result with hypertension. For this reason, many elderly is suffered with atherosclerosis and hypertension. Atherosclerosis, calcification of vessels, is also formed in brain vessels. The calcification of these vessels may result in Alzheimer, Parkinson and similar metabolic neurological diseases and disorders as long as they are not taken under control with a healthy nutrition which is rich in foods that dilute blood and increase the elasticity of vessel walls like omega 3 foods and antioxidant (whey proteins, selenium, calcium, zinc, beta carotene, vitamins A, B, C, D, E and K, magnesium, folate, folic acid) rich foods and regular sport and exercise. Some occasions are severe and may require the strict control of doctor and the administration of an anticoagulant medicine which may be recommended by doctor. Doctors are always very careful to prescribe and use these medicines since too much doses may thin the blood too much and increases the risk of internal bleeding while less doses will be useless, not effective. In conclusion, it is a triangular that one corner is planning the elderly nutrition, the second is the increase of daily life activity by the means of sport and exercise in low velocity and finally the third corner of the triangular is the administration of an anticoagulant if that is required by doctor. But, you should always keep in your mind that diluting blood naturally by the means of specific foods and knowing what kinds of foods are they will protect the elderly against thrombosis and emboly risks which are the initial risks of the elderly period in cardiovascular and nervous system. Coagulated blood rich in saturated fat, trans fat, omega 6 fat, oxidized bad cholesterol, sugar and

salt can always stop blood stream since these solid particles can accumulate, stick each other, form a coagulate, a tough and solid particle which closes the cavity of vessel. The diameter may be closed partially but sometimes completely. The partial or complete close of vessel cavity by the solid blood components which are accompanied by red blood cells many times is called as thromboses. The particles from thromboses may be separated and can reach to the other parts of vessels and block them which is called as emboli. Thrombosis or emboli may not be life threatening if the vessel is not too functional and if the other vessels can do the same function. But, if the concerned vessel is too important and functional, it may even be life threatening and fatal. Especially, brain emboly and thromboses result in Alzheimer, Parkinson and stroke in any occasions which are accompanied with complete or partial paralyse. Emboli, thrombosis, atherosclerosis, paralyse, hypertension, stroke, the mentioned disorders are the most common and life threatening risks of the elderly period. In fact, the solution may be too strong although it is too easy. The domination of the diluent C (thinning) food products more than ever, especially in elderly period.

Low fatty cheese is beneficial in the nutrition of elderly like all other dairy products and drinking milk. It is rich in vitamin $B_{12}$, high quality protein (casein) and calcium. But, the cheese which is produced from yogurt or cheese serum (whey) is also very rich in nutrition capacity. Alpha lactalbumin, beta lactoglobulin, immunoglobulin, lactopherrin, in other words, whey proteins are the proteins of whey cheese. The main special benefit of whey proteins which differentiates these proteins from other animal origin proteins is their cholesterol lowering effect. Whey proteins are the only cholesterol reducing animal origin proteins while all other animal origin proteins increase cholesterol less or high. Whey proteins also increase the concentration of glutathione antioxidant barrier around cells that protects cells against harmful aging compounds. Therefore, whey proteins can slow aging process in elderly while reducing and controlling cholesterol. For all these reasons, whey cheese, especially low fatty and salt free ones should be preferred. It may be mixed with different seasonings and chopped parsley to increase its sensory quality and served every day to supply whey proteins to the elderly.

The failure in absorption of vitally important minerals such as iron and calcium necessitates the conscious regulation of meals rich in high quality calcium and iron. The enrichment of meals with calcium and iron, preference of milk and dairy products, fish meat, dark green leafy vegetables may be beneficial, but not enough many times. Doctor may recommend administering a mineral supplement. Iron tablets should never be used since very minute amounts may be toxic. If your anemia is not too severe and if your doctor does not recommend it, do not use. But, calcium is essential for bone and muscle and it is the main mineral to protect elderly against osteoporosis and osteomalacia and slow the progress rate of these diseases. Of course excess amounts and unconscious use of these tablets may be toxic since excess amount of calcium can stick onto the wall of vessel, decreases the diameter size of blood vessel and cause atherosclerosis and hypertension. Excess amount of calcium can also bind to the brain vessels and can close the diameter size of these vessels which can cause Alzheimer, Parkinson or similar neurological diseases and disorders. If the person is already suffered with these neurological diseases, their severity and prognosis may be worse. But the doses of calcium up to 1000 mg/day are safe. Calcification, cardio or neurological problems or kidney stone risks may form in case of very higher doses than 1000 mg /day like 1500-2000 mg/day and for longer periods like two, three years or more. Calcium requirement of two target groups, elderly and young is more than other groups like 1200-1300 mg/day while other groups require 1000-1100 mg/day.

**Brussels sprout** which is one of the healthiest foods can be cultivated in every season but its main season is spring. It is one of the richest sources of vitamin K. It has got also rich content of vitamin C, folate, folic acid and vitamin A. Vitamin C and K as important antioxidants can adversely be affected and decrease in amount by heat. Therefore, in the case of Brussels sprout consumption as in form of salad, you can supply greater amount of vitamin C and K. But, **do not forget that, heating activates beta carotene, the precursor of vitamin A, increases its antioxidant effect while decreasing antioxidant effect of vitamin C and K. If you divide Brussels sprout into two equal as raw and cooked and if you consume half as cooked and half as raw as in salad form, you can both benefit from vitamin A, C and K.**

**Sulpharophen,** one of the most important and effective anti-carcinogens, exists in Brussels sprout in great amounts. This isoflavone activates detoxify enzymes especially P-450 cytochrome which is the most important detoxify enzyme system of liver. You can detoxify your body and eliminate dirt, hazardous compounds, harmful compounds such as carcinogens, toxic radicals; bad cholesterol (low density lipoprotein), allergens, trans fats, saturated fats, homocystein and many others by the effect of sulpharophen because of the activation of detoxify enzyme system of liver by sulpharophen. Liver is very important organ like all others but it is much more critic because of its detoxification function. All microorganisms such as bacteria and virus, toxic radicals, bad cholesterol, carcinogens, allergens and many others are detoxified by liver and excreted out of metabolism by the means of feces and urine. For all these reasons, liver health is a must for a healthy defense mechanism, for a better immune system, briefly for the protection against many metabolic diseases and disorders. In conclusion, you have to supply foods than can help for detoxification process of liver if your target is to boost immune system. Brussels sprout is a key food for it and should always be dominated in a healthy kitchen and especially in a detoxify kitchen. There are many scientific claims that sulpharophen decreases the risk of many types of cancer. Especially, sulpharophen supply and intake in great amounts during colon and chest cancer beneficially effects the cancer treatments. Sulpharophen is claimed to inhibit the activity and proliferation of cancer cells.

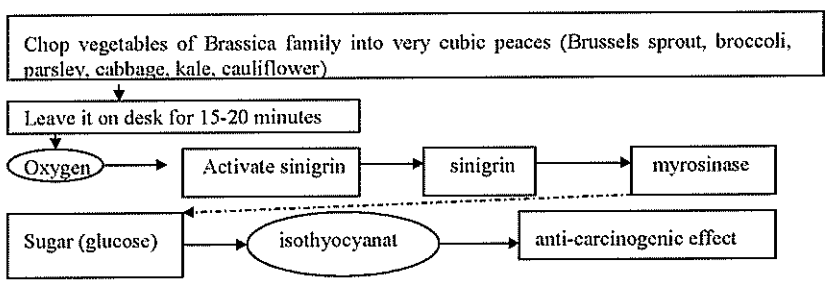



**Diagram 8**

The first trimester of pregnancy is deathly important for bone, vertebrae, skeleton and nerve progress of baby. Any kind of interruption in the progress results in incomplete vertebrae, nerve system and skeleton production of infant which is

called as 'spina bifida'. Spina bifida suffered infants are always more liable to microbial contamination and also paralysis risk in later periods of life. In the first trimester of pregnancy, nerve system is formed. Because this system initiates the stimulation of all blood vessels. Blood vessels can only be innerved by nerves around them to contract and supply enough blood and nutrients to other cells and tissues. Blood vessels can be diluted by these nerves, increase in diameter size and supply blood into cells to form bone, skeleton and vertebrae. Briefly, blood vessels can only be activated, decrease in diameter size and supply blood to baby followed by their stimulation by nerve cells. That is why first, nerve cells forms and then activated and then other cells are formed to form bone and skeleton and other organs. The nerve cell formations, their proliferation and their bone and skeleton production as combined with the activity of blood vessels should have been completed properly without any missing in the first trimester of pregnancy. Otherwise, blood vessels can not be activated, can not increase in diameter size and can not supply blood and consequently bone, vertebrae and skeleton cells can not form. Incomplete bone, vertebrae and skeleton production of these types of infants becomes much more liable to microbial contamination through skin. Also blood vessels can not contract and relax because of insufficient nerve stimulation due to lack of healthy nerve system. Blood can penetrate into tissues which results in edema which may sometimes form in head and sometimes in the other parts of body. Briefly, nerve cells and nerve system should be properly completed in the first trimester. Otherwise, infant can be suffered with the concerned syndrome, spina bifida. Nerve cells and nerve system can only be properly produced and completed by folate, folic acid and vitamin $B_6$. Three of these important antioxidant vitamins should have been taken into pregnant metabolism in the first trimester of pregnancy and should never be neglected. Folate, folic acid and vitamin $B_6$ antioxidants enter into the structure of enzymes which regulate the formation of nerve cells. All of them are exist in rich amounts in Brussels sprout. Other members of Brassica; cabbage, kale, broccoli, cauliflower are also rich sources of $B_6$, folate and folic acid.

Vitamin A is not only an antioxidant which decreases the production rate of free toxic radical compounds protects against oxidative stress, harmful effects of free toxic radical compounds of heavy oxidative stress, but also it is the only vitamin which is known as 'anti-infection' vitamin. The anti-infection effect of vitamin A is not due to its inhibitory effect on microorganisms. Vitamin A and its precursor, beta carotene, act importantly in the production of a mucous secretion. Mucous layer covers the surface of eye, ear, nose, abdominal cavity and chest cavity. Microorganisms usually prefer to enter into body through these cavities but mucous layer formed by vitamin A binds these microorganisms and interrupts the entrance of these harmful disease and disorder agents into body. In case of vitamin A deficiency and beta carotene, mucous layer can not be produced in sufficient amounts. Instead, a solid compound which is called as keratin is formed. It covers the surface of mentioned cavities but defects the surface smooth tissue of these cavities because of its tough structure. Bleeding formed followed by defects of keratin attracts microorganisms in these cavities since blood is a perfect media for their growth and proliferation. Keratin production and accumulation on the surface of cavities due to lack of beta carotene and vitamin A cause internal bleeding which may always be besieged by microorganisms which can form new inflammation areas in tissues in body. On the other hand, the sufficient amount of beta carotene and vitamin A supply into body by the means of vitamin A and beta carotene rich foods such as Brussels sprout cause to the production of mucous layer instead keratin and prevents the risk of defects due to keratin on smooth tissues of body cavities. The same effect of vitamin A and beta carotene by forming mucous layer prevents the risk of internal bleeding which may exposure into inflammation by the effect of microorganisms. Briefly, not only for visual health, but also for the prevention

of internal bleeding which have got an inflammation potent by the effect of microorganisms, vitamin A and its precursor are the protective key vitamins. You can avoid internal infection and bleeding risk in keratin origin due to beta carotene and vitamin A deficiencies by the consumption of vitamin A and beta carotene rich foods such as Brussels sprout.

**The dark greener the color is, the more beta carotene and vitamin A content is. You should never forget this important note and remember it during marketing. Some leaves of some Brussels sprouts may be yellow that they should be rejected and should never be preferred since it indicates poor vitamin A and beta carotene content.** It is the same for broccoli too. Dark green ones should have been required in both broccoli and Brussels sprout during marketing as the strongest beta carotene and vitamin A supplies.

The dark greener the color is, the more beta carotene and vitamin A content is. Prefer dark green and reject yellow and pale ones while buying Broccoli and Brussels sprout (and all other green leafy vegetables)!

In spite of its many beneficial effects on metabolism, one adverse effect may be the goitrogen content of Brussels sprout. These substances can inhibit the production of thyroid hormone. If you are the one who is suffered from the lack of thyroid hormone production (hypothyroid), Brussels sprout consumption may also decrease the low thyroid hormone production in your hypothyroid suffered metabolism. On the other hand, there are some researches which claim that goitrogens in Brussels sprout can be inactivated by cooking process. Nevertheless, 'how much goitrogen can be inactivated by what level of heat' is not known. **It appears that the only point we have to be careful seems to consume Brussels sprout as cooked if we are suffered with a severe hypothyroidism. Severe hypothyroid suffered patients should avoid from the consumption of this food in great amounts.**

Remember about the benefits coming from Brussels sprout;

- Great vitamin C antioxidant (ascorbic acid) which can protect you against harmful effects of excess amount of free toxic radicals by decreasing the production rate of them.

- Rich beta carotene and vitamin A enters into the production of mucous secretion and protects body from production of keratin. The mucous production by vitamin A protects metabolism from internal bleeding and infection risk.

- Sulpharophen and Isothyocyanat protect against cancer especially colon and chest.

- Both rich soluble and insoluble fiber content bind many kinds of harmful toxic and hazardous compounds such as carcinogens, allergens, salt, sugar, fat and therefore protects you against aging, cardiovascular diseases and disorders, hypertension, cancer, obesity, diabetes and many other metabolic diseases and disorders.

- Rich K and $K_1$ vitamin content of Brussels sprout is also another important factor but not only from the point of oxidation and free toxic peroxy radical risk. Vitamin K and $K_1$ activate osteokalsin, half calcium and half protein

compound which covers cortical bone (surface part). Osteokalsin can bind calcium which comes into bone surface by the means of blood and only after this activation by vitamin K and K1, calcium can be bound to bone. Vitamin K and $K_1$ content of a food is so important that calcium binding capacity can be enhanced by these vitamins. The richer sources of vitamin K and $K_1$ can make much more protection against osteoporosis. Calcium alone can not do anything for the protection against osteoporosis since it can only be bound on surface of bone (cortical bone) by activated osteokalsin while osteokalsin can only be activated by vitamins K and $K_1$. Brussels sprout with its rich vitamin K and $K_1$ content act as protective against osteoporosis and osteomalacia by enhancing calcium binding capacity into bone and muscle.

- Folate, $B_6$ and folic acids in Brussels sprout are not the only important antioxidants which decrease oxidative risk and their harmful free toxic peroxy radical production rate. Additionally, the same antioxidants are vitally important for blood and nerve cell proliferation. Because of the high rate of blood and nerve cell proliferation in baby metabolism in the first trimester of pregnancy, pregnant should not neglect folate, folic acid and vitamin $B_6$ rich foods such as Brussels sprout and the other members of Brassica.

**Mushroom** is one of the most important healthiest foods which you can administer for anti-aging and protection from many important metabolic diseases. The main reason for it is the rich vitamin, mineral and fiber content of mushroom. It is rich in riboflavin (vitamin $B_2$), beta glukan (soluble fiber), iron, copper, manganese, niacin, potassium, pantothenic acid, selenium, vitamin E (tocopherol) and phosphor. All the mentioned vitamins and minerals have got various beneficial affects on metabolism.

**Beta glukan** which is a soluble fiber rarely exists in nature. Very few food products contain beta glukan. Opposite to many fibers, its absorption rate through bowel mucosa and therefore solubility is very high. Most of this fiber can be absorbed through bowel and transferred into blood stream. The transfer capability of beta glukan in high amounts into blood stream is a big advantage for a food from the point of health because rich amount of beta glucan can bind high amounts of free toxic radicals and other hazardous compounds in blood and can eliminate them out of metabolism by the means of urine. Beta glucan's binding affect on free toxic radicals and other harmful compounds are also important from the point of anti-aging. Excess amount of free toxic radical compounds which are produced followed by the consumption of foods rich in fat, oil, trans fat, sugar and salt accumulates around skin cell membranes and can wound these membranes. Wounded cells come together to build up wounded tissues which sometimes appear as in wrinkles on face or on other parts of skin. We call it aging, but aging by the same mechanism which forms in tissues is much more important than wrinkles on skin. Wrinkles on skin is the visible and physical part of aging, but what about wounds and defects of tissues and organs by the effect of free toxic peroxy radical compounds and other harmful compounds. ? These types of defects in tissues and organs can result in organ and tissue failures. It can even result in renal failure or cardiac failure. Fiber rich food consumption especially soluble fiber rich foods such as beta glukan in mushroom can bind significantly important amounts of free toxic radical compounds and other harmful compounds and excrete them out of metabolism by the means of urine. This is the reason for mushroom which makes it as one of the initial detox foods in many detoxify programs. While writing these lines, I had to refer to detoxify programs which I never believed

in since they are completely and scientifically wrong. I want you to know that there is no 'detox' food which cleans your body or there is no 'wonder' food which creates magic on your metabolism. When you consume various kinds of foods as combined with antioxidant rich foods, you can benefit from all them. Each food created for us in the world has got beneficial and hazardous effects on our metabolism. There is no miracle food and they are not completely beneficial for us. The situation may even be much more complex than you can think. Sometimes, a food which is very healthy, very beneficial on your metabolism can be harmful on some other's metabolism. Broccoli with its rich fiber, vitamin A and isoflavon content seems very healthy, but not for all people. If you are the one who suffers from hypothyroid, goitrogenes in it may even worse your condition by decreasing thyroid hormone level. Grapefruit is also one of the healthiest foods but not during cancer treatments such as chemo and radiotherapies since bergamottin in it inactivates P-450 cytochrome enzyme system in liver which causes accumulation of radio and chemotherapeutic agents in blood stream. The residues of these agents can attack into healthy cells and kill them. Briefly, grapefruit if consumed during cancer can increase the side effects of cancer treatments. But the same food is very beneficial and healthy for persons who have got strong immune system. I will avoid from using detoxify word as much as possible since it can differ according to metabolism, sex, disease and disorder, activity, nutrition and life style and genetic factors. For all these reasons, detoxify programs, detox foods and similar terms are not completely and scientifically correct. One important disadvantage to define a food as completely healthy or as detox also motivates people to reject others which may result in very serious and even life threatening results. But, creation of detox foods and programs on minds make money, it is a trend and a huge financial income in spite of many wrong information and knowledge most of which is not scientifically correct. Many people believe in them because new miracle news about miracle foods mean hope for the treatment of many important and life threatening diseases, but only hope!. Prohibiting some foods and motivating people to only one or some group of foods causes to deficiencies of many vitamins and minerals which are exist in prohibited foods in such programs. Every food in nature has got beneficial effects and harmful effects on human metabolism. There are some foods which should especially consumed because of their beneficial and complimentary effects with medical treatment in some metabolic diseases while there are also some foods which are harmful and can even trigger the severity of disease. The most important point is to know which food for which disease, which food for which sex, which food for which age and life style. For example, proteins in animal origin are the base of child and youth nutrition and also sport nutrition because of their high quality essential amino acids, B complex and high protein quality in higher bioavailability. **Especially, lysine and methionin which are required for body length and muscle progress are completely exist in rich amounts in animal origin products such as milk and dairy products and meat and poultry. Therefore a child, an athlete or a university student should consume these foods, of course the low fatty ones, dominantly during child and youth periods and during sport life. But, if you are the one over 30s or if you are the one who is suffered with cardiovascular disease, diabetes, obesity or cancer, if you are the one who does not make regular sport and exercise, inactive and works in office all day long, the same consumption rich in animal origin may bring you many important metabolic diseases such as hypertension, diabetes, cancer or may make the condition worse if you are the one who has already got one of these diseases.** On the other hand, all foods including the ones which are healthy or detox have got less or high amount of carbohydrate, less or high amount of fat and oil like all others. Therefore, they are also taken into oxidation reaction followed by their consumption by the effect of oxygen and yields free toxic radical compounds. Some foods may yield less free toxic peroxy radical because of their high antioxidant capacity and low amounts of fat and sugar content

whiles some have got very high amounts of oil, fat and sugar with low amount of antioxidant. The later group increases the risk of oxidative stress and increases free toxic peroxy radical production rate and therefore the formation of many important metabolic diseases while triggering aging process. Briefly, all foods have got a potential to produce free toxic radical since they have got sugar, fat and oil. The main problem is the necessity for you to be the one who knows which foods have got more antioxidant content with lower amount of carbohydrate, fat and oil. If you are one of them, you can dominate these types of foods in your daily nutrition and life style, you can increase antioxidant supply from such foods and you can be better protected against life threatening metabolic diseases with less carbohydrate, fat and oil content and high antioxidant capacity for such food products. But you should never neglect other foods; you should always include them in daily nutrition but of course in different amounts. Different amounts. What are they? I cannot say and no one neither. It depends on various factors such as metabolism, sex, age, genetic factors, activity, life style, disease and disorder and nutrition style as I mentioned above. You have to know the correct food for your disease and metabolism, correct food for your age and life style. While doing this, you should also continue to consume others as combined but in fewer amounts!

**Mushroom** is one of the foods which I have just described above, less in sugar, fat and oil but very rich in various antioxidants. Therefore, it is in very rich antioxidant capacity whiles giving you very less calorie and will protect you against obesity and diseases in obesity origin such as hypertension, diabetes and cancer.

Other important benefit of mushroom is the rich selenium content. Selenium is one of the richest antioxidants apart from calcium, magnesium and zinc. Mushroom like all other foods have got an oxidation potential in metabolism because of its sugar, fat and oil content. Its fat and sugar amounts are lower than many other foods and it is also richer than many others in antioxidant capacity. These makes it a healthy and detox food if we have to define a food product as detox or healthy because mushroom can decrease its own free toxic peroxy radical compounds with its rich antioxidants while its own free toxic radical compounds are lower than many other foods. Glutathione is an important antioxidant which covers the round of cell membranes and protects the membrane and cell against harmful effects of free toxic radical compounds and other harmful compounds. Glutathione increase by the means of foods is one of the strongest bases of anti-aging and well being. This important antioxidant layer can also be defected, oxidized and may lose its activity. Therefore, glutathione should always be reproduced by the constant intake of antioxidant vitamins and minerals such as selenium. Glutathione is produced under the regulation of an enzyme called glutathione peroxidase. Selenium enters into the structure of this enzyme. Thus, selenium is a must for the production of glutathione which protects your cells against harmful effects of oxidation and many harmful compounds. Selenium is one of the most important anti-aging mineral in the world. In many cancer formations, mutation of genome (DNA) by free toxic radical compounds, fats, oils, trans fats, saturated fats, sugars, allergens, food additives, salt, benzapyren and polycyclic aromatic hydrocarbons are some of the initial causative agents. Selenium is the mineral which protects cell genome against the mentioned mutation and protects metabolism against cancer. Scientific researches claim that its protective effect is especially very significant in colon cancer. You can meet 52.6 % of your daily selenium requirement by consuming 1 glassful mushroom.

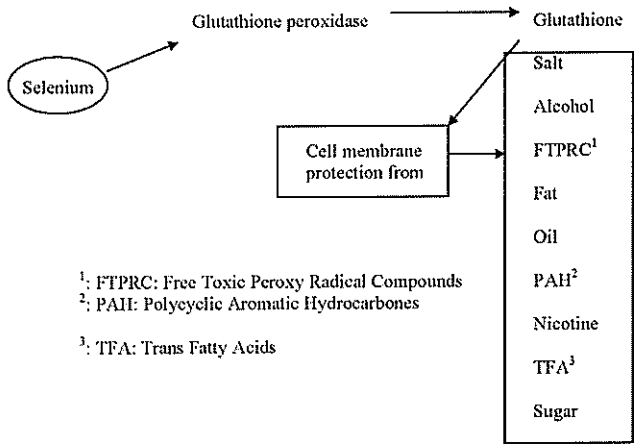



**Diagram 9**

**Mushroom** is also a great source of copper. Copper is one of the two minerals beside manganese which makes protection against rheumatoid arthritis. This mineral regulates the production of super oxide dismutase enzyme. Super oxide dismutase is an important enzyme because it protects mitochondria, the organelle in cell where energy is produced, from harmful effects of free toxic radicals and other harmful compounds. Therefore, copper is also advised for the protection against chronic fatigue syndrome. Copper also acts in the production of lysil oxidase. This enzyme regulates the production of collagen and elastin which are the connective tissues of our bodies. The free movement and healthy function of joints can only be possible by the means of tendon and ligaments which are produced by collagen and elastin. Therefore, joint health and function require sufficient amount of copper. Alkali phosphatase enzyme is a toxic enzyme which increases in blood in case of cancer. Copper decreases the production rate of this toxic enzyme. You can meet 35.5% of your daily copper requirement by consuming 1 glassful mushroom.

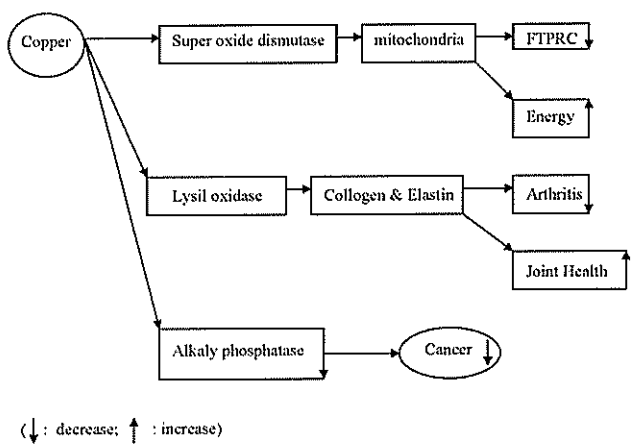



**Diagram 10**

**Tomato** is another important fruit which can decrease bad cholesterol (low density lipoprotein) while increasing good cholesterol like mushroom and Brussels sprout. Although many people know it as a vegetable, it is fruit in literature and has got brown, red, yellow red, yellow or green seeds. One of the differences of tomato from other vegetables and fruits is the huge amount of research about it with both human and rat. There are many researches carried out on humans about tomato by using both human and rat whiles many other researches about other fruits and vegetables used only rats.

The most important beneficial effect of tomato on human metabolism is due to leukopen. Leukopen is known as a member of vitamin A but it is not. It is a close friend to the members of vitamin A which shows similar structural and functional attributes although it is not a member of Vitamin A. It protects cell genome, DNA, against harmful effects of free toxic radical compounds. The protection of cell genome by the means of leukopene is one of the main protection mechanisms of leukopene in tomato against cancer. Leukopen also protects white blood cells against harmful effects of free toxic peroxy radical compounds. The protection is very important since white blood cells are the main protectors of our immune system which defend us against various kinds of diseases and disorders in bacteria and virus origin. Leukopen is protective in reducing cancer risk especially cancer of prostate, chest, uterus, lung and pancreas.

The most important point about leukopen although it is not known by many people is its activation by heat process. Heat and therefore cooking process unfortunately decreases antioxidant capacity for many important antioxidant vitamins and minerals such as vitamin B and C, calcium, selenium and zinc. On the other hand, heat such as grilling, simmering, cooking, scalding all increases antioxidant capacity for vitamin A, its precursor beta carotene and the members of vitamin A such as zeoxhantin. Also leukopen is activated and its antioxidant capacity increases by the effect of the mentioned heat process. Vitamin C which is known as the most versatile antioxidant vitamin which decreases bad cholesterol, sugar, serum triglyceride, increases serotonin, dopamine and melatonin can lose its antioxidant capacity because of heat process such as scalding, simmering, and grilling. Also curing, the addition of salt (NaCl) and other curing agents such as phosphate and sodium ascorbate to be able to extend the shelf life, smoking (fume application), cutting, grinding, fermentation, leaving on desk or long shelf life, exposure to sunlight, humidity, freezing an even stress factors, pollution and exercise can cause loss of vitamin C in great amounts. But, leukopen, beta carotene, vitamin A and members of vitamin A is beneficially affected by heat process. You decrease vitamin C amount of tomato by cooking it but the same procedure activates leukopen and increases its antioxidant capacity. What should we do if we cook tomato; we will decrease its vitamin C antioxidant capacity but if we do not, we will not be able to increase leukopen antioxidant capacity. The solution is very clear and net. You can divide your tomato into two equal and you can consume half as cooked and supply leukopen and vitamin A. You can also consume the other half as raw as in salad form and supply vitamin C. One big and important mistake is the consumption of fresh tomato juice. Pressing tomato during juice extraction inactivates vitamin C and causes significantly important amount of vitamin C antioxidant capacity. Let's disregard it. But many of us prefer drinking tomato juice as raw to avoid from vitamin C loss. You can be sure that you may have protected some of vitamin C because you do not apply heating but pressing tomato to extract its juice content causes significantly important decreases in vitamin C content. On the other hand, many people drink tomato juice without heat to supply vitamin C. But, drinking raw will supply you less vitamin A, beta karoten and leukopen. If you cook tomato juice and

also add one or two drops of vegetable oils like olive oil and mix it homogenously and then drink, your leukopen, vitamin A and beta karoten supplementation will be greater. What I mean here is 1. If your target is vitamin C from tomato, drinking tomato juice is not a good alternative; instead, you can consume it directly as in salad from. The consumption as in salad form as raw without pressing will protect vitamin C content and antioxidant capacity and 2. if you want to supply beta carotene, vitamin A and leukopen, you can cook tomato or you can cook tomato juice and then drink. Tomato juice as raw is not rich in beta carotene, leukopen and vitamin A antioxidant capacity whereas cooked tomato and cooked tomato juice are, finally 3. drinking tomato juice may supply you some amount of vitamin A, vitamin C and leukopen but you should always add one or two drops of vegetable oil and mix before you drink. Vitamin A, beta carotene, all members of vitamin A and leukopen are fat soluble. They cannot be absorbed and transferred through bowel and stomach mucosa without oil addition since they are fat soluble.

**Do not cook tomato, Do not press it, and do not make juice from it if you want to supply vitamin C. Pressing and cooking decreases vitamin C antioxidant capacity!**

**Do cook tomato or tomato juice by the addition of one or two drops vegetable oil if your target is antioxidant effect of leukopen, vitamin A and beta carotene.**

The more heat application, the more you can benefit from beta carotene, leukopen and vitamin A antioxidant capacity. Therefore, ketchup, tomato puree, tomato pastes which are treated by heating are very rich in beta carotene, leukopen and vitamin A antioxidant capacity. Unfortunately, I always hesitate when I recommend ketchup from market because many of them are produced by adding many kinds of food additives such as nitrate and nitrite, salts of ascorbate and salt. Do not prefer these types of processed tomato products. Instead, you can produce your tomato product weather ketchup or tomato paste, on your own at home by adding very little amount of salt and without adding nitrate and nitrite. Do not forget that regular consumption of nitrate and nitrite can increase the risk of cancer in digestive origin such as colon, rectum, anus, pancreas, intestine, jejunum, liver and stomach.

Another important item about tomato consumption is color. Some of you may enjoy raw and green ones but if you want to benefit from leukopen antioxidant effect, you have to prefer red ones. Do not forget that the more the red color tone or dark red color, the more the leukopen concentration and antioxidant activity is. Leukopen is one of the most important anti-aging substances that we know. It dilutes blood and gives an ease to blood circulation. Therefore it supplies cardiac function. It also decreases cholesterol and bad cholesterol and protects against atherosclerosis and hypertension. It decreases TNF (tumor necrosis factor) and makes a great protection against cancer as mentioned above. Its inhibitory effect on oxidative stress and its harmful free toxic peroxy radical compounds protect cells against defects of cell membranes of free toxic peroxy radical compounds which postpone the formation of wrinkles. Therefore, leukopen is a strong anti-carcinogenic, anti-aging (much more correct definition is; healthy aging) and cardiovascular system protector. For all these reasons, it is very natural that one of the important targets in tomato consumption is to supply leukopen and benefit from it. If you want to supply it in great amounts from a tomato, you have to select the dark red ones during marketing.

**The darker the red color, the more leukopen concentration and antioxidant capacity is.! So, prefer the darker red colored ones!**



Also your tomato should be swallowed, vigorous, juicy but not smooth. Smooth ones have got more fiber. Fiber is desirable, as the cornerstone of healthy life style and nutrition but many times I indicated that these compounds bind not only harmful compounds but also very beneficial compounds such as vitamins and minerals, essential fatty acids and amino acids. A fiber rich tomato may bind important amounts of leukopen and beta carotene. But the more juicy and vigorous ones are low in fiber amount and most of leukopen in them can be absorbed and transferred into blood circulation from digestive track without binding by fibers.

**Prefer the more juicy and vigorous tomatoes since they are low in fiber content. You can absorb much more leukopen and beta carotene from these types without binding by fibers.**

**If you want to benefit from beta carotene, vitamin A, the other members of vitamin A and leukopen, you should always not forget to add some droplets of oil or some slices of some fat rich foods as combined with tomato. For example, nut or avocado addition into tomato salad can increase the absorption of leukopen, beta carotene and vitamin A since they are fat soluble.**

We can buy tomato from market but also its tablet form. The tablet form because of significantly important and mentioned beneficial effects of **leukopen**, has become very popular among public which I can never recommend. If you extract one compound or substance from a whole body of a food, you can weaken its function. All vitamins and minerals have got proper antioxidant capacities in their natural existence in the bodies of foods. Whenever they are extracted out of food, they cannot be absorbed through bowel and stomach mucosa and transferred into blood stream. In other words, making tablets from isoflavones including leukopen, vitamins, minerals, proteins, essential amino acids, and essential fatty acids such as omega 3 can decrease their beneficial effects on human metabolism. This may be due to the other complementary

food substance existence which integrates with leukopen or similar food component. When you isolate it and extract it alone, you may have eliminated others which increase the bioavailability of the main concerned compound or substance. Leukopen absorption through bowel and stomach mucosa, briefly its bioavailability increases with many other fatty acids, amino acids, vitamins and minerals, but when you extract and separate it alone from others, its bioavailability and antioxidant capacity decrease. Therefore, you have to prefer to consume foods and food components as in their natural forms, but not in tablet forms including leukopen. Prefer leukopen as in tomato not in tablet?

Tomato is rich in folate, folic acid, vitamin K, $B_6$ and niacin. Vitamin K especially $K_1$ form of it enhances the activity of osteokalsin, the surface protein of bone. Its activation is important because it can take calcium from blood and stick it on the surface of bone. Briefly, calcium binding into bones forms by the means of osteokalsin. Vitamin $K_1$ is very important in protection against osteoporosis and osteomalacia because it activates osteokalsin and its calcium binding capacity on the surface of bone. Calcium alone cannot be bound without osteoklasin activation by the effect of vitamin $K_1$. Therefore, if you want to be protected against osteoporosis and osteomalacia properly, drinking milk may help you, but much more effective is to drink tomato juice and then milk, one after another.

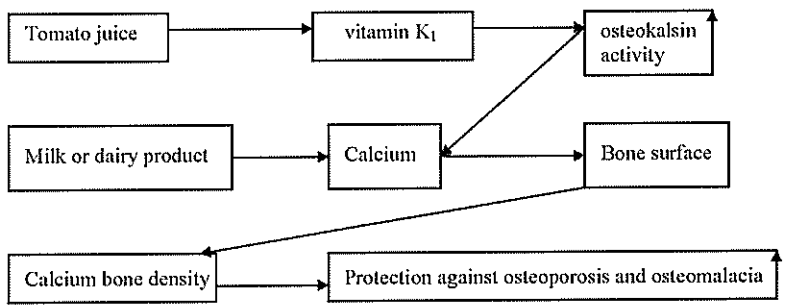



**Diagram 11**

Diabetes is one of the important and life threatening metabolic disease of today's world. Both types of diabetes, type 1 and 2, causes to death of cells on the surface layer of blood vessels. Blood vessel cells like all others lose their water content to be able to decrease increased sugar concentration in blood. They die due to water loss. The death cells enter blood stream but they may stick to the surface of vessel wall for a while before their entrance into blood stream. These cells which stick on the wall of vessel attract other cells, saturated fat and cholesterol also salt and sugar particles. Additionally, these substances stick on these death cells. The main parameter which causes this type of calcification here is the diameter size decrease by the effect of death cells in diabetes. Death cells decrease diameter size naturally because of their accumulation on the inner surface of blood vessel wall. Blood can not pass through these types of narrow cavities which are formed due to arteriosclerosis and slows when trying to pass through from these atherosclerotic cavities. So, solid particles such as bad cholesterol, cholesterol, saturated fat, trans fat, nitrite, nitrate, sugar, salt, all

can find an opportunity to stick on vessel surface, on plaques formed by the mentioned death cells (j. Amer. Med. Ass, 2004, Lazarus, S). What is the relation of all these details with tomato? In both types of diabetes, hypertension, in all cardiovascular diseases and disorders, coagulation of blood and increase in solid phase of blood is very harmful and hazardous, may even be life threatening since it can cause atherosclerosis, the decrease in diameter size of vessel. This can result in interruption of blood circulation since blood can not pass through these types of atherosclerotic narrow cavities. For solid particle concentration increase, the situation is much worse than ever since these particles can easily find opportunity to be able to stick on vessel wall which increases the severity of atherosclerosis. The protection may be the dilution of blood and decrease in solid phase in blood. Leukopen and similar anti-clotting substances can dilute blood and therefore decrease the risk of solid particle adherence on the wall of vessel. **That is why, tomato with its leukopen is a great anti-clotting and a great opportunity for both diabetes and hypertension suffered patients by protecting them against to a much more severe atherosclerosis.**

Niacin, vitamin $B_6$, folate and folic acid exist in tomato in enough amounts as mentioned above. As indicated in Brussels sprout, these vitamins should never be neglected especially in the first trimester of pregnancy to avoid baby against spina bifida risk. If you are the one who is pregnant, you should consume tomato, Brussels proud, broccoli and all other green leafy vegetables and also liver, in the first trimester of pregnancy, if you want to protect your baby against spina bifida syndrome. Later periods than the first trimester may be too late.

Homocystein is a toxic amino acid which is bound to wall of blood vessel and decreases its diameter size. In other words, it is an important atherosclerotic substance like nitrite, nitrate, sugar, salt, trans fat, saturated fat, triglyceride, bad cholesterol and cholesterol. But, people especially know cholesterol, bad cholesterol and saturated fat when hypertension and arteriosclerosis are concerned. Many scientific researches claim that hypertension and other cardiovascular suffered persons show a high concentration of homoscytein in their blood and muscle. Leukopen in tomato is a great opportunity which decreases the concentration of homocyteine. Not only leukopen, but also niacin, folate, folic acid and vitamin $B_6$ can decrease the amount of homocyteine. Therefore, the consumption of niacin, folate, folic acid, vitamin $B_6$ and leukopen rich food consumption such as broccoli, Brussels sprout, tomato, liver, cauliflower, cabbage, nut and mushroom may be protective against diabetes and hypertension and other cardiovascular disease and disorders. According to a review published in Journal of National Cancer Institute, tomato regular consumption of tomato can reduce the risk of cancer, stroke and cardiac spasm at significantly important rates.

Folate and folic acid act importantly in the proliferation of red blood cells and skin cells. Also, they stimulate the proliferation of bone cells and therefore, they are recommended to patients in plenty amounts followed by bone fractures. One of their common application fields is the chronic fatigue syndrome. Red blood cells are a must for energy production in our cells because they carry the required nutrient and oxygen into cell through blood stream. Only after their transport, the nutrients and oxygen come into cell and oxygen combusts nutrients to produce energy. Briefly, folate and folic acid are the two important vitamins which are required for energy production. An important portion of patients who suffer from chronic fatigue syndrome have got lower folate and folic acid blood concentrations. Tomato

is also very rich from the point of folate and folic acid. You can be protected from both chronic fatigue and spina bifida with folate and folic acid of tomato.

Riboflavin in tomato enters the production of flavoproteins which produce members of B complex. These antioxidants are cholesterol reducer, anti-clotting and have got very important beneficial effects in prevention against diabetes, hypertension and cancer. Riboflavin also exists in rich amounts in tomato.

If you are the one suffered with diabetes, then you have to consume tomato in enough amounts regularly. The main protective effect of tomato is due to its rich chrome content. Chrome is the mineral which enters insulin hormone production. Insulin is the hormone which decreases sugar concentration in case of its increase. Insulin hormone production is important since it is the main hormone which is secreted by pancreas but its level and secretion rate is very low in both types of diabetes. Chrome in tomato may help to increase or stimulate insulin hormone production which can be complimentary to the medical treatment of diabetes by increasing insulin production rate.

Despite of the fact that it has wonderful nutrient composition including niacin, vitamin $B_6$, folate, folic acid, vitamin $K_1$, leukopen, beta carotene, vitamin A, fiber, chrome, this wonderful fruit entered civilization very lately in 16th century. Until then, it was rejected and never consumed because it is a member of poisonous Solanaceae family. All other members had poisoned great number of people in history and people always afraid of consuming this fruit. Then, by 16th century, only leaves were discovered as poisonous and other parts of the fruit with the main body were proven as non toxic. Since then, it has become one of the most common fruits on our tables, in our daily nutrition. Mexico, United States, China, Turkey, Spain, Italy and Russia are the main producer countries of tomato.

Finally, I want to share another important and very practicable knowledge. If you already bought a raw and green tomato, place it into a plastic container with banana or apple. Close the edge tightly and never place the container into refrigerator. Keep it in a place under room temperature as free of light. The room temperature, ethylene gas which penetrates from banana or apple into tomato and the stimulation of tomato enzymes will mature tomato within a few days. But if you do not want it matured, you can place them alone without plastic container in inferior part of refrigerator as in cold refrigerated circumstances.

In spite of its rich antioxidant capacity and protective effects of many diseases mentioned above, the substances in tomato may be allergic for some metabolisms like soy, clam, orange, shellfish, milk, nuts, wheat, spinach, corn, poultry meat and veal meat.

If you are the one who is already prescribed by your doctor for using one of anti-clotting such as aspirin, Coumadin, tabochan, warfarin, or if you are using an anti-clotting or an anti-aging supplement such as tablets of gingko biloba, omega 3, garlic, onion, ginger, coriander, parsley, vitamin C, magnesium, B complex, selenium and zinc, then you have to avoid from tomato consumption in great amounts since this type of nutrition can dilute blood too much and result in

internal blood risk. Similarly, leukopen tablets should never be taken into metabolism as combined with the mentioned anti-clotting supplements because of the mentioned risk.

**Strawberry** may be one of the most effective fruit in decreasing bad cholesterol and increasing good cholesterol. I have tried to mention about anti-clotting effect of Brussels sprout, mushroom and tomato. The same anti-clotting effect is also possible with strawberry. Strawberry has got two effects on blood and cardio system. The isoflavones in strawberry decrease bad cholesterol and cholesterol while increasing good cholesterol. Good cholesterol (high density lipoprotein) takes the sticky cholesterol from atherosclerotic wall and gives these cholesterol particles back into blood stream. Bad cholesterol (low density lipoprotein) makes opposite that it takes free cholesterol from blood and binds them on wall of blood vessel. The increase of good cholesterol always decreases the severity of atherosclerosis, the blood vessel calcification. The decrease in atherosclerosis severity increases the diameter size of vessel and protects its elasticity. These types of blood vessels are always suitable for better blood circulation because of their larger diameter size. Opposite, calcified blood vessel due to the bad cholesterol increase are always low in diameter size and these types of vessels can not transfer blood in sufficient amounts because of their small diameter size. The blood which circulates through the vessels can not pass through these types of atherosclerotic regions where diameter size is very low, slows here and solid blood particles and cholesterol can find opportunity to be able to stick each other and on the wall of vessel. Hence, the severity of atherosclerosis increases. Atherosclerosis may not only be restricted in coronary vessels which supply blood into cardiac tissue, but also in every vessel including central nerve system and brain. Especially, the calcification of brain vessels because of increase in bad cholesterol and decrease in good cholesterol can interrupt blood supplementation into brain tissue. Very tiny and minute areas begin to die because of insufficient blood supplementation. These very small necrotic areas come together to form bigger necrotic areas followed by years if nutrition and life style continues as the same. One area of brain tissue which is responsible for the secretion of serotonin, relaxing hormone, can not secrete this hormone because of the mentioned necrosis of the area which results in depression and manic depression. Sometimes, the necrotic area may be the area which is responsible for the secretion of melatonin, sleeping hormone, which results in sleeping irregularities and insomnia. Sometimes an area which is responsible for the secretion of dopamine may be necrotic. The result is dopamine insufficiency, in other words Parkinson. Finally, both areas may be necrotic which are responsible for the secretion of both serotonin and dopamine which results in the formation of both Alzheimer and Parkinson. Briefly, atherosclerosis of brain vessel may be complicated with Parkinson, Alzheimer, manic depression, stress, sleeping irregularities, insomnia and similar neurological diseases and disorders. In conclusion, we have to dilute our blood, keep our vessels elastic and larger in diameter size. We have to protect our blood vessels against atherosclerosis. We have to decrease bad cholesterol whiles increasing good cholesterol. **Strawberry dilutes blood but also decreases bad cholesterol whiles increasing good cholesterol. It is one of the most friendly food for cardiovascular and brain system in metabolism.**

Vitamin C content of strawberry is 57 mg/100g which is a huge amount when compared with many of other fruits and vegetables. It meets 136% of daily requirement. I want to remind you the importance of vitamin C once more which is remembered in only flu and boosting immune system by many people. Vitamin C is a glutathione increaser. It increases the concentration of the antioxidant layer around cell. Also ginkgo biloba, Coenzyme Q10, selenium, zinc, calcium,

magnesium, vitamins A, B, D, E, K increase the antioxidant layer amount of cell membrane. But, strawberry makes this function more than others because of its greater amount of vitamin C. Strawberry is known as a strong protector against cancer because of its rich and important isoflavones such as phenol, anthocyanins and ellagitannins. These isoflavones dilute blood, increase the elasticity of blood vessels and ease blood circulation, supplies blood to cardiac system and always makes a protection against hypertension and other cardiovascular diseases and disorders. But, the same isoflavones and ascorbic acid (vitamin C) also increases glutathione antioxidant layer amount around cell membrane. Cells which are covered by high amounts of glutathione are less affected by harmful radicals, toxins, microorganisms and carcinogens. Today, we hear from media many things about foods as related to their anti-carcinogenic effects. Anti-carcinogen effect has become a term which is commonly used as completely wrong. I want you to know that for today, we have got no food or medicine or herbal supplement that kills cancer cells while saving healthy cells. If we would have got, we could have talked about a definite cancer treatment and cancer would not be classified as one of the life threatening metabolic disease of today's life. Unfortunately, we have not got any such product weather in food or medicine origin. What we want to mean and other scientists do while using the term 'anti-carcinogen' is the substance which decreases the risk of cancer formation before it happens by increasing glutathione around cell membrane and making it much more resist against carcinogen entrance or decreasing diameter size of the vessels which supply blood into cancer cells. This means that, when we talk about an anti-carcinogen effect of a food or herbal supplement, we should understand that the considered substance can help to medical cancer treatments as complimentary or can decrease the risk of cancer formation before it happens. Otherwise, they can never do anything to tumors. The opposite claims which take place in media are very far from scientific truths.

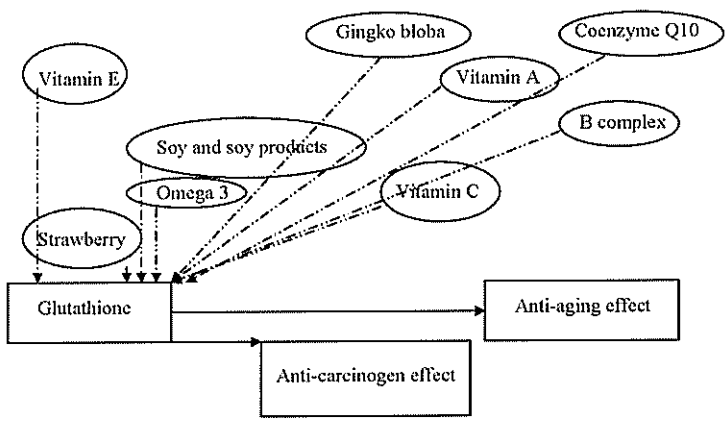



Diagram 12

**Phenols, anthocyanins and ellagitanins are in high amounts in strawberry which makes it as an important protector against cancer.** Another important effect of all these substances is that they decrease the production of cyclo-oxygenase enzyme and its activity. This enzyme is closely linked to the production of harmful free toxic radical compounds that persons who are under high oxidative stress have got this enzyme more than other metabolisms. The mentioned

compounds in strawberry decrease the production and activity of the concerned enzyme which also decrease the cancer formation risk since excess amount of free toxic radicals may be converted into carcinogen agents. If you are the one who consumes too much fatty, salty, oily foods, grilled, smoked and cured products, candy products and if you are the one who is far from regular sport and exercise while consuming all of these oxidative foods, you are under heavy oxidative stress. You have to be conscious that your metabolism has been making too much free toxic peroxy radical compound which can be converted into carcinogen and cause the formation of cancer and diabetes. If anyone would say that you should avoid eating all these hazardous oxidative foods and begin to regular sport and exercise immediately, most of you can not. Because traditions and life styles can not be changed promptly, no matter how we desire them. But consumption of strawberry in enough amounts regularly can decrease harmful free toxic peroxy radicals produced by these harmful food products. If you can not help leaving to consume these types of harmful oxidative food products, the best way for you seems to increase the consumption of antioxidant foods such as strawberry.

Phenols, anthocyanins and ellagitannins in strawberry decrease the production rate of free toxic peroxy radicals which are strong antioxidants as mentioned above. But, this effect is not the only one. The same isoflavones enlarge the diameter size of blood vessels, decrease cholesterol and bad cholesterol whiles increasing good cholesterol. These isofalvones are incredible. They have got both protective effects against cancer and diabetes, but also against cardiovascular diseases such as hypertension, cardiac spasm, arterial fibrosis by reducing cholesterol reducing and dilating vessels.

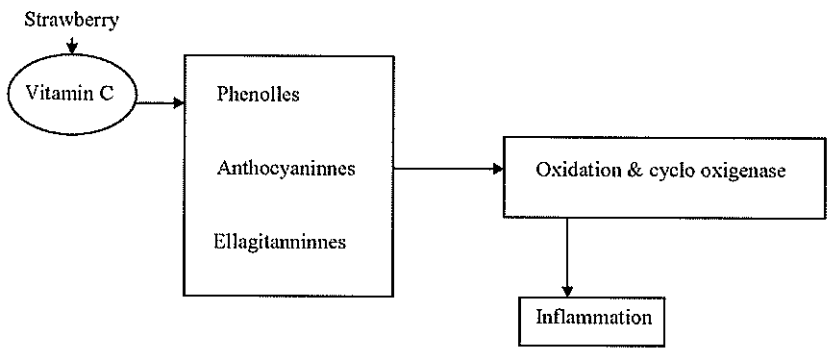



**Diagram 13**

People always know vitamin C as immune boosting vitamin and they always remind it whenever they get flu as I indicated above. Very few of us know that it increases the production rate of serotonin (relaxing hormone) and dopamine (anti-Parkinson hormone which coordinates muscle and bone coordination) and dopamine which is responsible from sleeping process. The production of all these hormones increases by the effect of vitamin C in strawberry. The increase of serotonin by the effect of vitamin C in strawberry protects you against Alzheimer, stress and manic depression. The increase in dopamine production by the effect of vitamin C in strawberry protects you against Parkinson. Dopamine increase by the effect of vitamin C in strawberry improves sleeping process and may increase the quality of sleeping. If

you want to be protected against osteoporosis and osteomlacia properly, calcium alone can not be absorbed through your bowel mucosa. But, the absorption of calcium can be possible by vitamin C which is exist in plenty amounts in strawberry. If you disregard fat risk, **cream with strawberry is a conscious combination that vitamin C coming from strawberry enhances the absorption of calcium coming from milk. Similarly, yogurt with strawberry and yogurt and kefir mix combinations are the combinations having got higher calcium bioavailability which should be considered in protection against osteoporosis and osteomalacia.**

Many of us in many countries all over the world has been talking and complaining for the present view of strawberry. Many of us miss the strawberry in higher quality in taste and aroma a ten or 20 years ago. Many of you have been complaining that strawberry is very bigger in volume nowadays while having got poor aroma and taste. Of course, the assumptions such as hormone added are always followed by. These hesitations may be correct or wrong. But, what I want you to know is that no one can claim that the concerned food product is hormone added, by only looking at it. It can only be understood with analysis after days. Even a very qualified food engineer or technologist can not claim and understand whether the concerned food is hormone added or genetically modified by only looking at it. These are possible by only laboratory analysis. What about the big volume of today's strawberry? Industrial farming and cultivation by the regulation and addition of vitamin and mineral, herbicides and pesticides can yield higher volume and the big volume can never claim the risk of hormone addition definitely. I do not want to say that this risk does not exist. Big volume can indicate to the risk of hormone addition but indicates to only the risk. It is not definite. It is only a possibility which we can never be sure unless we apply laboratory analysis. Do not make me misunderstood but we also could not prove yet that hormone added and genetically modified food products cause important diseases. It needs more than hundred years through generations. But, one important matter what we know today is that, the main beneficial compounds such as vitamins, minerals, essential amino acids of the product is not decreased by such applications. So, what? Every time you make shopping, if you worry about the food product that it might be the one hormone added or genetically modified, you can not be satisfied and perhaps can not find anything to buy and eat. The main solution here belongs to government of each country that the food products should have been tested regularly and labeled as genetically modified or hormone added or organic. Unfortunately, this approach is done by very few countries in the world like Germany and The United States.

The people above 40 begin to lose visual health year after year. It is a natural result of aging that older cells of macula and retina are much more sensible to defects caused by free toxic peroxy radical compounds. **Rich content of vitamins B, C and K as combined are claimed to protect the cells in macula and retina against the harmful effects of free toxic radical compounds.** Therefore, you could be the one who gets older in a healthy manner without losing your visual health by consuming plenty amount of strawberry regularly (Archive of Ophtalmology, 2004).

Vitamin $K_1$ which exists in strawberry in rich amounts is another side of the fruit which makes it wonderful in prevention against osteoporosis and osteomalacia. I want to remind you once more that vitamin $K_1$ stimulates the surface bone protein osteokalsin and activates it which binds calcium from blood on to the surface of bone.

Rich magnesium content of strawberry is another wonderful attribute of strawberry. This mineral enters the structure of

enzymes of more than 300 which act importantly in energy production. That is why it is also called as energy producing mineral. People are using too many magnesium tablets every day because of this definition. Advertisements and media also claim that this mineral is an energy producer. Magnesium mineral is important like all others since it enters the productions of enzymes which are required for energy production. But, this does not mean that you can increase your energy production by taking magnesium tablets every day and you can feel you much more energetic. Similarly, mega dose applications of magnesium tablets do not increase energy production in persons suffered with chronic fatigue syndrome. On the other hand, if you do not take this mineral in sufficient amounts into your metabolism, then you can be suffered with lack of energy problem or chronic fatigue or related disorders. Briefly, mega dose of the mineral, opposite to common belief, does not increase your energy production rate and make you more energetic, but can always cause side effects and a kind of poisoning while less amounts can cause lack of energy and chronic fatigue. Regular consumption of strawberry supplies you the daily required magnesium amount which is sufficient to protect you against chronic fatigue.

Strawberry is also rich in folate and folic acid. Folate, folic acid and magnesium should be taken into pregnant metabolism in the first trimester of pregnancy to protect baby against spina bifida risk. Therefore, the main diet of pregnant in the first trimester should have broccoli, Brussels sprout, liver, nut, spinach, cauliflower, cabbage, green leafy and strawberry.

Omega 3 fatty acids, the only fat group which have been claimed as having beneficial medicinal effects on metabolism are unfortunately exist in a very few food products such as fish, nuts and flax seed. But, I have to add to the end of the list strawberry as one of the richest omega 3 source among fruits. Omega 3 fatty acid content in strawberry is so rich that if you can not freeze it or refrigerate, it can be oxidized very easily and can give a rancid odor and aroma to the product. I want to remind you once more that omega 3 fatty acids in strawberry dilate your blood vessels, decrease your cholesterol and bad cholesterol, protect you from arteriosclerosis and hypertension, decrease TNF (Tumor Necrosis Factor), protect you against cancer, decrease blood sugar concentration, protect you from diabetes, increase seratonin, dopamine, melathonin, protect you against insomnia, depression, Alzheimer and Parkinson. No wonder that we can easily find strawberry tablets in many anti-aging stores all over the world in many countries today. But, I want to underline again that, do not prefer strawberry tablets, prefer natural consumptions like I had also advised tomato consumption rather than leukopen tablet supplementation. The two most important benefits as rich omega 3 and vitamin C content can give you many benefits but both can decrease in amount and activity with oxidation by the effect of oxygen. I want to share with you very important and practical information at this point. **If you have to consume your strawberry in long periods such as weeks and months, but if you want to save its omega 3 and vitamin C contents at the same time, place a piece of paper on the dip of a plastic container. Treat strawberry with half glassful of pure and fresh lemon juice (by mixing fruit with lemon juice homogeneously) then place these strawberries above paper layer in the container. Stretch the surface of container with a plastic film and place the container into freeing part of refrigerator. The additional vitamin C of lemon juice as combined with freezing protects the desirable red color of strawberry while protecting them against oxidation and prolonging the shelf life.**

I have tried to put all the benefits of strawberry which can be included to the daily nutrition and life style as one of the healthiest fruits. Unfortunately, like all foods, it has got some hazardous substances which should be considered by some

persons who are suffered with allergy and renal failure. High oxalate content of strawberry can cause the formation of oxalate crystals in joints, kidneys and gallbladder. Therefore, people who have got ball bladder or kidney stones should avoid from strawberry consumption because of its high content of oxalate. One hazardous effect of oxalate is that it binds calcium. Strawberry is also a fruit which has got very high soluble and insoluble fiber content. Both oxalate and fiber bind calcium. Many fiber rich foods have got high fiber content like strawberry. I do not want you to understand from this explanation that if you are suffered with osteoporosis or osteomalacia you have to avoid from strawberry consumption. All I want to indicate here is that if you are the one who use calcium tablets regularly, do not consume strawberry just after calcium tablet. Wait for a while, one or two hours that, calcium may have been absorbed in this period and then you can consume strawberry. Also, do not consume strawberry just after meals because rich fiber content of strawberry can bind some important and beneficial substances such as essential amino acids and fatty acids, vitamins and minerals as I indicated in many parts of the book. Therefore, I want to repeat my important advice once more that fiber rich foods such as strawberry should not be consumed just after meal times or as combined with meals. There should always be a period of time between them. Strawberry is also one initial fruit which causes allergy in some metabolisms.

One group which should avoid from strawberry is hypothyroid suffered people. Goitrogens in strawberry inhibits the production of thyroid. Broccoli, Brussels sprout, cabbage, radish and beet have also got high content of goitrogens which should be avoided in hypothyroidism. Finally, do not forget to consume this fruit at least within two days at refrigerated circumstances.

# OLIVE OIL

Inflammation, the initial cause of all diseases and disorders, the base of aging, should be controlled as long as we live. The more decrease in inflammation level, the less toxic radical compounds we will have produced in our metabolism. I had mentioned the adverse and inflammatory effects of the toxic radical compounds in previous pages. But I want to remind you these important and life threatening effects once more very briefly because the beneficial and important functions of olive oil can only be understood in the case of better evaluation of adverse and harmful effects of inflammation and its toxic radical compounds. Especially fats and carbohydrates, in case of their excess intakes into body, can react with oxygen in blood and yield some hazardous compounds which are called as free toxic radical compounds. Excess amount of free toxic radical compounds can accumulate around the cell walls of the cells and wound or rupture these cells. The result is the wounded, in other words, aged tissues and organs. Some of these toxic radical compounds can be converted into sugar and raise the sugar concentration level of blood and cause type 2 Diabetes while some of the excess toxic radical compounds can enter the cell by rupturing the cell wall, react with the genome of the cell and cause cancer. Some of them can accumulate on the wall of vessels and cause to the calcification of blood vessels which may result in hypertension and cardiovascular diseases while some of them accumulate in the tissue of liver and kidney and cause to renal failure and hepatitis. Sometimes, the excess amount of these compounds can accumulate in joints, defect them and cause arthritis. Gastritis and ulcer, the inflammation of stomach mucosa and the wound of stomach mucosa can also form by the accumulation of excess amount of these compounds on stomach mucosa. Brain tissue and vessels are also the other important organs and tissues which are adversely affected by them. Many cases of Alzheimer and Parkinson are because of the calcification of the brain vessels and inflammation of brain tissue due to excess amount of these compounds. The target of the person who aims anti-aging and protection against to these important diseases and disorders is very clear and net. The control and inhibition of inflammation and its free toxic peroxy radical compound production. You can do it if you evaluate the data in the book presented previously and adapt into your kitchen and life style. Increasing antioxidants and fiber consumption with plenty amounts of water and juice consumption as combined with daily and regular sport and exercise. But, if you increase the consumption rate of fats, oils and carbohydrates, you should know that, excess amount of them will react with oxygen in your blood and will be harmful by causing many of the mentioned diseases and disorders. As long as you will dominate antioxidant rich foods such as fresh fruits and vegetables, also fibers while decreasing the



consumption rate of processed foods, fatty and oily foods especially fried ones and meat and dairy products rich in fat, you will have started in increasing the quality of your life.

Of course, dominating fresh vegetables and fruits, restricting fat and oils, avoiding from alcohol, tobacco, processed foods and fast food is not easy. You will need some time to adapt this type of living if you are the one who used to consume meat and dairy products and not familiar with plant origin products. I do not advise you to cut all meat and dairy products since they are deathly important because of their incomparably superior protein quality. But you can prefer low fatty milk and dairy products and low fatty meat and meat products in your marketing.

All the scientific researches claim that four or five serving fruit and vegetable consumption a day is a key for anti-aging. In comparison of fats, oils and carbohydrates, the most aging food compounds are fats. Oils are in less risk when compared with fats. Fats and oils are the esters, in other words, combinations of fatty acids and three value alcohol glycerol. The main determiner for the health status of fats and oils is the type of the fatty acid in the composition of fats and oils. Oils are composed of unsaturated fatty acids which have got unsaturated hydrogen bonds among their carbon atoms whereas fats are composed of saturated fatty acids which have got saturated hydrogen bonds among their carbon atoms as I mentioned above. The more saturated fatty acid in the composition, the more solid and tough structure will form. Normally, the structure of animal origin lipids is always solid and tough under room temperature since they are composed of saturated fatty acids. The plant origin lipids such as oils are liquid under room temperature since they are composed of unsaturated fatty acids. In other words, the structure of lipid depends on its saturation degree of the fatty acids. Animal origin lipids which are composed of saturated fatty acids and which are solid under room temperature such as butter, inner and tail fat are many times responsible for the progress of many important metabolic diseases and disorders such as hypertension, cardiac spasm, calcification because of the saturated fatty acid accumulation on the wall of blood vessels. **Also, saturated fats such as palmitic and stearic acid are always liable to be converted into cholesterol by liver in metabolism. Therefore, excess amount of saturated fats or fats can accumulate on the wall of blood vessels and can cause aging and many important metabolic diseases and disorders. On the other hand, unsaturated fatty acids when compared with saturated fats are in less risk because their conversion rate into cholesterol is not too significantly important. First, they can be converted into saturated fatty acids and then they can be converted into cholesterol. So, it can be clearly expressed that unsaturated fatty acid rich oils are always in less risk when compared with the fats in animal origin which is composed of saturated fatty acids. But, it does not mean that you can consume oil as much as you want because oils are composed of unsaturated fatty acids and poor in saturated ones. Because the excess of unsaturated fatty acids in abnormally high amounts can also be converted into saturated ones by liver and you may face with the risk of cardiovascular diseases and disorders. I am only making the comparison of fats and oils between them. If you compare the equal amounts of fats and oils, oils are clearly in less risk since their accumulation capability on the walls of blood vessels are less and their conversion rate into cholesterol and bad cholesterol is less when compared with fats. But, I should remind you that, also the excess amount of unsaturated fatty acids can be converted into saturated fatty acids and they can be converted into cholesterol and bad cholesterol by liver and can raise blood cholesterol level.**

What is the daily consumption amount of oils which will not be too risky for your health? Only two table spoonfuls. Is it unexpectedly too small? Yes, I am definitely sure that many of you while reading these lines, can think that they can not be accepted and they are very small amounts, not enough for cooking and preparation of our meals. You may be right. I am only trying to analyze the data of scientific research findings that they claim the adverse and aging effects of more than two table spoonfuls of oil daily consumption. You should always consider that more consumption will not be healthy and will make a potential to cause hazardous and aging effects on your metabolism. I do not want you to obey this limit because I know that neither you nor I will be able to obey this rule. Fat and oil give appetite to our food. A food which is completely free of fat and oil will be too dry and far from being delicious. Appetite is a very important sensory attribute and a must for the food. What I only want to mention here is the necessity of restriction of fat and oil consumption. As long as we are close to the two spoonfuls daily oil consumption, we will be much more resisting against cardiovascular diseases and disorders. Opposite, we will be close to the risk of cardiovascular diseases and disorders as long as we consume very higher amounts of oils more than two spoonfuls.

Although, more than two table spoonfuls of oil will bring us some hazardous and aging effects in our metabolism, you should never understand it as a completely fat or oil free food product. Because a completely fat of oil free product will be free of many important fat soluble vitamins at the same time, the vitamins A, D, E and K. Vitamin A is a must for anti-aging because of its wonderful antioxidant potential, but also it is the initial vitamin which acts importantly in the production of white blood cells which fight for pathogen microorganisms. It also enhances the quality of visual functions by regulating the function of retina and protects against cataract. Vitamin D is the most important vitamin which enhances the absorption of calcium through bowel mucosa. Therefore, the protection against osteomalacia (bone and muscle density loss) and osteoporosis can only be possible by not only consuming calcium rich foods such as milk and dairy products, fish meat and dark green vegetables but additionally vitamin D rich foods. I want you to be careful at this point. Because, most of you will think that the food products here such as egg and liver and also butter are the ones which are rich in cholesterol. You will remember from the previous related part that cholesterol coming from foods can not be absorbed properly because of its waxy structure. In other words, cholesterol in food origin has been blamed for a long time with its cardiovascular disease potential. It has really very minute potential to be able to cause cardiovascular diseases and disorders since it has got very limited absorption limit through bowel mucosa. **The main criterion here is the capability of the food to be absorbed through bowel. Only after this absorption, the food can pass into blood and reach into liver and converted into cholesterol. The fatty acids which produce cholesterol in liver are initially saturated fatty acids, especially palmitic and stearik acids. Briefly, not the cholesterol rich foods, but saturated fatty acids, especially palmitic and stearic acid rich foods, are the main foods in high risk. Thus, it can be clearly expressed that olive oil which is free of saturated fat and rich in unsaturated fat has got a very low risk to form cholesterol. On the other hand, butter or margarine is rich in saturated fatty acids and not because of cholesterol they contain, but because of their rich saturated fatty acid content, they are a big thread in raising cholesterol level. But, we have to make another consideration before making a decision about butter. Because butter has got a very special potential with its high contents of vitamin A, D, E and K all of which are strong antioxidants.** These antioxidants in butter also decrease cholesterol content by inhibiting cholesterol production and conversion from free toxic peroxy radical compounds. Wounding, scar formation and coagulation of blood is

possible by vitamin K while vitamin E is not only a strong fat soluble antioxidant, but also it is a required antioxidant in prevention of sperm from hazardous effects of free toxic peroxy radical compounds. The absorption of all these antioxidants through bowel mucosa, transfer of them into blood and finally their action can only be possible by fat or oil. These antioxidants which act importantly in anti-aging, which protect us against aging and slow aging process and also protect us against diseases and disorders can only be absorbed as in fat form since they are soluble vitamins in fat. There should be less or high amount of lipid, fat or oil, for their absorption through bowel mucosa. In conclusion, fats and oils, although excess amounts of them are hazardous and aging, normal amounts or less amounts should always be exist in our foods to be able to absorb fat soluble antioxidants. Otherwise, we will have to be deprived of the beneficial and desired antioxidant and anti-aging effects of the mentioned vitamins. But, butter and margarine do this function with a risk, cholesterol, saturated fats and trans fats. Because both contain these hazardous compounds which are responsible for atherosclerosis (calcification of vessels), wounding of cells (aging), high cholesterol, bad cholesterol (LdL) and oxidized low density lipoprotein (OldL) levels. Especially, if you are the one who suffers from any cardiovascular disease and disorder like hypertension, diabetes or cancer, you'd better avoid both of them. Oils and especially olive oil is free from saturated fats and trans fats. They are also free of cholesterol since they are in plant origin. Only animal origin lipids, fats, contain cholesterol. Briefly, olive oil and other oils like sun flower, canola and soy appear as in less risk since they are free of cholesterol, bad cholesterol, trans fat and saturated fat. If you have to consume butter or margarine and if you have to make a comparison, you'd better choice butter always for your meals and breakfast since it is very rich in antioxidant fat soluble vitamins A, D, E and K, minute amounts of amino acids, folic acid, folate and $B_{12}$ although it contains saturated fat, cholesterol and trans fat. Perhaps, the rich antioxidant capacity for butter in spite of its rich cholesterol and saturated fat content may suppress the oxidant effect of cholesterol and bad cholesterol. We should not have prejudice at this point by rejecting butter from our life and neglecting its antioxidant capacity by only considering its high cholesterol and saturated fat content. Oil and especially olive oil seems to have got two important advantages when compared with these fats.

1. I had mentioned the superior effect of butter when compared with margarine because of the higher amount of trans fat in margarine and the existence of fat soluble vitamins with minute amounts of amino acids in butter. If you are the one who make regular sport and exercise and not obese, not suffered with any important metabolic disease and disorder, consumption of butter in small quantities will be anti-aging and helpful for your health. I always witnessed to people who are very fit, strong and consume butter regularly. It may be due to the higher content of fat soluble vitamins A, D, E and K, folate, folic acid and $B_{12}$. But, keep in your mind that butter is also solid which means that is very rich in saturated and trans fat. **But, olive oil is free of trans and saturated fats and it has got a very rich antioxidant capacity because of its polyphenoles, chlorophyll, tyrosol, hydrotyrosol and oleuropein content.** You will never have to worry about trans or saturated fat risk during consumption with olive oil in normal amounts. One common trick about margarine nowadays on advertisements on TV and other media is the presentation of margarine as a healthy energy source. In these advertisements, margarines are fortified with some beneficial and functional food compounds such as vitamins A, B, C, D, $B_{12}$, folate and folic acid. They are presented as a food product rich in high antioxidant capacity. Of course, you can understand the trick in these kinds of presentations.

The addition of these antioxidant functional components into butter during fortification does not mean anything since it can not make the rich content of harmful trans and saturated fats exist in butter. These types of information and advertisements can misguide many consumers. Many consumers can think about margarine as an energy source, rich in vitamins by neglecting its high amount of saturated and trans fat content. Therefore, you must prefer olive oil first and followed by butter but margarine should always be avoided or restricted for a healthy nutrition and lifestyle.

2. Olive oil is very susceptible to oxidation with its unsaturated fatty acid content with oxygen which means that you should preserve it under cool conditions free of light. Light and high temperature can shorten the shelf life and oxidize the oil and decrease its quality. The bottles should be dark colored to be able to protect the inner content against oxidation. So, be sure that olive oil which you want to buy should be in a dark colored bottle.

**Why winterized olive oil should be preferred?**

Olive oil is produced in three ways. If olives are pressed and the oil is extracted, this first extract is the richest in vitamins A, D, E and K, beta carotene, selenium, zinc and omega 3. This first extract which is the richest in nutrients is called 'winterized and extra quality'. But, if another second press is applied to these olives, the concentration of the mentioned vitamins and fats decrease. This lower quality but cheaper oil is called pure olive oil or extra quality. Finally, the extraction by the third pressure application decreases the nutrient concentration most and this last form of olive oil is the cheapest. Winterized one may be very expensive in comparison with other oils and fats, but if you can afford, it will be better and more beneficial for your health with its richest nutrient capacity.

# GRAPE FOR A HEALTY LIFE STYLE AND ANTIAGING

I want to explain some important data about a hormone which is called Angiotensin II. The hormone is responsible for many cases of cardiovascular diseases and disorders because it causes calcification of cardiac tissue. There is a connective tissue in cardiovascular system which is consisted of special connective tissue cells, fibroblasts. In case of increase in fibroblast ratio, the calcification degree and the ratio of connective tissue increases. Fibroblast cells produce collagen (the connective tissue itself) and the increase of collagen because of the increase of fibroblast cells decreases the ratio of cardiac muscle cells which means 'cardiac tissue fibrosis' or calcification. This type of cardiac muscle rich in connective tissue losses its elasticity and can not make healthy contractions and relaxation. Under normal conditions, cardiac tissue takes all the dirt from dirty blood into its cavities by making relaxation and pumps the dirty blood into lungs to be cleaned by oxygen by contraction. The cleaned blood turns back into the cavities of cardiac tissue and pumped into the coronary vessels (the vessels of cardiac system) by the contraction of cardiac tissue. The cleaned blood circulates all parts of the body by the means of vessels. It comes to each cell of our body, feeds them, takes the dirt from each cell and turns back into cardiac tissue. The dirty blood collected in the cavities of cardiac tissue is pumped into lungs again to be cleaned by the contraction of cardiac tissue and this circulation goes endlessly all through the living period. Briefly, feeding of all body cells and cleaning process of blood depends on the contraction and relaxation capability of cardiac muscle. Cardiac muscles should have got an elasticity to be able to make these contractions and relaxations. But, in case of an increase in connective tissue (collagen) ratio, cardiac muscle losses this elasticity and can not make these contractions and relaxations. The result is cardiac failure. Your body cells can not supply clean blood because your calcified cardiac muscle tissue in calcification can not pump dirty blood into lungs to be cleaned. The dirty compounds such as free toxic peroxy radical compounds, allergens, harmful food additives namely nitrite, nitrate, polycyclic aromatic hydrocarbons, salt, fat, cholesterol, bad cholesterol, carcinogens, trans fatty acids, bacteria, virus and their residues and toxins, omega 6 fats and many others begin to accumulate in blood. The latter step is toxemia, the accumulation of the mentioned toxic compounds in blood. Briefly, the elasticity of cardiac muscle is everything for a healthy living and detox process since only a flexible cardiac muscle can make contractions and relaxations and pump the dirty blood into lungs to be cleaned. Otherwise, body will have been deprived of clean blood and will continue to die by the time. That is why all detox process, diets and healthy life style which aim anti-aging and protection against diseases and disorders should focus on cardiac muscle health. Resveratrol in grape inhibits the production of Angiotensin II hormone and as a result the production of fibroblasts and decreases collagen production caused by fibroblasts. Therefore, grapes should not be neglected in a healthy life style and kitchen. But, this important antioxidant exists especially in skin and seed of grape. Therefore, all kinds of grapes should be consumed by chewing the skin and seed parts of the fruit. Always remember that the more colored the grapes are, the more their resveratrol content will be. So, it will be better to prefer dark purple and red grapes or dark green one rather than pale-yellow one.

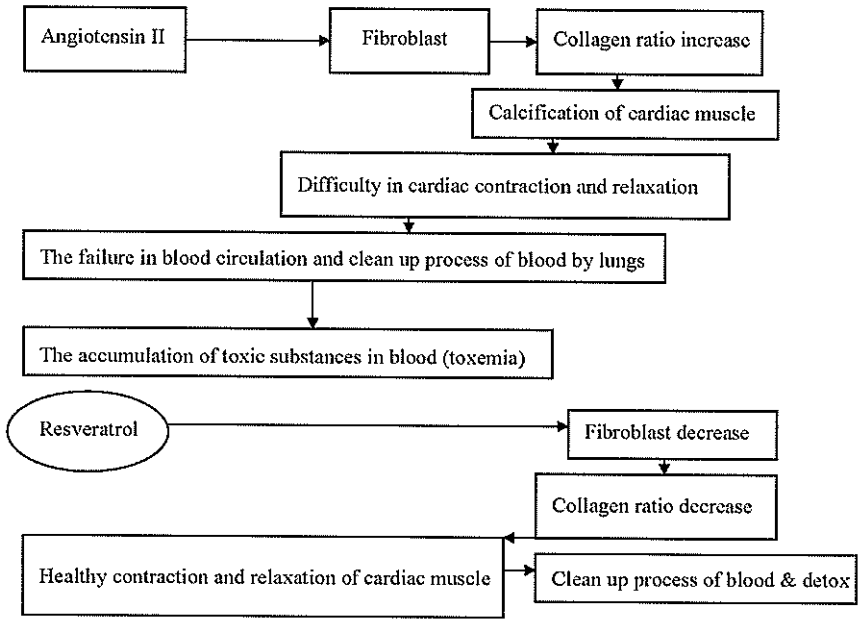



**Diagram 14**

Tyrosine kinase, a protein, is responsible for the contraction of vessels. The diameter size of the blood vessels decreases due to this effect. Blood can not pass through the cavity of such vessels in low diameter size. It slows by the time in the cavity and solid particles of blood find an opportunity to adhere on the wall of vessel. Briefly, this protein increases the risk of vessel calcification and cardiac failure as a natural result of the calcification. Many times, hypertension may accompany. But, polyphenol substances which exist in grape inhibit the production of tyrosin kinase. On the other hand, there exists another substance which is very similar to tryosin kinase in action, endotein 1. This protein is produced by the cells which cover the inner surface of blood vessels. The same substance is decreased by resveratrol which decreases the risk of calcification and cardiac failure.

Most of you especially the guys who are suffered with hypertension or any other cardiovascular disease in cholesterol origin knows saponines. Saponin is a kind of fiber like substance and binds fat, triglyceride, cholesterol and bad cholesterol. Saponin is one of the most common medicinal substances in cardiovascular platform with its cholesterol reducing effect. This important substance naturally exists in olive oil, soy and soy products and grapes. I want to make an addition to the data which I mentioned above as related to olive oil. You have got another reason to consume olive oil and dominate it as the initial cooking oil option in your kitchen. **Saponines.** But, also grapes have got this important cardio protective substance in high amounts. Unfortunately, saponin in grape is not bioactive. You can not benefit if you

consume grape directly as in its raw form. If you want to benefit from saponin of grape, you have to activate it. The best way and most common application to activate saponin in grape is fermentation. Alcohol beverages in grape origin like campaign or wine are produced by fermentation of grape. But, I will not recommend alcohol. I can not! You may have red from many magazine articles or heard on TVs or radio programs that little amounts of alcohol, especially wine and campaign in grape origin acts as anti-clotting (dilute blood) while dilating blood vessels. These claims are correct because grapes are rich sources of some important antioxidants like resveratrol, polyphenols and quercetin. All these antioxidants are activated by the fermentation of grape. So, alcoholic beverages in grape origin, which are produced by the fermentation of grape, are rich sources of these antioxidants and they contain active forms of these antioxidants. All these antioxidants dilate blood vessels and thus increase diameter size of blood vessels while diluting blood. For all these reasons, wine and campaign in grape origin have been recommended to public in media. Unfortunately, this kind of approach is seriously wrong. A food product can not be evaluated by considering only the beneficial attributes of the product. You should also take hazardous effects into consideration. There should be two parameters in the evaluation. First, the ratio of beneficial attributes to the negative ones and second is the severity of the negative attributes of the food products. A food product, in spite of having got very few negative or hazardous attributes which are very serious for the metabolism, the ratio of positive beneficial effects of the same product does not make any sense. Like alcohol and alcoholic beverages including wine or campaign. They may contain the mentioned antioxidants, dilute blood and ease blood circulation, decrease cholesterol and bad cholesterol. We are all acknowledged about all these beneficial protective effects of the rich antioxidant content of wine and campaign in grape origin constantly in media. What about the hazardous and harmful effects of the same alcoholic beverages in grape origin? You may notice many scientific claims which inform the destructive effect of alcohol, even in minute amounts, on brain tissue and liver. Briefly, you may have recovered or caused beneficial effects on your cardiovascular system but on the other side while doing this, you may have destroyed your liver or brain tissue. When alcoholic beverage products are evaluated from both sides, they appear as even toxic from the point of liver and brain health, no matter how they are good at cardiovascular health due to the rich antioxidant content of grapes.

If alcoholic beverages in grape origin, in spite of their rich antioxidant capacity and healing effect on cardiovascular system, have got hazardous effects on liver and brain tissue, how can we benefit from saponins or is there another healthy way without any risk to benefit saponin content of grapes.? Yes, exactly there is. The answer is grape pickle. I know that many of you are not familiar with the product but it is so easy to produce at home by yourself. I can not recommend you to buy it from market because they are too salty and salt, more than one tea spoonful, indirectly increases the oxidation rate and the production of free toxic peroxy radical compounds while excess of it can accumulate on the walls of vessels and cause calcification. But, you can keep the level of salt too low while increasing the grape and garlic content with a little sugar. Only you have to do is placing grapes into a container. 200 gram ground garlic for one kilogram grape will be mixed with ½ L grape cider, two tea spoonfuls of salt, 1 spoonful of sugar and 1.5 L clean water. The lid of the container will be tightly closed and the container will be left for incubation under cool temperature conditions. This type of production has got two benefits, one is activating antioxidant content and especially saponin of grapes and the second is using grape cider in the production which is also rich in saponin, resveratrol, quercetin and polyphenoles.

Women have got two important and special periods in their life. Premenstrual period (the monthly bleeding due to the burst of ovarium) and menopause. Both affect women health adversely. During premenstrual period, young women face with the loss of calcium, red blood cell in significantly important amounts. Therefore, women face with the risk of anemia and osteoporosis and just because of the period they are closer to the risk of these diseases seven times more when compared with men. Women also faces with the risk of osteoporosis because of menopause due to the slight decrease in estrogen (female hormone) since this hormone enhances the binding capacity of calcium to the bone cortex (surface bone). But, another risk for both periods is the increase in inflammation level. During both periods, prostoglandine E type 1 hormones which are very beneficial and protective against diseases and disorders by decreasing the risk of edema, Tumor Necrosis Factor /(TNF), sugar and allergy. These hormones secrete beneficial cytokines as I mentioned in the related part and these important proteins protect against diabetes, cancer and atherosclerosis. But, there are hormones in opposite effect in metabolism which is called as prostoglandine E type II. They produce harmful cytokines which increase the permeability of vessels and cause edema, increase TNF and the risk of cancer, allergy and the severity of atherosclerosis. As long as the body produces more prostoglandine E type 1 hormones and less prostoglandine E type II hormones, body is healthy and protected against important metabolic diseases such as cancer, atherosclerosis and diabetes. But during both periods of women, protoglandin E type II hormones begin to increase while prostoglandin E type I hormones begin to decrease. The result is the accumulation of peroxy radical compounds in blood while blood vessels are contracted by causing hypertension. Also, the change may cause to the increase in the risk of cancer, diabetes, edema, osteoporosis and allergy. Because of this hormonal change and imbalance, women during both period always complain about feeling hot, dry skin, anxiety, edema, allergy and itching, feeling depressed and tired. Prostoglandine E type II hormones cause these adverse and harmful changes with their harmful cytokines. The increase in the ratio of these hormones in body increases the rate and severity directly which results in cardiovascular diseases and hypertension and the mentioned complains of women during both period. These hormones stimulate the combustion of fats and oils and fat deposits with oxygen in body more than the other periods of life and produce free toxic radical compounds. They accumulate on the wall of vessel and decrease the diameter size of vessel and cause atherosclerosis (vessel calcification) and hypertension due to atherosclerosis. The increase of these toxic radicals in blood means the solid particle concentration in blood which may result in lung and cardiac failure and toxemia. For all these reasons, the women during both periods have got many complains as related to the circulation system and cardiovascular system. What is the relation of all these metabolic changes during these special periods of women with grape? Polyphenoles in grape prevents the accumulation of the solid particles and free toxic peroxy radical compounds on the walls of vessels. The women during both periods should know that their oxidative stress is higher than other periods during these periods and the amount of their free toxic radical compounds is higher. Therefore, they are closer to the risk of atherosclerosis, hypertension and cardiac problems than others. That is why they should never neglect to consume grape and benefit polyphenol content of grape. As long as they will consume grape and take these beneficial compounds into their bodies, they will be able to dilute their blood and protect their blood vessels against calcification. The women during these two important special periods should consume plenty amount of grape especially purple, darker or more colored ones. Because polyphenol compounds, resveratrol, quercetin and other antioxidants of grapes are exist with more amounts in dark green, thick skinned, purple colored ones rather than pale yellow green ones.

Cholesterol ester transfer is a protein which acts importanty in cholesterol production. But polyphenolles decrease cholesterol 15 %. For this reason, grape is one of the greatest fruit for the protection of cardiovascular diseases and disorders in cholesterol origin. Polypehnoles also decrease Tumor necrosis Factor (TNF) which increases the risk for the cancer formation. So, you can be protected to both cardiovascular diseases and cancer by consuming grape in plenty amounts.

Fuming or smoking technology is the application of fume to the food products. The fume is produced by tough and dry wooden material followed by burning the wood above 350 °C. The fume passes through a separator which eleminates the excess of solid particules and than reach onto the surface of the food product. Formaldehyde in fume is one of the strongest antimicrobial agents which can kill viruses, bacteria species and their spore formings. Therefore, the shelf life of the fumed product can be prolonged. Additionally, polyphenoles, benzapyren, organic acids, alcoholes and many others which are claimed as more than 500 compounds penetrate into the food product and increase the sensory quality and safety of the product. Because of the compounds in the fume, fumed products attract consumer more in taste, color, aroma and appearance. Especially, polycyclic aromatic hydrocarbones and benzapyren act more importantly in the formation of surface color, taste and aroma, but they are claimed as carcinogen. Because of the cancerogenic effect of these compounds, too much fumed food consumtion and domination of such products in daily kitchen and life style can increase the risk of cancer, especially in bowel and stomach origin. Benzapyren can rupture the cell wall and enter into cell, react with genome of the cell and increase the risk of cancer formation. The most important point at this stage is that the regular consumption of purple grape in pleny amounts can decrease the risk of genom change by benzapyren coming from fumed food products by resveratrol in grape (Life Science, August 2003). If you are the one who likes to consume fumed products and if you can not help stopping it, you'd better begin immeiately to consume purple grape regularly in plenty amounts.

The surface cells which are exist in the inner layer of vessels cover the inner surface of vessels but they produce an inflammatory agent called Cyclooxygenase-2 (COX-2). This enzyme is in protein structure like all other enzymes and regulates the production of inflammatory hormones; prostoglandines E type II. Resveratrol coming from grape inhibits the production of COX-2 and decreases the production rate of the inflammatory hormones. This attribute of grape is also very helpful in lowering oxidative stress and severity of inflammation due to the high oxidation level.

The brain tissue suffered with Alzheimer has got some abnormal special cells which are called as Abeta. Because they are not in normal form, they interrupt the transfer of dopamine, seratonin and melathonin neurotransmitters through the brain tissue which may result in Alzheimer or Parkinson or both. **Resveratrol in grape inhibits formation of Abeta cells in brain tissue and decreases the risk of Alzheimer and Parkinson in case of their daily regular consumptions in plenty amounts.** The mechanism is based on melting of Abeta cells by proteasom, special protein compounds, which are exist in healthy cells. Proteasom melts Abeta cells and they are activated by resveratrol of grape.

**Whenever antiaging, food and nutrition relation is concerned, one of the most common recommended fruit is grape. Sirtuin 2 is an enzyme which is claimed as directly linked with antiaging process in body. Scientific claims**

**indicate that the more the enzyme exists in metabolism, the later the aging process of the body is. Yeast cultures especially *Saccharomyces cerevisiae*, the one which is commonly used in bread production and production of other products in starch origin is very rich of the enzyme. But, sirtuin 2 is not active as in native form in yeast added flour products like in the case as of saponines. Resveratrol in grape activates sirtuin 2 in yeast added flour products and you can benefit the antiaging effect of the enzyme. So, what should we do? Very simple! You can consume yeast added flour products with grape together.**

Do not forget that although resveratrol is a new discovered antioxidant, it is claimed as 20 times stronger than vitamin C and 50 times stronger than vitamin E in antioxidant capacity. This attribute of resveratrol means that you can be protected against inflammation and cardiovascular diseases, cancer and diabetes in inflammation origin 20 and 50 times more than other antioxidants. Glutathion, the protective antioxidant layer around cell membranes can also be increased by resveratrol in grape.

Finally, another important disease which can be protected by resveratrol and polyphenol content of grape is chronic obstructive pulmonary disease (COPD).

Although, milk and dairy products are accompanied with many important metabolic diseases and disorders like cancer and diabetes because of their fat, trans fat, biogen amine, high sugar and protein content which can raise kreatin and uric acid content, low fatty one is exception. As long as you pay attention during marketing that your milk or dairy product is low fatty and you do not consume them in abnormally high amounts, you can easily benefit from their anti-aging and health improving effects. What I mean here is the consumption style. It always depends on the fat content and daily consumption amount. Unfortunately, we hear all similar misinformation from media that red meat and its products, milk and its products are adversely effective on human metabolism. You will remember from the related parts of the book that milk and meat and their products are the richest food products in nutrition capacity in the world. Especially, youth and elderly nutrition should be based on animal origin products such as red meat, milk and their products and also fish and marine origin products, egg, poultry and their products. I want to remind you the reasons for the superior attributes of proteins in animal origin as compared with proteins in plant origin. First, they do not have fibers. In fact it may be a disadvantage but proteins are not bound and can pass through bowel and are transferred into blood. So, biologic value is very higher in proteins in animal origin. The avalibility of calcium in milk and diary products and iron in meat and meat products are very high. These minerals by the means of these foods can easily be absorbed and transferred into blood. The proteins in animal origin are also rich in globulin ad albumin, the proteins which enter into the structure of white blood cells. The immunity may boost by these proteins more than the other proteins in plant origin. All essential amino acids including lysine which is required for body length and muscle progress without any missing are completely exist in proteins in animal origin. But some of these essential amino acids are not exist in proteins in plant origin. Especially, the two target groups, youth and elderly require these essential amino acids and their animal origin sources with their higher bioavalibility because their muscle, bone, blood and hormone levels should be renewed, reproduced or should be protected as much as possible. These foods in animal origin especially milk and dairy products are also rich in fat soluble vitamins A, D, E and K and also vitamins of B complex in addition to their superior protein

quality. Once again, you should know that you should better avoid from animal origin food products in high fat but those food products should also not be fatless since you may be deprived of fat soluble vitamins. In fact, evaluation of a food product is not so easy since many parameters are determiners in the nutritional quality and anti-aging status of the food product. For example, drinking milk or yogurt may be in high risk group with its high protein, biogen amin, sugar (lactose) or fat concentrations but on the other hand they are rich in high quality calcium, vitamin $B_{12}$, folate and folic acid, A, D, E and K as fat soluble vitamins and magnesium. All these minerals and vitamins are antioxidants and protect you against adverse effects of inflammatory agents like fat, sugar and high amount of protein exist in the same food products. I am not tired of giving the same example to you because it clearly expresses such status of a food product. Liver, always recommended to be avoided in cancer and diabetic nutrition with its high trans fat, fat, biogen amin, cholesterol and bad cholesterol content. Therefore, the patient suffered with cancer or diabetes should be avoided from liver and similar offals. But healthy old and young persons should not. The same liver as a food product is rich in vitamins $B_{12}$, folate and folic acid, A, D, E and K, magnesium, high quality iron, high quality and high amount of animal origin protein. $B_{12}$, high quality iron and high amount of protein in higher quality with magnesium in liver can protect the individual against anaemia. Protection against anaemia and the proliferation of red blood cells are one of the most important targets for young or old individual since the both target groups can save their progress status by the means of blood cells. A young boy should carry oxygen, protein, vitamin and mineral to his cells in his body by the means of his red blood cells and other cells will mature by this nutrition. The same exists for older individuals too. Although the maturation and progress are very slow, the old individual losses bone and muscle density, blood and hormone day by day. The aim at this point is to slow this loss and this may only be possible by nutrition in higher quality. Thus, being nutritious is very different; being anti-aging or aging in effect for a food is very different like in the sample of liver or yogurt. All of them are highly nutritious and should be consumed especially by some target groups, child, young (youth) and elderly. But the rich fatty ones are aging rather than anti-aging and may be accompanied with important metabolic diseases and disorders such as cancer and diabetes.

The superior nutrition capacity especially high protein quality and a wide range of vitamin and mineral content of yogurt is a wonderful alternative in anti-aging and protection against diseases and disorders as long as it will be low in fat content. High protein content will replenish the old and died cells while magnesium will give energy and help to increase red blood cell production.

The most important point about **yogurt** and its effect on health is due to its high content of probiotics besides its important antioxidant capacity. As you will remember from the related part about probiotics, yogurt itself is a probiotic food product. It is produced by the activity of non pathogen even beneficial microorganisms. The two most important probiotic organism used in the production is *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. Both are not harmful on human and animal metabolism but have got many important beneficial and protective effects against diseases and disorders. Another probiotic, *Lactobacillus casei*, also has found an application platform to be used as probiotic in yogurt production. This probiotic has been claimed to consume the inflammatory agents which cause pneumonia (lung inflammation) and protects the lungs against inflammation. Also, there are many other probiotics which may be used in yogurt production. All these probiotics come to the surface of bowel and stomach mucosa and make a barrier on

the surface of these organs. This film layer produced by probiotics protect the surface of these organs against harmful effects of cholesterol, bad cholesterol, nitrite, nitrate, toxic radical compounds, fatty acids, salts, carcinogens and trans fats. All these harmful compounds can not make an easy penetration into blood through this film layer because they can not easily pass this film layer. Thus, the levels of all these harmful compounds including uric acid, cholesterol, bad cholesterol, trans fats, trigliserid and sugar decrease in blood. The film layer produced by probiotics (as it was mentioned in detail in the related part) can protect you from cardiovascular diseases such as hypertension, diabetes and cancer since less sugar, cholesterol and cancerogen amounts can pass into blood stream.

Red meat and red meat products also poultry, egg and offals are the rich sources of cholesterol and bad cholesterol. But, if you are the one who consumes low fatty yogurt regularly without any missing while decreasing the consumption rate of red meat and poultry and their products, you can significantly be protected against cardiovascular diseases and protect you heart and blood circulation system. All you have to do is to consume two glassful yogurt daily in low fat amount (1.5 % or less) while you restrict the consumption rate of the mentioned cholesterol rich food products such as red meat and poultry. The probiotics coming from yogurt will have consumed the excess amount of cholesterol and bad cholesterol coming from red meat, poultry, egg and their products and controlled the cholesterol and trigliserid levels in blood profile.

Obesity is one of the greatest problems of child which may be due to many factors like genetic or nutrition. Especially, a great percent comes from nutrition and life style that many of the kids enjoy from fast food, hamburger, ketchup, mayonnaise, fatty milk and dairy and fatty meat products because they are delicious. Also, studying hard and a tough competition among students stop child from making regular sport and exercise. But, one claim made by scientific researches are very important at this point that more calcium intake by the means of food and calcium rich food domination in child nutrition whiles restricting fat decreases the risk of obesity. So, parents should supply more and more calcium rich foods with less fat amount to their kids like low fatty yogurt, dark green vegetables, fish, drinking milk, kefir and cheese. You should pay attention that in spite of the restriction of fat in milk, dairy products, meat and meat products, you should prefer fattier fish meat opposite to milk, dairy, meat, egg, poultry and red meat products. I want to remind you that only fish fats (omega 3) have got beneficial protective effects against diseases and disorders with their cholesterol, TNF, sugar and bad cholesterol reducing effect while all other fats have got adverse effects on human and animal metabolism. Thus, **you should prefer to buy less fatty milk and dairy products but fatty fish meat and its products in supplying rich calcium to your kid.**

Alpha lactalbumin, beta lactoglobulin, immunoglobulin and lactopherrin are called as whey proteins since they are exist in water content of milk or dairy product. The serum (water content) of milk is seperated due to high acidity which is formed by probiotic activity during yogurt production. Casein, one of the greatest animal origin in high quality pass into the solid part at the buttom while other protein group of milk which are water soluble pass into the serum. Serum or supernatant is rich in whey proteins while cheese or yogurt, the solid part is rich in casein (milk protein). Both of the proteins, casein or whey, are the greatest and highest quality proteins in animal origin. Both have got all essential amino acids, especially lysine which acts importantly in body lenght, bone progress and maturation, methionin, the amino acid

required for muscle progress and maturation, histidin and arginin, the amino acids required for blood proliferation. But, whey proteins have got superior benefits like higher bioavalibility. Casein has also higher bioavalibility in comparison with many other proteins in animal origin and many proteins in plant origin but bioavalibility of whey proteins are higher even than casein, the milk protein. Because, these proteins are absorbed by the mucosa of bowel and transferred into blood, they come into muscle cells and used by these cells for very longer periods. Many other proteins in animal and plant origin are absorbed very quickly, but excreted out of the metabolism as in the form of feces and urine very quickly. Also each of whey proteins; alpha lactalbumin, beta lactoglobulin, lactopherrin and immunoglobulin have got important functions, separately. One of the greatest functions belongs to lactopherrin in whey or yogurt serum. This whey protein activates the young bone cells which are called as osteoblast and enhances their calcium binding capacity. Osteoblast is the youngest bone cells having got the highest calcium binding capacity and these cells dominate the bone tissue until 30 and 40 ages. Then, the ratio of osteoblasts begins to decrease while mature bone cells which are called as osteocyste begin to increase and these mature cells with the oldest bone cells (osteoclast) have got no calcium binding capacity. Therefore, osteoblast cell proliferation, their existence and ratio in bone tissue is deathly important in calcium binding capacity. The more calcium binding capacity means the more calcium deposits in trabecular bone (the inner structure of bone) which can be used as calcium sources after youth, during 50, 60 and older ages. If you can manage to keep the number of osteoblasts higher and activate them when you are younger then 30 years old, you may have deposited enough calcium in your trabecular bone tissue which may help to protect you against osteoporosis and osteomalacia when you are older and loose your osteoblasts. Only the deposits of calcium made by osteoblasts previously, while you were younger, will be able to protect you against osteoporosis and osteomalacia during these older ages. Lactopherrin is the whey protein which activates osteoblast bone cells and especially the cells on the surface of bone which are called as osteokalsin. The number of these cells should be high, but additionally they should be activated to be able to bind calcium coming from blood by the means of food onto the surface of bone. This activation of bone cells which bind calcium can only be possible by sport and exercise. The muscle contraction and contact of muscle fibers with bone surface can only make this activation and surface bone cells can bind calcium. Please, prefer yogurt which is well homogenized and solid one without water (serum) part (many times green in color) on the surface of yogurt. Because, the opposite ones are consumed by separating the water part on the surface. Many consumers prefer not to consume this water part (whey) because of its salty taste and they prefer to throw it away. But, a yogurt which is produced by using high technology homogenizes it and keeps the dry matter content and whey protein content high so that the end product does not release any whey. So, the product itself is very rich of whey proteins. Only you have to do is to open the lid and see that it does not have the whey on the surface, very solid and creamy structure which dose not release any green colored whey. Otherwise, do not buy it!

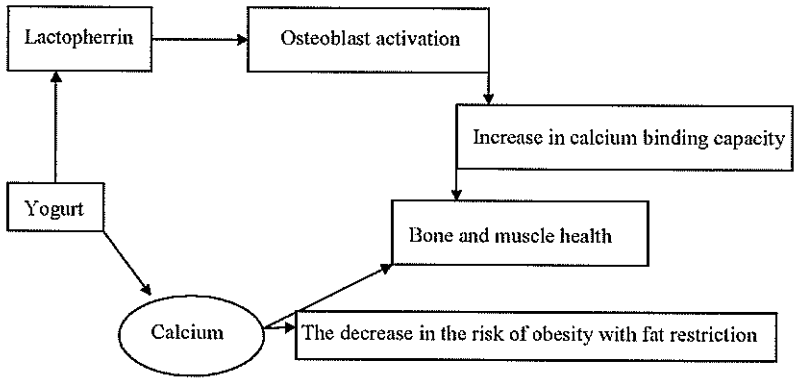



**Diagram 15**

**Keep in your mind that obesity prevention and fat limitation in nutrition will also ease the absorption of calcium through the mucosa of bowel. Too fatty and poor acidic food calcium can be absorbed less while aciditity without excess fat amount increases the absorption amount. That is why the bioavalibility of yogurt calcium is higher than many other dairy products such as drinking milk, cheese and kefir since yogurt is the most acidic one among others.**

Now, I want to mention another fact about yogurt. The best form of calcium which is absorbed in highest amount from bowel mucosa is yogurt and cheese calcium rather than tablet form. Scientists could not find the reason for the better absorption of yogurt and cheese calcium but they have an important explanation. Not only calcium, but all other vitamins and minerals have got less absorption capability through bowel when they are extracted from food and given as in tablet form. But, if hey are consumed as in their natural food source, they have got a better absorption level and transferred into blood in higher amounts. According to many scientists, a mineral, vitamin or any other food compound is active and best absorbed as combined with other vitamins, minerals, proteins, fats or sugars. Whenever you seperate the concerned vitamin, mineral, protein, sugar or any other compound from food and make it tablet, its bioavalibility and absorption capability through bowel mucosa significantly decreases. Therefore, **it is one of the rules of healthy life style and nutrition that it is always better to prefer to supply the food compounds as in their native form rather than tablet form.** The same principle also exists for calcium in yogurt. You'd better prefer yogurt consumption to supply calcium rather than calcium tablets. But, if you are suffered with a severe osteoporosis and osteomalacia or a similar metabolic disease or disorder and if your calcium nutrition status is poor, then you can also administer and benefit from tablet form. But, I can not advise you the tablet preference as long as you can supply it from natural sources and your disorder is not too severe.

*Lactobacillus acidophilus* and *Bifidobacterium lactis* are the two bacteria which are commonly used for yogurt production. They cover the surface of bowel and stomach, form a film layer. This film layer protects the surface of bowel and stomach

against many harmful compounds. Many cancerogen and allergen substances can not penetrate through this film barrier. Additionally, both probiotics kill a harmful pathogen bacterium which is called *Helicobacter pylori* which is responsible for ulcer and gastritis (the inflammation of stomach). The mentioned function of the probiotics which exists in yogurt in plenty amounts is the initial cause for the people who consume yogurt regularly and who are never suffered with gastritis, ulcer and similar disorders in bowel and stomach origin. Another probiotic, *Lactobacillus acidophilus* consume excess of nitrite and nitrate, the food additives which are commonly used for the red meat products such as salami and sausage because of their color, taste, aroma and texture improving effects, followed by its consumption by the means of yogurt. Nitrosamines, the strong and the initial cancer responsible agents which are produced by nitrite and nitrate food additives, are consumed by *Lactobacillus acidophilus*. Nitrosamines are claimed to cause especially colon cancer which is one of the most severe cancer types. Briefly, *Lactobacillus acidophilus* rich yogurt consumption can significantly reduce the risk of colon cancer. The same probiotic also kills funguses which are responsible for the inflammation of vulva, vagina and uterus (urogenital organs of women). For this reason, the regular consumption of yogurt can protect women against fungal infections of female urogenital organs.

The probiotics exist in yogurt bind the excess of bile acids. Normal amounts of bile acids are essential for bowel action and movement and protein absorption through the bowel mucosa. So, a healthy excretion and protein metabolism is directly related to bile acid secreation in normal amounts. But, abnormally high amounts of bile acids can be converted to cholesterol and raise cholesterol level in blood. Yogurt probiotics bind excess of bile acids and prevents their conversion to cholesterol. That is why one of the reasons for the protective effect of low fatty yogurt against cardiovascular diseases and disorders is due to the mentioned functions of yogurt probiotics.

One of the greatest vegetable God created in the world is **celery** because of its rich antioxidant vitamin, mineral, fiber, isoflavon and water content. When detox foods are concerned, celery with arthicoke comes first. A detox kitchen can not be without celery. You will understand the reasons when I explain the attributes and beneficial effects of the food on our metabolism.

First, celery is one of the rich foods in vitamin C, a greatest antioxidant vitamin. Detox may be defined as the elimination of the toxic metabolites such as cholesterol, bad cholesterol, excess of unsaturated fat, salt, saturated fat, homocyteine, uric acid, keratin and toxic radicals with many other harmful compounds out of metabolism as in the form of feces and urine by the means of a designed nutrition plan which includes special foods. These special foods should contain some special detox compounds which can excrete these toxic compounds from body. Vitamin C which exists in celery in great amounts inhibits free toxic peroxy radical compound production. You may have consumed too much fat, saturated fat, salt and unsaturated fat in every time of your life. Although our target is anti-aging and a healthy life style and living, unfortunately we continue to consume aging foods such as fat, salt and sugar because they are delicious and they increase appetite, taste, aroma and flavor of food products. Unfortunately, many of us do not like the taste and aroma of celery. I was one of them. But, many years later I realized its wonderful aroma and taste. If it is prepared and cooked with correct recipes that use garlic, olive oil, chopped onion, chopped carrot, tomato, green peas and parsley, you will realize that it has got a wonderful taste and aroma. The cooked recipes of celery does not mean anything from the point

of vitamin C since vitamin C is very heat sensitive and can be easily inactivated by heat application. But, some amount of vitamin C can still continue to exist in water part of the recipe. If you prefer to grate the raw celery and mixe it with minute amount of mayonnaise, plenty of low fatty yogurt with garlic, you can protect vitamin C and benefit from the vitamin. Do not forget that vitamin C is the most versatile vitamin which has got many beneficial effects in metabolism like lowering cholesterol, lowering TNF (tumor necrosis factor) and reducing the risk of cancer, inhibiting free toxic radical production and slowing aging by increasing the protective layer, glutathione, around cell walls, increasing good cholesterol (HdL) while decreasing bad cholesterol (LdL) and protecting against cardiovascular diseases and disorders, diluting blood and easing blood circulation, increasing dopamine and serotonin and thus, protecting against Alzheimer and Parkinson. The mentioned ones are some of the beneficial effects of the vitamin in our body. Therefore, the more you dominate this vitamin and keep its amount as plenty as possible in your meals, you can slow the aging process and the most important is that you can be protected against three important metabolic diseases; cancer, diabetes and heart attack. The protective effect of celery against cardiovascular diseases and disorders such as hypertension and stroke is because of phthalide in celery. This isoflavone increase the elasticity of blood vessels and increase the diameter size of the vessels. 3-n butylphthalide injection was claimed as reducing hypertension 12-13 % in mouse. If you are the one who is already suffered with hypertension, regular consumption of the vegetable may be helpful.

The most important protective effect of celery against diabetes and cardiovascular diseases is due to their bile increasing effect. Bile acids, opposite to cholesterol, reduce the rate and severity of atherosclerosis (blood vessel calcification) by increasing the speed of digestion. Proteins, carbohydrates, fats and oils are digested by three factors; enzymes, the protein bodies which decompose the complex nutrients into smaller components to be digested through bowel mucosa, stomach acid and peristaltic (wave) movements of bowel. The peristaltic action of bowel pushes the inner content, the bulk, into colon and rectum so that defecation can be made easily. The same movements of bowel decreases the contact time of fatty acids with bowel mucosa so that they are immediately transferred into colon and rectum and defecated out of body by the means of feces without absorption. Therefore, the peristaltic action of bowel is a very important factor in weight control, loosing weight and protection against obesity. We can increase the peristaltic action of bowel and protect it against inactivity. We can increase the speed of digestion in other words. One of the best solution is that the regular consumption of celery in plenty amounts every day can convert the excess amount of cholesterol into bile acids. The increased amount of bile acids can increase the speed and peristaltic action of bowel while the decrease in cholesterol amount may be protective against hypertension, atherosclerosis and other related cardiovascular diseases and disorders. I want to repeat this important effect and underline its importance once more that you can decrease your cholesterol level by converting excess of cholesterol into bile acids which may result in increase of bowel peristaltic action. The increase in bowel peristaltic action protects you against constipation and haemorrhoid, irritary bowel syndrome and gas problems, briefly various types of disorders in bowel and stomach origin. The same increase in the activity and peristaltic action of bowel decreases the absorption rate of saturated, unsaturated fat and cholesterol absorption through the mucosa of bowel which may result in serum triglyceride decrease. On the other hand, phthalide, the initial isoflavone of celery, dilutes blood, increases diameter size of blood vessel while increasing good cholesterol (HdL) and decreasing bad cholesterol (LdL). The decrease in fat, oil, bad cholesterol and cholesterol absorption by the increase of bile acids and dilution of blood by the effect of phthalide are the initial factors of cardioprotective effect of the vegetable.

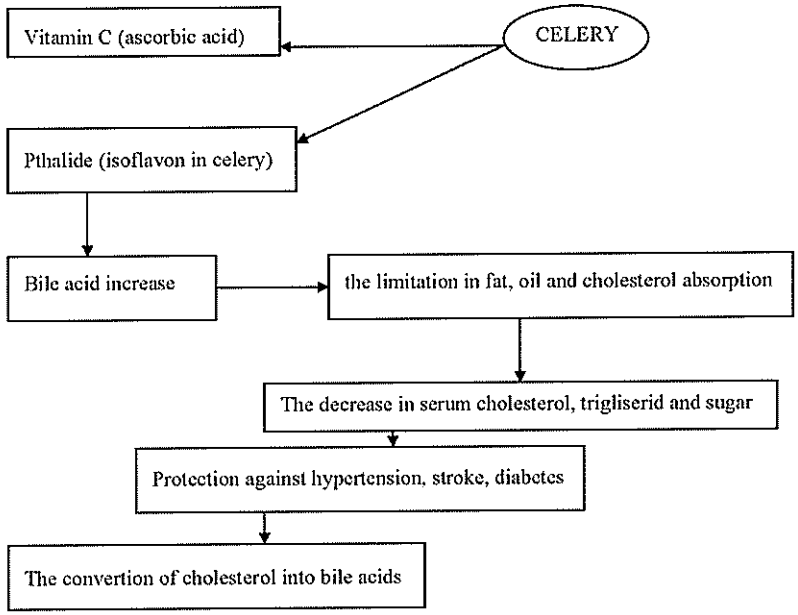



**Diagram 16**

**Sedanonik acid and sedanolid.** These two compounds exist in celery are myorelaxant which means that they relax your muscles and have got a sedative effect. What you have to do is simply cooking one or two celery with their leaves and stem in five glass of water for 15 minutes at boiling temperature. Separate water, cool it and drink one or two glass before sleeping. You will notice that it will improve your sleeping quality. Also, it will relax you whenever you are under big stress and when you feel depressed or irritated.

Another attribute which makes celery as one of the greatest detox food is the rich fiber content and lower calory. Its calorie content is only 37 %, is one of the foods in lowest calorie while containing 88% water content. Its fat content is only 0.6 % so that you can exactly define it as a fattless food which you can not see in the world very often. Briefly, it is a kind of vegetable that you are not taking fat into your body when you consume it. Additionally, you are reducing your cholesterol, sugar, trigliserid and bad cholesterol in your blood. Its rich in soluble and nonsoluble fiber content which bind your free cholesterol, carcinogen, fat, oil, salt, allergic substance, sugar, harmful food compounds and toxic radicals in the cavity of stomach, bowel and also in blood. The rich fiber content of the vegetable eleminates most of the mentioned harmful substances out of body by the means of feces and urine. The higher water and fiber content with its lower calorie makes the vegetable as one of the most wonderful and effective detox food in the world.

Celery is also rich in iron. Although it is rich in iron, unfortunately its quality is lower than animal origin foods except milk and dairy products. Milk and dairy products are very poor in iron content while egg, red meat, red meat products

such as pastırami, sausage, salami, fish and marine origin products and poultry meat are the rich sources in iron and also the quality of iron is superior in those products when compared with the quality of iron in plant origin. I had mentioned the reasons for the superiority of iron in animal origin in the related part but I want to remind it once more to be able to understand the importance of iron supplementation by the means of celery. Animal origin meat products have got a protein which binds iron and carriers it through bowel mucosa which increases the bioavailability of iron in animal origin. This protein factor does not exist in plant origin products which causes to lower bioavailability of iron in plant origin and an important amount of iron is excreted out of metabolism by the means of feces. Another factor is the form of iron that animal origin iron is in two values which is called as ferro, meaning that it can be easily absorbed and pass into blood stream from bowel mucosa. Iron in plants is in three values which is called as ferri. Ferri form is not properly absorbed and some of it excreted by the means of feces. Another reason which makes plant origin iron in lower quality is the fiber factor that fiber does not exist in animal origin foods. It is only exist in plant origin foods such as legumes, fruits, cereals and vegetables. On the other hand, fibers may act as a detox factor by binding excess of cancerogens, allergens, toxic radicals, cholesterol, bad cholesterol, salt, homocyteine and many other harmful compounds and excrete them out of metabolism by the means of feces. But, these compounds also bind beneficial compounds such as important vitamins and minerals such as calcium and iron. There is no fiber in animal origin foods and iron is not bound by them in animal origin foods. It directly passes into blood stream from bowel mucosa. Because of the mentioned rich fiber content and absence of protein binding factor, the iron in celery is also in lower quality like in all other plant origin products. But this does not mean that celery does not make any sense in iron requirement of metabolism. **If you mix the food in plant origin which is rich in iron capacity but low in bioavalibility with an animal origin food which is rich in high quality iron (high in bioavalibility), the high quality iron and protein binding factor exist in animal origin food enhance the bioavailability of low quality iron in plant origin.** A good example is celery with meat. If you are the one who likes to consume red meat, always cook red meat with celery, in the oven or in simmering water. But do not neglect to add celery near meat. You will realize by the time that celery also enhances the sensory quality, especially flavor and aroma of red meat. But, the most important advantage of combined consumption of meat and celery is 1. Phthalide and fiber coming from celery will be able to bind excess amount of cholesterol, bad cholesterol and trans fat coming from meat and 2. Iron in low quality in celery will be bound by protein binding factor in meat and meat products and will be transferred into blood by this factor. Thus, the combined consumption of both celery and meat or meat product will have increased the bioavalibility of low quality iron in celery.

Celery is also rich in potassium, sodium and magnesium. Magnesium is required for energy metabolism. Unfortunately, this mineral is exaggerated and many people believed that a person can increase their energy production rate by consuming magnesium rich foods or taking the mega doses of magnesium. The reason for the important function of magnesium is due to its participation in production of special enzymes which act importantly in energy production. Magnesium enters into the structure of more than 300 enzymes which are responsible from energy production as mentioned in the related part previously. But, this does not mean that the more magnesium intake into body will cause more energy production. The energy production capacity of the body is up to a limit. Only the low amount of magnesium will restrict energy production because the enzymes responsible for energy production can not be made because of lack of magnesium. Briefly, the insufficiency of magnesium may result in energy problem while exaggeratedly high amounts do not increase

energy production. The only parameter at this point as a consumer which you have to know is the energy loss caused by magnesium insufficiency. Therefore, the required amounts of magnesium should be supplied by the consumption of magnesium rich foods if you want to be resist against chronic fatigue syndrome. One of the greatest vegetable which can supply you in sufficient amounts is celery. On the other hand, potassium is required for the electricity transfer from nerve to muscle and from muscle to nerve. Muscle cells are contracted and relaxed by this electricity transfer through muscles and nerves. Potassium, magnesium and sodium minerals are necessary since the change in their position through the cell and muscle membranes creates this energy. It can be clearly expressed from this explanation that the insufficiency of any of the mentioned minerals including potassium may result in energy problems and problems as related to muscle relaxation and contraction. Cardiac muscle is contracted and relaxed every second. Especially, these contractions and relaxations of cardiac muscle is vitally important because blood circulation depends on these cardiac contractions and relaxations. In conclusion, sufficient amount of potassium is required for a healthy muscle contraction and relaxation including cardiac muscles. Celery is also a good and sufficient supply for potassium mineral.

In spite of its wonderful nutritious and detox capacity, two important possible adverse effects of celery should always be taken into consideration. One is its blood diluting effect (anticoagulant effect) and the other one is bile increasing effect. Bile increasing effect is normally a wonderful beneficial effect if the person who consumes celery is healthy. But if the consumer is already suffered with a disease related to bile gladder or bile stone, the regular consumption of the vegetable in plenty amounts may be contraindicated since the increase of bile may move the stone into the bile channel which may cause worse conditions. Goitrogens in celery, the compounds which bind thyroid hormone cause to decrease in thyroid hormone. Thus, persons suffered with hypothyroid (lack of thyroid hormone production) should avoid from the regular celery consumption in plenty amounts. Finally, if you are the one who is suffered with a cardiovascular disease such as emboli, thrombosis, stroke and if you are already prescribed with a regular anticoagulant use, you should better avoid celery and celery tablets. Blood diluting effect of celery and celery tablets as combined with an anticoagulant use may increase the risk of internal bleeding and may be life threatening.

**Acetylenic acid** in celery makes it as one of the most powerful vegetable which protects the consumer against cancer. In conclusion, celery has got many beneficial effects on human metabolism. But, the most important beneficial effect is for both diabetes and cancer. The effect mechanism in protection against cancer and diabetes is closely related to each other. The effect mechanism is the same for both protections; the antioxidant effect of celery. The antioxidants in celery, phthalide, vitamin C, beta carotene, vitamin A, decrease the rate of free toxic peroxy radical production and inhibit oxidation.

The excess of harmful free toxic peroxy radicals can be converted sugar or cancerogenic agents. Therefore, celery with its high content of antioxidants is a good chance for you to be protected against both cancer and diabetes. Many cases of cancer and diabetes are closely linked to each other since excess amount of sugar in blood can easily be oxidized and converted to cancerogens. That is why protection against diabetes and controlling blood sugar is a very effective approach in protection against cancer.

When I summarize the details belong to celery above, it can be clearly expressed that celery is a wonderful and effective detox vegetable in protection against cancer, diabetes, cardiovascular diseases and disorders such as thrombosis, emboli and hypertension, dyspepsia ( a disorder including a group of problems in digestion) and aging, because;

It has one of the lowest calorie foods in the world. It does not increase blood sugar and can help for controlling blood sugar.

It can convert the excess amount of cholesterol into bile acids which may help for an easier digestion while increasing peristaltic (wave) action of intestine and eliminating most of the feces out of body. This attribute makes it as a wonderful detox vegetable which cleans up all the cavity of stomach and intestine.

Although cooked celery does not mean anything from the point of vitamin C, the chopped or less heated vegetable can supply an important amount of vitamin C content which can help to decrease cholesterol and bad cholesterol while protecting you against cancer and diabetes. Also, vitamin C can protect you some important neurological diseases and disorders such as Alzheimer and Parkinson by increasing serotonin and dopamine.

The quality of sleeping process and the time is very important for the person who wants to slow aging process. Because, new cells can be produced and wounded cells can be repaired when you sleep and also growth hormone is secreted. The water of cooked celery which is rich from sedanonic acid and sedanolid can improve the sleeping quality.

**Pthalid**, vitamin C, beta carotene and vitamin A makes celery as a strong blood diluting vegetable. Dilution of blood, increase of diameter size, elasticity of vessel wall and decrease in cholesterol and free toxic radical compounds ease blood circulation and decrease the risk of atherosclerosis (blood vessel calcification). For this reason, celery is a wonderful vegetable in protection against cardiovascular diseases and disorders especially with its decreasing effect of thrombosis and emboli risk. But, it should not be consumed and especially its capsule form should be avoided if you are already using the tablets of vitamins, minerals, ginkgo biloba, omega 3, coumadin, warfarin and aspirin. All are blood diluting preparates and their combined use may increase the internal bleeding risk.

Cooking process of celery, opposite to vitamin C, can activate beta carotene and vitamin A of celery. Cooked celery with its high beta carotene and vitamin A content can boost your immune system while protecting you against infections.

Celery is one of the most effective vegetables in protection against cancer with its acetilenic acid content.

Especially, the combined consumption of celery with carrot and dark green leafy vegetables increases beta carotene and vitamin A intake into body. Therefore, celery should better be consumed as cooked and combined with dark green leafy vegetables and carrot to be able to increase its vitamin A and beta carotene content.

Excess amount of cholesterol is converted into bile acids. This attribute of celery makes it as an initial vegetable which should be exist in the kitchen for cardio and dyspepsia.

Celery is a strong detox vegetable because of its lower calorie content, higher antioxidant and fiber content. But, detox kitchen can not be created by using only celery. It is a life style and should have got many other detox vegetables which I will continue to write about in the later parts of the book such as artichoke. But before, I want to remind you the initial and very important steps of detox and nutrition for healthy life style once more;

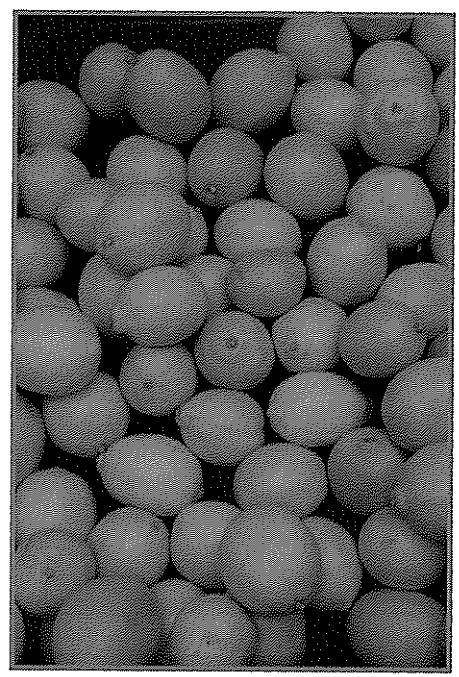
You should avoid from alcohol in spite of its cardio protecting effects. Many scientific researches claim that alcohol decreases cholesterol and bad cholesterol and dilute blood. Hypertension and cardio disease protecting effect of moderate amount alcohol consumption is correct but on the other hand, alcohol is very toxic for hepatic tissue (liver) and brain tissue. Liver is the center of detox process of the body since all carcinogens, cholesterol, bad cholesterol, allergens, microorganisms, their metabolites and toxic radical compounds are detoxified in liver tissue. Thus, detox and healthy living depend on liver health. Liver is the initial organ which protects brain and heart and other organs against the mentioned harmful compounds. Excess amounts of nicotine, alcohol, excess amount of tea and caffeine consumption with excess amounts of cholesterol and saturated fat foods such as red meat and fatty milk and their products damage liver tissue. Detox kitchen and kitchen for a healthy life style should be free from alcohol, nicotine and excess amount of tea, coffee, fatty meat and dairy products while including celery.

Carbohydrates give us energy. They give this energy at the shortest time as compared with fats, oils and proteins. In the evaluation of proteins, energy function comes last since these nutrients are initially utilized for muscle, bone, blood, hormone productions and productivity. Fat and oil metabolism is the most complex one that is why lipids give energy after long periods of time. But, if you need energy immediately, your easiest energy source is carbohydrate. On the other hand, because of their simple metabolism and higher bioavailability if they exist in food as combined with fibers, their bioavailability is higher. They can be absorbed and pass into blood and raise blood sugar promptly in case of their consumption without control. Celery, artichoke, dark green vegetables and legumes are the good examples of carbohydrates but healthy carbohydrates. I want to make a classification of carbohydrates as healthy and harmful. Because, carbohydrates without fiber such as white sugar, white flour, chocolate, candies and sweet products which use refined sugar are the good examples for the carbohydrates without fiber. So, their carbohydrates can be absorbed and their sugar content can pass into blood stream through the wall of intestine without binding with fibers. Other words, their sugar increasing effect is greater than other foods especially the foods with rich fiber content. These fiber free sugar rich foods can raise sugar concentrations promptly. The increase of sugar in blood may continue for very longer periods of time if the consumption of fiber free sugar product consumption is a life style for you. Followed by years with this type of nutrition and life style, you may be suffered with Diabetes type 2. If you do not control it and continue to consume fiber free sugar rich food products regularly, neglect water and leafy vegetable, fruit, fruit and vegetable juice consumptions, you may also be suffered with various cancers especially in bowel and stomach origin. The reason is first, meat and milk and dairy products are fiber free because they are in animal origin and they are rich in carbohydrate content. So, their blood sugar increasing potential is higher than other foods. Additionally, their proteins are in higher bioavailability which means that they can be easily absorbed but excess amount of these proteins in animal origin can yield biogenic amines which can then be converted into carcinogens and allergens. But fibers are the filtering compounds for us which can easily be supplied by the means of foods. They can not be absorbed and pass into blood stream but they

bind excess amount of sugar, fat, oil, carcinogen, toxic radical, bad cholesterol, allergen and metabolites so that these harmful compounds are bound by fibers and excreted out of metabolism by the means of feces. For all these reasons, healthy carbohydrates are the ones which have got a high content of fiber such as unrefined (browny) sugar and sugar products, unrefined flour and flour products, leafy, seedy vegetables and fruits and thick skinned legumes. Opposite, the carbohydrates which are free of fiber or have got very low amount of fiber, in other words, harmful carbohydrates, can elevate your sugar concentration and may cause Diabetes type 2, cancer or hypertension in the long run. Briefly, healthy or harmful function of carbohydrates depends on their fiber content and you have to prefer fiber rich ones like celery and artichoke for detoxifying your body and for a healthy life style and kitchen.

All fats and oils, briefly lipids, are harmful and cause all kinds of metabolic diseases and disorders in case of their consumptions in great amounts. One exception is omega 3 fatty acids. They have got many beneficial effects on metabolism and important protective effects against many important metabolic diseases and disorders such as cancer and diabetes. But, also their consumption in great amounts especially as combined with other blood thinning foods such as celery, artichoke and vitamins and minerals which dilute blood can be harmful since it can increase internal bleeding risk. Omega 3 fatty acids are the only fatty acids which decrease cholesterol, sugar and inhibit inflammation and oxidation. Omega 6 fatty acids increase inflammation and oxidation rate opposite to omega 3 fatty acids. Therefore, omega 3 rich fish meat should have been dominated as meat alternative instead of red meat and poultry meat in a detox kitchen and healthy life style.

Fried and processed foods are rich in inflammatory compounds such as nitrite, nitrite, artificial colorings, benzapyren, sugar, phosphate, saturated fat and trans fat. Instead, natural foods rather than processed such as raw fresh fruits and vegetables, especially as in salad form with minute amounts of cider and olive oil addition, should be consumed one plateful daily at least, and this consumption should be regularly without day missing. When you enter into a hypermarket, your direction should be vegetable and fruit departments rather than processed food sections. The more natural and less processed food consumption means higher antioxidant and fiber intake into the body which is a key to inhibit oxidation and inflammation rate in your body.



Especially dark green, dark yellow and dark, intense red colored foods which are initially consisted of fruit and vegetables with some legumes are the good and rich sources for beta carotene and vitamin A. They should also be consumed regularly without a day missing to reduce cholesterol and sugar and for the protection against infections and boosting immune system.

Citrus fruits, the juicy and sourish fruits are the initial source of vitamin C (ascorbic acid). This vitamin is the most versatile vitamin. It dilutes blood,

decreases cholesterol and bad cholesterol while increasing good cholesterol, increases the elasticity of blood vessel wall, decreases TNF (Tumor necrosis Factor) and protects against cancer, increases dopamine, serotonin and melatonin and protects against Alzheimer, Parkinson and insomnia. Citrus fruits and also dark green leafy vegetables as vitamin C rich sources should have been dominated in the kitchen for a healthy life style and nutrition.

Milk and dairy products should be low fatty since the fat in these products are in omega 6 form rather than omega 3. But, this does not mean that you should consume completely fatless or skimmed milk and dairy products. Because they will be free of fat soluble antioxidants such as vitamins A, D, E and K. Only the enriched and fortified ones may be rich in these vitamins. You should better prefer enriched or fortified and skimmed milk and dairy products or low fatty milk and dairy products to be able to benefit from fat soluble antioxidant vitamins of milk and dairy products. Do not forget that these vitamins are strong antioxidants which mean that you can inhibit your oxidation and inflammation, reduce your cholesterol, sugar and free toxic radical compounds by consuming them regularly while taking a very important mineral, calcium, into your bones besides high quality proteins.

Mineral water, cola and other mineralized water sources, opposite to many advertisements and media claims, are the rich sources of phosphate and potassium. Too much sodium and potassium intake into body causes a great excretion of calcium out of body. You should protect your bone and muscle calcium deposits and that is why it is always better to avoid from these drinks. Instead, low fatty drinking milk, kefir, fruit and vegetable juices and water should be your initial healthy drink alternatives.

You can read in many articles that the cells in liver can repair themselves if they are wounded. Unfortunately, such information is not correct. Especially two cells, brain and nerve and also hepatic cells (cell in liver) can repair themselves but the degree is very low which can take years. Many media claims as related to the production of new cells instead of wounded and death cells in brain and liver are also completely wrong. No cells can be reproduced instead of nerve system and liver tissue. The inability of nerve and hepatic tissue to reproduction may worry you but may also warn you. Because if you know that there will be no reproduction in the cells of nerve system and liver instead of wounded and death cells, then, you protect your body and especially your nerve and hepatic tissue better than ever. What are the initial enemies which are harmful and which destroy brain and liver tissue? Excess amount of fat, saturated fat, trans fat, homocyteine (an amino acid exist in meat origin products), some food additives such as nitrite and nitrate in case of their high amount of intakes into body, nicotine, alcohol, excess amount of formaldehyde, benzopyrene intakes by the means of fumed products, salt and the consumption of excess amount of cured products, fried foods and fast food, cola, excess amount of tea and caffeine because of their oxidants such as tannin and caffeine. The mentioned compounds are directly or indirectly give damage to brain and hepatic tissue. Direct damage is the mechanical effect of the compounds such as cholesterol, bad cholesterol, salt, sugar, unsaturated fat, their decomposites like aldehyde and ketone, food additives and other solid particles against cell wall. The mechanical pressure made by the mentioned solid particles against cell membrane can wound or even rupture the cell. The result may be the damage or the death of the cell. But, also salt, caffeine, nicotine, sugar, fat, omega 6 fatty acids, cholesterol and bad cholesterol and tannin can increase the rate of combustion of fats and carbohydrates with oxygen. In other words, they trigger the oxidation and elevate the production of free toxic peroxy radical compounds. The final end products, free toxic peroxy radical compounds, come around cytoplasmic cell membrane and give mechanical defect to the membrane. These kinds of damages

on the cell membranes are a good example for the indirect oxidative effect of the mentioned compounds which may also result in death or wounded cells. Besides of the compounds which directly or indirectly increase oxidative stress and which may wound or kill the cells, some approaches as related to the life style is another contributor in the elevation of oxidation. Nutrition which is rich in animal origin with its poor antioxidant and fiber capacity, not drinking fresh fruit and vegetable juices which are rich in isoflavone content that decrease cholesterol, bad cholesterol and oxidative stress, lack of sport and exercise, habits that consumes caffeine, nicotine, tea and coffee regularly, inactive life style such as desk or office depended working, stress and inability to cope with stress increase oxidative stress directly or indirectly and yield too much free toxic radical compounds in body. Keep in your mind that all the mentioned nutritional compounds and life styles increase free toxic peroxy radical amounts in body while increasing fat deposits. Why? Free toxic radical compounds are one of the threads like bacteria, virus, yeast, mold, salt, harmful food additive, genetically modified food, a foreign hormone, cholesterol, bad cholesterol and heavy toxic metals. All these harmful compounds are decomposed and detoxified by liver followed by their enterance into body. The result of the initial decomposition, degradation and detoxification processes of these harmful compounds besides sulphurization and oxidation is the fattening of liver. Liver cells add sulfur coming from sulfur rich foods to the harmful compound and convert it into harmless compounds which is called as sulphurization. Another detoxification technique of liver cells is the addition of oxygen atom to the harmful compound which is called as oxidation. Finally, one other detoxification alternative for liver is the production of fat because all the mentioned harmful compounds can be kept in fat in liver. Briefly, fattening of liver is a kind of defend mechanism of liver. I do not want to say that liver fattening is a good result. I can not give such explanation, but it is a natural and expected result, a kind of defend mechanism to be able to keep the mentioned harmful and hazardous compounds and not to give them into blood stream. As you can easily understand, liver fattening is an alarm, a warning for you that you are under a heavy thread of a wrong life style or threatening life style and nutrition factors (inactivity, lack of sport and exercise, lack of fluid, fiber and antioxidant intake, harmful, fatty, too much processed, salty, fumed...). The solution is you. You are the only one who can take a very easy, definite, effective protective action to heal your fatty liver. Liver fattening may not be exaggeratedly important or serious since many occasions can be treated by the regulation and immediate application of a correct nutrition and life style. But, many persons in many cases can not make the immediate start and liver tissue becomes fattier and fattier time after time. Fat means oxidation, oxidation end products such as aldehyde, peroxide, moloxide, keton and free toxic peroxy radical compounds. All these compounds begin to kill or wound hepatic cells. Your liver may die because of fattening. In conclusion, liver fattening is an alarm and warning to you and a defend mechanism produced by liver to detoxify harmful compounds of body but if it is not taken under control, these fat deposits not only kill harmful compounds, but also begin to kill the cells of liver. There may be several reasons for liver fattening. They may be in viral or bacterial origin or may be a toxic compound. If the reason is pathologic, the medical treatment should be given immediately without loosing time. But, many cases of liver fattening are due to wrong nutrition, stress and inactive life style. Especially, fatty foods, foods in meat and milk origin, cured products which are rich in salt, nitrite, nitrate and phosphate, fumed products rich in formaldehyde and benzopyrene, fried products rich in saturated and unsaturated fat, poultry, egg, red meat and their products rich in saturated fat and biogenic amines are the initial causes in increasing the risk of liver fattening. It can not be claimed that the consumption of them in normal amounts or twice or three times of their consumptions a week can increase the risk. Here, the main determiner is the regular consumption in great amounts every day. If the consumption of the mentioned food products is a life style and nutrition style for you, then you are in the highest risk group that you are very close to the risk of liver fattening. On the other hand, if you are not familiar with fruit and vegetable consumption in sufficient amounts, if your nutrition is lack of liquid consumption and antioxidant,

you are also very close to the risk. Free toxic radical compounds which are mainly responsible for liver damage are the end products of fat oxidation. Only, fibers and antioxidants decrease the amount of these harmful compounds in body. Soluble fibers can also be absorbed through bowel and enter into blood. They can bind free toxic peroxy radical compounds in the cavity of bowel and stomach but also in blood since they can be absorbed from bowel and pass into blood circulation. Insoluble fibers can not be absorbed since they are not soluble in water. Also, these fibers are not digested by the effect of stomach acid and enzymes. Therefore, they can not pass into blood stream. They only bind free toxic peroxy radical compounds and other harmful compounds such as saturated and unsaturated fat, salt, nitrite, nitrate, formaldehyde, cholesterol, homocyteine, bad cholesterol, cancerogen and allergic substances in the cavity of bowel and stomach. According to this explanation, it seems that soluble fibers are a little bit more advantageous as compared with insoluble fibers. I want to remind you once more that if you can crush the texture when you press with your finger easily, if the texture is very smooth and juicy but if the skin, root and leafy parts, the harder textured parts, are lower in portion, then you can say that the food concerned is richer in soluble fiber. Strawberry, mature peach and mature tomatos are the good examples. Opposite, if the texture is solid and tough, if the water content is poor, if the structure has got too much root, leaf, skin and seed, it is rich in insoluble fiber. Both foods are good since they are rich in fiber but if you have to make a preference you'd better choose the ones which are rich in soluble fiber. Always remember that soluble fibers will bind the harmful compounds in blood and in the cavity of stomach and bowel and protect your liver from harmful effects of them while insoluble fibers will bind these toxic compounds in the cavity of bowel and stomach and protect the liver against the harmful effects of these toxic compounds. On the other hand, antioxidants; vitamins A, B, C, D and E, minerals Mg, Ca, Zn and Se, Ginkgo biloba and Omega 3 fatty acids, directly inhibit the oxidation reaction and prevent the conversion of saturated and unsaturated fats into free toxic peroxy radical compounds. The regular intake of antioxidant rich foods into body by the means of antioxidant rich foods can decrease oxidative stress and protect liver tissue against these harmful compounds. Celery and artichoke are the two great vegetables which are rich soluble and insoluble fibers and antioxidants. For this reason, they are some of the initial protectors of liver tissue. I want to remind you once more that rejection of red meat, milk and dairy product, poultry and egg an and their product consumption is not correct in a healthy life style and nutrition. Although these foods increase oxidative stress and free toxic peroxy radical compounds, although they are rich in fat and cholesterol and increase the rate of inflammation in body and in liver, their rich nutrition and protein quality can not be ignored. The rich and high quality essential amino acids and proteins with vitamin B, folate, folic acid, magnesium, high quality iron and calcium make these products as vitaly important in a healthy life style and nutrition. As I mentioned in the related part, cholesterol and bad cholesterol content of these products should not be exaggerated since cholesterol and bad cholesterol in food origin can not be absorbed through gut mucosa and its bioavalibility is very low. But, saturated fats in these products can be absorbed and pass through bowel mucosa and they can be converted into cholesterol and bad cholesterol by liver tissue. In conclusion, the saturated fat and unsaturated fat content, not cholesterol and bad cholesterol, in the food is important and should be taken into consideration. That is why animal origin foods should not be neglected but should be preferred as low fatty. Another protective action which can be applied to the meal by consumer may be the combined preparation of meat and poultry products with celery, arthicoke or similar vegetables rich in antioxidant and fiber content. Chlorogenic acid of arthicoke and asetilenic acid of celery are strong anticancerogen and they protect you against colon cancer. The same compounds are strong isoflavones that they can decrease cholesterol and bad cholesterol coming from meat, poultry and their products.

**Peroxynitrite** is the compound which decreases cholesterol and bad cholesterol while diluting blood. This compound exists in artichoke in rich amounts which makes the vegetable as great protector for cardiac health while protecting liver tissue. Caffeolquinic acid in artichoke converts excess of cholesterol and bad cholesterol into bile acids. This attribute of artichoke, like celery, prevents the consumer from dyspepsia especially, elderly. Bile acids, not only increases the wave action of bowel and helps for digestion, but also bind free toxic radical compounds and protect liver and other organs and tissues against these harmful compounds. Caffeolquinic acid activates HIV blockators and is very complementary for the treatment in AIDS. Caffeic acid, luteolin, cynarin, cafeolcunic acid and chlorogenic acid are the compounds exist in artichoke in rich amounts which protects liver tissue and also hearth and blood circulation system against oxidation and its harmful free toxic radical compounds.

Unfortunately, in spite of its rich antioxidant and nutrition status, many people do not know how to cook celery and artichoke. Many of us use these vegetables by separating leaves. First, you have to pay attention that the leaves should be completely green, intense green color. It is an important indicator for the freshness but also an indicator for rich antioxidant and isoflavone content that comes from the leaves. Especially, the texture of celery should be tough, not porous, dry and firm. In the preparation and cooking part, the leaves should have been included that the isoflavones, beta carotene, magnesium and chlorogenic acid can pass into water and your body can benefit and use them. Note that artichoke is so strong and effective vegetable in protection of liver against diseases and harmful compounds that it was used in France in 1850 in the complementary treatment of a younger suffered with jaundice in which the patient was completely recovered. Jaundice, with its other name icterus, is the release of bile pigments into blood stream by liver tissue followed by a defect of the tissue because of various reasons. During the treatment, the defected liver tissue should no more be exposed to the damage of free toxic peroxy radicals, histamine, histidine and other biogenic amines, homocytein, benzopyrene, saturated and unsaturated fatty acids, salt, sugar, cholesterol and bad cholesterol, formaldehyde, cancerogenes and allergens. This kind of luxury and tolerance does not exist for liver tissue since it is already damaged in jaundice and other liver diseases. The medicines used for the treatment can accelerate healing of the wounded cells and stimulate the growth of new healthy cells. But, the consumption of the foods containing the mentioned harmful compounds may cause new defects in some of the liver cells while medicines recover some of them. Briefly, nutrition style is the determiner and very important which can decrease or increase the effectiveness of the treatment in liver diseases such as jaundice and hepatitis.

Celery and **artichoke**, the wonderful vegetables which are complementary for the treatment of liver disease and disorder may be prepared by adding green pea, carrot, garlic, potato and parsley. This kind of mixture will also increase the fiber, isoflavone and antioxidant content of the meal. Note that, you should consume both vegetables fresh and if you do not prepare your meal immediately, you should place them as packaged in refrigerator and you should consume them in two days under fridge conditions.

Celery and artichoke, both vegetables are;

Low glycemic index vegetables which mean that they have got lower amount of glucose and do not increase blood sugar.

If you prepare the meals by adding too much lemon juice, carrot, green pea and garlic, they can lower blood sugar concentration more. Therefore, both vegetables are dietetic and diabetic.

Both vegetables decrease cholesterol and bad cholesterol by converting them into bile acids. For these reasons, they are strong protectors of heart, blood circulatory system and liver against cholesterol and bad cholesterol damage.

Both vegetables have got rich amount of anticoagulant substances which ease blood circulation. Thus, they should be dominated in a kitchen for hypertension and other cardiovascular diseases and disorders but too much consumption and especially the tablet intakes should be avoided because of blood thinning and internal bleeding risk. If you are the one who is already suffered with bile or bladder stone, you'd better not to consume excess amounts and not to take the tablets of them since the increase in bile by their effect can move the stone which can result in worse and severe conditions.

The conversion of cholesterol and bad cholesterol into bile and the increase of peristaltic bowel action due to the increase may be helpful in the treatment of dyspepsia.

The rich content of soluble and insoluble fiber cleans up digestive track while protecting liver and heart against harmful compounds. The rich antioxidant and fiber content of both vegetables make them as the essential vegetables in nutrition programs which aim detox and anti-aging.

# SOY AND SOY PRODUCTS

One of the controversial foods is soy since there are many conflicting results of the researches about soy, although Food and Medicine Administration defined and accepted it as a safe and beneficial food for health. I tried to identify all foods as the products which have got hazardous, harmful effects, but also with their beneficial and protective effects on our health. Once more, I want to underline that, there is no completely friendly or there is no completely harmful food. Only, we have to know is; which food to eat in which metabolism, disease, age, sex, blood profile. Every food today is becoming subject of researches and every one is claimed to have got beneficial but harmful effects on human and animal metabolism at the same time. These kinds of researches and findings will continue since each food in the world has got its own beneficial and harmful effects. Soy and its products are one of them. But, in spite of many claims and findings about their harmful effects, one definite endpoint about them is that they are one of the initial food group in decreasing cholesterol and bad cholesterol. Therefore, they are very popular in cardiovascular disease kitchen.

The biggest failure and mistake you can ever make is to accept or assume a food as completely beneficial for health or completely harmful. The clearest example of it is red meat and red meat products such as salami, pastrami and sausage. These foods are always introduced in media with their cholesterol and bad cholesterol increasing effects. They are rich in cholesterol and bad cholesterol, but also they are very rich in saturated fatty acid concentration. In fact, unsaturated fatty acids are combusted with oxygen more than saturated fatty acids and therefore their free toxic peroxy radical production rate and oxidative stress increasing effect is much more when compared with saturated fats. But, saturated fatty acids can directly adhere to the wall of blood vessels and can accumulate on the surface of these walls. Briefly, their atherosclerotic (vessel calcification) effect is greater than their beneficial effects on cardiovascular system due to their unsaturated fatty acids. For all these reasons, they should be restricted in the diets of patients who suffer with cardiovascular diseases and disorders. Unfortunately, very few people and media talk about beneficial effects of these products. We know an important data about red meat and meat products that, first they are very rich in high quality proteins and second, they are very rich in high quality iron which protects against anemia. Since they are in animal origin, they are free of fiber and thus their proteins are absorbed without fibers in greater ratios. They have got an iron carrier, a kind of protein compound which passes iron through the mucosa of bowel and transfers iron into blood stream. The same red meat and meat products are also very rich in folate, folic acid, vitamins A, D, E and K, all of which decrease cholesterol and bad cholesterol. In conclusion, a food such as red meat appears as cholesterol and bad cholesterol decreasing food compounds such as folate, folic acid, vitamins A, D, E and K while it is very rich in cholesterol, bad cholesterol and saturated fat. So, an approach to identify and accept a food is not scientifically correct since it can have got many harmful and beneficial attributes in its same complex structure. As I mentioned above, although there are some critic points as related to the adverse effects of soy and soy products on our health, the same products with their cholesterol and bad cholesterol decreasing effects are vitally important and should be included into the diets of cardiovascular and hypertension suffered persons.

First, I want to begin to evaluate the status of soy and soy products from its important beneficial effects on our cardiovascular system while they are very rich in high quality proteins. Unfortunately, we have got a dilemma about

protein sources and their origin. High quality proteins which can be utilized for our bone, blood, nerve, hormone and muscle reproduction are exist in animal origin products such as meat, poultry and dairy products which are all rich in saturated fat, trans fat, unsaturated fat, cholesterol and bad cholesterol. We need high quality iron and the initial sources of high quality proteins which are all exist in animal origin foods but they are also rich in saturated, unsaturated and trans fat and cholesterol which can cause hypertension and other related cardiovascular diseases and disorders. The dilemma here is the need for high quality iron and protein but the foods rich in high quality iron and proteins are the sources of harmful compounds which are responsible from the progress of hypertension and cardiovascular diseases and disorders.

A young person until 30s can tolerate cholesterol and even cholesterol may be very beneficial since young body can produce testosterone and estrogen from cholesterol. Excess amount of cholesterol can be utilized in the production of these sex hormones, but also calcium can be bound into bone surfaces by the means of cholesterol. Vitamin D is produced from cholesterol, serotonin relaxing hormone, melatonin, the hormone required for sleeping and dopamine, the hormone against Parkinson which is responsible for muscle coordination and bile acids which able protein digestion and absorption through bowel mucosa, are all produced from cholesterol. Therefore, a young metabolism can tolerate the excess of cholesterol by converting it into the mentioned beneficial hormones, vitamins and fatty acids. But, the conversion rate of cholesterol excess into the mentioned beneficial compounds decrease by aging since sex hormone production, vitamin D, calcium metabolism, bile acids and protein metabolism become poorer by aging. For this reason, an old person can not show the same tolerance to the excess of cholesterol. Excess of cholesterol in elderly directly goes and adheres to the wall of blood vessel and accumulates there, decreases the diameter of vessel and causes calcification. In conclusion, excess amount of cholesterol can be tolerated and may even be beneficial in a young metabolism whereas the same amounts can not be tolerated in an old metabolism and may be the main reason for hypertension and related cardiovascular diseases and disorders. That is why, until 30s, a young metabolism can dominate meat and meat products, milk and dairy products, egg and its products which are less fatty in kitchen and life style and they can supply their growth and metabolic progress with this approach. But, after 30s, the individual should know that sex hormones, calcium, protein and adrenalin metabolism in a body after 30s will be poorer and will not be maintained at higher levels by the use of cholesterol excess. Therefore, they should restrict cholesterol intake while dominating cholesterol and bad cholesterol decreasing foods. If you are the one from this group, then you should restrict animal origin protein consumptions which are rich in bad cholesterol and cholesterol, also trans fatty acids and saturated fats while replacing them with cholesterol and bad cholesterol reducing foods. But, a question here is that will you not need to high quality protein intake any more.? First, your metabolism, muscles, hormones, nerves, bones, blood all have completed their progress that is what we call it maturation. Under these circumstances, you have to consume plenty of animal rich foods but the less fatty ones to improve and complete your body progress. After 30s, you have to know that you will not be able to show the same tolerance to the excess amount of cholesterol and convert it to the beneficial compounds any more. This does not mean that you will not need high quality animal origin proteins any more when you get older. Animal origin proteins in other words high quality proteins are always vitally important in all periods of your life for repair and progress. But repair, maturation and progress in bone, blood and hormone is always in greater level in youth than other periods of life after 30s. There is a greater tolerance to the excess of cholesterol because it can be utilized in these repair,

maturation and progress of metabolism. The main problem here is that after 30s you still need high quality proteins, but the same animal proteins in high quality will be able to cause vessel calcification, hypertension, cardiovascular diseases and disorders with their rich fat and cholesterol content in an old metabolism which has got lower cholesterol tolerance. We face with a problem after 30s that we need a group of high quality proteins which contains all essential amino acids, can be absorbed in a greater extend, can be utilized for bone, muscle, blood and hormone in greater amounts but this group of food should not cause vessel calcification, increase cholesterol or bad cholesterol and should be less in saturated fat content. All scientific findings today share the same idea that the initial protection against vessel calcification, all metabolic diseases and disorders taking their origin from vessel calcification such as Alzhemer, Parkinson, hypertension, thrombosis, emboli, liver and renal failure can be prevented with a diet which restricts saturated, trans and unsaturated fats and also cholesterol and bad cholesterol while dominating water and fiber consumption. A person after 30s should consume a food that it should be rich in high quality proteins with all essential amino acids while the same food should not increase cholesterol and bad cholesterol and should be low in saturated and unsaturated fat content. Soy and soy products are such foods what you are looking for. They are free of cholesterol and bad cholesterol since they are in plant origin. They are also very low in saturated and unsaturated fat content. They do not increase cholesterol and bad cholesterol and they also do not decrease good cholesterol while decreasing bad cholesterol and cholesterol. But, having got no cholesterol and bad cholesterol while they are very rich in high quality proteins is not the only attribute which makes them important and beneficial in the protection against cardiovascular diseases and disorders. Soy and soy products are also anti-clotting, other words they dilute blood. The dilution effect can rinse saturated and unsaturated fatty acids which are already bound to the surface of vessel wall away while decreasing the binding risk of saturated and unsaturated fatty acids with cholesterol and bad cholesterol. Diluting effect of soy proteins is not the only protective effect against cardiovascular diseases and disorders but also against Alzheimer, Parkinson and similar neurological diseases and disorders and also renal failure, liver failure and other organ failures. The decrease in diameter size of blood vessels followed by their binding with cholesterol, bad cholesterol, saturated fat and trans fat decreases blood supply to the concerned tissue and organ. If that is the brain which can not supply enough blood from these types of calcified vessels, Alzheimer, Parkinson and other similar neurological diseases and disorders can form. The insufficient blood supply for kidneys or liver may result in death of the cells in these organs which may result in renal failure or kidney failure. Organ and tissue failures, defects in cells of organs and tissues cause rapid aging. Therefore, blood should always be kept as diluted and its heavy density should be avoided for the protection against both metabolic diseases and disorders and rapid aging. Cholesterol, bad cholesterol, trans fat and unsaturated fat are some of the initial compounds which cause significant increases in blood density. But, soy proteins as free of cholesterol and bad cholesterol can dilute blood and make an important protection against vessel calcification, rapid aging, tissue and organ failures, neurological and cardiovascular diseases and disorders.

Diluting blood, decreasing cholesterol and bad cholesterol, these are the great beneficial effects especially in protection against many important metabolic diseases and disorders such as cancer, diabetes, hypertension and Alzheimer. But, also having got high quality protein content makes this group of foods are friendly and high quality. Let me explain high quality protein sources which are very important for our metabolic reproduction and progress. Very briefly, I can clearly mention that, **animal origin proteins are always superior in quality when compared with plant origin since fiber**

**components of plants bind the proteins in their structure and decrease their bioavailability. Also, many plant origin proteins are lack of important critical essential amino acids such as methionine and lysine. But, although they are plant origin, soy and soy products are also rich in these amino acids and they contain all other essential amino acids such as tryptophan, threonin, leucine, isoleucine, valine which are utilized in liver functions, hair, bone, blood and muscle reproduction.** The amount of soy proteins which are absorbed and transferred into blood followed by their digestion in stomach and bowel by stomach acid and enzymes of bowel is called as 'Net Protein Utilization (NPU)' and NPU of soy and soy products is higher than other plant origin proteins although it is lower than animal origin proteins. Comparing soy proteins with animal origin proteins will not be fair since there is a great gap between high quality animal origin proteins and plant origin proteins that animal origin proteins are incomparably greater in protein quality. But, in the comparison of plant origin proteins among others, soy protein appears as the greatest, the most superior one and the closest protein to the animal origin proteins as a plant origin protein. No matter how you behave carefully, pay attention during marketing to buy a free fat meat and meat product. Red meat or poultry meat and their products will be closely integrated with fat globules and it is very impossible to separate these fat globules completely from meat particles. The pan procedure, placing the cubic meat pieces as one layer on the pan and covering the surface with water, heating at boiling water for only one minute may be very effective in reducing cholesterol and bad cholesterol, but not completely. You can eliminate only some amounts, but there will still some cholesterol and saturated fat content to exist in meat pieces. Briefly, you need high quality proteins which will supply you all essential amino acids including methionine and lysine as the most common missing ones in plant origin proteins without cholesterol and bad cholesterol risk and your address is soy proteins.

Total cholesterol in blood can be reduced 10% with a diet rich in fiber, low in saturated, unsaturated, trans fats, cholesterol and bad cholesterol and 1% decrease in total cholesterol reduces the risk of cardiovascular diseases and disorders 2 %. Remember that soy proteins do this very successfully while not decreasing good cholesterol. Unfortunately, many foods which can decrease cholesterol and bad cholesterol makes this function while decreasing good cholesterol. Good cholesterol, other words, high density lipoprotein, is always desired to be kept higher in blood since it separates the sticky cholesterol and bad cholesterol particles from calcified vessel wall and gives them into blood and helps for removing these harmful compounds out of body by the means of feces and urine. **Preferably, you should keep its level as min 60 mg /dL and higher while your bad cholesterol other words low density lipoprotein should be kept as lower than 140 mg/dL. Soy and soy products will always help for reducing bad cholesterol and total cholesterol in your blood without effecting good cholesterol.**

**Daidzein** and **Genistein** are the two isoflavones and they are very similar to female sex hormones which are called 'estrogen'. Therefore, they are called as estrogens in plant origin. You should be very careful at this point. If you are suffered with menopause and if you have got lower estrogen levels as a natural result of it, you can consume plenty amounts of soy and soy products because you can replace missing amount of estrogen in menopause with estrogens in soy and soy products. On the other hand, some researches claimed carcinogen effects of estrogens in soy and soy products. There is still a very big difference between the scientific claims as related to the carcinogen and anti-carcinogenic effects of soy and soy products that some findings claim the carcinogen effect of soy estrogens. They are correct since healthy

women without menopause may be suffered with cancer by too much soy and soy product consumption. Because her estrogen levels are in sufficient amounts opposite to a women suffered with menopause. An additional estrogen from soy and soy products can raise estrogen levels too much and can cause a hormonal imbalance which can result in breast and chest cancer. But, here the main problem leads to cancer is the excess amount of estrogen accumulation in the body of a healthy women which is not suffered with menopause. We are making the critic of excess of estrogen that additional soy and soy product consumptions in greater amounts can cause to significantly important increases in blood estrogen hormone levels which may result n breast and chest cancer in a healthy women. But, if we are talking about women with menopause, she has got low amounts of estrogen, lower than normal standard levels and in this case, the supplementation of estrogens in plant origin by the means of soy and soy product consumption may replace the missing amount without causing excess estrogen accumulation in blood. Briefly, **soy and soy product consumption can relief the symptoms of menopause without increasing cancer risk in menopause suffered women while the same consumption in great amounts can raise estrogen levels in blood and can cause breast and chest cancer in women without menopause.** Therefore, scientific findings may seem conflicting at this point, but in fact two sides are right and they point out different realities about soy and soy products in different metabolisms. Note that, daidzein and genistein isoflavones, in case of their regular consumption can increase glutathione protective antioxidant layer around cells and can decrease the risk of entrance of free toxic radical compounds into cell. Therefore, the isoflavones of soy and soy proteins can decrease cancer risk by increasing glutathione. The increase in glutathione concentration by the effect of soy isoflavones not only minimizes the risk of toxic radical entrance into cell but also the entrance of trans fat, carcinogens, allergens, salt, nitrate and nitrite and many other important harmful compounds which can react with DNA and mutate it which may result in cancer, allergy or diabetes.

Soy estrogens in case of their consumption in child metabolism can cause hormonal imbalance, especially in boy that they may face with undesirable growth of breast region. Therefore, boys until 17-18 years old should avoid from plenty of soy and soy product consumption.

**All soy products are not equally healthy on human metabolism. One of them is soy sauce since it is very rich in phosphate, potassium and salt.** The excess of these minerals can be bound on the wall of inner layer of kidney vessels. Kidneys that locate on both sides have got many vessels which are very thin and fragile in structure. Their diameter size is so small that no operation can be made on them. Any kind of incision can defect these vessels and can be life threatening. A vessel from cardiac system can be taken into an operation. The calcified and closed region by the effect of clot can be taken out and a healthy vessel fragment can be replaced which is called as 'by pass'. But, this kind of operation can never be made on kidney vessels since they are very small as in diameter size. Why it is so important? It is so important because we have to protect these thin and fragile vessels which are responsible for filtering and production of urine from calcification. Once they are calcified and once their diameter is closed by clot, no operation to open these vessels is available. More clots in diameters of more filtering vessels of kidneys mean more failure of kidneys. At the early stages, it depends on the number of filtering (percolator) vessels which are clotted by calcification, if the number of these vessels is few and the severity of clotting is less, the other healthy vessels can supply urination and filtering and kidneys may somehow be able to do their function. But of course the decrease in number of healthy filtering vessels of kidney is the

indicator of renal failure (kidney failure) in a very near future if diet and treatment is not immediately applied. The super function of healthy filtering vessels may also result in clotting of their cavities by particles such as excess of salt, sugar, potassium, nitrate, nitrite, polycyclic aromatic hydrocarbons, cholesterol, bad cholesterol, saturated fat, unsaturated fat, toxic radicals and biogenic amines. The severity in renal failure may progress step by step which may even require dialyze. Dialyze is one of the most important factors which decreases life quality of person and family. Because you will have to use a machine to excrete your urine and your toxic metabolites, you will have to wait for the availability of the machine. Many of us do not give importance to liquid consumption, always neglect fruit juices, vegetable juices and especially water consumption. We always consume these types of liquids whenever we are thirsty. You should consume liquid not only to get rid of thirstiness but to open the diameter of the filtering of kidneys and other vessels in body. As long as you consume liquid, you can protect your blood against clotting, you can supply your cardiac and kidney functions and you can be protected against a possible cardiac failure and renal failure. I always mentioned in various parts of the book that diluting blood by plenty of fluid consumption, fiber consumption and antioxidants is the base of a healthy life style and nutrition. Because, only this type of nutrition and life style can excrete and eliminate the toxic metabolites and harmful compounds out of your body and can decrease the risk of calcification in vessel by the effect of these toxic compounds. Liquid and especially water is an important vehicle to excrete and eliminate of these toxic and harmful compounds but that is not the only one. **All potassium, phosphate, sodium (salt), nitrite, nitrate, polycyclic aromatic hydrocarbons, cholesterol, bad cholesterol and fat rich foods should be avoided. Soy sauce is that kind of food product, rich in potassium, phosphate and sodium and therefore should be avoided especially in the metabolisms suffered with renal failure.** I can not say that all soy products are rich from sodium, phosphate and potassium because it changes from producer to producer. But phosphate as an emulsifier and sodium as a taste improving agent are added into many soy products. Therefore, many soy sauce products in market are very rich of these substances. It can be better for you to avoid from plenty use of soy sauce even though you are not suffered with renal failure. Note that;

*Red meat and red meat products namely sausage, salami, pastrami are rich of cholesterol, bad cholesterol, saturated and unsaturated fat and trans fat

*Smoked (fumed) foods since they are rich in polycyclic aromatic hydrocarbons and benzopyrene,

*Fermented meat products with some canned products rich in nitrate and nitrite,

*Soy sauce since it is rich in sodium, potassium and phosphate

*Cured products (salted products) rich in sodium, phosphate and sodium ascorbate

Regular consumption of the mentioned foods above in excess amounts because of the mentioned substances which they contain can increase the risk of calcification in vessels in cardiac system, in vessels which are responsible for urination and excretion of toxic metabolites.

Other soy products are much safer than soy sauce such as tofu, soy milk, soy flour, soy protein and miso. Tofu is produced by grinding and emulsifying soy as in the shape of cake. Soy milk is produced by pressing soy within vanilla, cacao or coffee addition. Soy flour is produced by directly grinding soy, while miso is produce by fermenting soy paste.

Daidzein and genistein isoflavones in soy bind and inhibit an enzyme called thyroid peroxidase which acts importantly in thyroid production. For this reason, persons with hypothyroid should avoid from soy and soy products. If a person with hypothyroid still continues to consume soy and soy products regularly in great amounts, the result may be the progress of the severity of hypothyroidism.

Soy and soy products also contain phytic acid, a kind of fiber substance. It can bind bad cholesterol, fat, trans fat, carcinogen and allergen, salt, potassium, phosphate, sugar in the cavity of stomach and bowel and prevent their absorption through bowel. This function is desirable but the same fiber can bind iron and calcium and decrease their absorption and bioavailability. **Persons with anemia and osteoporosis should consume foods rich in calcium and iron, but avoid from soy and soy products since phytic acid in them can bind calcium and iron and decrease their bioavailability.**

Soy and soy products are anti-clotting. This attribute is very desirable and make them as important and beneficial agents in cardio kitchen. Persons who target protection against cardiovascular diseases and disorders can consume soy and soy products. But, if you are the one who suffers about too much clotting or too much anti-clotting, then you have to pay much more attention to what you eat. Some individuals with paralyze, emboli and thrombosis are treated with anti-clotting medicines. Their blood should be kept as diluted to avoid further thrombosis and emboli formations. But it is a kind of sharp knife having got two sharp points on both sides. If you take too much dose of anti-clotting, then your blood may be diluted too much which may result in internal bleeding. If you take less dose of anti-clotting agent, this time your blood continues to face with clotting and so with a further thrombosis and emboli. What you have to do under these circumstances is to decide with your doctor. Your cardiologist or neurologist will prescribe you hopefully the correct dose of anti-clotting according to your dilution level of your blood. But, you should regulate the consumption rate of clotting and anti-clotting foods when you return home. If your blood analysis indicates that your blood is too diluted and if your doctor decreases dose of anti-clotting, then you should consume less anti-clotting food with more clotting food such as red meat, poultry, egg, fast food, milk and dairy. But opposite, if your analysis indicate that your blood is too high in blood density and if your doctor naturally increases dose of anti-clotting agent, then you should consume anti-clotting foods when you return home such as fruit, vegetable, fruit and vegetable juices while decreasing consumption rate of clotting foods (meat, milk and their products with poultry, egg and their products). This period, you can also include soy and soy products with their anti-clotting function to your diet. Note that you should avoid soy and soy products because of their anti-clotting effects if your blood is detected as too diluted.

I had mentioned at the beginning of this topic that soy and soy products although have got some serious adverse effects of some metabolisms, they are very beneficial with their cholesterol and bad cholesterol reducing effects and anti-clotting function. They do not have got cholesterol, bad cholesterol, fat and trans fat risk but they are also the closest food

protein group in protein quality to animal origin proteins while many animal origin proteins may bring you the risk of cholesterol and bad cholesterol. Note that you can supply 57.2% of your daily protein requirement with less than 300 Kcal energy and maximum 2.2 grams of fat.

Isoflavones in soy and dilution of blood by the effect of soy isoflavones can decrease the risk of hypertension, especially in men. Therefore, if you are a man over 30s and want to be protected against hypertension, calcification and related cardiovascular diseases and disorders, you can include soy and soy products in your nutrition and life. I want to remind you the important and life threatening effect of vessel calcification by the effect of some substances in foods. Thrombosis is the complete close up process of vessel cavity while emboli can be defined as the second and third and later attacks of thrombosis in other vessels. Any thrombosis or emboli in brain vessels which interrupts blood supply into brain can result in Alzheimer or Parkinson, manic depression, insomnia and sleeping irregularities. Soy and soy products with their anti-clotting effects due to their isoflavones can also decrease the risk of the mentioned diseases and disorders in neuralgic origin.

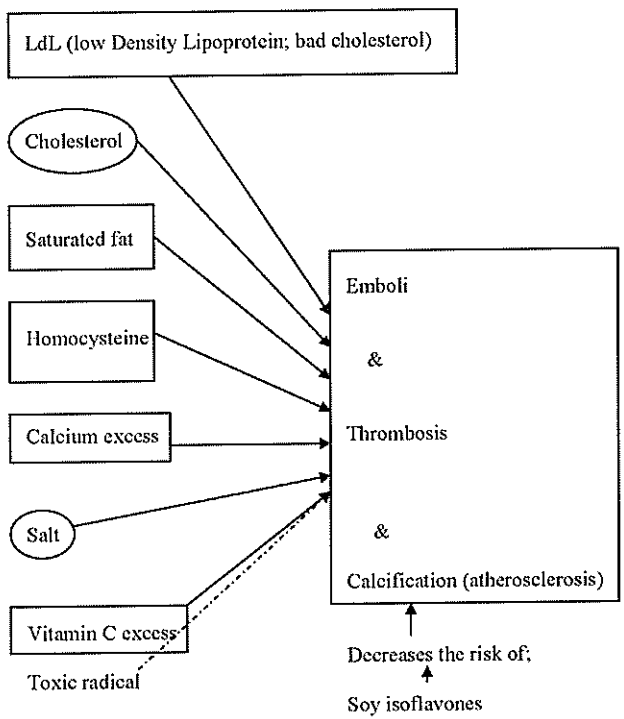



**Diagram 17**

There are no definite scientific findings about the healing effects of soy compounds on tumor although soy isoflavones are claimed to make a protection against cancer before tumor formation. Glycosylceramide in sphingolipid structure in soy is claimed to slow tumor progress. Although it is not definite, genistein in soy is claimed to slow the progress in prostate cancer. All claims take their support from Asian women who suffer with cancer in ovaries, vagina and uterus origin less when compared with other women who do not consume soy and soy products regularly in plenty amounts.

You can consume soy bean for 3-4 days under refrigerated conditions. If you want to consume cooked form, you have to place it into refrigerated as tightly closed and consume within 2-3 days.

Soy and soy products, in case of their regular consumption in plenty amounts as combined with deficiency of milk and dairy product, liver and fish and marine products can result in vitamin $B_{12}$ and D deficiencies. Vitamin $B_{12}$ and D in soy and soy products can hardly be absorbed from bowel mucosa and transferred into blood. Briefly, vitamin $B_{12}$ and D bioavailability of soy and soy products is very lower.

Trypsin is an important amino acid and it is utilized in the production and reproduction of bone, muscle and blood cells. But, soy and soy products contain substances which inhibit trypsin which are called as trypsin inhibitors. That is why children should also avoid too much soy and soy protein consumption, instead they should consume milk, dairy products, meat, fast food, fish, marine and egg and their products which are very rich in trypsin and other essential amino acids.

**Nitric oxide** has finally become the most popular supplement of body builders. It accumulates in muscle cell and the cells which cover the inner layer of vessels followed by its release. Especially, the accumulation of nitric oxide in the cells of inner layer of vessel dilates these cells and these cells push the surface cells on them. The result is the enlargement of vessel cavity that blood can flow in it easier and can be pushed into muscle cells and cardiac tissue. That is why, this supplement as in powder form is not only used in body building to supply more blood and more nutrient into muscle cells by enlarged vessels but also persons who want to improve and strength cardiac tissue may benefit from nitric oxide. Soy and soy products significantly produce nitric oxide and increase the production rate of nitric oxide. But note that, increase in diameter size of blood vessels can result in hypertension. Too much blood supply by the means of vessels in increased diameter size by the effect of nitric oxide can cause over function of cardiac tissue which may result in tachycardia (more contractions and relaxations of cardiac tissue). Therefore, this supplement should be avoided in persons suffered with tachycardia or hypertension and any other cardiovascular diseases and disorders. **Body builders can benefit the combined use of soy and soy products with nitric oxide supplements since soy proteins increase the production rate of nitric oxide.** Briefly, **body builders, and persons who want to be protected against cholesterol and bad cholesterol risk, persons who want to dilute blood and be protected against calcification and rapid aging can include these products into their diets. But children because of their trypsin inhibitors, women in premenstrual syndrome and menopause because of their estrogens, persons with hypothyroid because of their goitrogenes and thyroid peroxidase inhibitors should avoid from the consumption of soy and soy products in plenty amounts.** But, decreasing cholesterol and bad cholesterol while not effecting good cholesterol may be beneficial for also diabetes suffered persons and they can include these products into diabetic kitchen.

One of the enemies for liver, a strong threatening factor for the organ, is sugar. Carbohydrates and their simplest structure sugar called glucose is the easiest energy source. The metabolism of carbohydrates and glucose is the simplest among proteins, fats and oils. You can easily produce energy from carbohydrates at the shortest time whenever you need. Another advantage of sugar or carbohydrate is that you can easily eliminate the excess amount of energy coming from carbohydrates. As long as you do not consume in huge amounts, you can easily eliminate the energy of carbohydrates from your body by the means of sport, exercise of job activities. Huge amounts may seem scientific and clear to you but no one can define the 'huge amounts' of sugar since it always changes from metabolism to metabolism. If you are the one who is very active, familiar with regular sport and exercise, consume fresh fruit and vegetable and also liquid, you can show more tolerance to sugar and carbohydrates than others. But, if you are not active, if you are the one who does not like sport and exercise, fruit, vegetable and liquid, if you are too close to nicotine and alcohol, if you are constantly under heavy stress, even the energy of minute amounts of sugar and carbohydrates can accumulate as in fat form in your body and elevate your oxidative stress. Briefly, the hazard potential of carbohydrates depends on your metabolism, nutrition, the consumption amount and activity. A person who makes sport and exercise regularly in high velocity uses carbohydrates and glucose as simple sugar as the easiest and most effective energy source. But the same amounts may be harmful for the people who do not make the same exercises in the same velocity. The energy coming from carbohydrates can easily be deposited as in the form of fat in bodies of such people. Obesity, fat deposits or fattening is not the only problem of obese people. People who make regular sport and exercise, who targets anti-aging and who wants to increase life quality always avoid from high intakes of fat, oil and sugar into their bodies. Because fat deposits among the cell walls of muscle and these deposits make a barrier for muscle cells. Fat deposits surrounding the muscle cells give damage to the muscle cell membranes and wound them. Also, muscle cell which is filled with blood can not expand because of fat barriers which surround them. Briefly, **the increase in fat ratio always minimizes the ratio of muscle. Increase in muscle and decrease in fat ratio is an essential for fit shape but also anti-aging since fat can easily be oxidized and yield free toxic peroxy radical compounds which are responsible for atherosclerosis, hypertension, cancer, diabetes and aging.** Additionally, another important beneficial effect of the increase in muscle and decrease in fat ratio is the increase in lipolytic activity. Lipolytic activity means the combustion of complex fats into alcohol and free fatty acids. Especially, enzymes in muscle cells with their lipolytic activity degrade the complex fats and oils into fatty acids. Thus, masculine bodies do not make fat deposits easily like obese people. The lipolytic activity decreases due to decrease in muscle ratio and increase in fat ratio in obese people. Less muscle cells means less lipolytic activity (melting lipids; fats and oils) in such bodies. That is why obese people gain weight much easier than fit people. Unfortunately, many of us concern about fat and oils as the initial causes of obesity and fattening. Very few of us remember the important effect of excess amount of sugar and carbohydrate consumption on fattening and obesity while most of us focus on fats and oils. The reason may be the same factor that I have mentioned above. The same amounts of sugar and carbohydrates can be eliminated out of body as in the energy form easier when compared with the same amounts of fats and oils. But, I want to underline once more that although the same amounts of carbohydrates can be eliminated out of body much easier and rapidly when compared with the same amounts of fats and oils, the consumption of huge amounts of carbohydrates can also be deposited in body as in the form of fat. In conclusion, fats and oils and excess of carbohydrates when consumed

in huge amounts are all deposited in the form of fat. Fats, oils and carbohydrates especially simple sugars which are free of fiber can easily be converted into fat and increase the risk of obesity and fattening. The solution is the 'fiber rich' and 'fat and sugar low' nutrition. Excess of the fat, salt and sugar is also decomposed and detoxified in liver. Liver produces fat to be able to store and not to give the harmful metabolites of excess amounts of sugar, fat and oil into blood. Thus, fat, sugar and oil poor but fiber rich nutrition are musts to protect liver tissue from fattening. One of the food groups which should never be neglected in a healthy life style and nutrition is **mushrooms** especially the medicinal mushrooms with their rich fiber, low fat and sugar content. Most of us consume these foods in one or more period of life, definitely.

Haven't you been suffered with an infection and prescribed with an antibiotic namely penicillin which is also produced by molds, the family of mushrooms?. Antibiotics, which treat many infections in bacterial origin, are the end products, the metabolites of molds. Cyclosporin, a medicine derived from a fungus that uses insects as its hosts suppresses the immune system of transplant patients, hence lower tissue rejection rate. Mushrooms are the visible and the most solid form of molds which are edible although there is some groups which are very toxic. Mushrooms have been consumed for centuries and they have been the initial food and medicine components of traditional Chinese medicine. Medicinal mushrooms, **maitake**, reishi and cordyceps, have found a great consumption rate by people because of their rich fiber, vitamin, mineral and lower sugar, fat and oil contents. Mushroom contains some important and beneficial components which protect us against diseases and disorders. These compounds may be called as 'host defence potentiators'. They are responsible for the enhancement of immune system. Several different anti-tumor agents have been developed from fruiting bodies (mycelium) of these molds (Lentinus edodes, Ganoderma lucidum, Schizophyllum commune, Trametes versicolor, Inonotus obliquus, and Flammulina velutipes).

One important function of mushroom comes from its rich fiber content. As I have indicated in many parts of the book, soluble fibers have got more advantage than insoluble ones because they can bind the toxic compounds in the cavity of bowel and stomach but also in blood. In other words both blood and gut content may be filtered by the means of fibers. Many research findings indicate to the cancer protective effect of mushroom and medicinal mushroom. This effect is also related to the rich fiber content that excess amount of cancerogen agents are bound by the rich fiber content in the cavity of bowel and blood so that they can no more stimulate tumor formation. **Beta glucan** is the most effective soluble fiber among others since it can pass easily through bowel mucosa and bind many toxic compounds from cancerogens to allergens, cholesterol, bad cholesterol, salt, fat and sugar. Resihi is one of the important medicinal mushrooms. It has got antiinflammatory and antioxidant effect in metabolism. It is a good expectorant that you can eleminate the allergens and toxic compounds from lungs. It is also very helpful in lowering cholesterol and bad cholesterol. Especially, beta glucan in Reishi binds the toxic compounds and prevents liver from their damage. Mushroom is also rich in vitamins C, D, B, panthotenic acid, calcium, iron, and phosphorus.

Another important medicinal mushroom which can be consumed for detox is maitake. **Maitake** is the one which is the richest among others from the point of beta glucan. Beta glucan has become so popular that you can see its tablet form in many medicine stores and markets which sell anti-aging preparates. But, I can never advise the use of them. I want to remind you the same factor which you should always take into consideration during your marketing for such preparates.

Do prefer the natural consumption rather than their tablet forms because all scientific findings claim the same thing that, the extraction of the foods and the separation of some or one of the compounds such as vitamins, minerals or proteins decrease their bioavailability. The decrease may be due to the synergic effect of each vitamin, mineral, protein, sugar and fat in the considered food. In case of the separation of the compound from others, this synergic effect disappears. Thus, do prefer mushroom as beta glucan source instead of beta glucan tablets. Maitake has also been shown as protective against breast cancer. It decreases the risk of breast cancer 87%. Also maitake and other medicinal mushrooms relieve the effects of chemotherapy and radiotherapy. But, the question of 'should we consume mushrooms, medicinal mushrooms, omega 3 fatty acids, ginkgo biloba, isoflavones, vitamins and minerals, briefly, nutrition compounds which relieve radio and chemotherapy side effects during the application period of them?' is an important question. Unfortunately, many scientific claims express the benefit of these compounds while they also claim that they can relieve pain, upset, dizziness, tremor, weight loss and many other side effects of the treatments if they are consumed in rich amounts during their application periods. Yes, the relieving effect of them including mushroom and medicinal mushroom is correct but the consumption of these foods and perparates during the treatments to relieve the side effects of the treatments is completely wrong and may even be a disaster. The relieving effect of these compounds also depends on the same attribute, the rich fiber content, beta glucan, complex polysaccharides and starch content of mushroom and medicinal mushroom. These fiber components may bind some amount of radiotherapic and chemotherapeutic agents. Thus, their consumption decreases the pain or similar side effect due to the treatment. But, they will also have bound the therapeutic agent and cause significant decreases in radio and chemotherapeutic agent amount which will result in decrease of success of the treatment. In conclusion, if you consume these types of compounds to be able to relieve the side effects which are due to the treatment, you can be successful, and you can relieve the side effect up to a limit, but this approach will also decrease the success and expectations of the treatment. Briefly, they are all contraindicated if they are used or consumed during the treatments. The best way should be the application of radio or chemotherapeutic period alone without taking any tablet or similar product, fiber rich food or any special fatty acid or protein. Natural foods such as vegetables and legumes and fruits (which should be cooked properly to be able to protect the weak immune system of the patient during these critic times) as combined with plenty of water consumption. Followed seven or ten days of the treatments, then you can consume these types of foods including mushroom and medicinal mushroom. This kind of approach can be complementary for the treatments and increase the effectiveness of the treatments since the rich fiber and antioxidant content of the food products which are consumed after treatments (not during treatment periods) may stop any cancerogen entrance from out into body.

**Cordyceps**, another medicinal mushroom, have been used for centuries especially in traditional Chinese medicine that it is claimed to increase macrophage activity while lowering cholesterol and bad cholesterol. Macrophage cells are the initial cell types which protect liver against viruses and bacteria. Thus, the mushroom is a detox food product for liver which can also be consumed in hepatitis (the inflammation of liver). Hepatitis, the inflammation of liver is characterized by jaundice, hemoglobinuria (blood in urine), fever, dizziness and weight loss. Many cells in liver tissue can be wounded due to the inflammation. The target in this period of hepatitis and also in other liver diseases should be the healing of liver cells as quickly as possible. If the patient can heal the wounded cells, the effect of medical treatment and medicine can increase and the disease can be cured in shorter periods. Mushroom and medicinal mushrooms, the heavy antioxidant

and fiber content in their bodies, stop oxidant compound production in body. Liver tissue and wounded liver cells are no more destroyed by these free toxic peroxy radical compounds of oxidation. One important criterion which should always be taken into consideration is the necessity of proper cooking since patients suffered with hepatitis have got a weak immune system. Any microorganism entrance into body such as yeast, mold, bacteria or virus can make prognosis worse and prolong the curing time of the disease. Therefore, all meals in treatment and healing periods should be properly cooked. Raw foods should definitely be avoided. Although there have been conflicting scientific claims, cordyceps is also consumed for treating impotence and increasing libido. But, you should note that, many important scientific data claims that sexual hormones are most produced by proteins in animal origin. The proteins in animal origin are free of fiber and they can be absorbed properly through bowel mucosa and pass into blood circulation, metabolized for the production of sexual hormones. **That is why you can increase your libido and the production rate of sexual hormones such as testosterone and estrogen by only consuming proteins in animal origin, not in plant origin.** Mushroom proteins including the proteins in cordyceps may not be definitely classified as proteins in plant origin. Because they are in the class of molds as I have indicated above. But, the definite point is that they are not in animal origin and they are very rich in fibers which decrease the bioavailability of them. For this reason, mushroom and medicinal proteins can not increase libido and the production rate of sex hormones as much as proteins in animal origin. Please, do not believe such information which seem advertorial rather than scientific.

**Lentinan** is the name of the main fiber component in **Shiitake** which is also licensed by the Japanese FDA. It is claimed as complementary in the treatment of stomach cancer, ovarian cancer, liver cancer and bowel cancer. Lentinan also activates T lymphocytes and natural killer cells which kill bacteria, virus, yeast and molds, the harmful microorganisms which cause various diseases and disorders. This attribute of the mushroom has caused its popularity among patients who targets immune boosting. Especially AIDS and hypertension suffered patients have consumed the mushroom with its rich lentinan, vitamins A, E, C and D content. The mushroom has also been claimed as antiviral because of its interferon increasing effect.

Briefly, in spite of some conflicting research findings about mushroom and medicinal mushroom, the definite correct point about them is that they are one of the important healthy foods for cancer, cardio, diabetes and detox kitchen with its rich hemicellulose, polysaccharides, polysaccharides and starch content which act as fiber. Light cooking procedure except hepatitis condition, radio and chemotherapy application periods, is always recommended to avoid antioxidant loss.

# CROHN'S DISEASE AND FOOD

The disease may be defined as the inflammation of the last part of small bowel (ileum). The inflammation may involve not only intestine but also colon. In some conditions, if the inflammation is not taken under control, it can spread to stomach or rectum. Therefore, the borders of the inflammation may change and it may not be restricted with only ileum or small bowel.

The reason or reasons for the disease is not clear. But, it is thought to be a genetic disorder which is coordinated by abnormal genes. Followed by its formation, the disease continues as in the form of an autoimmune disease. It collapses the immune system. The main reason for the immune system failure in Crohn's is the inflammation of small bowel, ileum, because this part of the bowel is the part which absorbs most of the vitamins, minerals, proteins and essential fatty acids. The inflammation of ileum naturally decreases the absorption rate of most of these important vitamins, minerals and essential fatty acids which make immune system stronger. Thus, a person with Crohn's disease should be conscious that the immune system of the body may be weaker than ever because of the inflammation of ileum. The solution is clear. More and more vitamin and mineral rich foods and high quality protein and essential fatty acids in plenty amount than ever should be consumed. Briefly, the nutrition quality is much more important than ever and it should increase especially during Crohn's Disease. Because of the decrease in the absorption rate of vitamins, minerals, essential fatty acids and amino acids which make the immune system stronger, the amounts of all these important nutrients can support immune system and can be complementary for the treatment of the disease.

One reality which should be taken into consideration about Crohn's Disease is that unfortunately there is no available and definite nutrition or any food, plant, chemical and medical treatment including operations and medicines for the disease. All of them target to heal the inflammation but because of the genetic and autoimmune reasons of the disease, the disease can be chronic and can continue for very long periods of life. Here below are some of the initial details which we have to know about Crohn's Disease;

- The treatment, like in all other diseases, should be medical treatment under the strict control of doctor. Background is the life style and nutrition that can complete and increase the success of the medical treatment significantly. You will easily remember from the other parts of the book that there are inflammatory foods and also anti inflammatory foods. Fats, carbohydrates are all inflammatory food components since they can easily enter into the reaction with oxygen and yield inflammatory free toxic peroxy radical compounds. These toxic radicals can accumulate on the mucosa, the surface layer of ileum and small bowel and can cause Crohn's Disease. What I mean here is the possibility of the disease in food and nutrition origin if your fat and sugar intake is too much without control. I want to include also Crohn's Disease into the list besides cancer, renal failure, hypertension, stroke and diabetes. Especially, the diets low in antioxidant vitamin and mineral content but rich in fat and carbohydrate can easily elevate the free toxic peroxy radical compound production of the metabolism and these toxic and inflammatory compounds can cause Crohn's Disease. So, the disease is not necessary to be only in genetic or autoimmune origin.

The formation of the disease can also be triggered by the excess rate of oxidation and oxidative stress due to excess amount of fat, oil and carbohydrate in addition to poor fiber and liquid consumption.

- Ileum and other parts of the bowel are unfortunately the most sensitive parts of the body to inflammation besides liver. Liver is susceptible to inflammation many times because of the toxic dirsts and metabolites. Liver is the main organ to detoxify the toxic radicals, cholesterol, microorganisms and their metabolites and therefore it is very natural for liver to be deposited by these toxic metabolites and compounds. These detoxified products with toxic ones pass into bowel by the means of blood circulation. Other words, bowel and ileum is a kind of station where all the toxic and inflammatory compounds and metabolites accumulate and wait here to be excreted out of body through anus and rectum as in the form of feces. In conclusion, the surface layer of cells which is called as mucosa of ileum and other parts of the bowel are constantly in contact with all these inflammatory agents and toxic metabolites and compounds. That is why the probability of the high rate of inflammation in ileum is high, higher than the probability of the inflammation in any other organ and tissue. So, what can we do to avoid from the risk of Crohn's Disease. The predisposed factors (the factors which prepare the circumstances for the formation of the disease) in nutrition and life styles are well known. So, the protective actions according to these predisposed factors can be taken under control and adopted to kitchen and life style. You should never forget that although nutrition and life style is not capable to cure the disease, it is always complementary which means that it completes medical treatment for the disease, enhances its curing effect. **The medical treatment does not mean anything as long as you continue to consume fat and carbohydrate rich and fiber and liquid poor nutrition and elevate your oxidative stress.** Your medical treatment will try to heal you but you will insist on inflammating your ileum mucosa by the means of inflammatory agents in some hazardous foods!. During crohn's Disease or for the protection, keep in your mind that;

- The main target should be the protection of your bowel and ileum mucosa more than ever. Your body and especially your ileum and bowel mucosa should be protected against inflammation and high rate of oxidation. This can initially be maintained by a good and enough defecation. Because the inflammatory agents and compounds such as fat, oil, sugar, cholesterol, homocyteine, bad cholesterol, salt, caffeine and alcohol can only be eliminated out of the metabolism by the means of feces. An easy defecation can only be possible by the means of fibers. Fibers, soluble or insoluble, form a bulk which is called as feces and pushes all these harmful inflammatory agents and compounds in foods out of body.

- Another important vehicle which pushes the dirts, inflammatory and toxic agents out of body besides fiber is the liquid consumption including water, tea, cold tea, fresh fruit juices and vegetable juices and even cola, mineral water and other mineralized water products. Most of the toxic radicals, fats and oils, cholesterol, bad cholesterol, homocyteine, biogenic amines and their degradation products and metabolites are sticky. They can easily adhere on the mucosa and can not be pushed and rinsed away by feces. Many times, feces can not be sufficient enough to be able to rinse all these toxic radicals and compounds out of the surface of ileum and bowel. The best and the most effective vehicle which can rinse these dirts and toxic metabolites are the liquids. That is why drinking liquids in large quantities 1.5-2 L a day is a must to be able to protect the mucosa of ileum and bowel from inflammation.

- The initial foods that elevate the rate of inflammation including the inflammation on mucosa of ileum in Crohn's Disease are the meat and dairy products, meat and meat products. First of all, these foods are commonly consumed as processed rather than raw since they are very rich in microbial contamination flora which is responsible for many diseases and infections. Therefore heat, food additives and some food preservatives are generally used in the production and extension of these foods. Unfortunately, salt, sugar, nitrite, nitrate, monosodium glutamate and similar additives used in the process increase the rate of inflammation directly or indirectly. Also, the rich content of cholesterol and bad cholesterol (low density lipoprotein), fat and oil, saturated and unsaturated fat content are the initial sources of the higher inflammatory effects of these products in animal origin. In fact, as you easily remember from the other parts of the book, I have constantly reminded you the same protective action; the limitation of animal origin food products such as poultry, red meat milk and their products especially the ones rich in fat. The limitation of all these products while increasing the consumption rate of plant origin products rich in fiber and antioxidants such as green leafy vegetables and citrus fruits will not only help for the protection against diabetes, hypertension, stroke and many other similar metabolic diseases and disorders but also will be able to minimize the risk of Crohn's disease.

- In spite of the great importance of the limitation of animal origin fat rich food products in Crohn's disease and increase in vegetable and fruit product consumption rich in fiber and liquid consumption is deathly important. Because the limitation of fat rich animal origin products and increase of plant origin foods lower in fat and high in fiber content may change in some periods of the disease. **If Crohn's disease is in a period with fever and acute inflammation, you should better follow a low fiber diet which means animal origin foods such as red meat and its products, milk and dairy products, poultry, egg and its products, fish meat and marine origin food products (of course as low fatty ones).** But also, do not forget that although all plant origin food products; cereals, legumes, vegetables and fruits are the plant origin foods which always contain less or high amount of fiber, excessively cooked plant origin foods may be defined as very low fiber foods since heat process may degrade fiber and decrease its amount. I think, it will be better to explain the reason of the necessity of poor fiber nutrition when there is severe and acute inflammation and fever in Crohn's Disease. The periods with fever and high rate of inflammation during the disease indicate that the cells which cover the surface of ileum and colon and other parts of the bowel are in severe inflammation and they can not make the absorption of essential nutrients more than ever because of the high rate of inflammation. The fever is the initial sign of the high rate of inflammation. Fever signals that the inflammation is too severe and more than ever on the mucosa of ileum and bowel. Under these circumstances, the cells of bowel can not absorb vitamins, minerals and also proteins and essential fatty acids. All through this period of the disease, the absorption of these essential nutrients is never complete and proper because of the damage and inflammation on the cells which cover the surface of ileum, colon and other parts of the bowel. But, during the disease without fever, when the inflammation is under control by doctor and medicines used, these essential nutrients can be absorbed up to an extend although that is not completely. For this reason, in case of fever and severe inflammation which shows itself with severe diarrhea, abdominal pain, colitis (the inflammation of colon), lack of appetite, weight loss and ulcerative colitis, the main problem and threat is the impossibility of the essential nutrient absorption through ileum which may result with worse conditions such as immune deficiency, the complications with viral and bacterial infections and osteoporosis. Knowing these risks, it is always protective to follow a low fiber diet but rich in high

quality nutrients such as vitamins, minerals, proteins, essential amino acids and essential fatty acids but poor in fiber content. Fibers bind many of the essential nutrients and decrease the bioavailability of these essential nutrients. Many of important essential nutrients such as folate, calcium, iron and $B_{12}$ can be bound by the rich amount of fiber and excreted out of the metabolism by the means of feces. During the disease, especially in the period with fever, the absorptions of the concerned nutrients are not possible because of the damage and inflammation of the the surface cells of ileum and bowel. Any kind of fiber rich food consumption in rich amounts in these periods with fever can also decrease the absorption and make the malnutrition worse and worse. **Thus, if you are the one suffered with the disease with fever, you should better avoid from fiber rich nutrition, instead, prefer fiber poor nutrition and high quality protein and vitamin and mineral rich nutrition.** Of course you can easily predict that it will be better to consume foods rich in animal origin but lower in fat and oil since animal origin foods are fiber free, in other words, they are deprived of cholesterol lowering effect of fibers. As you clearly realize and understand in conclusion, a cornerstone of healthy nutrition and life style, fibers, may not be beneficial in some diseases like Chron's, while they have got many beneficial effects in many other diseases and disorders. This is the one which I am trying to explain in all parts of the book that, there is no any food which is completely good or completely bad. It depends on disease, disorder, metabolism, sex, age, nutrition status, life style, activity and genetic factors.

- **In spite of the fiber free or poor nutrition in the period of the disease with fever, in other periods without fever and as long as the inflammation is under control by doctor and medicine, the person should consume opposite, fiber rich foods, not fiber free!. What I mean here is that the period with fever and severe inflammation is an extreme period of the disease and only in this period fiber free food should have been administered to be able to supply vitamin, mineral, essential amino acids and essential fatty acids and make the absorption of these essential nutrients easier. In other periods, where fever is not exist and inflammation is under control, fiber rich foods such as cereals, whole grain products, legumes, vegetables and fruits should have been consumed. Especially, there may be a severe constipation and a significant decrease in bowel movements which can cause digestion problems such as gas and abdominal pain. Fiber rich food intake in these periods can make the bowel movements easier and support digestion.**

- **Psyllium** (Plantago asiatica) is a plant rich in monoterpenes and phenol diterpenes. Psyllium is one of the greatest plants with its supportive effect to the medical treatment during Crohn's disease, especially with its rich content of fibers and monoterpenes. Knowing something about the importance of monoterpenes on our health can help us to understand the important role of the plant in the disease.

- **Monoterpenes:** In spite of the advances in medicine in today's world, people are dying younger because of unhealthy lifestyle and malnutrition or bad nutritional habits while many suffers from illnesses such as heart disease and cancer. Unfortunately, these diseases are treated with very expensive medications that have adverse effects on metabolism many times. We are focusing on medical treatments so much although there is no definite treatment for cancer or diabetes type 1 or Crohn's disease. Of course medical treatment comes first as I repeated in many parts of the book but it is always missing without a healthy life style and kitchen. Since there is no any definite curing and completely

healing treatment for the mentioned diseases, a correct nutrition and life style can control and prolong the life span in these diseases. Free toxic radical compounds which are produced by the oxidation of carbohydrates, fats and oils which attack our organs and tissues. They can cause great damage to our cells like nicotine and air pollutants and once more I want to remind you that antioxidants absorb free radicals, decrease the rate of oxidation and prevent inflammation from becoming worse by decreasing oxidation rate. Crohn's disease is an inflammatory disease and the person suffered with the disease should control the inflammation on the mucosa of colon and ileum and should dominate antioxidants in large quantities in the kitchen. One of the important groups of antioxidants in foods is phenol 'monoterpene'. Monoterpene phenol compounds are also strong cancer fighting phytonutrients which exists in citrus peels and oils. One of the namely monoterpene phenol is limonene that it has been shown to shrunk tumors in lab animals by blocking proteins which promote cell growth in some other types of cancers. These compounds also exist in larger quantities in grapes. The main mechanism of monoterpene in preventing cancer is the induction of phase II carcinogen-metabolizing enzymes which results in carcinogen detoxification or may be due to the induction of apoptosis (programmed cell death mechanism that allows cells to self-destruction which is initiated when a cell is no longer needed and when a cell becomes a threat to the organism's health) and inhibition of cell-growth regulating proteins. Monoterpenes; namely limonene and perillyl alcohol are shown to be easily metabolized in liver, lung and many other tissues by the means of feces and urine. Another wonderful, chemo-preventive effect of monoterpene is the activation and support on cytochrome P450 enzymes of liver which is responsible for detox process in body that monoterpenes induce some of these enzymes namely CYP2B1 and CYP2C (Source: Crowell, P. L. 1999. Prevention and Therapy of Cancer by dietary monoterpenes. The Journal of nutrition. 129:775-778.).

One of the important and richest sources of monoterpenes is **dill** which should be included to diet in all periods of life. The monoterpens namely in dill are carvone, limonene and anethofuran. Dill is also rich in flavonoids namely laempferol and vicenin. The monoterpene components in dill activate the enzyme glutathione-S-transferase. This enzyme activates glutathione which is a strong antioxidant that decreases free toxic peroxy radical production in body. Monoterpenes which are exist especially in oils in dill act as chemopreventive like in parsley which can help to neutralize particular types of food carcinogens such as benzopyrenes in fumed (smoked) products. The oils and monoterpenes in dill also act as bacteriostatic (inhibit bacteria growth) and therefore very protective against infections. Crohn's disease, although it may not be bacterial origin every time may be complicated with pathogen bacteria many times. For all these reasons, the inflammation of ileum and colon is often complicated with many pathogen bacteria species which may sometimes elevate the rate of inflammation. That's why dill and parsley, especially as in raw forms, may be as in salad mixtures with other vegetables, should be consumed in addition to the other similar vegetables with their bacteriostatic and bactericide (bacteria killing) actions like onion and garlic, in large quantities, which have got the similar effects, all through the disease period.

Dill is also a vegetable rich in calcium, iron, dietary fiber and magnesium. When deficiencies of iron, calcium and magnesium are concerned in Crohn's Disease, dill's concerned vitamin and mineral rich composition makes it a wonderful dietetic and functional food for the disease. You can use this vegetable when you cook fish especially salmon and trout or you can consume it together with yogurt. Calcium coming from yogurt and dill enhances the absorption level of each other, in other words, bioavailability of each other. The combined consumption of dill and yogurt may be beneficial in osteoporosis.

Another group of foods rich in monoterpenes are the citrus fruits, sourish and juicy fruits such as lemon, orange, pineapple and kiwi. They are the rich sources of vitamin C which is called as the most versatile vitamin. You can benefit from the vitamin to increase your serotonin and protect against depression, anxiety or you can help to increase dopamine and protect against Parkinson. Vitamin C also increases the bioavailability of calcium from bowel which makes it more important especially in Crohn's Disease. The vitamin is also important in protection against osteomalacia (loss in bone and muscle density) and osteoporosis (loss in bone density) since it increases the bioavailability of calcium. Vitamin C also helps to decrease sugar concentration in blood and can help to protect against Diabetes type 2. It enlarges the diameter size of vessels while diluting blood, meaning that it has got the similar beneficial effect with aspirin. For these reasons, it should also be dominated in the kitchen for cardiovascular health. Vitamin C rich fruits are also rich in some other important phytonutrients such as betacryptoxanthin, coumarins, limonene, lycopene and pectin. Limonene has also been shown to play an important role in reducing inflammation that causes arthritis, asthma and allergies.

One of the healthiest fruits for Crohn's Disease and other metabolic diseases such as hypertension, Diabetes, stroke and cancer is pineapple which contains an important enzyme called bromelain. It is an antioxidant and may be helpful in Crohn's Disease.

- **Cruciferous vegetables** belong to cabbage family namely Brussels sprouts, broccoli and kale are not only rich in vitamin C but also they are the rich sources of indoles, dithiolthiones, oltipraz, sulfides and sulforaphane besides monoterpenes. **Brassinin** in cabbage has also been shown to inhibit tumor growth of skin and breast. As indicated in the related part, indoles activate the breakdown of estrogen and estradiol, thus decrease the risk of breast cancer tumours. Dithiolthiones and oltipraz stimulate and activate glutathione and decrease the oxidation rate which may be helpful in Crohn's Disease. This group is also very rich source of fibers which are important food components that should be heavily consumed in the periods of Crohn's Disease without fever.

- You can also benefit from the rich fiber content of umbelliferous vegetables like carrot, celery, parsley and parsnips which are also rich in coumarins, monoterpenes, polyacetylenes, psoralens, briefly the phytonutrients, not only through Crohn's Disease to be able to inhibit inflammation with their rich antioxidant capacity and monoterpene content, but also they should be consumed regularly for the protection against cancer in a healthy life style and kitchen. Do not forget that the mentioned phytonutrients in all these vegetables and fruits should be consumed together as much as possible. Finally, yellow and red-fleshed fruits like lemon, apricot, cantaloupe, cherrie, mango, papaya and peach are the rich sources of carotenoids (the precursor vitamin A which is a strong antioxidant including alpha and beta carotene, betacryptoxanthin. These foods are also rich in vitamin C and soluble and insoluble fibers (Source: Consumer Health Organization of Canada, Consumer Health, 19:4, 1996, April).



- In case of evaluation of cereals in the disease, soluble and insoluble fiber rich cereals should have been consumed in the periods of the disease without fever while fiber free and vitamin, mineral and protein rich and high quality nutritious foods should have been administered in the periods with fever. Especially, barley with its rich insoluble and soluble fiber is one of the healthiest cereal options for the disease. It is rich in selenium, a strong antioxidant mineral, which you can benefit its antioxidant and anti-aging effect in your body. This mineral also increases the bioavailability of calcium and may help to protect you against osteoporosis and osteomalacia. Another important food commodity in barley is beta glucan which is the strongest among soluble fibers. The insoluble fibers are beneficial since they form bulk and make the defecation easier while preventing gas and abdominal pain and also the risk of diverticula problem. But soluble fibers have got an important plus advantage that they can also be absorbed from the mucosa of bowel and transferred into blood opposite to the insoluble fibers. So, these soluble fibers can also bind the hazardous and harmful compounds such as cholesterol, carcinogens, bad cholesterol, homocyteine, salt, saturated and unsaturated fat and sugar in blood. That's why, you can find its tablet forms in anti-aging and medicine stores and you may have heard its strong cholesterol reducing and cancer fighting effect of them.

- **Psyllium** (Plantago asiatica) has gained a very common application field in Crohn's disease so that many patients with the disease know this name. The higher consumption rate of the plant in the disease is due to its special function. Its special biological structure is the main factor for its special function and role in Crohn's Disease. Its fibers absorb excess amount of water in the cavity of bowel and prevent diarrhea. On the other hand, it forms bulk with its fiber content and makes the defecation easier which may help for constipation. It seems very strange but this plant can be used in both cases; constipation or diarrhea. The plant may be consumed as in salad with other vegetables or may be supplied as in tablet form. It has got important and beneficial compounds for health like beta carotene, allantion, aucubin, linoleic acid, sorbitol, tannin, vitamin C, apigenin and calcium. Once it is taken one hour before meal, it decreases appetite and help for the diet. It also reduces cholesterol, bad cholesterol and total serum triglyceride and thus the plant is also a very beneficial preparate for the patients with cardiovascular disease

or for the protection against hypertension, stroke or other cardiovascular diseases and disorders. Formation of bulk by the support of the plant also helps for the elimination of dirt and toxic metabolites from bowel. Therefore, the plant is also important with its detox capability.

- **Rosemary** with its rich omega 3 content enlargers the diameter of vessels and dilute blood. This function of the plant may be helpful to be able to enlarge the diameter size of the vessels beneath bowel tissue and may supply more blood and nutrients to the inflammatory region of the bowel. The same function of the plant may also be helpful for the complementary treatment to the medical treatment of migraine, gastritis and ulcer. Caffeic acid and rosemarinic acid are the other important phytonutrients while the great content of monoterpenes, phenolic diterpenes and flavonoids in the plant act importantly on reducing inflammation with their strong antioxidant capacity. But, you should definately note that the plant should be avoided in epilepsi, pregnancy and hypertension. Another advantage of the plant is the diuretic effect without any side efffects such as the deficiencies of potassium, chrome and sodium which are inspected during the medications with many other diuretics. The plant with its great antioxidant compounds help for the protection of a protein coded HSP70 which decreases the damage due to stress factor. As a result, the protection of the enzyme by the antioxidants of the plant reduces the the risk of disease and disorder while slowing aging process. Diuretic effect and easy defecation by the support of the plant helps for the elemination of the toxins from bowel out of body. I would like to remind you the importance of detox and oxidation control during Crohn's Disease to be able to protect the patient from worse conditions of the disease. One of the greatest factor that increase the severity of the disease is toxemia. Toxemia is a general term rather than specific although many people know it as the toxic substance entrance into the blood. The identification is correct that toxemia is the existence of toxic substances in blood. Unfortunately, many of us restrict the identification and only assume the toxic substances as toxic minerals such as mercury or a similar toxic compound. Toxic substances are very different and we are constantly consuming them such as cholesterol from meat, meat products, milk and dairy products, bad cholesterol from the same products, cholesterol and bad cholesterol from shellfish, cafein from coffee, tanen from tea, benzapyren from cured and smoked products, smoked products, nitrate and nitrite from cured products and pickles, salt and phosphate from cured products, monosodium glutamate from cured and processed meat products, phenols from cured and processed products, sugar and salt from cereal products, trans fatty acids from margarins. The list may continue for pages but especially the mentioned ones are the initial toxic compounds that we consume and take into our bodies by the means of processed foods. That is why, I want to remind you once more that the more processed food you consume the more you may be suffered with toxemia. Toxemia does not only mean a syndrom which is characterized by some pathologic clinical symptoms. It may be exist in your metabolism without giving a clue like in atherosclerosis (the calcification of vessels). Similarly, atherosclerosis may not be understood until you are suffered with a severe hypertension. Dizziness and neusea make you irritaded and you need to consult to your doctor. Then you and your doctor can understant that you are suffered with hypertension in other words atherosclerosis. The main factor, the main predisposed factor for the progress of your hypertension is atherosclerosis, the calcificaion of your vessel walls by the excess of salt, benzapyren, nitrite, nitrate, saturated and unsaturated fat, trans fatty acids, bad cholesterol, cholesterol, phenol, alcohol, nicotin, sugar, cafein... The main problem here is your life style and your kitchen. There is something wrong with your life style that you are taking too much from these mentioned toxic compounds by the means of these harmful foods and you are consuming

these harmful compounds so much that they accumulate on the walls of your vessels, decreasing the diameter size of your blood vessels. The blood can not pass and continue to its stream through these kinds of atherosclerotic vessels and begins to slow by applying too much pressure on the walls of blood vessels which is called as hypertension. These types of atherosclerotic vessels can not supply enough blood to the organs where they supply blood from such atherosclerotic vessels. When they do not supply enough blood, they begin to die which may result in cardiac failure, renal failure, liver failure and many other deficiencies with many other diseases and disorders. Briefly, many metabolic diseases, disorders, organ failures, tissue failures and their deficiencies are due to the atherosclerosis when these tissues and organs can not supply enough blood from such atherosclerotic vessels. The main cause of atherosclerosis is a kind of toxemia which you run every time without knowing it as long as you consume from the mentioned toxic and harmful foods. If you are the one who consume these types of foods too much without control, if you are not familiar with regular sport and exercise, if you are the one who consumes processed food products too much and if you are the one who consume alcohol and nicotine, you face with toxemia risk and atherosclerosis due to toxemia. The preventive actions are clear. The friendly and harmful foods should have been concerned carefully. Regular sport and exercise with plenty amounts of fiber and non alcoholic liquid consumption should never been neglected. The mentioned toxic food compounds are not only responsible for the progress and formation of cancer, diabetes, hypertention and atherosclerosis but also for Crohn's disease since most of them hurt and give damage the tissue of bowel. Therefore, the history of Crohn's disease many times takes its origin from wrong and harmful nutrition and life style.

# WHICH FAT; OMEGA 3 OR OTHERS, IN A HEALTHY LIFESTYLE AND NUTRITION?

I know it is not difficult for you to predict that I will advice you to dominate omega 3 fatty acids while restricting the intake of other fats. But, I must add that although omega 3 fatty acids are functional and can improve the quality of life, the excess level of their intake into body may also be harmful.

Fats have been considered as harmful compounds and blamed for many chronic metabolic diseases and disorders for ages. But, scientific findings present us the most important factor which is not the fat itself but the amount, the type and the functionality of the fat. Even n-3 omega fatty acids, no matter how they are functional and may have very important and beneficial body functions while improving our life quality, the consumption of these fats without control in excess amounts may have very serious harmful effects on our body. Nevertheless, many media are not successful enough to inform the adverse and harmful effects of this group while educating people about their functionality. Why n-3 omega fatty acids should not be neglected in our meals and kitchen and why we should consume this group of fat more than others or why we should prefer them? What makes this group of fat functional? The answer for all these questions is the effect of this group of fat on our hormonal metabolism which I had also indicated above. They inhibit the production rate of some harmful hormones and the harmful cytokine production of these hormones in body. These hormones are called as prostaglandines E type 2. These hormones constrict blood vessels and decrease the diameter of blood vessels. They are important and very effective factors in the progress of hypertension. Cytokines, the protein compounds which are produced by these hormones, cause allergy, edema, insomnia and inflammation. But, n-3 omega fatty acids decrease the production rates of these hormones and so the harmful cytokine productions which are produced by them. This effect directly decreases the oxidation rate in body. For this reason, n-3 omega fatty acids decrease the oxidative stress in body. On the other hand, the same group of fatty acids increases some beneficial hormones which are called as prostaglandin E type 1. This group produces beneficial cytokines opposite to the previous group of hormones. Prostaglandin E type 1 hormones dilate blood vessels which results in decreasing the severity of hypertension. The beneficial cytokine products of these hormones decrease the risk of edema, allergy and insomnia. Some green leafy vegetables, strawberry, nuts, bitter chocolate, especially ocean salmon and fatty fish are rich sources of n-3 omega fatty acids. That is why; the regular consumption of the mentioned foods all through life circle can improve the quality of life and may protect body against important harmful chronic metabolic diseases and disorders. One of the most harmful cytokine which is produced by the harmful hormones; prostaglandines E type 2, is TNF (Tumor Necrosis Factor) and the increase of this protein increases cancer risk. But, increasing the consumption rate of n-3 omega fatty acids by concerning all their mentioned beneficial effects on body may bring some harmful effects. No matter how they are beneficial and important fats, they are fats. Fats are decomposed and oxidized by the effect of oxygen in body to yield harmful free toxic radical compounds which are the initial causes for aging and metabolic diseases from hypertension to cancer, diabetes and depression. Unfortunately, media advertises the only beneficial effects of this group of fat. The dose and the consumption rate is always neglected. Especially, n-3 omega supplement tablets are much worse because they are commonly consumed in many developed countries without concerning the nutrition type. If you are the one who uses such tablets regularly but

who already runs a nutrition style rich in n-3 omega fatty acids, you may have taken too much fatty acid into your body. **This group of fat is blood thinning and too much can cause internal bleeding risk which may even be fatal!** Many people use these tablets as combined with aspirin, Coumadin and other similar blood thinning medicines or supplements such as ginger, garlic, strawberry, leukopen, celery and artichoke tablets which are also blood thinning. The result may be the same. Too much blood thinning effect and the risk of internal bleeding. So, the excess use and consumption of n-3 omega fatty acids and tablets may result in two risks which may be very harmful, aging and may even be fatal.

Since they are fats themselves, they are oxidized by oxygen and converted into harmful free toxic peroxy radical compounds like all other oils and fats. Thus, they may increase oxidative stress which may result in aging and cause many important metabolic diseases and disorders in case of their excess intakes.

They are anti-clotting, in other words they are blood thinning. Their combined use with other blood thinning medicines and supplements may cause too much blood thinning that may result in internal bleeding risk. The result may even be fatal.

According to the mentioned information above, the most important and initial factor which should be taken into consideration is the amount of fat consumed. The other factor is the type of fat. The only fat groups which are defined as functional are n-3 omega fatty acids and monounsaturated fatty acids. Therefore, we should know which food is rich of n-3 omega fatty acids.

In spite of many beneficial and anti-aging effects of n-3 omega fatty acids, some other fats have got opposite harmful effects on our metabolism, like margarines. Margarines are produces by the saturation of oils, the liquid and plant origin lipids which are free of cholesterol, by the effect of hydrogen gas. You will remember as I mentioned in the related part, many of us use margarine in cooking, in many types of recipes from cakes to desserts, meat and fish meals. People always think that margarines are not in animal origin which means that they are free of cholesterol. They are solid like animal origin fats since they are already produced by the saturation by hydrogen gas. Margarines may be in plant origin and they are free of cholesterol since they are produced from plant origin lipids but this does not mean that they are healthy and should be preferred. The saturation process by the effect of hydrogen causes some toxic compounds which are called as trans fatty acids. These substances are even more harmful than cholesterol and bad cholesterol. Unfortunately, many advertisements in many countries do not inform people about these risks and other side of margarines, just because of financial concerns.

Some other group of lipids is monounsaturated fats. n-3 omega fatty acids is a group of polyunsaturated. Lipids are the conjugations of free fatty acids with a three value alcohol glycerol. If only one fatty acid makes conjugation with alcohol, the end product is called as monounsaturated since the number of saturated fatty acid is only one. In case of many saturated fatty acids, the end product is called as polyunsaturated which includes n-3 omega fatty acids. At this point, we face with an important question.

# MONOUNSATURATED OR POLYUNSATURATED FATS FOR A HEALTHY LIFE STYLE AND NUTRITION ?

Cholesterol and bad cholesterol, the harmful compounds, as long as they are taken into body in huge amounts, they may accumulate beneath the inner layer of vessels, decrease the diameter size of blood vessels and cause hypertension and other diseases. Cholesterol exists in body in two forms. As I mentioned in the related part, these are bad and good cholesterol. Bad cholesterol or low density lipoprotein (LdL) increases the risk of calcification (arteriosclerosis) because it binds the free cholesterol and bad cholesterol onto wall of blood vessel and increases the risk of calcification. Good cholesterol or high density lipoprotein (HdL) has got the opposite effect that it takes the cholesterol and bad cholesterol from surface of blood vessels and gives them back into blood to be excreted by urine. Monounsaturated fatty acids like soy, sunflower, corn and olive oil decrease the amount of bad cholesterol whiles increasing good cholesterol. Although polyunsaturated fatty acids and especially n-3 omega fatty acids as important members of this group has got many important and mentioned beneficial effects on our body, these polyunsaturated fatty acids have got one important disadvantage when compared with monounsaturated ones. They decrease bad cholesterol but also decrease good cholesterol. You may think the effect as neutral. Therefore, **monounsaturated fats besides polyunsaturated n-3 fatty acids should have never been neglected in a healthy nutrition and life style. Do not forget. If you only consume polyunsaturated, you will have used the benefits of n-3 omega fatty acids like protection against hypertension, diabetes, depression, cancer, insomnia and many other metabolic diseases, but both of your bad and good cholesterol will have been decreased. If you consume monounsaturated fatty acids regularly besides polyunsaturated fats all through your life, you will have gained the benefit of lowering bad and increasing good cholesterol at the same time. The findings of many researches claim that the ideal consumption ratio and rate of polyunsaturated to monounsaturated should be; 1:1.**

Another group of fat, n-6 omega fatty acids are completely in opposite effects with the effects of n-3 omega fatty acids. They inhibit the production of beneficial prostaglandin E type 1 hormones while increasing the production rate of harmful prostaglandin E type 2 hormones. Thus, they also increase the production rate of harmful cytokines of harmful prostaglandin E type 2 hormones which are responsible for the progress of hypertension, cancer, diabetes, depression, edema, insomnia, allergy and many other diseases and disorders. The richest sources of this group are red meat and its products, milk and dairy products, nuts, shellfish, fast food and fried products, egg and poultry and their products and finally many of the processed foods. Briefly, animal origin food products except fish are the rich sources of these harmful fatty acids in spite of their super protein content and quality. But, one other reality, failure and missing in information made by the media is the presentation of n-6 omega fats. These fatty acids are claimed like they are not necessary or should have never been exist or should be completely eliminated from the diet and tablets. **Remember that n-6 omega fatty acids, no matter how they have got harmful effects in metabolism, they are also the precursor of n-3 omega fatty acids which have got many important benefits for your body. They are produced in body from n-6 fatty acids. n-6 fatty acids may be converted into n-3 omega fatty acids and n-3 omega fatty acids may be converted into n-6 omega fatty acids. Briefly, the wonderful n-3 omega fatty acids which are told and presented in media very**

often can not be produced without n-6 omega fatty acids. Here, the most important factor is the ratio in diet or in supplement. Higher ratios of n-3/n-6 omega like 1/11 and more (1/13, 1/15..) increases the risk of cancer and diabetes. n-6 fatty acids always balance and neutralize the effects of n-3 omega fatty acids. The most important neutralizing effect is for blood thinning that n-3 omega fatty acids may dilute blood too much and it may even cause internal bleeding risk without n-6 omega since n-6 omega fatty acids are blood clotting. The same is exist for opposite that n-6 omega consumption alone without n-3 may cause a severe blood clotting which may close the diameter of vessel and stop blood circulation. This fatal risk may be prevented by the corporation of only n-3 fatty acids as combined with n-6 omega. The result is simple and obvious. Although n-3 fatty acids are beneficial and n-6 omega fatty acids are harmful, they should be included in diet or supplement but as in special ratios and as balanced.

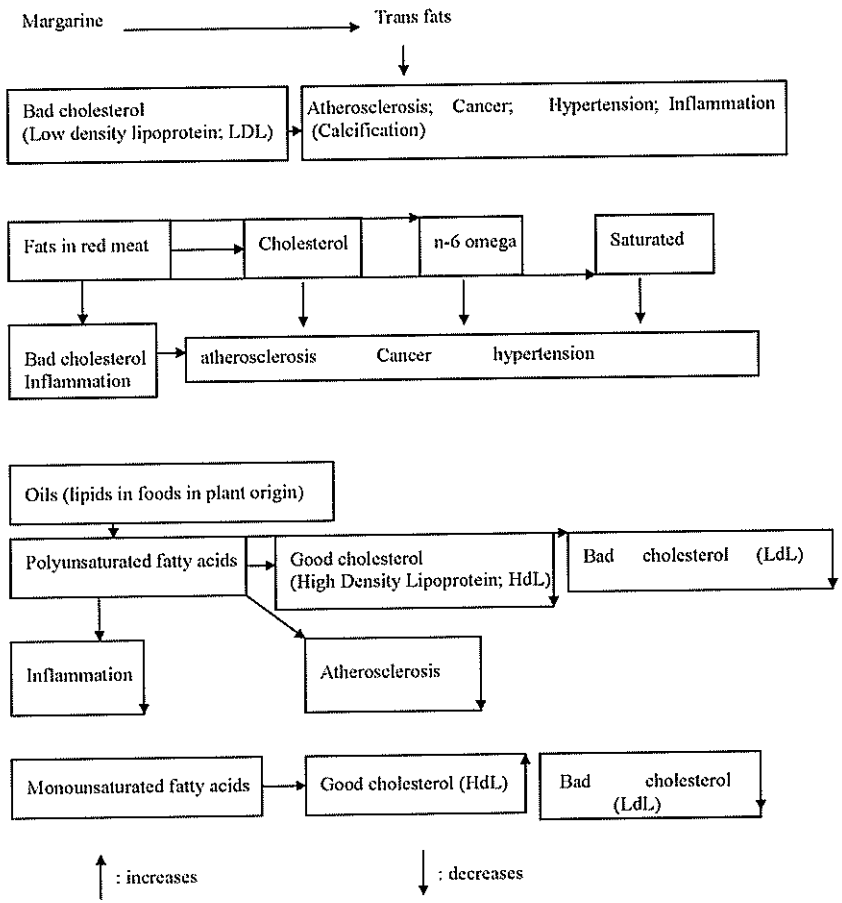



Diagram 18

You can find plenty of n-3 omega in the followed food products; plants, marine sources like fish, mussel, oyster, shrimp and primarily cold water fish (Friedman and Moe 2006), a wide range of plant products such as nuts, especially English walnuts, seeds, namely sesame (Namiki 2007), flax seed and vegetable oils such as soybean and canola besides olive (Whelan & Rust 2006).

**Do not forget that fish which have got white meat color before and after cooking has got lower omega 3 content while red colored or gray colored or black-brown colored ones have got more omega 3content. Therefore, prefer the later group during marketing!.**

n-3 omega fatty acids, unlike saturated fatty acids, have been associated with various health benefits relating to the treatment of rheumatoid arthritis (Rennie et al. 2003) and coronary artery disease (Freeman 2000) whilst improving blood pressure control and preserve renal function even in hypertensive heart transplant recipients (Holm et al. 2001). The effects of n-3 omega PUFAs on various cancers and also on other clinical disorders including edema, rheumatoid arthritis, cardiovascular disease and others, is closely related to their metabolism.

**Hence replacement of saturated fats with unsaturated fatty acids for the protection from metabolic diseases and disorders, n-3 Omega Polyunsaturated Fatty Acids (PUFAs) have been widely accepted as one of the cornerstones of healthy life style and nutrition.**

# N-3 OMEGA PUFAS, INFLAMMATORY DISEASES, DISEASES IN CHOLESTEROL, SATURATED FAT AND SUGAR ORIGIN, WITH THEIR LITERATURE FINDINGS AND REFERENCES

The anti-inflammatory properties of n-3 omega PUFAs are used in the treatment of inflammatory diseases such as Inflammatory Bowel Disease (IBD), eczema, psoriasis and rheumatoid arthritis (Cleland et al 2003). Similarly, an increase in n-6 omega PUFAs and a decrease in n-3 omega PUFAs raise the rate of occurrence of Crohn's disease (inflammation of colon). Inhibition of the inflammatory cytokine (proteins, peptides or glycoproteins that are produced widely by cells throughout the body cells which are critical to the development and functioning of the immune response by activating immune cells to increase the systems response to the pathogen) synthesis by n-3 omega PUFAs can therefore be beneficially used in the treatment of Crohn's disease (Griffiths 1998). Treatment of such diseases with n-3 omega PUFAs also reduces mucosal damage caused by inflammation or by Crohn's disease. Stenson et al (1992) and Hawthorne et al (1992) have treated ulcerative colitis with first 5.4 and then 4.5 g of n-3 omega PUFAs (fish oil) and observed significant healing of colon mucosa. The effects of leukotrienes which are inflammatory mediators which can lead to post traumatic immune dysregulation, can also be mediated by n-3 omega PUFA supplementation in the postoperative period. Thus, n-3 omega PUFAs are important anti-inflammatory agents in the postoperative periods (Köller et al 2003).

Trans fatty acids, cholesterol and saturated fats are mainly responsible for atherosclerosis. On the contrary, n-3 omega polyunsaturated fatty acids are beneficial in reducing cholesterol and thus the risk of myocardial infarction (Zyriax and Windler 2000). Another cause of cardiovascular disease formation is the hypertriglyceridaemia, an increase in the serum triglyceride in blood serum level, can also be reduced by the addition of n-3 omega (fish oil) to the diet (Hau et al 1996). The modern science of Dietetics and Nutrition studies the relationship between nutrition and health so that people can protect themselves from diseases or ameliorate the adverse effects of these diseases by means of appropriate diets. The many close relationships between 'a high selenium intake and a lower incidence rate of cancer' (Borek 2004; Diwadkar-Navsariwaka and Diamond 2004; Charalabopoulos et al 2006; Jacobs et al 2004) despite conflicting evidence of no effect (Clark et al 1996), 'high carotene intakes and lower risk of cancer' (Mannisto et al 2004), 'dietary fat, high amounts of animal, saturated and trans fat intakes and obesity' (Bray and Popkin 1998; Field et al 2007)', 'high dietary sodium intake and increase in the risk of hypertension' (Adrogue and Madias 2007; de Wardener et al 2004)', 'high alcohol intake and stroke risk' (Reynolds 2003) have been proven and similarly the close link between omega 3 PUFAs and cardiovascular disease is now widely accepted (Temple 2002). According to Harris et al (2003), of all known dietary factors, long-chain omega 3 fatty acids may be the most protective against death from coronary heart disease, by increasing the n-3 omega intake of an individual with coronary artery disease by approximately 1 gram per day. The best prevention of cardiovascular diseases appears to be achieved by replacing saturated fats with n-3 omega PUFAs (Temple 1996). Such replacement appears to have a direct effect on the intrinsic ability of a cardiac muscle fibre to contract at a given fibre length. These effects indicate to the beneficial and protective effects of omega 3 fatty acids in preventing sudden death following myocardial infection (Bhatnagar and Durrington 2003). Eicosanoid synthesis from n-3 omega PUFAs minimizes the production of PGE2 (Prostaglandin E type 2) and thromboxane A2, Interleukin 1, 2 and 6 cytokines (the harmful cytokines). Specifically, minimizing the production of thromboxane A2 and Interleukin 1, 2 and 6 by n-3 omega PUFAs protects the individual's health by protecting cardiac tissue from clot formation, platelet aggregation and thrombosis risk (Arkhipenko and Sazantova 1995; Wahlqvist 1998). A further benefit for the cardiovascular system is the lowering of total cholesterol by n-3 omega PUFAs (Kusunoki et al 2003). Indeed, daily supplementations of 3 g in men and EPA containing soy phospholipid at 10% level in rat can decrease total serum cholesterol and low density lipoprotein whilst slightly increasing high density lipoprotein (Lox 1990). Supportive data is found in a study in rats in which a soybean oil containing 5% EPA(the precursor of n-3 omega PUFAs) showed a significant decrease in serum triglyceride (TG) levels (Dasgupta and Bhattacharyya 2007).

**The protective effect of n-3 omega PUFAs on cardiovascular system, can easily be increased by niacin and other members of B complex vitamins, bile acid, resins, sport and exercise, which highlights the importance of life style and nutrition on health.** Similarly, increased intakes of marine n-3 omega PUFAs can result in decreased triglycerides, fibrinogen and platelet aggregation, which are considered to be beneficial for cardiovascular diseases (Wijendran and Hayes 2004). It was found in a study by Sweeney et al (1999) that Japanese students who had relocated to USA showed higher serum triglyceride, cholesterol levels and a high risk of cardiovascular diseases when compared with the general population of Japan. The apparent explanation of this difference is that the native Japanese diet is high in n- 3 omega

PUFAs whilst the US diet is not. The fact that higher serum triglyceride, cholesterol levels and high risk of cardiovascular diseases found in Japanese students, following their moving to the USA, can be compared with the lower triglyceride and cholesterol levels of the general population of Japan, is a clear example, showing the significance of n-3 omega fatty acids as cardio protectors (Sweeney et al 1999). Liu et al (2001) added n-3 omega PUFAs to bread, as one of the most commonly consumed food products, and this enrichment lowered serum triglyceride level and also total serum cholesterol by increasing HDL. Russo (2009) recommends the intake of 1 g/day of EPA and DHA for treatment of post Myocardial Infarction (MI) and prevention of sudden cardiac death and other cardiovascular dysfunctions. n-3 omega PUFAs also inhibit protein kinase C and increase in nitrous oxide (NO) release, which inhibits platelet adherence to the collagen and thus eases blood circulation (Schoene 2001; El-seweidy et al 2002). Thus, supplementation of the diet with n-3 omega PUFAs is very effective and protective against cardiovascular diseases, such as hypertension and atherosclerosis (Shoda et al 1996; Temple 2002) and even in the reduction of the incidence of sudden cardiac death (Villa et al 2002). n-3 omega supplementation of the diet of rats, decreased the mortality rate, caused by myocardial infarction (MI) while decreasing creatine phosphokinase as the indicator for MI. In contrast, an increased mortality rate was observed when the rat diets were supplemented by saturated fat from coconut oil (Nageswari et al 1999). Mente et al (2009) conducted a systematic search of Medline for cohort studies on randomized trials investigating dietary exposures in relation to coronary heart disease. They pointed to the moderate evidence of associations that exists for intake of fish, marine n-3 omega PUFAs, folate, whole grains, dietary vitamins; E, C and beta carotene, alcohol, fruit and fibre.

# ARE N-3 OMEGA FATTY ACIDS WONDERFUL AND BENEFICIAL FOR HEALTH EVERY TIME OR THESE CLAIMS AND PRESENTATION ARE MISLEADING UNDER SOME CIRCUMSTANCES?

**Although there is important evidence relating to the protective effects of n-3 omega PUFAs on cardiovascular health, very surprisingly, these fatty acids may accelerate heart beat, cause adverse effects and even be life threatening according to the findings of Raitt et al (2005). In their randomized controlled trial involving 200 patients, 1.8 g daily fish oil supplementation caused significantly important accelerations of the heart beat in patients with Ventricular Tachycardia (VT), an accelerated heart beat initiated within the ventricles that may prevent heart from pumping enough blood and Ventricular Fibrillation (VF), a heart failure due to sudden cardiac death. The findings are seriously important since it indicates that patients with VF and VT should rather avoid n-3 omega PUFAs. When 37.393 deaths in only United States of America in 2002 with 1.6 % of all deaths that year with $ 2.2 billion payment to medicare beneficiaries for cardiac dysrhythmias concerned, findings are seriously important and needs further studies for definiteness.**

Inuit peoples have a substantially lower rate of acute myocardial infarction, commonly known as a heart attack which occurs when blood supply to heart is interrupted causing some heart cells to die, when compared with Western people despite having a diet high in fats. Studies (Kromann Green 1980; Bang, Dyerberg, Nielsen, 1971) have shown that the diet is high in omega-3 polyunsaturated fats (PUFAs) from sea mammals and fish has a protective effect. In one of the studies which obtained information on deaths from different diseases for 2005 from United States National Center for Health Statistics, Danaei et al (2009) examined lifestyle and metabolic risk factors in death and determined a deficiency of n-3 Omega PUFAs as the eighth highest killer in death for people living in United States of America. Deficiency of n-3 Omega PUFAs with 84,000 death/year even beat out nutrition rich in trans fat with 82,000 deaths annually as a causative factor. The same study findings also suggested that the huge number of annual deaths (84,000/year) in United States of America is mainly depended on deficiency of n-3 Omega PUFAs, EPA/DHA, which can also be prevented by Omega 3 supplementation and a change in nutrition style to a diet rich in n-3 Omega PUFAs. Thus, the study indicates to the importance of increasing consumer awareness of the dangers of about the drastic deficiency of n-3 Omega PUFAs. A recent meta-analysis of randomized controlled studies of Omega-3 fatty acid supplementation of the diet by Preiss and Satar (2009) confirmed that this treatment had a cardiovascular benefit but suggested that more data would be needed to support use in clinical practice. With our present data mentioned above, we can note this cardio protective effect of n-3 omega PUFAs. However according to Lee and Lip (2003), the use of n-3 omega PUFAs should be considered as a part of comprehensive secondary prevention strategy in patients following myocardial infarction. **It has also been proposed that ischemia-induced arrhythmias may be prevented by n-3 PUFA supplementation** (Leaf et al 2003). In spite of many studies, indicating the protective effect of n-3 omega PUFAs on cardiovascular system, the minimum dose which shows this effect, was not established until the studies by Weber and Raederstorff (2000). They stated that, **1 g/day n-3 omega (in the form of fish oil) is sufficient to show this serum triglyceride and LDL lowering effect whilst a daily intake of 3 g of EPA and DHA is regarded as safe by Food and Medicine Administration** (O'Keefe

**and Harris 2000).** Similarly, Retterstol et al (1996) claimed the serum triglyceride and LDL lowering effect of n-3 omega, but as combined with medicines to treat hypercholesterolemia. On the other hand, an insufficiency of n-3 omega PUFAs and high amounts of n-6 omega PUFAs may also increase the calcified effects of environmental chemicals such as polychlorinated biphenyls (PCB), leading to dysfunction of the vascular endothelium. In spite of the cardiovascular protective effects of n-3 Omega PUFAs, n-6 Omega PUFAs do not appear to be correlated with cardiovascular benefits even though they lower LDL and cholesterol (Lecerf, 2009). The effects of Linoleic acid or (PCB) are contrary to those of n-3 omega PUFAs, disrupting the endothelial barrier function. Cellular enrichment with linoleic acid can amplify PCB induced endothelial cell dysfunction, which brings about a cardio toxic effect (Slim et al 2001). These findings underline the importance of n-3 omega PUFAs supplementation in daily nutrition in the prevention of diseases associated with high cholesterol levels.

# WHAT ABOUT N-3 OMEGA CONTENT IN RED MEAT OPTIONS

There appears to be significant evidence that n-3 omega PUFAs have a protective effect on the cardiovascular system and evidence of an inhibitory effect on inflammation. This evidence made n-3 omega rich foods, especially fish meat, as the most popular meat option when compared with other meats. **Among red meat options, beef cut (round) may be advised with a higher α-linolenic acid content (32 mg/100g) (as the indicator of n-3 omega PUFAs) and lower palmitic acid content (958mg/100g) followed by beef cut (leg) with 22mg/100g α-linolenic acid content and 2804 mg/100g palmitic acid content and dark chicken meat with 25 mg/100 mg α-linolenic acid content and 1097 mg/100 g palmitic acid content (Almeida et al (2006). Linseed oil with 55% linolenic acid content may be considered as the optimum plant oil being the richest among others although it is often neglected by the media.**

It is possible that the cardio protective effect of n-3 Omega PUFAs is dependent on the anti-inflammatory properties. The anti-inflammatory properties are due to the incorporation of EPA and DHA into cell membranes. NADPH oxidase, the main producer of cell membranes, is also activated by n-3 omega PUFAs. Only after this activation, does the enzyme regulate the cell membrane production and make it more durable and cells become more resistant to extrinsic and intrinsic destructive factors, especially inflammatory agents. This protection against inflammation is of course the same for the cells of blood vessels and the heart (Heine et al 1999). On the other hand, when omega 3 fatty acids are provided, there is partial replacement of AA in cell membranes by EPA as one of the important members of n-3 omega PUFAs which results in strengthening of the cell. (Calder 2003a, 2003b).

The anti-inflammatory and cardio protective functions of n-3 omega PUFAs improve the immune system. This improvement which is very important for immune system diseases such as HIV/AIDS, requires nutrients to power the immune system and support maximum cellular protection and function for long term survival. It can be clearly stated that, n-3 omega PUFAs have potential as an immune system defenders and enhancers in immune system deficiencies (Zimmerman 1997).

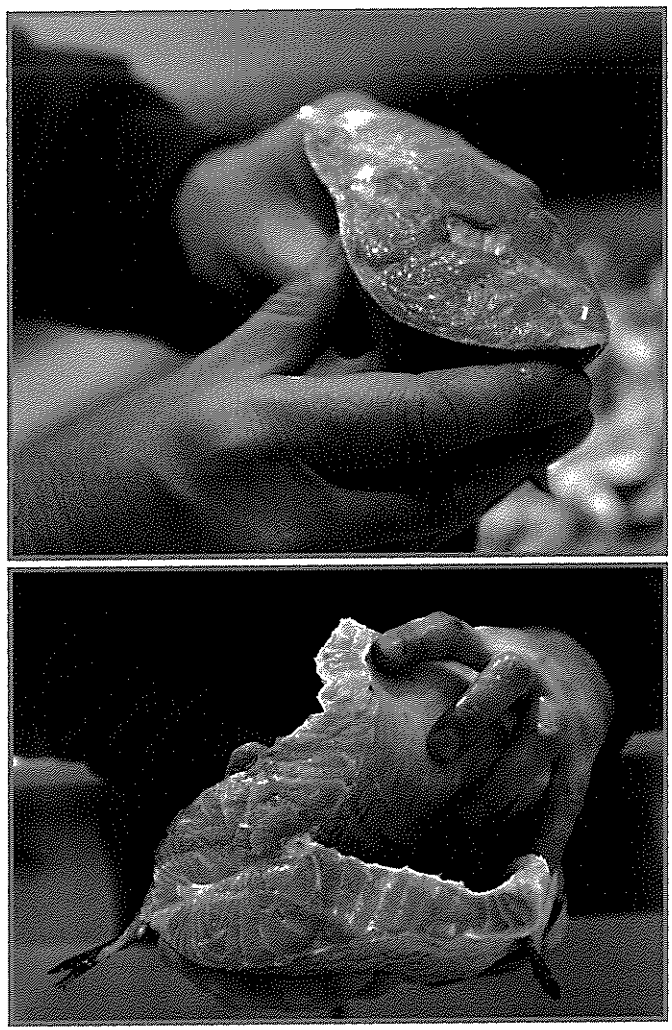
# N-3 OMEGA PUFAS AND DIABETES IN LITERATURE.

Diabetes, remarkably increases plasma glucose, fructosamine, triglyceride, LDL and decreases HDL. It also enhances oxidative susceptibility of LDL, catalase activity and NO (nitrous oxide) levels, while increasing the synthesis and release of cytokines (IL-1 and TNF). During the treatment of diabetic rats with n-3 omega PUFAs, a significant decrease of LDL with plasma triglyceride and cytokine synthesis was noted (El-seweidy et al 2002). One of the very few studies related to the serum glycogen level and n-3 omega intake detected lower glycogen concentrations in n-3 omega fed rats, when compared with casein fed rats (Gavia et al 2003). The studies of El-seweidy et al (2002) and Gavia et al (2003) seem to support the proposal that PUFAs may have a role in the treatment of diabetes because of their availability to lower blood sugar levels and reduce the hazards associated with inflammation. More studies are needed to highlight the sugar lowering effect of n-3 omega PUFAs in human serum profile.

n-3 omega PUFAs are also used for the treatment of diseases in gastrointestinal origin and especially the stimulation of Prostaglandin secretion by n-3 omega PUFAs by decreasing platelet aggregation (Levy and Herzberg 1996).

# WHICH FORM OF N-3 OMEGA IS HIGHER IN BIOAVAILABILITY?

The effect of treatment with n-3 omega PUFAs is closely related to the form of the fatty acid used. **Pure EPA (epoxypentaenoic acid; the precursor of n-3 omega) supplementation in the ethyl ester form always has a greater effect than fish oil because of the easier absorption of the ethyl ester through the intestinal wall without requiring lipase.** As an example, platelet reactivity is more inhibited by pure EPA dietary supplementation than it is, when supplementation is with fish oil extract (Wojenski et al 1991).

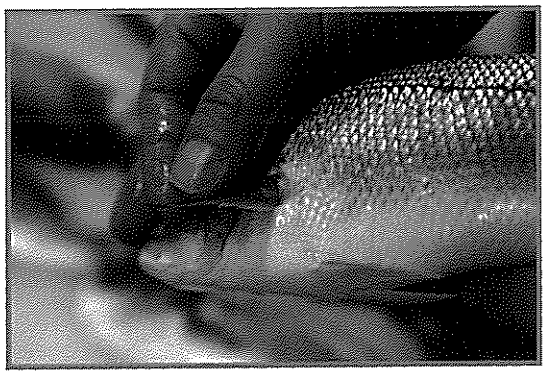


# N-3 OMEGA AND CANCER

As with cardiovascular diseases, one initial predisposing factor for cancer appears to be the fat composition of the diet. Whereas an increased ratio of saturated fatty acids in the diet leads to cancer, many researchers have determined the protective effect of dietary eicosanopentaenoic acid in diet against cancer in gastrointestinal origin. Increased concentrations of long chain fatty acids and eicosanopentaenoic acid (as the main constituents of n-3 omega PUFAs) protect against colorectal cancer (Nkondjock et al 2003). Dietary supplementation with n-3 omega PUFAs has been shown to produce beneficial effects in patients with pancreatic cancer, by decreasing tumor formation (Gogos et al 1998) and reducing weight-loss (Barber et al 1999). Fish oil alone or soy bean and fish oil combined dietary supplementations produced an increase in body weight in a study on rats, indicating their potential for weight gain in cancer (Gavia et al 2003). n-3 omega fatty acid supplementation is very effective, not only as an antitumor agent but also in mediating the effects of nutritional interventions by prolonging life span, suppressing autoimmune diseases, decreasing tumorigenesis (Troyer and Fernandes 1996) and Tumor Necrosis Factor (TNF; a protein which is detected in high concentrations in various types of cancer which increases T suppressor cells) (Simopoulos et al 1991).

**Unlike the significant protective and suppressing effects of n-3 omega PUFAs in cancer and autoimmune diseases, n-6 omega PUFAs increase the risk of tumor promotion, indicating the advantages of olive and canola oils, which are low in n-6 omega (Wood et al 1996).** A 3g daily supplement of flaxseed, which is a rich source of lignan and n-3 omega PUFAs, when combined with dietary fat restriction, results in decreased prostate specific antigen levels and proliferation rate in prostate cancer (Demark-Wahnefried et al 2001). According to Moyad (2003) one of the initial causes of death in prostate cancer patients is cardiovascular disease rather than cancer. Thus, these patients with prostate cancer should increase their consumption of omega 3 fatty acids as well as maintaining a healthy weight and getting physical activity. The data relating to the protective effect of n-3 omega PUFAs against cancer is mainly determined by the following factors; the type of the cancer, metabolism, genes, sex, age and diet. Whereas n-3 omega PUFAs show their protective effect against cancer on metabolism by acting on the metabolism, high dietary linoleic acid (e.g. n-6 omega PUFAs) intake can elevate estrogen levels in pregnancy, altering mammary gland morphology and expression of fat-and/or estrogen-regulated genes and increasing breast cancer risk (Clarke et al 1999). Theodoratou et al (2007) found a significantly important association between n-3 omega PUFAs and colorectal cancer in a large scale meta analysis, involving data from 1455 patients studied between 1999 and 2006 that, n-3 omega PUFAs decreased the risk of colorectal cancer whilst saturated fatty acids, namely palmitic, stearic and oleic acid increased the risk. Similarly, supplementing the diet of tumor-bearing mice with n-3 omega PUFAs was claimed to slow the growth of cancers including lung, colon, mammary and prostate, according to Hardman (2004). The author also indicates to the importance of n-3 omega PUFAs as a complementary medicine which can improve the efficacy of cancer chemotherapy medicines such as doxorubicin, epirubicin, 5-fluorouracil, tamoxifen and of radiation therapy. Geelen et al (2007), in their meta analysis, involving 14 studies, relating to colorectal cancer, suggested an evidence that n-3 omega PUFAs inhibited colorectal carcinogenesis but the authors also concluded that there is insufficient data available to definitively confirm this association.

An important finding which conflicts with findings that claim n-3 omega PUFAs are significantly effective in reducing cancer risk belongs to MacLean et al (2006). In their review, a total of 38 articles with prospective cohort study design and different levels of exposure in the cohort were included. Interestingly, in their review, a large body of literature, spanning cohorts from many countries, did not provide evidence to suggest a significant association between n-3 omega PUFAs and cancer incidence. According to this meta analysis in the review, dieatry supplementation with n-3 omega PUFAs, as conflicting with many others, is unlikely to prevent cancer.







Easy tips to understand whether the fish meat is fresh; blood around gills should be red but not black-red, brown or brown-red while gill structure is hard and dry and the body in vertical position should be straight not bended when hold from tail.

# PUFAS, BRAIN HEALTH AND NEUROLOGICAL DISORDERS WITH LITERATURE FINDINGS AND EVIDENCE

Phospholipids make up 60% of the dry weight of the brain. An increase in phospholipid concentration of brain cell membranes has a significantly beneficial effect on the treatment of schizophrenia (Horrobin et al 2002). Phospholipids are essential for neurone function, especially for synaptic structure, and play a key role in the signal transduction responses to dopamine, serotonin, glutamate and acetyl choline. n-3 omega PUFAs, by controlling the over-activity of T-cells and antiphospholipid antibodies may be effective in decreasing the severity of major depression events (Maes et al 1993). The same relationship between low numbers of major depression incidents and high levels of omega 3 supplementation has been reviewed by Colin et al (2003). On the other hand, these inflammatory processes mentioned above, may influence the levels of neurotransmitters, especially by decreasing serotonin levels. n-3 omega PUFAs, by enhancing the production rate of serotonin, can also reduce the severity of depression (Song et al 1998; Maes et al 1997). In cases of depression, there are abnormally low levels of omega 3 PUFAs and eicosapentaenoic acid whilst excessive amounts of omega 6 PUFAs are seen. The unsaturated fatty acid components of phospholipids are abnormally low in depression, with deficits of eicosapentaenoic acid and other n-3 omega PUFAs and excesses of the n-6 omega PUFA (arachidonic acid). Despite this, n-3 omega PUFAs can not be administered to the patients as an effective monothreapy to treat depression. However, adjuvant application of folic acid, S-adenosyl-methionine, n-3 omega PUFAs and L-tryptophan with antidepressants may be beneficial, particularly in people with both depression and dietary deficiency (Sarris, 2009). Hamazaki et al (2005) examined the effect of n-3 omega PUFAs on catecholamines (epinephrine and norepinephrine). In a randomized, placebo controlled double blind study, daily doses of 762 mg EPA plus DHA lowered the norepinephrine concentration in blood. Norepinephrine is an important catecholamine which closes vessels and increases blood pressure in many cases of stress and depression. This randomized, placebo controlled, double blind study is the only study, presently, as related to n-3 omega PUFAs and catecholamines. Hallahan et al (2007) found significantly greater improvements in depression, suicidality and daily stresses by 1.2 g EPA or 0.9 g DHA supplementation as combined with psychiatric care for 12 weeks. Laure and Marc (2006) observed a progressive decline in anxiety as compared with placebo in patients who were given 3 g of EPA and DHA for 3 months as compared with patients receiving a placebo. Similarly, Yehuda et al (2005) observed reduction of high cortisol levels back to normal values and remediation of sleep disturbances and anxiety during 'test anxiety' (an anxiety which may be defined as incapacitating academic syndrome) in students supplied with 225 mg n-3 and n-6 omega PUFAs. Nemets et al (2006) claimed highly significant therapeutic effects of 1 g/d supplementation of n-3 omega PUFAs for 16 weeks in children with childhood depression, between the ages of 6 and 12. Similarly, the same dose, 1 g EPA supplementation in 24 patients with depression, was claimed as beneficially effective in another double blind, randomized, placebo-controlled study (Frangou et al 2006). According to a meta analysis among randomized controlled trials by Freeman et al (2006), although there is less evidence of benefit in schizophrenia, EPA and DHA may have some potential benefit in major and bipolar depressive disorder but the authors conclude that results remain inconclusive ( Freeman et al 2006).

Frasure-Smith et al (2004) examined the relationship between depression and omega 3 and 6 serum levels in patients at

the age of 54 years and older in the recovery period from acute coronary syndromes in a case control study. Depressed patients had significantly lower concentrations of total n-3 omega PUFAs and higher ratios of AA (Arachidonic acid; the precursor of omega 6) to DHA and AA to EPA. They also concluded that their study was a case control study and should have been supplied by both prospective studies and randomized trials.

Antalis et al (2006) point out that lower levels of long-chain polyunsaturated fatty acids, particularly n-3 omega PUFAs in blood have repeatedly been associated with a variety of behavioral disorders including attention-deficit/hyperactivity disorder (ADHD). They reported in their meta analysis that one small randomized controlled trial with n-3 omega PUFA supplementation in depression in children found a small beneficial effect over placebo. Four placebo controlled trials showed uncertain benefits of n-3 omega PUFAs for children with ADHD while a single placebo controlled trials showed no benefit in autism or bipolar disorder. Reviewers also concluded an absence of studies examining the benefits for first-episode psychosis or schizophrenia in children and adolescents (Clayton et al 2007). A very high dose, 10 g/day of EPA was claimed to ameliorate the symptoms of schizophrenia while AA had no similar effect (Peet et al 1997).

Finally, in case of Alzheimers Disease (AD), various genetic, medical and environmental factors appear to be causative. The risk of AD increases, when one of these factors leads to a decreased cerebral perfusion, which causes an insufficient flow of blood to the brain. Thus, the beneficial effects of n-3 omega PUFAs can decrease the risk of AD by easing the flow of blood in the brain and central nervous system (Heininger 2000).

# N-3 OMEGA PUFAs AND EYE HEALTH WITH LITERATURE FINDINGS

One of the fields which need further investigation and evidence as related to the effects of n-3 omega PUFAs is on eye health. One disease of the eye which has been most studied is Age Related Macular Degeneration (ARMD), an illness that progressively degenerates the back of the eye (macula). There is also insufficient evidence with few prospective studies and no randomized clinical trials to support n-3 omega PUFAs routine consumption for ARMD prevention (Chong et al 2008). However, Chiu et al (2009) claims in their study that weekly consumption of two or three portions of fatty fish can be beneficial for ARMD patients. The claim is based on an eight year study of 3000 patients who were given n-3 omega supplements and monitored for the possible development of macular degeneration. Findings determined ARMD 25 % less likely among participants consuming a diet rich in omega 3 fatty acids, EPA and DHA. The authors concluded that the combined consumption of a diet rich in omega 3 with low glycemic index carbohydrates such as whole bread products rather than processed may diminish the risk of progression of the disease to the advanced state. Deficiency of n-3 omega PUFAs was also shown to be adversely effective especially on visual and neural function in preterm infants which may need to be supported by n-3 omega formulas since n-3 omega PUFAs rich formula supports for visual and cortical function significantly in such infants (Hoffman et al 1993).

Causes of ARMD have still not been identified although any arterial plaque may also affect the delicate blood vessels in the eye. Because of such possibility, it is commonly believed that a low-fat diet, but rich in n-3 omega PUFAs could help to guard against ARMD. In one of the studies, testing this theory, 90,000 participants over the age of 50, were monitored in a 12-year period. Findings of the research claimed that high intakes of linoleic acid (n-6 omega PUFA), exist in beef, pork and lamb and high amounts and trans fat in margarine appeared to increase the risk of ARMD, while the participants who consumed n-3 omega PUFAs rich foods such as Tuna were about 35 % less likely to develop ARMD (Cho et al 2001). Ouchi et al (2002) evaluated the relationship between fatty acids and ARMD by comparing the fatty acid fractions within the red blood cell membrane and plasma of 11 ARMD patients and 10 healthy individuals (controls). They determined that there was a higher arachidonic acid and docosahexaenoic acid in the controls than in the ARMD patients which indicates that polyunsaturated fatty acids, vulnerable to free radicals and reactive oxygen species, easily peroxidized, may be related to ARMD induction. Another study that claims the beneficial effects of n-3 omega PUFAs on eye health was conducted by Seddon et al (2001). In the case study with 349 individuals at the age of 55-80 years, a higher intake of vegetable, monounsaturated and polyunsaturated fats and linoleic acid (n-6 omega PUFA) in 8 years was claimed to be associated with a greater risk for advanced ARMD while diets high in n-3 omega PUFAs and fish were inversely associated with risk for ARMD when intake of linoleic acid was low. Opposite to the findings of mentioned studies which indicates to the beneficial effects of n-3 omega PUFAs on ARMD, any significant relationship between age-related maculopathy and dietary fat including n-3 omega was not detected in a large cross-sectional survey of 7883 participants aged between 40 to 798 (Heuberger et al 2001). Confirming this, Oral n-3 omega PUFA supplementation as 1000 mg/d did not make any effect on improving visual activity recovery time. The authors underlined the importance of combined use of n-3 omega PUFAs with photodynamic therapy for ARMD in order to improve retinal metabolic function only under this combined use upto an extent (Scorolli et al 2002). Since n-3 omega PUFAs exert important effects on eicosanoid metabolism, membrane properties and gene expression, it is

reasonable to hypothesize that maternal n-3 fatty acid intakes might have significant effects on infant visual function and neurodevelopmental status. There is also very limited data as related to the effects of n-3 omega rich nutrition and supplementation during postpartum period on visual acuity of infant. In one of these studies, 1.3 g n-3 omega PUFAs supplementation of lactating women for the first 4 months of postpartum also did not effect visual acuity of infant (Lauritzen et al 2004). Similarly, DHA in algae origin, but with a lower dose (200 mg daily), was given to lactating women during the first 4 month of postpartum. It had no effect on either neurodevelopmental progress of the infant at 12 months of age 4 or the visual function at 4 or 8 months of age (Jensen et al 2005). Confirming these earlier findings, Gibson et al (1997) claimed that, 200, 90 and 130 mg/day DHA supplementation of breast feeding women during the first 12 week of postpartum period did not affect visual acuity of the infant. No clear consensus exists in studies as related to the effects of n-3 omega PUFAs on infant visual function and neurodevelopmental status of infant while only a few available data suggest a modest effect (Jensen 2006).

**Presently, there is an important amount of scientific data as related to the beneficial and protective effects of n-3 omega PUFAs and their effects against inflammation, cancer and heart diseases.** The association between major and bipolar depression, schizophrenia, pregnancy quality, osteoporosis, renal failure and n-3 omega PUFAs still requires further studies to be highlighted. Some algae species and dinoflagellates appear as potentially rich sources of n-3 omega PUFAs for the very near future although we have also got very limited number of researches in the related area. The greater effects of mega doses in some diseases have been advocated, but the risk of side effects such as internal bleeding associated with such doses was neglected like the negligence of antioxidant administrations in many studies which should be combined with n-3 omega administration.

The effect mechanism of n-3 omega PUFAs on catecholamine metabolism, the daily recommended intakes for cancer, heart disease and diabetes suffered patients, pregnant women, the elderly and children, the type of n-3 omega PUFAs, -linolenic acid, DHA or EPA or both, the stronger effect, possible serious side effects of n-3 omega PUFAs on patients with ventricular tachycardia and ventricular fibrillation and finally, the potential of n-3 omega PUFAs to ameliorate coronary arteriosclerosis after heart transplants are all the initial questions which still wait to be studied and answered. But, in spite of many questions waiting to be highlighted, it seems very clear that domination of omega 3 as in balance with monounsaturated fats and omega 6 give you some important benefits since;

- Omega 3 fats unblock arteries, thin blood and support blood circulation.
- Omega 3 fats decrease bad cholesterol.
- Omega 3 fats are antioxidant and therefore protect from inflammation.
- Omega 3 may act as anti-aging due to their blood thinning and cardio supportive effects.

# ANTI-AGING SUPPLEMENTS AND MEDICINE INTERACTIONS IN ANTI-AGING PLATFORM AND HEALTH CONCERN

A huge number of people all over the world are using herbal products and food supplements for preventive and therapeutic purposes. The manufacturers of these supplements are not required to submit proof of safety and efficacy in many countries. The adverse effects and the interactions among food, herbal remedy and medicine are largely unknown. Gingko bloba, ginseng, soy and soy products, tablets of ginger, garlic and parsley, Coenzyme Q10, Omega 3, Vitamin C and B, Coumadin, Aspirin and Tabochan most of which are used in anti-aging targets can act as anti-clotting and increase internal bleeding risk in case of their combined use. Tetracycline and Penicillin group antibiotics can interfere with dairy products and vitamin tablets that contain iron. Sulfonamides, antihistamines, analgesics, Non-Steroidal Anti-inflammatory Medicines (NSAIDS) are commonly interfered with foods and therefore should be taken on empty stomach whereas high-fatty meals may increase the amount of bronchodilators namely theophylline while high carbohydrate meals may decrease it. K rich food intake should be limited in diuretic medications since these medicines cause Na loss and K accumulation in blood profile. $B_6$ which is known as a great antioxidant has been reported as contraindicated in Parkinson since it binds Levadopa, the precursor of Dopamin. A rapid and potentially fatal increase in blood pressure can occur if foods or alcoholic beverages which contain tyramine are consumed while taking MAO (Monoamine Oxidase Inhibitors). Ginseng, St. Jhon's Wort (Hpericum perforatum), Ephedra and Kava also appears as some of the most preferred anti-aging supplements have got important side effects such as nausea, dizziness, hypertension, myocardial dysfunction, arrhythmia, insomnia and nervousness which are not well known by public. One of the important threatening concerns is the exaggeration of food supplements and herbal remedies without consideration of their interactions with medicines as in case of Omega 3 use. The very long chain Polyunsaturated Fatty Acids (PUFAs) ($C_{18}$-$C_{22}$) and n-3 omega PUFAs seem to be widely accepted in today's life and nutrition style because of their beneficial effects on metabolism. Especially, the protective effect of the concerned fatty acids, against cardiovascular and inflammatory diseases including cancer has made them incomparably more beneficial than other dietetics. Unfortunately, lack of studies related to their effect on serum profile on human metabolism, the application dose and the side effects with/without omega 6 PUFAs have left us with crucial questions to be clarified. We still do not know the correct doses of n-3 omega with their possible contraindications when combined with other medicines and supplements. But all interactions among food, medicine and herbal are not all in negative manner. Calcium tablet alone intake which is still under critics is not effective if not taken as combined with one of C, B, A, D, Mg, Se and Zn. Although solutions are limited because of countless interactions among food, herbal and medicine, we have made a start to gain an important data as related to some of these important interactions. All scientific findings claim one important result. The doctor should know and make the decision about medicine or anti-aging supplement as in cooperation with food scientists and dieticians and also patient should determine the foods which may cause interaction with the concerned medicine.

Foods are the initial must to survive for us and all other living organisms to live and to survive. Food in detail with its hazardous and beneficial compounds should be carefully concerned which will improve health or cause disease. We

still do not have enough data as related to the combined use of medicine and food combine uses. The people who take medicine treatments in some periods or all through their life still do not know about the interactions and side effects and interactions between food and medicine. On the other hand, food and medicine antagonism is severe, serious and important since some of them may be life threatening.

The reason for the insufficient amount of data and insufficient level of education of people about food and medicine antagonism and side effects is due to many food compound and medicine compound existence in the world. There are so many, even countless food and medicine compounds and ingredients which naturally cause countless of food and medicine compound antagonisms and side effects. This point is the pessimistic side of the situation but the other side is promising. We began to have some important data as related to the antagonism of initial or most common used and preferred medicines and foods and their side effects in case of their combined uses.

**Medicine binders and 'Timing' concern:**

Fibers, although they are not absorbed and not pass to the blood stream properly, at the end of the 20th century, human being has just discovered their important protective effects against many metabolic diseases and also anti-aging. They are not affected by stomach acid and gut enzymes and hence they are not properly digested. They are directly excreted out of metabolism as in the form of feces and urine. For this reason, for years, we did not give importance to their intake and we neglected to take them in rich amounts in our daily nutrition. But finally, at the end of the twentieth century, especially at the end of 90s, food engineers and medical platform discovered that they could bind many hazardous compounds such as cholesterol, bad cholesterol, fat, salt, homocystein, nitrite, nitrate and many other carcinogens, allergens, trans fatty acids and excess amount of sugar. After this discovery of these important beneficial effects, media and market with the support of scientific platform gave a big importance to the fiber use and consumption in daily nutrition. But still, an important point which I will try and explain below, is being neglected.

**Fibers**, in spite of their beneficial and protective effects against metabolic diseases and disorders with their binding effects of many hazardous and harmful compounds, they bind many beneficial compounds at the same time. In other words, they are not selective and while they bind toxic and harmful compounds including free toxic radicals, they bound many beneficial and protective compounds such as omega 3 fatty acids, essential amino acids and calcium, many important antioxidants; minerals and vitamins such as vitamins A, B, C, D, E, selenium, magnesium, folate, folic acid, iron and isoflavones. But, they also bind medicines, many vitamins, minerals and other anti-aging medicine and supplements and their ingredients. Medical platform and food science and engineering platform always advised to take the fibers without considering time. Still, many doctors, many educators, many food scientists and media advise the intake of fibers. Of course, the intake of these compounds since they bind many toxic and harmful compounds is a must for a healthy life style and anti-aging target but while doing this, we always have to concern one important point. This important point is 'timing'. For all foods, all vitamins and minerals and all medicines there should be a 'timing' concern. The main reason is that fibers, soluble or non soluble, can bind the effective substances of many medicines.

You take medicine in some time in the morning, or at night which is determined by your medical adviser. You do not consume too much strawberry if you are suffered with a severe hypothyroidism since it contains goitrogens which bind thyroid or you consume meat and egg products more than others if you are suffered with anemia. In different disease and under different metabolic conditions, the medicine and the vitamin, mineral and herbal supplement differ. Therefore, you, as a conscious and educated person, should know which food, antioxidant, medicine or herbal to use under which circumstances. Briefly, there is a 'timing' for every one of them but also for fibers. As it has just been mentioned, these important food compounds do not bind only toxic and hazardous compounds, but also important and beneficial protective food compounds against diseases and disorders. Not only they bind these important and protective compounds, but most importantly, they decrease the digestibility and absorption degree of medicine compounds in stomach and bowel by binding them. While they are not absorbed and transferred to the anus and rectum by creating feces, they also pass the medicine compounds into the feces by binding them. The result is the significant decrease of bioavailability of the concerned medicine. Therefore, the persons who are prescribed with the medicine should pay attention to 'timing' of fiber and medicine use and they should never take medicine and fiber at the same or close times into their bodies. So, what are the times of medicine and fiber to be taken into the body? Of course, the medicine and its time to be taken into body should be determined and decided by your doctor. But, as a food scientist, I should strongly underline the importance of fiber rich food intake as two or three hours after medicine intake. Within these two or three hours, although a definite time can not be given, most of the medicine compounds may have been digested and absorbed through stomach and gut mucosa and transferred into the blood stream. If the time period required to absorb the considered medicine is asked, unfortunately, there is no answer for this question, since it depends on stomach acidity level, gut enzyme concentration, blood profile, and many biochemical factors in gastro digestive track (stomach and intestine and related organs and tissues) and of course fiber amount consumed which always differ from person to person. But, in the case of approximately two or three hour intervals after the medicine intake, you will give a chance to medicine for its better absorption at a higher level since there will be no fiber in the gastro digestive track of the individual which may bind medicine and decrease the bioavailability of it.

Briefly; always avoid from the intake of very rich fiber intakes at the same times of medicine intakes. Namely; salads, foods in green leafy vegetable and legumes, hard skin fruits such as apple and purple grape, whole bread and pasta products! Wait two or three hours and than pass to the fiber intake and consume whatever you want to consume in fiber rich composition after these two or three hours!





Food and medicine antagonism and their side effects in case of their combined use always became a problem and we still face with this problem. The initial cause of this problem as I have just indicated is the many ingredients which are exist in the structure of foods and compositions of medicines which cause many antagonisms which are still waiting to be highlighted.

One of the most threatening disease as one of the highest in mortality after cardiovascular disease is cancer. Unfortunately, many cancer patients and their families still do not know the food products which decrease the side effects of cancer treatments such as radio and chemotherapy applications. Many scientific researches claim that the intakes of selenium, omega 3 fatty acids, zinc, whey proteins and vitamin C in mega doses decrease the side effects of the concerned therapies at a significantly important level. But, some of the scientific findings conflict and claim that the mega doses of the concerned agents can be contraindicated with medicines. Not during cancer treatments, but after the completion of treatments, in recovery periods, the mega dose intakes of the concerned supplements may support recovery and be complimentary to cancer therapies.

**Whey proteins** had always the same destiny in the last decade similar to fibers. Like fibers, they are neglected and did not take any interest from public and media in anti-aging platform and in prevention against disease and disorders. One of the important reasons was the lack of data as related to their functions and structures. Like fibers, especially at the same period, at the end of the 90s, many studies were carried out to understand whether they have got beneficial effects in anti-aging and prevention against important metabolic diseases and disorders such as hypertension, stroke, immune

system disorders and cancer. Their structure was also highlighted in detail in a very near past. These proteins are the milk proteins but exist in water phase of milk. In case of cheese and yogurt production, followed by the coagulation of cheese protein, casein by the acidity due to probiotic microorganism activity, the liquid phase of milk is separated from coagulum. The coagulum, the solid phase, formed from milk protein casein by the effect of the acidity is called yogurt or cheese (depending on the production methods). The supernatant which is forms by the separation of water part from this coagulum is called 'whey'. Until the end of 20th century, human being always concerned about yogurt or cheese protein casein as one of the most important protein of the world which has one of the highest bioavailability among other proteins but they neglected cheese or yogurt serum protein or with its other name; whey proteins. Alpha lactalbumin, beta lactoglobulin, immunoglobulin and lactopherrin as the four groups of whey proteins, were studied by many food scientists and medicine researchers. They were discovered as one of the most protective anticancer and anti-aging compounds. These findings caused them to be one of the important anti-aging and antioxidant weapons of today's daily nutrition. We should never neglect to consume these proteins, not only to supply high quality proteins but also a significantly important anti-aging and anticancer effect. First, these proteins are the only animal origin proteins without cholesterol risk. They even decrease cholesterol and low density cholesterol (bad cholesterol). Therefore, these animal origin proteins can be addressed to supply high quality protein requirement in higher bioavailability without hypertension risk due to higher cholesterol and bad cholesterol contents of other animal origin foods. You have got two alternatives as animal origin protein supply without cholesterol and hypertension risk. These are first, fish proteins, since they are closely integrated with cholesterol decreasing and anti-clotting omega 3 fatty acids and second, whey proteins. All other animal origin proteins are integrated with less or high amounts of cholesterol and saturated fat and have got a higher potential to cause cardiovascular diseases and disorders such as hypertension, arterial fibrosis and cardiac spasm.

Whey proteins have got a protective effect against cardiovascular diseases and disorders as being far from cholesterol and hypertension risk but this is not the only one. Also, these proteins have been proven as having got anticancer effect. The higher intakes of these proteins or a rich consumption in whey proteins during radiotherapy and chemotherapy agents decrease the side effects of these agents. These anticancer agents always cause defects on healthy cells and tissues while killing the cancer cells and tissues. But whey proteins, in case of their higher intakes during these treatments, protect the healthy cells by increasing the protective antioxidant coating substance called 'glutathione' around them. Very interestingly and selectively, the same proteins decrease the amount of the same protective glutathione coating around the cancer cells. The decrease in glutathione protective layer around cancer cells and the increase of the same coating layer around healthy cells cause to enhance lethal effect of anticancer agents on cancer cells with a minimized side effect on normal healthy cells.

Besides whey proteins, among other food components, omega 3 fatty acids as the only lipid substances which can increase glutathione protective layer around the membranes of healthy cells. Cancer suffering person and the family of the cancer patient should know that the chemotherapy and radiotherapy agents will definitely defect and give damage to the healthy cells while killing cancer cells. With the present scientific data, we have got only one chance or application to be able to protect these healthy cells that locate near cancer cells. This chance is to increase glutathione antioxidant protective layer

around the healthy cells. In the case of increase of this protective barrier, anticancer agent penetration into the healthy cell through the cell membrane will be much more difficult. Not only omega 3 fatty acids and whey proteins, but all antioxidant mineral and vitamins such as $B_{12}$, other members of B complex vitamin, selenium, zinc, calcium, magnesium, folate, folic acid, A, C, D, E and K vitamins, all increase the glutathione protective barrier around the healthy cells and help to decrease the side effects of the anticancer agent applications during cancer treatments.

Whey proteins are extracted from serum part of cheese and yogurt by using micro filtering techniques under vacuum conditions. Here, the diameter size of the pores on the filtering membranes determines the extract type. If the pore size is smaller, the filtrate contains only whey proteins. If these pores are bigger, not only whey proteins, but additionally minute amounts of calcium and milk sugar lactose may exist in the filtrate powder. The later, because of its cheaper membranes, cost lower price. This latter form, containing minute amounts of calcium and lactose in addition to the whey proteins is called 'whey concentrate'. The first one which will cost more expensive is called 'whey isolate' since it only consists of pure whey proteins with zero lactose and calcium. The existence of calcium and lactose, in addition to whey proteins in the composition of whey concentrate cause 1% higher amount of whey proteins of whey concentrate. But this missing amount is too minute. Also, the existence of calcium as a bone and skeleton improver and cramp preventing agent and lactose as an energy giving substance makes whey concentrate much more attractive. At this point, my advice is to forget whey isolate and in spite of its 1% whey protein less amount, to prefer whey concentrate with its lower price and calcium and lactose existence. Normally, whey proteins are taken into the body during sport life to supply strength and receptivity to the muscle cells, especially before and after body building and similar lifting and stretching exercises. The mechanism here is the same as already mentioned above. The increase of the glutathione protective barrier around muscle cells and to gain resistance and strength by this way. The recommended daily dose for a person who makes regular sport and exercise in normal velocity is two loops by mixing into skimmed milk or water. The preference of whey proteins in sport life is not only because of its supply to muscle cells but also these proteins are absorbed much easier and faster and excreted from body by the means of feces and urine as in comparison with other sport proteins such as egg albumin or casein powder. Briefly, bioavailability for longer periods in the muscle cells makes these proteins as the most preferred protein powders in sport platform. But, in the last decade, the researches carried out to highlight the other effects of these proteins against metabolic diseases and disorders made these proteins important in the prevention of cardiovascular diseases and cancer. In the present time, these important antioxidant proteins are widely used in cardio diseases such as hypertension with their cholesterol and bad cholesterol lowering effects and in cancer and in anti-aging with their glutathione increasing effect.

In addition to omega 3 fatty acid rich nutrition and whey proteins, patients with cancer should consume beta carotene and vitamin rich foods more than others in their daily nutrition which means the domination of yellow and green foods such as broccoli, Brussels sprout, spinach, kiwi, avocado and pineapple. **Vitamin C** (ascorbic acid) as another important antioxidant that increases glutathione protective layer around healthy cells exists in two groups of the products; citrus fruits which are juicy and sour such as kiwi, apple, orange, lemon, grape, mandarin and green leafy vegetables such as broccoli, Brussels sprout, spinach and kale. Selenium as another glutathione increaser is exist in foods such as cauliflower, white cabbage, onion, garlic, all green leafy, tomato and mushroom. All red meat and its products such as salami,

pastrami, bacon, sausage, egg, poultry and their products, canned products, cured products and all kinds of processed products added sugar, salt, phosphate, nitrite, nitrate.. are claimed to increase cancer risk especially in gastrointestinal origin such as stomach, gut, rectum, anus and prostate cancers. Therefore, the patient with cancer and the family of the cancer patient should prefer fatty fish with its higher omega 3 content and whey proteins as the only protein alternatives in animal origin. But, you do not have to buy only whey protein powder supplements to supply these proteins. Another cheaper way to supply these proteins is to consume 'whey cheese'. Some daily integrated companies and producers apply heat to yogurt serum or cheese serum. The application of heat to milk serum denatures and coagulates whey proteins and causes to form a cheese coagulum. You can also consume it in large amounts especially during anti-cancer agent treatments to be able to decrease the adverse and side effects of these treatments.

**Grapefruit contraindication:**

The most important point for cancer patients and their families is that they the necessity of avoidance from grapefruit. **Bergamottin** is the main reason. The anti-cancer agent applications leave residues in healthy tissues after their applications. These residues should immediately be excreted out of metabolism after completion of these treatments. Otherwise, they can damage healthy cells and tissues besides cancer cells. At this point, liver enters to the process and tries to detoxify these residues of radiotherapy and chemotherapy agents by using its p-450 cytochrome enzymes. This enzyme system is the main defense mechanism of organism since it detoxifies all harmful food additives, trans fatty acids, nitrate and nitrite, cholesterol, allergen and pathogenic microorganisms. Therefore, the immune system and its defense depend onto this enzyme system. The same enzyme system, under normal conditions, also detoxifies these radiotherapy and chemotherapy agent residues before they begin to kill the healthy cells in addition to cancer cells, in the period after anticancer agent applications. But, bergamottin which exists in grapefruit inhibits this enzyme system and cause to the accumulation of the toxic residues of radio and chemotherapy agents in healthy cells and tissues. For this reason, especially during anticancer agent applications such as radio and chemotherapy and the period after these applications, patients with cancer and their families should avoid from the consumption of grapefruit. Note that, banana's feathery, tiny brown and black skeleton inside of its structure that many times you can see it clearly with naked eye was also proven as carcinogen. Therefore, although they are good sources because of their high vitamin C, magnesium, vitamin A and beta carotene contents and lower calories for healthy persons, they should be avoided by patients with cancer and their families.

**Histamine and antihistamines:**

**Antihistamines** are used against histamine origin diseases and disorders. Histamine as an end product of protein degradation causes allergy in the case of its excess accumulation in blood and tissues. Presently, antihistamines are not only used to allergic diseases and disorders but also to make the body resist and strong in hay fever and cold. In the case of antihistamine use, especially fibers and proteins also fiber and protein rich food intakes should be avoided. Because, fibers and proteins compete with these medicines and they are absorbed from the mucosa of stomach and gut by replacing antihistamine medicines. With this mechanism, they decrease the absorption degree and bioavailability of

antihistamine medicines. Therefore, there should always be 2-3 hours intervals between the intakes of antihistamine and protein, fiber rich food intakes. Antihistamine medicines should not be taken into the body at the same time with protein or fiber rich foods.

**Alcohol:**

Another important substance is alcohol which should be avoided in the case of antihistamine use. Because, alcohol can increase the sedative effect of antihistamine and narcotic analgesics such as codeine which is used to provide relief for moderate to severe pain. It has been known that alcohol has already been proven as beneficially effective in the prevention against cardiovascular diseases and disorders such as hypertension, cardiac spasm and arterial fibrosis due to its anti-clotting effect and vasodilating effect (diluting blood and increasing the diameter size of blood vessel and enlarging blood vessel). Evaluation of a food from the side of human and animal health can not be made from only one side. While making this, various points, attributes and substance in the structure of the food should be taken into consideration and then public should be informed by the means of media. Unfortunately, this approach was always neglected. Especially, by the internet use, the reader became much closer to the knowledge which is not always correct but sometimes distorted, wrong and unscientific. We face one of the clear examples as in alcohol concept. There are many scientific researches to claim the beneficial protective effects of alcohol against cardiovascular disease and disorders and even cancer because of the ingredients which are called 'isoflavones' such as quercetin and resrevatrol which dilate blood vessel, decrease tension, dilute blood and give an ease to blood circulation. But, this is the one side of the situation. There are also many other studies that claim the harmful effects of even moderate alcohol intakes after long periods which increase the risk of Alzheimer, cirrhosis and stroke.

Briefly, alcohol may prevent cardiovascular diseases and disorders, may be helpful about these diseases, up to an extent, with its rich isoflavone content and may even be protective against cancer. But, alcohol and alcoholic beverages during their constant and long period of consumptions can defect brain and liver tissue. It should be remembered that, even the minute amounts of alcohol is treated by the liver tissue and it p-450 cytochrome enzyme system as a toxic metabolite. This toxic metabolite spontaneously defect liver tissue. Damage on liver is too severe when it is concerned as a defense organ of the organism. Besides liver, the second organ which is affected adversely from alcohol is brain. Neither brain nor liver damage can be understood clearly and easily. Because, the diameter size of these defects due to alcohol in liver and brain tissue are very small in diameter size. But, these small necrotic areas, in case of constant and chronic alcohol use, become more and more and they increase in diameter after long periods. They combine to produce wider necrotic areas which result in dysfunction of the concerned area of concerned tissue. The results are cirrhosis and Alzheimer, not immediately, but surprisingly, at an unexpected time, years later, in the elderly period of life. That is why, alcohol should never be recommended by concerning only its protective effect on cardiac tissue. The hazardous and harmful effects of even minute amounts of alcohol on brain and liver tissue should also be taken into consideration. If we want to supply isoflavones to dilute our blood, control our tension and protect us against cancer, the source should not be the alcohol. Instead, should be the foods which alcohol and alcoholic beverages are made from, such as purple grape, barley, rice, grape and corn. This kind of approach will

protect liver and brain tissue from the damage of alcohol and alcoholic beverage while protecting metabolism against cancer and cardiovascular diseases and disorders.

**Analgesics** which are used for their sedative effects and antipyretics for decreasing body temperature in fever should be taken on empty stomach since fibers and proteins also fats bind the effective substances of these medicines like in antihistamines. On the other hand, it should be kept in mind that their one important side effect is the risk of gastritis and ulcer because the effective substances in these medicines defect the mucosa of gut and stomach. As you easily understand, these two attributes of these medicines are conflicting. On one side, they should be taken on empty stomach since their effective substances are bound by fibers, fats and proteins of the foods. On the other hand, in case of their intake on empty stomach, they have got a side effect that they may defect the mucosa of gastro digestive track. We have got only one option at this point. These medicines, like antihistamines, in spite of their irritating effects on gut and stomach mucosa, should be taken on empty stomach. But, other substances which irritate mucosa of stomach and bowel such as tea, coffee, alcohol and nicotine should definitely be avoided in case of their administrations. Otherwise, gastritis, ulcer, liver damage and stomach bleeding risk may appear as the side effects as a result of this food and medicine combined use.

**Non Steroidal Anti-inflammatory Medicine Substances (NSAIDS) and Corticosteroids:**

Non Steroidal Anti-inflammatory Medicine Substances (NSAIDS) and Corticosteroids such as methylprednisolon, prednisone, and prednisolone and cortisone acetate for pain, fever and inflammation should be taken with food or milk because these medicines can irritate stomach. The main reason for this side effect is due to the effect mechanism of these medicines since they work by enlarging blood vessels and increasing blood supply to the defected area to heal the wound or pain by increased blood volume. This effect, in the case of their intake into the body without food, may be too severe and the dilation of the blood vessels may result in bleeding. Especially, milk and dairy products in moderate amounts, by covering the surface of the stomach and gut mucosa, may decrease these side effects. Stomach bleeding and liver damage should always be considered in NSAIDS medications namely aspirin, ibuprofen, and naproxen.

**Bronchodilators:**

Bronchodilators are used to enlarge (dilate) bronchus of lungs to give an ease to inhalation and exhalation, especially in asthma and other respiratory track disease and disorders. Bronchodilators such as theopylline, albuterol and epinephrine may be contraindicated in case of high fatty and high carbo food intakes. High fat meals may increase the amount of these medicines especially theophylline while high carbohydrate meals such as candy, flour, cereal and their products can decrease the effective substances of these medicines. Therefore, the dose and the form of the medicine should have been decided as in cooperation with food scientist or dietician.

**Caffeine and caffeine containing products:**

Caffeine and caffeine containing products decrease the effect of bronchodilators since it has got opposite effect to these medicines. The caffeine containing products constrict blood vessels and bronchus and the expected result from the use of the medicine may not be obtained. Alcohol has got side effects as vomiting, nausea, headache and irritability on the mucosa of bronchus in lungs and on the mucosa of bowel and stomach in digestive track if taken during the administration of bronchodilators.

**Diuretics:**

Diuretics are used to excrete excess blood water phase and therefore decrease hypertension and control tension by increasing urine secretion. Unfortunately, too much urination, the secretion of urine in high volumes, causes sodium, magnesium and calcium loss from blood circulation in body. Magnesium is an important mineral, participating in the production of over 300 enzymes which acts and regulates energy production. Long term use of diuretics may result in lack of energy and energy related problems as a result of the mentioned magnesium loss. Calcium is another important mineral which participates in bone and muscle structure directly. Muscle contractions and relaxation can only be possible by the means of calcium while calcium directly enters into the structure of bones. The long term use of these medicines can also cause high amount of calcium loss which may increase the risk of osteoporosis (the liability of bones to fracture as a result of decrease in calcium density in bone structure) and osteomalacia (the decrease in both bone and muscle volume and as a result, the liability of both tissues to fractures, defects and decrease in size; atrophy). While sodium, magnesium and calcium concentrations decrease in blood, potassium increases in concentration. The increase of potassium and decrease of sodium interrupts cell respiration and cell nutrition which may be deathly hazardous. Excess potassium accumulation also increases the excretion rate of calcium and magnesium by the means of urine. The result is the density increase of urine, the pressure increase on heart, hypertension, and cardiac spasm or may even be ischemic stroke (interruption of blood supply into brain tissue and as a result, partial or complete paralyses). Briefly, diuretics are used and prescribed by doctors to treat hypertension and other cardiovascular disease and disorders. But, during their long term use, calcium, magnesium, sodium decreasing and potassium increasing effects, if not be taken under control by supplementations of calcium, magnesium and sodium rich foods while avoiding from potassium rich foods, unexpected results may form such as hypertension, lack of energy, chronic fatigue and osteoporosis. Therefore, in the long term use of diuretics;

1. Sodium, calcium and magnesium losses should always be concerned and the person should not neglect the consumption of sodium, magnesium and calcium rich foods. For this reason, dark green leafy vegetables and legumes may be addressed in addition to milk and dairy products. Especially, these foods should be consumed more than ever in the case of diuretic medicine administrations and,

2. Potassium rich foods should be avoided such as potato, tomato, all tomato origin products such as ketchup, tomato drinks, tomato sauces, meat and its products, cacao and cacao added products, banana, tea and coffee, sprinkle water,

soda, melon and watercress. Note that, triamterene, as a commonly used diuretic, has got the highest potassium increasing effect in blood profile.

**Beta blockers:**

Blood vessels are contracted and relaxed by the stimulation of nerves connected closely to them. Followed by the stimulation of blood vessels by the effects of nerves, the blood vessels may be exaggeratedly contracted which may result in blood pressure increase which is called hypertension. Beta blockers, a group of medicines, decrease nerve impulses of nerves to blood vessels and with this mechanism, act as lowering high blood pressure in blood vessels. Therefore, this hypertension lowering effect and controlling blood tension capability of beta blockers gained them a wide platform of application in cardio. But, the persons who take regular alcohol should leave alcohol immediately in case of beta blocker use since both alcohol and beta blockers have got the same effect mechanism and both decrease blood vessel tension. As a result, a severe hypotension may form.

**Nitrate and nitrite:**

Nitrate and nitrite are some of the most commonly used food additives in food hygiene and technology. Because, they have got both antimicrobial and sensory (taste, flavor, aroma, texture, color) improving effects. When they are added to foods, they are converted to nitrate by microbial activity. Nitrite kills many bacteria species including most heat resist bacteria such as *Clostridium botulinum* which is a common and great problem in canned meats and canned products which causes paralyses with its toxin called 'botulinum'. In some cases, the bacteria existence may be understood from the bombage on the surface of the can but the toxin may continue to exist without causing bombage on the walls of canning material. This bacteria with many other heat resist bacteria species can produce spore (a kind of new body of microbe which is more resist against durability, heat, acidity, humidity, pressure and similar abnormal and hard conditions than its vegetative forms). The spore forming, unfortunately, is the main reason for heat's insufficient effect on these types of microbes since they can produce their heat resist spore forming whenever they face with high levels of heat temperatures. Under these conditions, to be able to decrease spore formation and toxin production of the concerned toxic microbes, nitrite and nitrate food additives are consciously added prior to the canning process because, nitrite and nitrate, not only kill bacteria, but even can kill the spore forming of the bacteria. Additionally, the same food additives are commonly used to improve and fix the desired red color in meat and meat products. Nitrite fixes oxymyoglobin pigment (which gives the desired red meat color to the meat and meat product) by producing nitrosooxymyoglobin. This end product is much more fixed in the meat and meat product which means the longer shelf life of the desired red meat color during marketing. The same additives can also improve flavor and aroma while improving texture. But, many reliable scientific researches claimed that the long term consumption of nitrite and nitrate added products namely; sausage, salami, pastrami, bacon, canned products, in case of their long term of consumptions in huge amounts, can increase the risk of cancer in gastrointestinal origin such as pancreas, colon, jejunum, intestine, bladder, stomach, anus and rectum. The reason of cancer risk is due to nitrosoamine compounds which are naturally formed followed by digestion and separation of amine group of amino acid and combination of this amine with nitrite and nitrate residues to form nitrosoamines. We

should keep in mind that the lower amount of nitrite and nitrate we consume in processed meat and canned products the lower we will be able to keep our cancer risk in gastrointestinal origin. Followed by this important information, I have to underline the importance of nitrite/nitrate added foods and their risk in cancer formation. Because, in addition of color, microbial, flavor and texture improving effects, the same compounds cause an increase in diameter size of blood vessels and decrease hypertension. Therefore, in medicine, nitrite and nitrate origin medicines have gained a wide range of application to treat hypertension and cardiovascular diseases. In addition to nitrite and nitrate origin medicine use, if the nitrite and nitrate added products are consumed in high amounts, too much nitrite and nitrate accumulation in blood profile can cause too much decrease in blood vessel tension and the result may be a severe hypotension which may cause to the interruption of blood supply into brain tissue. As a natural and expected result of this, ischemic stroke, cardiac failure, briefly life threatening effects may form. For these reasons, if you are prescribed by nitrite or nitrate containing medicines, you should decrease or you'd better avoid nitrite and nitrate added food products such as sausage, salami, pastrami, canned products and pickles. Not only during the intakes of these types of medicines, but all through your life, if you can minimize the intake of these types of food products containing nitrite and nitrate with all other processed foods, you will be able to decrease the risk of allergy, cardiovascular diseases, cancer, diabetes and similar important metabolic diseases and disorders. Very briefly, many important and reliable scientific studies claim one important result. The more processed food consumption, the faster aging will be, the higher the incidence rate of the mentioned metabolic diseases and disorders will be. That is why, I want to recommend definitely that, not only during the treatments with nitrite and nitrate containing medicines but also in other times of your life, if you can succeed to minimize the consumption rate of these types of processed products, two important targets you may reach; anti-aging, less risk of metabolic diseases and disorders.

**Angiotension Converting Enzymes (ACE):**

Angiotension Converting Enzymes (ACE) such as Captopril, Enalapril, Lisinopril to relax blood vessels by preventing angiotensin II (a vasoconstrictor which constricts and decreases the diameter size of blood vessels and causes hypertension) formation should be taken one hour before or two hours after meals. They can cause water loss by their relaxing effect on blood vessels like diuretics and nitrite and nitrite containing medicines mentioned above. This results in Na (sodium) loss and K (potassium) increase in blood profile. Therefore, too much K rich foods such as banana, water cress, melon, potato, tomato, tomato by products such as ketchup, tomato sauce, cacao, cacao containing products, orange, meat and salt may be harmful if consumed in large amounts during ACE administrations.

I had explained detailed information about fibers as one of the most wonderful and beneficial compounds in foods as long as you make their timing. They decrease the risk of cancer, cardiovascular diseases and hypertension, allergic diseases, diabetes by binding excess amount of salt, sugar, toxic radical, cholesterol, bad cholesterol, nitrosoamines, benzapyrenes, trans fatty acids and other similar carcinogens and homocystein. But, as I mentioned above, they can decrease the bioavailability of many important and beneficial compounds in foods such as vitamins, minerals, amino acids and omega fatty acids. Therefore, once again, I want to remind you not to forget their intake after two or three hours of your meal times, followed by the completion of the digestion process of all these important food compounds

and ingredients. But, this will be completely different in case of HMG-CoA reductase Inhibitors (Statins) which are very similar to fibers in both structure and function. Since these medicines bind excess amount of cholesterol and bad cholesterol and excrete them out of the body as in the form of feces, without concerning whether they bind also beneficial substances, they should be taken during or just after dinner. These times are the times when stomach and bowel cavity has got the highest amount of bulk. Therefore, if you take statins like lovastatin, atorvastatin, cerivastatin, fluvastatin, pravastatin and simvastatin at these times, you will be able to bind much more cholesterol and bad cholesterol and excrete them out of your metabolism than other times. Briefly, opposite of fibers, statins should be taken during or just after heavy meal times while digestive track is full, especially at dinner times.

**Anticoagulants:**

Anticoagulants are used for thinning the blood, diluting and therefore making blood circulation through blood vessels easier. The faster and easier blood circulation supports heart. This effect of anticoagulants such as aspirin, tabochan, cumadin and other anticoagulants made them as one of the initial medicines commonly used in neurology and cardiology fields by improving blood circulation into the defected areas in brain or heart. Because of the similar effects, although they are not medicines, omega 3 fatty acids and Gingko bloba (a plant) tablets are widely preferred by many people all over the world. Improving blood supply to the brain and heart tissues and other parts of the body would be an advantage and perhaps would prevent fast aging and diseases in brain and cardiovascular system. Because of faster blood supply into cells due to anti-clotting effect of these food and herbal supplements, presently, many people in many countries administer the tablets of ginger, coriander, garlic, cinnamon, strawberry, flaxseed, purple grape, onion and parsley. All these foods in plant origin and especially their mentioned tablets are in anti-clotting effect, dilute blood and give an ease to the blood circulation and for these reasons they are widely consumed and preferred. But, in the case of their combined use with anticoagulant (anti-clotting) medicines at the same time, too much anti-clotting may form which can increase the risk of internal bleeding, may even be life threatening. No one can claim that this risk will definitely form in case of their combined use, but it is a possibility and this risk may be too severe and may even be fatal. Therefore, you'd better avoid from the combined intakes of these herbal and food supplements and anti-clotting medicines. First, you will ask your medical supervisor whether your medicine is anti-clotting. In the case of positive answer, you will avoid from the tablets of ginger, coriander, parsley, strawberry, flaxseed, resrevatrol, quercetin, purple grape, celery, artichoke, omega 3, gingko bloba and cinnamon. On the other hand, if you are not suffered with a cardiovascular disease, cancer, diabetes and hypertension, if you are not prescribed by an anti-clotting medicine and want to use the mentioned anti-clotting tablets in herbal and food origin, then you have to make your preference and you have to take only one of them. Because the combined use of two of them may increase the same life threatening effect, internal bleeding risk.

Briefly;

1. If you are prescribed by an anti-clotting medicine, do not use any of anti-clotting herbal and food supplements mentioned above and,

2. If you want to get an anti-clotting food supplement, choose your option, decide for one and only take it. Do not consume these types of anti-clotting supplements at the same time, otherwise internal bleeding risk may be!!!

**Antibiotics:**

Another group from medicines which interacts with food is antibiotics. Penicillin and Erythromycin should be taken on empty stomach since proteins and fibers compete with them and bind them. Therefore, they decrease the bioavailibility of these anti-infection substances.

- Namely, **Penicillin, Erythromycin, Quinolones** such as **Ciprofloxacin, Levofloxacin** and **Ofloxacin** should be taken on empty stomach for its proper absorption. Especially, fibers in foods and proteins, by binding or competing, can bind these antibiotics and decrease their absorption rate. Caffeine and caffeine containing product consumption during quinolone may cause excitability and nervousness. The same effect may be observed for other anti-infection medicines in a less severity, but should be concerned as an important side effect. It should be kept in mind that caffeine is always concerned because of its excitability and nervousness effect. But it can only be possible above 450 mg caffeine daily consumption which makes 4 and more mugs (in average size). Always, consumer neglects or does not know binding effect of caffeine. Caffeine is a kind of fiber and has got the same function with fibers. Similarly, tannins in tea and tea products are also fiber components and have got binding effect. Tannin and caffeine, in the case of their intakes during meal times or just after or before meal times will cause to the significant decreases in the absorption levels of important vitamins, minerals, essential fatty acids such as omega 3 and essential amino acids. Therefore, not only the mentioned medicines, but the important and essential nutrients can also be bound by tannin and caffeine in coffee and tea and their products. This means that you should avoid from tannin and caffeine to avoid from their excitability and nervousness effect but also because of their binding effects which results in decrease of bioavailability of essential, beneficial and important nutrients. For this reason;

- You should avoid from the excess intakes of tea, caffeine and their products. Some people may say that they stimulate the body, may cause an awakening effect and may be beneficial during hard working conditions. These kinds of information are not based on scientific findings. As I have just indicated above, for its excitability and stimulation, you have to consume more than 4 mugs that even most of the addicted persons rarely do it. Also, caffeine and tannin in coffee, tea and their products cause oxidation, stimulate the combustion rates of fats and sugars with oxygen in the cell and increase oxidative stress. You produce freer toxic peroxy radicals which cause many metabolic disease and disorders. You become older faster than other persons because of this high oxidative stress due to heavy coffee and tea consumption. But, there are also other adverse effects of too much tea and coffee consumption. Tannin and caffeine bind many important essential nutrients. Especially, high quality iron coming from meat and egg and their products and also calcium. Calcium is not only structural component of bones, but it is also required for muscle contractions and relaxation. It makes the interval between thin and thick muscle filaments labricious and then these miyofilaments can contract each other or can leave each other. Otherwise, they fix their contracted forms

which is called 'muscle cramp' in public. The decrease of calcium intake and its metabolism is poor in elderly and therefore cramps are much more common in older persons than others. Similarly, the persons who make regular sport and exercise in high velocity spent too much calcium and may face with calcium deficiency and suffer with these kinds of cramps. In addition to these cramps, if you still continue to consume high amounts of tea and coffee and their products, the severity and occurrence rate of these cramps may increase. Also, calcium binding by tannin and caffeine in tea, coffee and their products show its most adverse effects in young and old persons. Because, young person and child are in growing state and their calcium requirements by their bone and skeleton system is much more than adults. In addition to this higher level of calcium requirement of child and young, the heavy consumption of tannin and caffeine will have bound some of the calcium and will have interrupted the growth speed, bone and skeleton production. For this reason, the younger and child who drink too much tea and coffee fail in being taller and stronger in many times. Another problem appears for old people since their gastrointestinal track, the mucosa of gut and stomach become older and loose some of its functions. As in correlation, the absorption rate of many important and essential nutrients such as calcium and iron through their bowel and stomach mucosa decreases and these people face with calcium and iron insufficiency. Tannin in tea and its products, caffeine in coffee and its products will all worse these calcium and iron insufficiencies and severity of osteoporosis while anemia incidence rates of the old persons will increase. What I try to mention here is that calcium and iron insufficiencies with many other important vitamin and mineral insufficiencies are normal and expected for old people because of aging in their metabolism and digestive track. The old person should know it, be conscious and should avoid tea and coffee consumption or decrease the consumption rate of these products. The child and younger should be conscious of calcium and iron binding effects of these products and should avoid or decrease the consumption rates of these products if they want to obtain a maximum growth and strength.

**Iron** is another important mineral which is required for blood cell proliferation since it is the structural component of hemoglobin's hem part of red blood cells. The hem structure carries oxygen to the cells and after this transportation, the oxygen reaches and enters into the cell and combusts fats and sugars in the cell to produce energy. Briefly, the energy production that we need for all our metabolic functions and daily activities is produced by the means of iron. Because of the mentioned mechanism, the iron deficiency in many cases results in lack of energy and always persons with iron deficiency complains tiredness and fatigue. There are two sources of iron in foods, plant origin and animal origin. Animal origin iron is defined as good quality iron since it is in two value or in Ferro form of iron which means the higher absorption rate through bowel and stomach mucosa whereas 3 forms or ferri form as the plant origin iron is not absorbed properly through bowel and stomach mucosa and therefore has got very lower bioavailability. If you are suffered with anemia and lack of energy problems due to anemia, your address is very clear and net after this explanation which I had mentioned in other parts of the book. Animal origin iron rather than plant origin. Also, always remember that, fibers which are only exist in plants and plant origin products have got less or high amounts of fiber which bind iron and calcium and decrease their bioavailability. But, fibers are never exists in animal tissues and all animal origin foods and their products are free of fibers which means the higher bioavailability of iron and calcium in animal origin. For this reason, calcium in milk and iron in meat is always better than calcium and iron in a dark green leafy. There will be no fibers to bind these important minerals and your metabolism will be able to absorb and evaluate them much

more than calcium and iron in plant origin to produce blood, bone and muscle. Although you can easily fill your calcium requirement from milk and dairy products, these are not advised for iron supplementation since they are very poor from iron opposite to their rich calcium capacity. Many times, I hear from my listeners and students that some doctors or dieticians advise them not to drink milk and dairy products if they are suffered with anemia. Completely wrong! and this type of advise may be a disaster!!!. Milk and dairy product consumption in rich amounts is always a must in every period of life since they are one of the richest groups of calcium, essential amino acids, essential fatty acids, A, D, E, K and some B vitamins, sugar (lactose) and water. Briefly, they are complete in many important nutrients. But, casein an important protein which improves body length, muscles, blood proliferation and brain functions, hormone productions and antibody productions, unfortunately binds some amount of iron. Therefore, milk and dairy products should never be neglected but should not be consumed just after the consumption of iron rich products. Additionally, being very low in iron content for milk and dairy products is another important factor. Like in fibers, after 2-3 hours of meals rich in iron, milk or dairy products can be consumed. As easily can be understood from this explanation, milk and dairy products should not be neglected since they are very rich in calcium and protect you against osteoporosis and osteomalasia, but not against anemia since they are very poor source of iron. But, if you require iron, you have got only four addresses; egg and its products, liver, meat and its products, fish and marine and poultry and its products. Others are always poor in iron capacity and iron quality. In spite of their rich iron capacity, spinach and dark green leafy vegetables make no sense when compared with meat products because of their lower iron quality. As clearly mentioned above, the important point is not the amount of iron, rather than that is the quality and bioavailability of iron. Again, I want to remind you that tea and coffee, tannin and caffeine, will not only bind and decrease the bioavailability of anti-infection medicines and will be able to cause to excitability and nervousness, but also will increase the risk of anemia and osteoporosis by binding calcium and iron in case of their regular consumption in long terms.

**Antifungal** and **dairy products** are much contraindicated. Dairy product intake should be avoided during antifungal administration.

**Macrolide** and **sulfonamides** if taken on the stomach upset, food may be advised.

**Tetracyclines** as one of the most common applied antibiotics can interfere especially with dairy products such as milk, yogurt, cheese and kefir and vitamin supplements that contain iron and loss their effect.

**HMG-CoA Reductase Inhibitors ('Statins')** lower cholesterol and reduce the production rate of LdL (Low Density Lipoprotein; Bad Cholesterol). In case of statin use, the time of food intake is important. Lovastatin should be taken in the evening meal since the stomach bulk will have been completely formed and more cholesterol will have been bound by statin. Also the meal should not be rich from fibers and also should not be too fatty or rich in protein since they may limit the effect of statins. The namely statins currently used are Atorvastatin, Cerivastatin, Fluvastatin, Lovastatin, Pravastatin and Simvastatin.

**Monoamine Oxidase Inhibitors (MAO)** to treat depression, emotional and anxiety disorders:

Tyramine is an amine which causes elevated blood pressure and tachycardia by displacing norepinephrine from storage vesicles. It is produced by decorboxylation of the amino acid tyrosine during fermentation and storage of food products. All protein rich foods which have been matured will contain more tyramine that depends on storage and temperature conditions. MAO inhibitors can increase the sensitivity to tyramine if taken orally and if tyramine in high amounts ingested, hypertension crisis, stroke or cardiac arrhythmia and migrainnes may be. Alcoholic beverages, orange, pineapple, plums, prunes, eggplant, banana, avocados, matured cheese, beer, figs, raisins, many processed products such as shrimp paste, vegemite and sauerkraut are rich in tyramine. Old liver and meat, meat from game birds and wild animals matured, processed meats such as salami, sausage, pastrami.., cured and pickled meats, meat by products and broths, soy and all soy products, nuts contain high levels of tyramine.

**Herbal Concern:**

- **Ephedrine** and ephedrine containing supplements since they increase blood supply by dilating blood vessel and bronchus are commonly preferred by elderly, esp. sport platform, body building and athletics. Ephedrine products, marketed as decongestants, bronchodilators and stimulants. Side effects; hypertension, insomnia, arythmia, nervousness, tremor, headache, seizure, myocardial infarction and kidney stones. 1- 5 mg ephedrine daily intake is life threatening.

- **Ginseng**, preferred in chronic fatigue, elderly and sport platform, has got side effects called 'Ginseng syndrome' caused by Ginseng glycosides; headache, insomnia, nervousness, hypertension, gastritis and ulcer.

- **Kava** is another herbal with its sedative and calming effects. 100-450 mg/day may result in oral and lingual dyskinesia (inability to control muscle and bone coordination), torticollis (stiffening or contraction of neck muscles), painful twisting movements of the trunk, oculogyric (pertaining to the rotation of the eyeballs within their orbits) crisis and exacerbation of Parkinson. Alprazolam (Xanax), Cimetidine (Tagamet) and Terazosin (Hytrin) are some of the antidepressants which become lethargic and disoriented after ingesting Kava.

- **Gingko bloba** extract often advertised in media with cholesterol, LdL lowering, serotonin increasing and cardio supporting effects but can especially interact with anticoagulant medicines

**Facts and Questions as related to Omega 3 supplements;**

In consideration of omega 3 supplements; we have still got unanswered questions. The minimum effective dose for the concerned disease and patient?. The unique metabolism of each person has different serum DHA and EPA levels, which depends on metabolism, genetic character and nutritional habits. Under these circumstances, the dose given to the person, in tablet or in food form, may be excessive or insufficient that points out strongly requirement of standards,

indicating which patient serum DHA and EPA levels should be supplied by what amounts of DHA&EPA levels in food. The minimum effective omega 3 dose?. Most widely accepted one (FAO/WHO), is 5-10:1(n-6/n-3) (Trautwein 2001). But it has not been established by taking different serum DHA&EPA contents of different metabolisms into account. No study related to the serious side effects (like the risk of internal bleeding!!!), that arise from the excessive intake of n-3 omega PUFAs. It has been established that, only 2.5:1(n-6/n-3) daily intake has been proven to be beneficially effective on colorectal cancer, 2-3:1(n-6/n-3) intake on rheumatoid arthritis, and 5:1(n-6/n-3) on asthma. Interestingly, 5-10:1(n-6/n-3) intakes, recommended by FAO/WHO, have been proven to have adverse effects on metabolism (Simopoulos AP, 2002). What is the situation related to the side effects of n-3 omega PUFAs such as fattening of mucosa, the risk of internal bleeding or their unfavorable interaction with other food ingredients? All these questions about n-3 omega fatty acids still needs to be highlighted while many of us continue to use plenty of n-3omegatablets.

**In conclusion:**

- The use omega 3 supplements and other herbal remedies and food supplements but sometimes during medicine medications can be life threatening.

- Side effects and interactions between 'medicine and food supplement', 'food supplement and food supplement', 'food supplement and herbal remedy', 'herbal remedy and medicine' are countless since food ingredients and their combinations, medicines and metabolic diseases and disorders are countless.

- Some of them which are mentioned and discussed above should be informed by the media by qualified authorities and public should be well educated abut them.

- Most of the developing countries and their hospitals except some of the hospitals in developed countries still do not have the lists and programs to inform their personnel and patients about these interactions like bleeding from excess intake of n-3 omega or thrombosis and emboli from excess intake of n-6 omega.

- All scientific findings claim one important result. The doctor and pharmacist should know and make the decision about medicine as in cooperation with food engineers and dieticians and also patient should determine the foods which may cause interaction with the concerned medicine.

# MEAT AND MEAT PRODUCTS

The consumption of meat and meat products has become one of the initial conflicting and discussion platform of anti-aging, clinic nutrition and preventive medicine. Presently, we face with many of web sites trying to express the harmful effects of meat and meat products and nutrition rich in meat products. There are also many authorities, web sites, media programs claiming the adverse effects of meat and nutrition rich in meat origin. But the definite point is a complete exaggeration and distortion of scientific matters since meat and meat products as long as their intakes in normal amounts as combined with regular sport, exercise and plenty of vegetable and fruit consumption, they do not cause disease and disorder, opposite, increase life quality. A complete vegetarianism which does not accept the consumption of any product in animal origin may face and suffer with many metabolic diseases and disorders. We should never neglect that there is no a completely good and beneficial food or food product without any adverse effect and similarly, there is no food or food product which is completely harmful and hazardous without having any beneficial attribute. Every food and food product has got its own beneficial and harmful effects on human and animal metabolism. For this reason, nutrition and food science is very important which shows us to select foods in concerned disease and disorders. Sometimes, for some disease or disorder, for some sex, some profession, some kitchen and life style, age, blood and hormonal profile, some foods may be beneficial with their special substances for the disease or disorder, but the same food may be hazardous in another disease with its harmful substances for the disease. Briefly, as I indicate the same point every time that, foods always differ depending on the type of metabolic disease or disorder. Therefore, meat and meat products may be harmful or may be beneficial. Whether meat and meat products are beneficial or harmful for metabolism depends directly on metabolic conditions. I had given a clear example in cellulite part that meat products may be very beneficial in anemia because of their high quality iron content but the same products may be harmful for persons with cancer, cardiovascular diseases, hypertension and diabetes because of their rich cholesterol, saturated fat, nitrite and nitrate contents. What I want to indicate strongly here is the unnecessary discussions about foods including meat and meat products which describe them as completely hazardous or completely beneficial.

First, complete vegetarianism can not be accepted and defined as a healthy nutrition style since it excludes meat and meat origin products with other foods in animal origin. As I mentioned above animal origin products including meat and meat products have got many beneficial and superior attributes such as high quality iron, a rich zinc content which is a strong antioxidant, a very important and superior high quality protein content which are free of the risk of binding by fibers, a rich $B_{12}$ vitamin, folate and folic acid contents which are all important antioxidants that act importantly in blood and myelin coat (protective layer of nerve cell) production. For all these reasons, a complete vegetarianism may always suffer with Alzheimer, Parkinson and anemia. These vegetarian persons can not use the beneficial effect of high quality iron of meat and meat production which is very important in prevention against anemia and can not have the advantage of folate, folic acid and $B_{12}$ antioxidants of these products which protect brain tissue against Alzheimer, Parkinson and other similar neurological diseases and disorders. That is why a healthy nutrition can not be planned without meat and meat products. Here, the main problem is the determination of the normal amount of meat consumption for person which differs as depending on individual's metabolic conditions.

**If you are the one who suffers with cancer, hypertension, any form of cardiovascular disease and disorders, obesity, diabetes and cancer, it will be better for you to avoid from red meat and red meat products. Especially red meat products such as pastrami, sausages, salami and others have got nitrite and nitrate additives which are converted into nitrosamine compounds in digestive system in bowel which are carcinogen.** Excess salt, saturated fat, trans fat and phosphate can accumulate inside the walls of vessel and cause hypertension. Because of this reason, persons who are suffered with hypertension, cardiac failure, by-pass, angio, and stroke should avoid from the consumption of red meat and red meat products. On the other hand, vegetables, fruits, legumes and cereals with their fiber rich compositions bind cholesterol and bad cholesterol, toxic radicals, homocyteine, nitrate, nitrite, salt, saturated and unsaturated fat, sugar and phosphate that all act harmfully with their binding to the vessel wall. **Therefore, fiber rich food intake is very beneficial and complementary in medical treatment of cardiovascular diseases and disorders such as hypertension. Meat and meat products do not contain fiber since fiber is only in plant origin.** This attribute makes meat and meat products also milk and dairy products in a worse position. **Meat products and dairy products briefly animal origin products with their fiber free compositions can not bind harmful compounds including toxic radicals and cholesterol.** On the other hand, the same disadvantage of animal origin products, being free of fiber, increases protein quality of them because most of the animal origin proteins can be absorbed through the mucosa of bowel and transferred into blood at higher rates as compared with plant origin proteins, without binding with fibers.

**Except milk and dairy products since it is very poor from the point of high quality iron, other animal origin products are the richest sources of high quality iron.** It is high quality iron since iron in animal origin can be absorbed in greater amounts without binding by fibers in these animal origin products that are free of fiber. The other advantage and the reason of better iron quality in meat products as compared with plant origin iron is a protein carrier existence which binds iron and transfers it through bowel. This function of this carrier naturally increases the bioavailability of animal origin iron. The same carrier does not exist in plant tissues. Also, ferro form (2 value) of iron in meat and meat products is absorbed more than the ferri form (3 value) of iron in plant origin foods. Briefly, **meat and meat products can not be defined, or treated or accepted as harmful food commodities. This kind of approach always becomes nonsense, completely far from science and reality. We have to educate ourselves and others about the importance of meat origin products in prevention against anemia with their high quality and rich iron content in addition to their rich vitamin $B_{12}$, folat, folic acid which are all essential in blood cell proliferation.** All evaluations as related to the effects of foods on metabolism and its position in nutrition should not be made from only one side. A complete evaluation from various sides should be made like in meat example; fiber free attribute as a disadvantage, but high quality of iron as an advantage.

**In the consideration of anemia, high quality iron of red meat and red meat products, poultry products, egg and egg products, fish and marine origin products are the main food products which should be dominant in kitchen and life style.** But except anemia, in all other diseases and disorders this superiority of meat and meat products should not be exaggerated. Because mega dose intakes of iron from meat and meat products may be toxic on cardiac tissue. Therefore, I need to underline the importance of avoidance from meat consumption in cancer and cardio kitchen, not only with their cholesterol, saturated fat and bad cholesterol content, but also with their rich and high quality iron content.

Some media and literature finding says that high lactic acid level of meat and meat products increase lactic acid content in cell and tissue which block cell respiration. Therefore, rich domination of meat and meat products is always a risk in increasing acid level and blocking cell respiration. But this evaluation is not completely correct since some of meat and meat products may not be too acidic. The acidity of meat depends on many factors such as ante mortem period; the period before slaughter and postmortem period; the period after slaughtering process, stress factors before and after slaughtering process, slaughtering technique, maturation of meat, contamination level of meat during and after slaughtering process, the breed, sex, environmental factors such as humidity, heat, light, sound and nutritional factors and finally, metabolic conditions of animal as the raw material of meat product. In the case of strict control of all these factors, the acidity of meat can be taken under control. Otherwise, not only high acidic meats harmful for human and animal metabolism, but also meats and meat products which are liable to the meat infection and poisoning may be produced and consumed by public.

Like human beings, animals and husbandry animals may suffer with stress under some special conditions. Dirty atmosphere and environment, humidity, crowded places, light, sound, lack of nutrients, long time transfers of animals, microorganisms including yeast, mold, bacteria and virus which cause poisonings and infections are some of these stress factors. Under some of these stress conditions, they burn their glycogen deposits in their muscle more than other times. Glycogen enters into reaction with oxygen and is converted to lactic acid. The production of lactic acid in excess amount in metabolism increases total lactic acid and acidity levels of muscles at abnormally high levels. Meats of these animals after slaughtering process are also abnormally high in acidity. These meat cuts during slaughtering process have also got higher internal temperature levels such as 38-39 °C when compared with animal's temperature 37 °C. The high acidity as combined with high internal meat temperature causes decomposition of meat proteins and degrades polar groups of meat proteins which bind water. These types of proteins release their water into the meat surface followed by this degradation. Finally, the surfaces of these types of acidic and hot meat cuts which are produced under stress conditions have got a juicy layer on their surface. The water particles on meat surface reflect light which cause pale color formation. But, these types of meats are dry inside whenever they are cut since all water penetrates out of meat surface from inside. These abnormal changes increase the microbial contamination risk of these types of meats from meat surface. Briefly, the meats and meat cuts which are produced by animal slaughtering under stress conditions are too acidic and hot because of meat protein degradation due to high lactic acid accumulation due to stress. These meats are juicy on surface, dry inside, hot and always very liable to surface microbial contamination since many microorganisms like water for their activity and proliferation. Of course, breed is also one of the most important factors since some breeds such as Holstein enters into stress easier than other breeds such as Brown Swiss. But, the producers can make so much to control acidity and protect our health by controlling slaughtering and handling conditions. The hygiene before and after slaughtering process, avoidance of animals before slaughtering process such as too much light, humidity, sound and dirt are important protective actions. Also the animals which will be used in meat production should be taken to a complete starvation for 8-12 hours except water. This approach decrease microbial contamination risk of animals during slaughtering process. Many of microorganisms namely *Klebsiella, Yersinia, Salmonella, Staphylacoccus, Citrobacter, Escherichia coli, Escherichia coli O157-H7, Campylobacter* are in stomach and bowel origin. Starvation as long as 8-12 hours before slaughtering process can help to excrete the bulk full with these microorganisms out of animal body. Especially,

during slaughtering process, accidental incisions and cuts to stomach and bowel can cause cross contamination from inner feces content of bowel and stomach to meats. These types of meats are always in poor microbial quality and high risk for meat poisoning and infections. In conclusion; our healthy meat consumption is very closely depended on quality of meat production. Avoidance from stress and starvation of animals for 8-12 hours before slaughtering process and the hygiene before, during and after slaughtering process decrease the risk of high acidic, juicy, pale meat production poor microbial quality. We should note that slaughtering technique is also very important since it is the most stress giving factor to animal. Especially, slaughtering with knife from neck region in some countries gives too much pain and therefore stress to animal and increases acidity at significantly high levels. Ether use or electricity applications are very beneficial alternatives to block sense and decrease pain of animal just before slaughtering and they decrease the risk of acidic meat production.

Starvation of animal in meat production to minimize the risk of microbial contamination in bowel and stomach origin should not exceed 8-12 hours. Otherwise, it results with abnormal meat production in low quality. Longer periods of starvation than 8-12 hours can deplete glycogen stores. The animal can not produce enough lactic acid and acidity can not be maintained. These types of meats are always poor in acidity and their proteins are not degraded and they continue to keep their water inside. These sorts of meats are too dry on surface since all water is kept inside. Because of dry texture on surface, light beams are bound on surface, not reflected and therefore meat surface becomes dark. Because of water accumulation inside, these meats are very prone to microbial contamination during cutting and chopping processes. Briefly, low acidity like high acidity is also another important factor which causes abnormal meat production in low microbial quality. Too acidic meats are always prone to microbial contamination on surface since they release all their water from inside to meat surface due to high acidity. On the other hand, meats in low acidity are prone to the same microbial contamination risk inside of meat cut during cutting and chopping processes since they keep most their water inside. Both types are very prone to microbial contamination risk and potential to cause meat poisonings and meat infections. You, the consumer, can understand the quality of meat cut you want to buy up to a certain level during marketing. If its surface appears as dry and dark, inside is juicy and rich in water, then they are prone to microbial contamination from meat inside. If their surfaces are pale and juicy, they are also liable to microbial contamination from surface. Also you can understand by pressing your finger on meat surface. **Whenever you press, if it releases its water out, then it means that it is too acidic. If you notice water droplets on meat surface and at the bottom of meat cut and if it is juicy and acidic, then you should reject these types of meats in order to avoid from food poisoning and infection risk.**

Meat cuts which have got good microbial and physical quality criteria are in cherry red and bright color. They are not too dry on surface and inside, but also not too juicy. They do not have water droplets on surface or at the bottom. Whenever you smell, they give a characteristic and very weak meat flavor but that should not be nasty, decayed odor or flavor. There should not be a labricious liquid and dense layer on meat surface or on any meat product such as salami, sausage. Because the labricious and dense layer which covers the surface of meat or meat product indicates microbial spoilage of the product. Microorganisms decompose proteins, fats and sugars in meat or meat product and produce simple compounds as end products followed by decomposition by using their enzymes. These metabolites with meat

juice form a labricious layer in nasty odor and flavor which is called as 'slime'. Therefore, in case of the mentioned slime layer, you have to reject the product and inform producer or the sales stuff because they are also big potentials to cause meat poisoning and infections with their high amounts of microorganisms. Some consumers may not notice slime existence and do not make the concerned evaluations during marketing which also increases the risk of meat poisonings and infections.

Anthrax (*Clostridium botulinum*), Pasteurellossis, Pestis bovina, Aphtae epizootica, Tuberculosis, Tetanus (*Clostridium tetani*), Brucellosis, Actinomycosis, Actinobacillosis, Leptospirosis, Mastitis, Enteritis, hemorrhagic enteritis are the most important diseases of animals from the point of public and consumer health since microorganisms that cause to the concerned diseases can be transmitted to human by consumption of contaminated meat. What can consumer do at this stage? Nothing. Because these animals should be detected from their abnormal symptoms like fever, tarry stool, dense and dark blood and should be separated and banned from slaughtering before meat production in the period before slaughtering. Slaughtering of these animals with these diseases may be a tragedy since some of the microorganisms of these diseases can kill consumer or can cause meat poisonings and infections. For example, ***Escherichia coli* O157-H7 is very dangerous for consumer and transmitted by the consumption of contaminated meat especially hamburger and similar fast food meat products.** Although many *Escherichia* serotypes can be cured by antibiotic applications, this serotype damages mucosa of bowel and stomach immediately and doctors can not apply antibiotics. A further antibiotic use can rupture stomach and bowel which may toxemia and death. Only alternative is belong to meat producers rather than consumers that they should detect animals with disease and prohibit their slaughtering. Also hygienity before, during and after slaughtering process, hygiene of market and shelves, storing, marketing all should be under hygienic conditions. The consumer and producer should always remember that meat and meat products are one of the food groups which are richest in nutrition capacity but not only we, consumers, but also microorganisms like this atribute of these foods and make them a top risk group from the point of meat poisonings and infections.

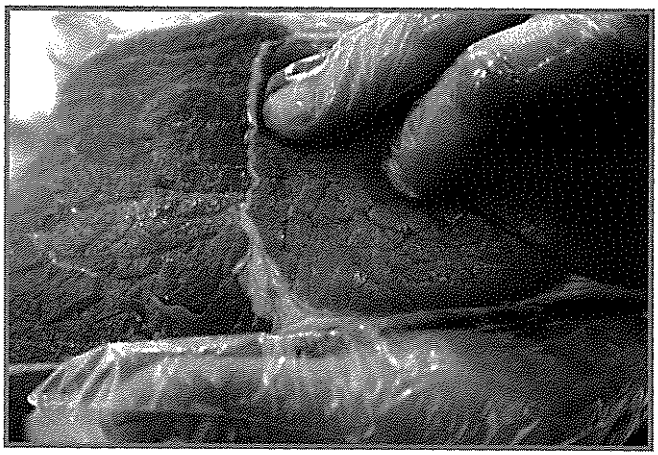
Another important parameter for consumer during marketing is whether meat product has got slime layer. Microorganisms, especially bacteria species decompose proteins, carbonhydrates and fats and convert them into simple and much smaller components for digestion by using their enzymes. In the case of too much microbial contamination or after the completion of shelf life in older products, the excess microbial activity cause the formation of a labricious and dense liquid formation which covers the surface of meat or meat product. This film layer which is consisted of decomposed proteins, carbohydrates and sugars with meat juices and microorganisms is called 'slime' as I also mentioned above. Slime formation indicates that the production is old and decayed or contaminated. These types of meat and meat products should be informed to the producer or sales department of the concerned market immediately since they are always potential of meat poisonings and meat infections with their high microbial loads.

One great advantage of meat and meat products is the rich high quality iron capacity. This attribute is very important since it makes meat and meat products very important in prevention against anemia. Unfortunately, except persons with anemia, too much meat and meat product consumption and meat domination in kitchen and life style may result in important metabolic disease progress risk which may also be due to high amount of iron intake from these products. Iron

is an important mineral which protects us against anemia and chronic fatigue. It is important in energy and red blood cell production. Hemoglobin, the pigment that gives red color to red blood cells and ables them to carry oxygen is the core of these cells. Globin is the protein part of the core while hem is consisted of iron. Therefore, iron is a must for the production of red blood cells. In the case of its insufficiency in metabolism, person may face with insufficient amount of red blood cell production. Red blood cells are one of the most important blood cells because they carry all nutrients and oxygen into the cells. Other words, cell nutrition and respiration can only be possible by these cells. The lack of these cells means the interruption of oxygen and nutrient transfer into the cell which may result in cell death, wounding or lack of energy production. Result is the same; energy problem, chronic fatigue or anemia. That is why meat and meat product with this important mineral protect us against anemia and chronic fatigue which should never be neglected. If you are the one who suffered with anemia or afraid of getting suffered with anemia because of genetic liability, domination of meat and meat products in a controlled manner will be very effective and complementary to medical treatment in increasing energy production rate and red blood cell amount. But first, you should know the richest meat and meat products that contain iron most. No need to keep it in mind but very easy formula to determine iron richest meat on your own during marketing. You have to look to the color. **The darker or redder the meat or meat product is, the more iron capacity of the product is. For example liver is the richest iron source because it is tarry red-black. Than comes heart, the reddest in color. You can make your comparisons according to the density and tone of red and you can understand which meat or meat product is richer in iron capacity. Similarly, young animal meats are poorer than older meats because their red color density is less; they are much paler than their older generation. Younger meats with their pale red tone have got lower red blood cell concentration and therefore lower iron concentration. During aging with years, red blood cell proliferation increases with iron capacity. Another important factor is the region of the meat cut on carcass that leg parts are the richest since they are the most active part in motion. Because legs move in a constant motion most of the day, the vessels supply more blood to the cells in leg region. They supply more blood so iron at the same time. Opposite, loin region and the meat cuts in this region; contrfile and bonfile, although they are the most quality meat cuts having got lowest connective tissue, collagen, which decreases the digestibility and bioavailability of meat proteins like fibers in plants, they are the most inactive region of animal. These regions do not move enough because they locate on upper part of animal body. They supply less blood and less blood supplementation to these regions which causes lower concentrations of iron and pale-less red color density of the same meat cuts. But this evaluation is only one site, only from the point of iron. In the consideration of high bioavailability of amino acids and proteins, less fat ratio with higher water content and very low amount of collagen, loin part meat cuts appear as the most quality meats with tail part of carcass. Briefly, we have got two options and evaluations during marketing as related to our health.** These are;

If your first target is the protection against anemia you should pay attention to the meat color during marketing and prefer the one with reddest color. **Although it is very rich in cholesterol and saturated fat, if you are not suffered with cholesterol problem, hypertension or any other cardiovascular problem, it may be very healthy and protective to consume liver two or three times a week. There is no need to worry if you are not suffered with cholesterol, hypertension or similar cardiovascular problem and also if you are one of the guys making regular sport and exercise.** Do not forget that most of cholesterol, hypertension and cardiac problems are due to wrong nutrition but lack of sport

and exercise at the same time. Do not forget that cholesterol is converted into testosterone, the male sex hormone which is responsible for muscle production, by the means of sport and exercise, especially fitness and weight lifting sports.





If you have got no problem from the side of anemia, but **if you are the one who suffers with hypertension, cardiac failure, stroke, cancer or diabetes, you should avoid from liver, red meat and red meat products. If you want to be protected against anemia and chronic fatigue, you have to prefer the highest density and strongest color tone in red color, the darker tones.** Rabbit meat is much paler than chicken meat while chicken meat is paler than turkey meat. Veal meat is much redder than lamb meat. Buffalo is redder than veal meat. You can increase the examples. All you have to do is to notice the red color density. I indicated to the importance of iron rich capacity of meat and meat products as a great advantage of this group in prevention against anemia. But the same attribute is very dangerous, harmful in the case of diabetes, cancer, hypertension, stroke, cardiac failure, thromboses and emboli. Although iron is the most protective mineral against anemia and chronic fatigue, it may be very toxic and harmful in the case of the mentioned metabolic diseases and disorders. Iron intake may be very harmful like cholesterol and bad cholesterol in cardiovascular diseases and disorders because it triggers the oxidation of fats. The increase of oxidative stress cause high amount of free toxic peroxy radical compound production. Excess amount of these productions may accumulate inside the walls of vessels like cholesterol and bad cholesterol and can cause hypertension, emboli or thrombosis. Excess amount of these compounds can be converted into sugar and can increase sugar concentration in blood which may result in Diabetes type 2. Another possibility is the conversion of these toxic compounds into carcinogen agents that these agents can rupture cell membrane, enter into cell and mutate genetic material of cell which may result in cancer. These are the possibilities and whether which will turn into reality depends on hormonal, metabolic, nutritional and genetic factors. But the clear and net view is that the rich iron intake by the means of red meat and red meat products can make the metabolic conditions worse and can progress the mentioned metabolic diseases and disorders. For all these reasons, persons with diabetes, cancer, thrombosis, emboli, stroke, hypertension and cardiac failure should avoid from iron rich red meat and red meat product consumptions.

Heterocyclic amines are the other critic compounds like iron in meat and meat product consumption. They form during grilling and frying processes more than simmering, scalding or oven. Heterocylic amines have got two adverse effects on human and animal metabolism. They may enter into cell and mutate genetic material of cell and cause cancer. The second adverse effect is for cardiovascular system that they can bind to the wall of vessel, may decrease diameter size of vessel, cause calcification, hypertension and all other related cardiovascular diseases and disorders like cholesterol and bad cholesterol. Heterocylic amine risk not only depends on heating technique, but also genetic factors act importantly. Bowel and stomach mucosa of some persons do not absorb these compounds properly while others can digest easier. The same important factor also exists in alcohol example that alcohol tolerance is very lower in women than in men because of the same bowel and stomach barrier. This barrier is less in women as the main cause of lower alcohol tolerance in women. Heterocyclic amine compounds are exist especially in fried skin and grilled skin parts which appear as golden-brawny with frying and black in grilling. Especially, black parts should be separated from the surface of grilled green pepper, grilled meat or any kind of grilled product. Because of all these mentioned details, the best way for a healthy nutrition and life style should prefer to apply simmering and scalding. Too much heating, frying and grilling do not only increase the concentration of heterocyclic amines but also increase iron activity by making it free. Many scientific researches claim the strong and close relation with red meat and meat products in rich amounts and cancer in digestive origin such as colon, rectum, pancreas, stomach, bowel, liver and kidney. Pancreas is one of the most important organs in spite of its small size and shape because it is responsible for many hormone productions and hormone regulations. For this reason pancreas cancer is one of the most serious and worst. **We should never forget that, the consumption of too much meat and meat products all through life increases the risk of pancreas cancer. More than 80 % of pancreas cancer occasions are claimed to form due to excess amount of animal origin product consumption and especially fatty meat and meat products.** The close integration of animal fat into meat proteins are the main causative agents for cancer progress rather than meat proteins. The non fatty meat consumption or the consumption of meat products in low fat amount may be a protective action up to a level. 90 grams of veal meat contains 9 grams of saturated fat and this fat is not visible because it is closely integrated into meat particles, can not be separated as manually or by any kind of technology. For all these reasons, the domination of vegetable, fruit, legume and cereal rather than animal origin decreases the risk of cancer especially in gastro digestive origin. On the other hand, I should remind you once more **that rejection of animal origin foods completely from daily nutrition and life style may be another different metabolic disaster while decreasing cancer risk.** Non fatty animal origin products and non fatty or low fatty meat and meat products with their high quality protein, $B_{12}$, folate and folic acid, zinc, potassium, iron in addition to plenty amount of vegetable and fruit consumption appears as the healthiest nutrition style according to the latest scientific findings.

The digestion of meat and meat products are much easier when compared with plant origin products; vegetables, fruits, cereals and legumes. As I discussed it above, this attribute is due to two factors; they are free of fiber and their proteins can be absorbed without binding with fibers through bowel and the other factor is the rich nutrition capacity of these products. All essential amino acids, $B_{12}$, folate, folic acid, high quality iron, magnesium, potassium, zinc, selenium, $B_1$, $B_2$, $B_5$ and $B_6$ and water are exist in rich amounts in the nature of meat and meat products. Especially, for child during growth, women in weight loss and weight control and during elderly period, fatless meat and meat proteins can supply nutrition requirement during less food intakes. Except these target groups, other persons who consume big amounts

of meat and meat products in their daily life take the mentioned nutritious elements such as minerals, vitamins, water, sugar, proteins and fats which are also required by microorganisms. The meat rich consumption has got two meanings. If you are the one of the mentioned target groups, a boy during growth, an old person having got problems as related digestion, a women loosing weight or trying to control weight, this type of nutrition, as long as it is supplemented with vegetable and fruit, may be advised and can help your targets; growing, using benefits of high quality proteins, vitamins and minerals of meat. But, if you are the one who is out of these target groups and who wants to consume too much meat and meat products, also your microorganisms in your metabolism will like and use the benefits of the rich nutritious capacity of these food products. We have got two types of microorganisms in our bodies. Beneficial and harmful microorganisms. The easy digestible nutrients of meat and meat products (and also of all other animal origin foods) are digested and metabolized easily by harmful microorganisms in bowel, stomach and blood stream. They produce harmful metabolites from these foods. The more you continue to this type of nutrition style, the more harmful bacteria domination you will face with the increase of their toxic metabolites. The most important point here is not the critic of meat or animal origin rich consumption. As I already indicated and I will indicate many times in the book, meat and meat products and other animal origin products are the most nutritious foods, incomparable with others in protein quality and their bioavailability. But they may be harmful in case of their excess intake. We should critic the consumption amount of meat and meat products rather than their effect on metabolism. The effect of animal origin products like meat and meat products always depends on amount and consumption rate. If consumption rate is not too high, if normal amounts are consumed as in low fatty and as combined with vegetable and fruit consumption, you always have got the chance to use the benefits of these products in increasing your life quality.

In this part, I want to continue to share the benefits and risks of meat origin nutrition with you. Besides iron, toxic radical, high oxidative stress and heterocyclic amines other risks may be hormone, antibiotic, sulfonamide, pesticide and herbicide residues under some extreme conditions. In the past and presently, meat producers all over the world are using hormones to improve texture, tenderness of meat and to increase meat volume. The commonly used hormones are testosterone (male sex hormone) and estrogen (female sex hormone). Estrogen is applied to male and testosterone is applied to female meat animals since opposite hormones show its effect in opposite sex much more. There are many studies claiming the harmful effects of the residues of hormones. Most of these adverse effects are very serious and even life threatening such as cancer. Other adverse complications are anemia, depression, allergy, hepatitis, insomnia and sleeping irregularities, hypertension, diabetes, cardiac failure, stroke, lung edema, baldness, renal failure and sex hormone imbalance. I think, it can clearly be seen how hormone residue containing meat consumption may be harmful for public health from these examples. Therefore, inspection services and agents from governments of many countries like U.S.A., United Kingdom, France, Italy, Germany and Canada apply strict screening and inspection visits to the meat producers to detect whether their meat and meat products have got hormone residues. Hormone applications are permitted in some of the mentioned countries and many countries, but here the most important factor which is controlled and screened by government agents is the residue control until marketing. It should guarantee that hormone residues should be withdrawn from meat tissue before marketing. As long as the residues of hormones applied are withdrawn and as long as there is no residue in meat and meat product during marketing, there is no problem in such applications and they are permitted. Otherwise, they are illegal. **How can we understand whether the meat or meat product that we want to buy has got hormone. No one can!**

**The changes made by hormone in meat are the meat volume increase and pale color. Also, fat globules are composed and integrated with meat particles much more homogeneously which increases the juiciness, digestibility, taste and tenderness of hormone applied meats. If you inspect that the meat cut seems bigger than its usual size, if it is less red, juicy, if water droplets accumulate on surface and at the bottom, if you see juice separation when you press with your finger, it may be hormone added but only 'may be'. You can not be definitely sure, it is only an assumption.** The mentioned described attributes may also indicate abnormal meat production under stress factors which are described in detail above. Briefly, the pale, big in volume and juicy meats and meat cuts may indicate two risks; abnormal meat cut which is produced under stress that these meat cuts are always liable to microbial contaminants and often in microbial load or they may be hormone added. The consumer, you, can not be sure which one is, but in both cases what you should do is, to reject and inform the abnormalities to the sale staff, market owner or meat producer.

Not only hormones, but also antibiotics and sulfonamides may be given to meat animals in treatment of some diseases and disorders. The same musts are also required for meats contain sulfonamides or antibiotics. These agents are permitted in many countries since they treat disease or protect immune system and may be helpful to the growth and meat gain. But all their residues should have been withdrawn from meat or meat product until marketing so that the consumer should have not taken any residue of these substances. It is impossible to understand whether the meat or meat product contains sulfonamide, antibiotic or herbicide and pesticide which are the chemicals to kill animal and plant origin harmful threats that may contaminate animal meat before slaughtering. These chemicals defect liver tissue and defect immune system. Tetracycline antibiotics opposite to erythromycin and penicillin can be withdrawn much earlier since their residues can be excreted out of metabolism by the means of urine and feces. But, the use of these antibiotics and other antibiotics unconsciously without control and the intake of these antibiotics in many periods of life by consumption of meat and meat products can increase the tolerance against these antibiotics and decrease their effect in case of their future applications as medicines.

Hormone, antibiotic, sulfonamide, pesticide, herbicide, iron overdose, cholesterol, bad cholesterol, trans fat, saturated fat and heterocyclic amines are the main risks which may come from the consumption of meat and meat products. For all these reasons, there are many claims of scientific researches and media about the harmful effects and risks of too much consumption of animal origin products including meat and meat products. On the other hand, because of their rich B complex, folate and folic acid, high quality amino acid, protein and iron capacity, magnesium, selenium, zinc, potassium in high bioavailability, they are one of the most nutritious food group especially for children and young during growth, women during weight loosing and control, elderly with digestive problems, persons who make professional or regular sport and exercise in low-medium-high velocity, women in breastfeeding, young girls and women during Premenstrual Syndrome (PMS) since they loose significantly high amounts of iron, protein and calcium due to blood loss. We should know the group which we belong to and our metabolic targets and than decide the amount of animal origin consumption rate which we can take. If we are the person who make regular sport and exercise in high velocity, or pregnant, or in breastfeeding, or in PMS, or old or young and active, we need high quality proteins, we need animal origin proteins rather than plant origin. Controversially, if we are the one with hypertension, cardiac failure, stroke, diabetes, obesity, inactivity, lack of sport and exercise, cancer and renal failure, we should restrict the animal origin and

meat origin food intake and dominate. Instead, we should consume vegetable, fruit, legumes and cereals as combined with meat and meat products.

What is the daily protein requirement of an average person? 1 gram per Kilogram body weight. It should be lower than 0.8 (0.5-0.7) grams in renal failure since protein particles can adhere to the walls of glomerulus which are thin vessels that filter blood and worse the severity of renal failure. It may increase up to 1.2-1.4 g in sport and exercise depending on the velocity and frequency of sport and exercise. We should always remember the importance and incomparable nutritious characteristics of animal origin proteins and of course meat and meat products. An approach as in vegetarianism which rejects all animal origin proteins with meat and meat proteins can always face with important metabolic and neurological diseases and disorders such as osteoporosis because of calcium insufficiency, Alzheimer and Parkinson because of $B_{12}$, folate and folic acid insufficiency, anemia because of high quality iron in high bioavailability, magnesium, folate and folic acid and lack of body weight, lack of body length, weaker immune system and low IQ because of the lack of high quality proteins and amino acids in high bioavailability. For all these reasons, a complete vegetarianism can not be accepted and it is completely wrong. It should include milk or fish or egg to be able to meet some of the mentioned benefits of these nutritious compounds.

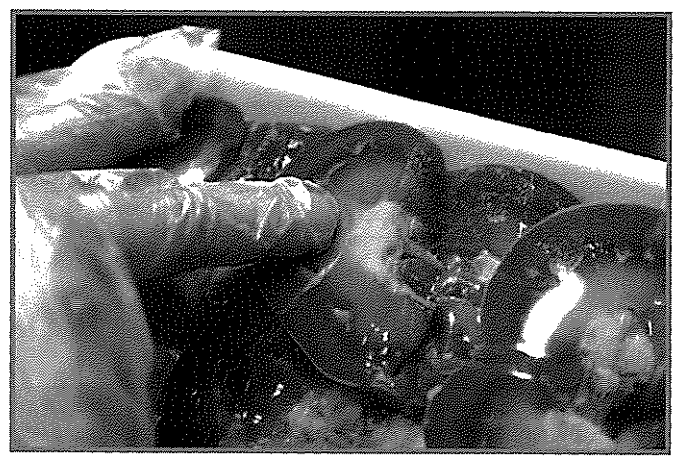
In comparison of protein quality, meat and meat proteins; fish and marine origin proteins, poultry meat proteins and egg proteins appear are superior to plant origin proteins. As I mentioned above in detail, one of the most important reasons is the absence of fibers in animal origin foods that directly increases absorption and therefore bioavailability of these food products. Proteins are composed of amino acids. Many amino acids as the structural components come together to build up proteins. There are approximately 23 amino acids in nature and 9 of these amino acids should be taken into body by the means of foods because these amino acids can not be produced in body. These 9 amino acids are methionine, lysine, isoleucine, leucine, valine, threonine, alanine, histidine and tryptophan which are all called as essential amino acids. Others are not essential since they can be produced in body from these essential amino acids. Essential amino acids should be exist in the concerned food completely without any missing since each of the mentioned essential amino acids play an important function in body like; lysine improves body length, methionine improves muscle volume and resistance, histidine is required for blood cell proliferation, valin is required for nerve system while threonine, tryptophan, leucine and isoleucine are required for bone, hair, nail and liver metabolism. Proteins which are complete from all these 9 essential amino acids are called '100 protein ratio' and proteins which are missing from one or two of the essential amino acids are called as '0.5 protein ratio'. Briefly, 100 or 0.5 protein ratios are the indicators of protein quality. You may ask whether one or two missing in essential amino acids matters and the answer is yes. Because, even there is one lack of essential amino acid in protein, it may cause serious metabolic problems in body. All animal origin proteins including meat and meat proteins are 100 protein ratio while plant origin proteins are 0.5 protein ratio. Another important criterion, NPU (Net Protein Utilization), shows the amount of digested and absorbed protein amount through bowel mucosa after digestion process with stomach acids and bowel enzymes from 100 grams of protein consumed. NPU levels are also higher in animal origin proteins as compared with plant origin as in the interval of 70-100%, whereas plant origin proteins have got lower than 80%. NPU level is not only criteria, much more important criteria is BV (Biologic Value) which means the availability of digested and absorbed

proteins in cells for important metabolic functions such as hormone, antibody, bone productions followed by their transport by blood stream into cell. BV levels are also very higher in animal origin products than plant origin proteins.

In conclusion; definition of meat and meat proteins and approach to them in food and anti-aging platform can not be made by taking only the harmful effects and risks of animal origin into consideration since they have got incomparable nutritious capacity. On the other hand, what makes meat and meat products and all other animal origin products as harmful in some diseases and disorders are saturated fat, omega 6 fat and trans fat. Therefore, the amount of consumption and fat ratio in these types of products are the main determiners whether these proteins will act harmfully on metabolism or not. Finally, I want to add that, always cook meat and meat products in oven or at medium heat level, do avoid from high heat temperatures above 100 °C and humidity. Because under these conditions, the amine groups of meat proteins enter into reaction with carbo groups of sugars of meat which forms a crust layer. This crust layer binds important essential amino acids like methionine and lysine and decreases high bioavailability of meat and meat products. Also, heating below 100 °C in dry conditions decreases the risk for the formation of heterocyclic amines which are strongly carcinogen.

# HEALTH FOR KIDNEYS WITH FOODS, NUTRITION AGAINST RENAL FAILURE

Liver is the organ which is vitally important for detox process which means the elimination of all kinds of dirt, toxic metabolite and free toxic peroxy radical compound from blood. But, liver alone can not make detox of body without kidneys. Kidney is another important organ which acts importantly in detox process. The blood which is pumped by cardiac tissue (heart) circulates all parts of the body, organs and tissues, each cell of our organism. During its circulation, it gives oxygen and nutrients into the cell, feeds it and takes the toxic metabolites, free toxic peroxy radical compounds which are produced by oxidation from cell. Giving the nutrients and oxygen into the cell for energy production and taking back all toxic metabolites with toxic peroxy radicals of oxidation increases the solid concentration of blood. Too much fatty food consumption also increases the solid concentration of blood. Trans fatty acids of margarine, butter, tail and inner fats of poultry meat and red meat and their products directly pass into blood followed by their digestion and increases the solid concentration of blood. Salt, sodium chloride and potassium (kalium) are some of the minerals which increase the solid concentration of blood. Therefore, consumption of cured products, which are produced by the addition of salt (sodium and chlor) and phosphate directly, increases the solid concentration of blood. Benzopyrenes and polycyclic aromatic hydroxcarbones which are taken into body by the means of fumed products are the other components which increase the solid concentration of blood and its density. Too much red meat, red meat product consumption such as salami, pastrami, sausage and pathe can cause increase in cholesterol and bad cholesterol. Cholesterol and bad cholesterol are some of the initial compounds which increase blood density. Hormones coming from foods and the toxic degradation products of genetically modified foods have become other toxic harmful compounds which increase the density of our blood day by day. Nicotine also increases blood density and coagulates it. Briefly, we are surrounded of many harmful compounds, generally taken into body by the means of foods which decrease blood density and coagulate it. The solid fragment concentration increase in blood directly increases the calcification risk of vessels. Blood vessels should be in proper diameter size to enable blood circulation. Otherwise, blood can not pass through the calcified cavity of the vessel which forms due to the accumulation of all the mentioned toxic compounds on the walls of these vessels. But, the most important parameter which we have to take into consideration is the difference between the calcification of blood vessels and kidney filtering vessels. Although the calcification of both blood vessel and filtering vessels in kidneys are very important and may even be life threatening, calcification of kidney vessels can make too much trouble when compared with the calcification of cardiac vessels. The reason is the diameter size and structural difference between cardiac (heart) vessels and kidney filtering vessels. Opposite to cardiac vessels, diameter size of kidney filtering vessels are too small that they are like a ball of wool. They are very closely integrated with each other that neither a knife nor a similar incision can be used. These vessels which filter the dirt, free toxic peroxy radical compound and all other harmful toxic compounds from



blood can not be taken into any operation because of their very narrow diameter size. They are also too thin, thinner than cardiac vessels and susceptiple to the defects of the mentioned harmful compounds coming from food and consumption.

Why did I indicate to the important difference between cardiac and kidney filtering (percolator) vessels? In case of any calcification of cardiac vessels, the calcified region from the ends can be ruptured, taken out, replaced by the healthy vessel fragments which are taken from other parts of the body like leg or neck. The process is called bypass. Bypass can be possible for cardiac vessels since they are not more than the fingers of two hands and they are not closely integrated and located with each other as opposite to kidney vessels. That is why; bypass operation can be possible which can cure many severe calcification and emboli of important cardiac vessels. But, kidney's filtering vessels are too small in diameter size and also these vessels are too closely integrated and located with each other that it is impossible to separate them from each other. Any incision can defect others and may be life threatening. In conclusion, the calcification in even important cardiac vessels can be cured by the means of chemical anti-coagulant medicines (blood thinning medicines) or bypass or balloon catheter and similar applications, but none of them can be used in the calcification of kidney's filtering vessels. Therefore, the control of food intake and nutrition, the control of kitchen, the control of the food what you eat is deathly important, not for only preventing cardiac vessels from calcification but also kidney's filtering vessels. Whenever, the term of calcification or atherosclerosis is used, many of us consider the calcification of cardiac vessels, but not the calcification of kidney's filtering membranes. The later may be much more severe and life threatening since cardiac vessels can have bypass treatment opportunity whereas kidney vessels haven't got. I had to make this explanation as related to the progress of cardiac and renal (kidney) calcification because the calcification of kidney filtering vessels are many times the initial reason for renal failure. Because, all the dirt, toxic metabolites and free toxic peroxy radical compounds pass from filtering vessels of kidneys into kidney tissues and start to toxify the tissue. Therefore, the calcification of filtering vessels which are called as 'glomerulus' should be protected from calcification risk to be able to prevent renal (kidney) failure. As it can easily be understood from the data given above, the risk of cardiac vessel calcification is closely related to the calcification of filtering vessels of kidney. The solid concentration increase of blood shows its adverse effect on both vessels of cardiac tissue and kidneys. When a calcification forms in the vessels, it begins from every vessel of the body but the severity may be much more for some of the vessels as I mentioned above. That is why the target for the consumer should be not to increase solid concentration of blood by avoiding from fatty, cured, smoked, processed foods, nicotine, alcohol, fried food products, fast food products, fatty meat and milk and dairy products, excess amounts of salt, sugar, margarine and butter. On the other hand, increasing the ratio of green leafy vegetables and citrus fruits help for decreasing solid concentration and increasing the diameter size of blood vessels while increasing elasticity of vessel walls because of ascorbic acid, vitamins B complex, magnesium they contain. Ascorbic acid (vitamin C), vitamins B complex and magnesium act as blood thinner. They are also strong antioxidants which means that they can decrease the production rate of free toxic peroxy radicals which can also dilute blood by decreasing solid concentration of blood due to decrease of free toxic peroxy radical compounds.

One important factor or risk which increases the risk of **renal failure** is protein intake into body in excess amounts. Proteins are important and essential since they are composed of amino acids which increase body length, muscle

progress, reproduction, healing of tissues, hormone, bone, blood and antibody production. Thus, a nutrition poor in protein quality can not increase life quality and may even be complicated with important diseases and disorders while decreasing life quality. Especially, proteins in animal origin have got all essential amino acids responsible for hormone, blood and antibody production. People who consume proteins in animal origin, especially in child and youth period, are stronger, taller and more masculine. Your child can be taller if its genetic is suitable as long as your child consumes sufficient amounts of proteins in animal origin and make regular sport and exercise. Another advantage is the high quality of iron in meat and meat products, egg and egg products which make protection against anemia and high quality of calcium exist in rich amounts in milk and dairy products. People who make regular sport and exercise also require high quality of protein intake. But, childhood, youth and sport period are the extraordinary periods which require more protein in higher quality than the other periods of life. When the body completed its maturation and progress, after 30s, if you still insist on consuming large quantities of proteins, especially rich in saturated and unsaturated fat content, you may easily increase the risk of cardiovascular disease and disorder or renal failure by causing vessel calcification in cardiac and kidney tissues. Therefore, as long as you do not make sport and exercise, as long as you are not active or not young or child, it is always better to control protein and fat intake into your body. Whenever you are active, make regular sport and exercise, it is very natural and expected to increase the protein intake in higher quality and less in fat. But, you should always consider that after 30s, your metabolism will have become slower and will not have been able to utilize proteins as much as in younger periods of your life. Some of the proteins will have been able to be utilized for muscle, blood and immune systems but the rest will have been transferred into liver. Liver tissue processes the excess of proteins and converts them into toxic protein degradation products, metabolites and toxic ammonia acid. These toxic protein degradation products are namely urine, uric acid, ammonia, histidine, histamine, cadaverine, putrescine, ornithine, creatine and creatinin. The more you consume protein, the more the toxic protein metabolites are produced. The worst is the risk of accumulation of the mentioned toxic protein degradation products on the walls of filtering vessels of kidneys. For all these reasons, high protein intakes without control in every period of life can result in renal failure. Prevention of high protein intakes into body without control is helpful for the prevention of renal failure risk besides hypertension and coronary atherosclerosis risk. Normally, people without renal failure need 1 g per Kg body weight. It is recommended for people who suffer with renal failure as 0.5 or 0.7 g per Kg body weight. It is always better to avoid animal origin proteins in people with renal failure since the biogen amine production potential of animal origin proteins is always greater than proteins in plant origin. The main reason is the fiber existence in proteins in plant origin which bind some of the proteins and decrease the bioavailability of these proteins. Therefore, some of the proteins in plant origin can be bound by the means of fibers in these plant structures and can be excreted out of body by the means of feces. Thus, people suffered with renal failure should prefer soy and soy products, legumes, cereals and green leafy vegetables as the initial protein sources in plant origin in spite of their lower protein quality and lower protein quantity.

One of the most harmful effects of renal failure is its osteoporosis and osteomalacia, in other words, bone and muscle weakness risk. Decrease in the density of muscle and bone is inspected in many cases of renal failure. The reason is one of the important functions of kidneys. Kidney produces vitamin $D_3$. This vitamin is essential for the absorption of calcium through bowel mucosa, its transfer into blood circulation and bone surface. Calcium binding onto the surface

of bone can only be possible by the production of vitamin $D_3$ by kidneys. The vitamin can not be produced during renal failure and calcium can not be absorbed or bound onto the bone surface. An important amount of calcium is excreted out of body by the means of feces. Calcium is not only required by bone and muscle but also cardiac muscles need it since each muscle relaxation and contraction is made by using calcium. Calcium deficiency due to renal failure and vitamin $D_3$ deficiency causes arrhythmia. Cardiac muscles can not make healthy contractions and relaxations. If vitamin $D_3$ and calcium deficiency with renal failure can not be taken under control, arrhythmia and interruption of cardiac relaxation and contractions may be life threatening.

The decrease in vitamin $D_3$ production and calcium loss due to renal failure stimulates kidneys and kidneys secrete a hormone called parathyroid hormone. Parathyroid hormone separates deposited calcium from bone and transfers it into blood. The result is the increase in severity of loss of bone density, in other words osteoporosis.

The solid concentration increase in blood initiates renal failure, but also renal failure accelerates the solid concentration increase in blood. The dirts, toxic metabolites, protein degradation products and toxic metabolites, briefly all toxic and harmful compounds can not be filtered and transferred back to blood and continue to circulate the other parts of the body by the means of blood vessels. The increase in the solid fragment concentration coagulates blood and excess amount of these fragments accumulate on the wall of blood vessels. Hypertension or a cardiac failure may be complicated. The vessels which supply clean blood and nutrient into liver or lungs may be calcified and lung or liver failure may accompany in addition to renal failure. Briefly, renal failure can cause other severe and life threatening complications and the initial solution here is keeping blood thin in all periods of life. Note that calcium loss can result in phosphor deficiency since metabolism tries to eliminate phosphor to be able to make a balanced ratio between calcium and phosphor. Phosphor rich foods are legumes, cereals and dried fruits. Another mineral like phosphor which is depleted by metabolism due to calcium loos is magnesium. Magnesium rich foods are cereals, legumes, nuts, green leafy vegetables, citrus fruits, soy, strawberry and broccoli.

1 Liter of milk weighs 1028-1039 g most of which consists of water. 96 % of milk is water and milk proteins and fats are dispersed in water that milk may be defined as the emulsion of protein and fat with water. 1 glass of milk may give you the sufficient amount of protein, mineral, sugar and vitamin that can define the nutritional capacity of milk. Water is a structural liquid. But if a comparison should be made among nutritious drinks, milk appears as incomparably superior. Milk means too much with its high vitamin C, $B_{12}$, riboflavin, high quality protein, calcium, phosphate, potassium and folic acid for an infant. Vitamin C, an important vitamin and antioxidant which depletes free toxic peroxy radical production, decreases oxidative stress, enhances calcium and iron absorption through the mucosa of intestine, increases the production rate of serotonin (relaxing hormone), dopamine (hormone against Parkinson) and melatonin (hormone regulates sleeping process), decreases cholesterol and bad cholesterol, acts importantly in the production of connective tissue collagen, participates with dental health and increases glutathione. Briefly, vitamin C is one of the most important vitamin, not only because of antioxidant effect, but you can be protected against depression by its serotonin increasing effect, Parkinson with its dopamine increasing effect, insomnia with its melatonin increasing effect, flu and cold with its immune boosting and antioxidant effect, diabetes with its sugar decreasing effect, anti-aging effect due to its glutathione increasing effect, osteoporosis with its calcium absorption enhancing effect and anemia with its iron absorption enhancing effect. Briefly, you can be protected against cancer, diabetes, aging, anemia, osteoporosis, depression, hypertension and other cardiovascular diseases and disorders by plenty amount of vitamin C consumption. The rich nutrition capacity of milk is digested completely by infant metabolism. The rich amount of vitamin C is given to baby without oxidation risk since baby mouth is closely connected to mother breast during breastfeeding. But, drinking milk is not rich source of vitamin C because of vitamin C oxidation during milking and during pasteurization, processing and marketing of milk. A significantly important amount of vitamin C content is oxidized by the effect of oxygen in air during these process steps. But, the main importance of milk and dairy products are deathly important for people because of its high protein quality. There are two types of proteins in milk and dairy products in high quality. 1. Casein, milk protein itself and 2. Whey proteins. Casein is a complex protein which contains all essential amino acids; methionine, lysine, leucine, isoleucine, methionine, tryptophan, treonin, phenyalanin, valin and also nonessential amino acids; glycine, proline, oxyprolin, alanine, glutamic acid, aspartic acid, serine, tyrosine, sistine. All these amino acids act importantly in body length, body mass bone and skeleton progress, blood proliferation, hormone production and replacement, reproduction and repair of cell and tissue. Therefore, casein should be consumed especially in youth period since body weight, bone and skeleton and body length should improve until 30s since genetic capacity permits the growth of metabolism. The growth of bone and skeleton, nerve system and connective tissue are completed until 30s. Therefore, casein and similar high quality proteins should be consumed in plenty amounts as much as possible during youth. You will remember from meat part that body length, muscle power and resistance, bone and skeleton, dental health all improve in accordance with high quality animal origin proteins. Two weapons of these high quality animal origin proteins are meat and milk proteins. Milk protein, casein, is the fourth important highest quality animal origin protein followed by egg albumin (egg white), whey proteins (in water phase of milk) and fish proteins.

The same argument of meat exists for milk and dairy products which are the fat and cholesterol problems in milk and dairy products and their adverse effects on human health. I want to critic this point in some detail with you below. I hope this critic will help you to evaluate milk and dairy products much more consciously and correctly.

Fatty acids are the conjugations of carbon and hydrogen atoms. Because of missing hydrogen atoms among carbon atoms, some fatty acids are unsaturated. These types of unsaturated fatty acids are four; oleic acid, linoleic acid, linolenic acid and arachidonic acid. Two of these fatty acids; linoleic and linolenic acids are claimed more important than other unsaturated ones because of their important and beneficial metabolic functions. Linoleic acid can be converted into linolenic acid in metabolism and linolenic acid produces a specific group of unsaturated fatty acid, long chain polyunsaturated fatty acids which are called as omega 3. Omega 3 fatty acids are mentioned with its initial details in its related part and in many parts in the book. In fact, cholesterol and bad cholesterol, sugar, TNF, oxidative stress can be decreased with rich content of linoleic and linolenic acid contents of milk and dairy products. Calcium is another important structural component of milk and dairy products that milk and dairy products are the richest and initial food sources to supply this important mineral to be protected against osteoporosis (susceptibility of bones to fracture) and osteomalacia (susceptibility of muscles and bones to defects). Calcium is always known as bone and muscle structural and functional mineral but it is more than that. Calcium decreases cholesterol and bad cholesterol while increasing good cholesterol. Calcium also increases the amount of glutathione which is the protective antioxidant layer around cell. Therefore, this mineral helps for the cell protection against harmful effects of free toxic peroxy radical compounds, sugar, salt, carcinogens, microorganisms and all other harmful compounds. Briefly, besides bone, muscle and skeleton effects, calcium is also cholesterol reducer and in anti-aging effect. This mineral is very rich in milk and dairy products. How can you, as a consumer, understand the calcium concentration in milk and dairy product during marketing?. Knowing calcium concentrations belong to different types of dairy products and milks one by one is a hard way to remember. I will give you a very easy method to understand how rich the milk or dairy product is from the point of calcium content. Dairy products such as yogurt and cheese are made of fermentation of milk protein casein. Normally, milk is first pasteurized at 90 °C to eliminate harmful and pathogenic microorganisms. Followed by, cooling is applied and probiotic microorganisms which are not harmful and even beneficial for human metabolism such as *Lactobacillus* and *Streptococcus* are added into pasteurized and cooled milk at 42-45 °C circumstances. These probiotics ferment milk sugar lactose and converts it into lactic acid. Lactic acid which is accumulated in milk increases the total acidity of milk or other words decrease pH level. The increase in acidity decomposes milk protein casein into its fragments as alpha, gamma, capa, beta casein. Phosphate and calcium in front part of alpha casein make a combination and this combination forms 'alpha para phospho calcium caseinat' particle in solid form. These solid particles settle down at the bottom to form a coagulated calcium, phosphate and protein rich layer which is called yogurt or cheese. The type of probiotic, acidity level, incubation, cooling, fermentation level briefly procedure details determine the type of the product whether it will be cheese or yogurt at the end of the process. But, from yogurt to ayran and cheese and also kefir all dairy products are produced with the mentioned mechanism as based on the fermentation of lactose and milk protein casein's coagulation. In case of lower fermentation degree and higher water concentrations, the concentration of alpha para phospho calcium caseinat particles becomes naturally higher which indicates to the tough and hard texture. Briefly, **the more solid, tough and hard texture of dairy product naturally indicates to the rich calcium, phosphate and casein with lower**

**amount of water content. Controversially, liquid structure of the dairy product indicates more water content with less calcium, phosphate and casein contents. According to this simple and brief explanation, cheese has got the highest calcium concentration and then comes yogurt, then comes kefir and ayran finally drinking milk.** What you have to concern should be the texture and tenderness in determining calcium content of the considered milk and dairy product.

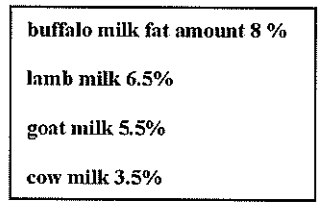
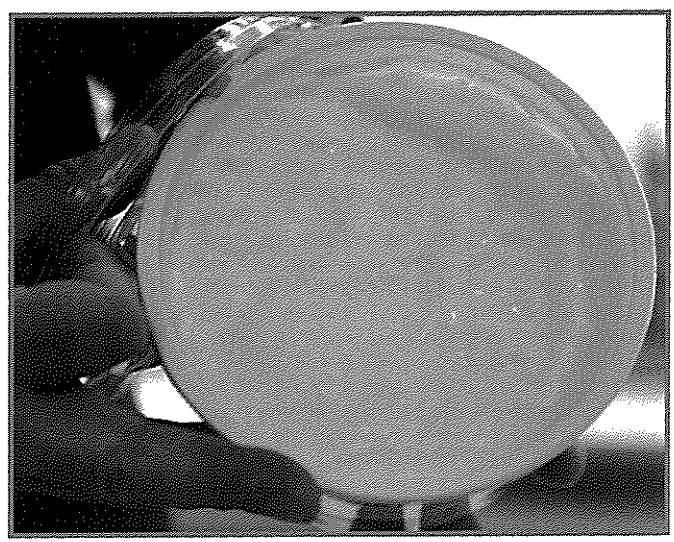



**Diagram 19**

What is the reason for the fears against milk and dairy products from the point of health? The answer may be summarized as 'fat'. Let me continue to explain about fat types to be able to understand the reason better. Milk and dairy products do not only have the mentioned unsaturated fatty acids which are beneficial for metabolism since they are the precursors of beneficial and protective omega 3 fatty acids against many diseases and disorders, but they also have saturated fats. Saturated fats, unlike unsaturated ones, are complete from the point of hydrogen bonds among carbon atoms in their structure. Therefore, they are solid under room temperature and they are in animal origin while unsaturated fatty acids are in plant origin. There are approximately 14 saturated fatty acids. These fatty acids make esters with three value alcohol glycerin and the end product is the fat itself. In case of ester formation of unsaturated fatty acids with the same alcohol, the end product is liquid under room temperature because of its unsaturated fatty acid composition and they are in plant origin. Fats, produced by saturated fatty acids in animal origin when taken into metabolism can be converted into cholesterol. Especially, there are three saturated fatty acids that can be converted into cholesterol by liver. These are palmitic acid, stearic acid and kapric acid. Palmitic acid and stearic acid conversion rate into cholesterol is more than others. This means that the more palmitic acid and stearic acid content in milk and dairy product or in any other animal origin product, its cholesterol risk is significantly high. As I mentioned in cholesterol related part, cholesterol concern is somehow exaggerated in public and in media all over the world. I want to indicate the importance of cholesterol once more that cholesterol exists in metabolism in two forms as; ergosterol and 7-dehydrocholesterol. In case of contact of skin with sun light, these two substances, by the action of liver are converted into vitamin D which is one of the most important antioxidant. Vitamin D also enhances calcium absorbance through bowel and calcium binding capacity of bones. As a result, vitamin D, an important antioxidant and calcium enhancer for bones and muscles is in cholesterol origin. Dopamine, serotonin, melatonin are all produced from cholesterol. Additionally, male and female sex hormones testosterone and estrogen are also produced by cholesterol. Finally, bile acid which decomposes proteins and regulates protein digestion is also in cholesterol origin. Besides all these beneficial and vitally important functions, cholesterol in food origin, in other words, cholesterol which is taken into body by the means of food and nutrition is not absorbed

through bowel and not transferred into blood circulation because of its waxy and hard structure. For all these reasons, cholesterol which is taken into body by the means of food products, as long as they do not exceed exaggeratedly abnormal amounts, are not absorbed and transferred into blood and therefore does not increase total cholesterol level of blood. The main danger and the main determiner at this point is palmitic and stearic fatty acid amounts in the total fat amount of foods while the main danger is not cholesterol in food which is in a very low bioavailability. The more palmitic and stearic acid amounts in fat part of food, the more they may be converted into cholesterol in metabolism. Because palmitic and stearic acids, opposite to cholesterol, can be absorbed and transferred into blood, reach into liver and converted into cholesterol. Note that milk and dairy products are rich in these two critical saturated fatty acids which can be converted into cholesterol. Briefly, the main problem with milk and dairy product is not the rich cholesterol content of milk fat, but the rich content of palmitic and stearic acid contents of milk fat. It can be clearly expressed as in the highlight of this explanation that low fatty or skimmed milk (having got no fat) does not increase cholesterol significantly. Opposite, fatty milk and dairy products may always be a risk in increasing cholesterol, but not because of cholesterol in these products but because of the rich amount of palmitic and stearic acid contents of these products. Skimmed milk may be advised since it is free of palmitic and stearic acid and therefore it is free of cholesterol risk, but this type of advice can never be beneficial for your metabolism. Milk and dairy products are also rich sources of fat soluble vitamins A, D, E and K which are all strong antioxidant and calcium enhancer. They can be absorbed and transferred into blood from bowel mucosa as in the existence of fat. Fat existence is a must to absorb and utilize them in metabolism. That is why; completely fatless milk and dairy products may cause lack of these vitamins in metabolism which may deprive your metabolism from the mentioned strong antioxidants and anti-agings. The best alternative is the preference and consumption of low fatty milk and dairy products rather than skimmed milk and dairy products.





One of the disadvantage which should be concerned by you as a consumer is the contamination risk of milk and dairy products like all other foods and their food infection and poisoning potential. But, milk and dairy products are more liable and they are in the first group with meat and meat products with their rich nutritional composition and free fiber structure. Fiber free structure of meat and milk products increase bioavailability of milk and meat proteins since these proteins can be absorbed without binding with any fiber in the cavity of bowel and stomach. This attributes also increases the quality and bioavailability of milk and meat proteins. But, fiber free structure increases the risk of microorganism penetration into milk and meat and their products. Because microorganisms can not digest and utilize fiber rich plant origin proteins since fibers are insoluble and can not be digested properly because of their tough and hard structure. Therefore, especially bacteria species can face with difficulty in entering and penetrating into fiber rich plant structure whereas it is much easier for them in fiber free animal origin proteins. They can easily enter and penetrate and also utilize these fiber free proteins without being interrupted by fibers in plant structure. Microorganisms, followed by their easy entrance and penetration into milk or meat product, can digest and utilize the proteins and begin to proliferate. Their proliferation and activity at a greater level because of the rich nutritional profile of meat and dairy products cause adverse and harmful changes in chemical composition of milk or meat product. I do not want to say that these microbial activities and adverse changes in food composition do not appear in plant origin products. Plant origin products, cereals, vegetables, legumes and fruits are also suffered with microbial contaminations many times as long as they are under low quality production, insufficient refrigeration and improper marketing conditions. The critical point for all kinds of foods that protect them from microbial contamination and slow microbial activity by decreasing their proliferation rate in case of their contamination is heat level. All kinds of foods should be produced under 14 °C and should be preserved and marketed less than 7 °C. Dried foods may be the exception since they do not contain water and many microorganisms can not grow and show activity without water. Because of the same mechanism, cereals such as lentil, rise or barley can not be spoiled by microbial contamination and activity as long as they are stored under dry conditions and in contact with air. High humidity levels are the main initial factor for their contamination and spoilage. Otherwise, they are very hard to be spoiled by microbial activities. Milk and dairy products are very liable to spoilage by microbial activity since all milk and dairy products are rich of water. One exception is milk powder which has got no water and in case of its storage in cold and dry conditions without light, it is very rare and difficult for it to be spoiled by microorganisms. But the same can not be mentioned for kefir, ayran or yogurt because of their higher water contents. High amount of water when combined with rich amount of protein, sugar and fat makes them an ideal medium for many microorganisms to proliferate and activity forms. But the liability of milk and dairy products are well known and therefore milk is pasteurized to eliminate its pathogens first and than it is taken into process. After process, all milk and dairy products without differentiation are taken to preservation under cold circumstances such as 4-7 °C. Especially, one factor, light and mineral, decomposes milk nature and causes adverse changes in taste and aroma of milk and dairy product. Light or mineral such as copper and iron oxidizes unsaturated long chain fatty acids and causes nasty aroma and taste because of aldehyde and keton products in the product which is called oxidation. Not only long chain polyunsnaturated fatty acids but also short chain saturated fatty acids can be oxidized by oxygen in a media that contains water, mineral and oxygen. This decomposition of milk fat is called as 'rancidity'. Both rancidity and oxidation sometimes can inform themselves with their nasty aroma and taste but sometimes not. The toxic aldehydes and ketons may be consumed and can cause toxication in metabolism. You as a consumer should pay attention to the shelf life of the product. You should also pay

attention and be sure that the milk and dairy product you intent to buy should be properly preserved and marketed under hygienic and cold circumstances as free of light or sunlight. If they are packaged as tetrapack, light or sunlight may not make a problem but milk in bottle can easily be oxidized by light and sunlight. You should pay attention while marketing and be sure that your milk in bottle should be under cool conditions without light.

I had also mentioned in meat part that essential amino acids are very important since they act importantly in body repair and progress. Valin for nerve system, methionine for muscles, lysine for body length, bone and skeleton, histidine and phenylalanine for blood proliferation and replacement are required by metabolism and these essential amino acids should be taken into metabolism from out by the means of foods and nutrition.

Plant origin foods are always poor in these essential amino acids. Lentil, as one of the richest in nutritional capacity and essential amino acid composition among other cereals does not have lysine like many other cereals while legumes are deprived of methionine, another important amino acid, which is used for muscle growth and resistivity. Briefly legumes are lack of methionine and cereals are lack of lysine, but animal origin foods such as milk and dairy products and meat and meat products contain both critical amino acids. Keep in your mind that because legumes do not have methionine and cereals do not have lysine, it may be a better way to use both legumes and cereals as mixture in the preparations of foods to supply both lysine and methionine critical amino acids.

Milk and dairy products are wonderful for your health in spite of the arguments and fears as related to their saturated fat and cholesterol because they are the richest sources of calcium. If you are the one who makes regular sport and exercise or and old person above 60, or a baby or young at 20s, you should dominate the consumption of milk and dairy products in plenty amounts. If you are in Premenstrual Syndrome (PMS) or suffered with menopause, you are the first target group to osteoporosis which requires a plenty amount of milk and milk origin food consumption.

Persons who regularly make sport and exercise inhale more oxygen. They also contract and relax their blood vessels by the effect of muscle contractions and relaxations during exercise. The larger volume of oxygen intake with relaxation and contractions of blood vessels causes to supply greater amounts of blood which means greater amounts of nutrients and oxygen when compared a standard body which is free of sport and exercise. The greater amount of nutrient and oxygen supply into the cells in persons who make regular sport and exercise cause more proliferation of the muscle cells. Therefore, muscles always tend to grow and increase up to a level but especially in volume. Bigger cells require much more blood, oxygen and nutrient until next following exercise which means that a person who makes regular sport and exercise should keep the intake levels of protein, water, oxygen and sugar at higher levels than a standard body which does not make sport and exercise or persons which are inactive. Otherwise, in case of lack of high quality amino acids, nitrogen, sugar, oxygen, vitamins and minerals and high velocity sport and exercise, cells demand their increased protein, vitamin, mineral, sugar and oxygen requirement from other cells and tissues. Under this circumstance, cells and tissues begin to loose their nutritional capacity, some of them die and some others shrink which all results in muscle mass and power decrease.

Ladies during PMS and menopause are the two important target groups which may suffer significantly from protein and other nutrient insufficiency. Young women with PMS loose significantly important volumes of blood which means significantly important losses of high quality iron, calcium and protein. Women with menopause have got decreased level of estrogen (female sex hormone) production which is the centre and reason for all kinds of complains during the period. Estrogen is not only a female sex hormone, but also a hormone that enhances the binding capacity of calcium into bones. The decreases in estrogen levels in women significantly decrease calcium binding capacity to the bones. For this reason, a women with menopause is always much more liable and close to the risk of osteoporosis and osteomalacia than other women without menopause. PMS also increases the risk of osteoporosis and osteomalacia, in other words weakness of bones and muscles, with its calcium loss due to bleeding. Young women with PMS and women with menopause should take into consideration that they are the target groups which are closest to osteoporosis, osteomalacia and anemia because of calcium, protein and iron losses in these periods.

After 30s, aging makes people feel it more than ever year by year. Cells and tissues including mucosa cells of bowel and stomach surface also become older and they begin to loose their nutrient absorption capability slowly. The decrease in nutrient absorption and transfer capability of them through bowel mucosa cells and digestion capability of stomach due to stomach acid do not slowly disappear. They continue but as in a decreased manner as in accordance with aging. A man's digestion at 70s is never as the same and healthy as a boy's at 20s. This differentiation necessitates a specified nutrition and life style which is specific for only elderly people. Fiber rich nutrition to ease defecation, avoidance from constipation and diverticule, a high quality protein, vitamin and mineral rich nutrition in meals should be regulated and never be neglected.

Young person until 30s continue to body repair and progress at the highest limit as individual's genome permitted, but it also slows down after 30s when aging starts. Body length, nerve system and IQ, blood system, bone and skeleton are all completed and matured until 30s. Especially, the growth of bone, muscle and blood requires high quality proteins, in other words, animal origin proteins such as milk and dairy products and meat and meat products.

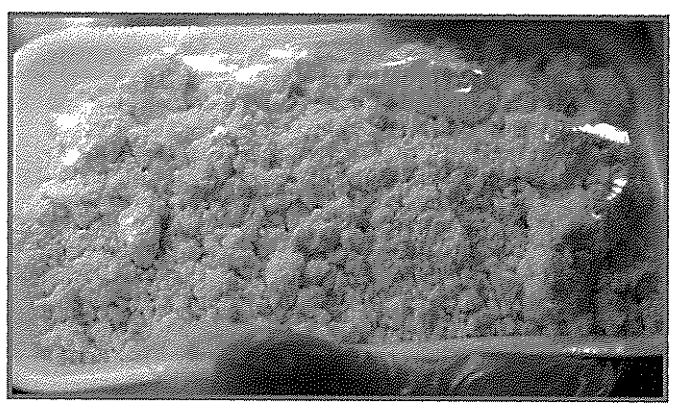
All the target groups mentioned above require protein, mineral and vitamin in plenty amounts more than other groups. Here, I am only trying to express the importance of calcium and high quality protein for human metabolism and especially for the mentioned groups. Calcium and high protein combined existence in the same food product group is hardly found in nature. Legumes and cereals are lack of lysine and methionine, most of vegetables and fruits are lack of high quality calcium and high quality proteins. High quality proteins are very rich in meat and meat products with milk and dairy products. But, if we are talking about calcium and high quality protein combined existence in the same food product group, milk and dairy products appear as the only alternative. You may ask about the risk of saturated fat and cholesterol which I tried to discuss above. Preference and buying of low fatty milk and dairy products as combined with regular sport and exercise is the best option that can supply you the highest amount of calcium to protect your bones and muscles against osteoporosis and osteomalacia while giving you all high quality proteins with complete essential amino acids without any missing. A life without milk and dairy product or a life style which neglects the consumption of milk and dairy products may always suffer from Alzheimer, Parkinson and similar neurological diseases and disorders due

to the lack of $B_{12}$, folate and folic acid, short body length and poor muscle volume and resistance because of lack of high quality proteins, liability to osteoporosis and osteomalacia because of calcium insufficiency. It is a kind of knife having got two sharp end points on both sides. On one hand, we need calcium and high quality proteins of milk and dairy products, but on the other hand, we may face with the risk of rich saturated fat content of these products. The solution is very clear and net. Do prefer and buy milk and dairy products in low fat amount such as 1.5-2 %, but always as lower than 3% while keeping an active life style with regular sport and exercise.

Followed by pasteurization of milk at 90 °C and cooling back below 45 °C, milk is treated with probiotics as mentioned above or cheese yeast called 'rennet' which is obtained from the last compartment of stomach of young veal is added. Rennet or probiotic decomposes lactose and increase acidity by producing lactic acid from lactose. The increased acidity causes to decomposition of milk protein, casein, and decomposes it into alfa, beta, gamma and delta casein. Delta casein is not sensitive to calcium, but alpha casein is the most sensitive one to calcium. Para casein, the front part of alpha casein which is called as 'alpha s casein' is very sensitive to calcium and combines with it. The end product is combined with phosphorus and forms 'alpha-s calcium phosphor paracaseinat' which is the cheese itself. Water separates and accumulates above as supernatant which is called as whey. I have mentioned it above as you remember that the water part, whey, contains special proteins which are called as whey proteins that they are higher in protein quality even more than milk protein, casein. Whey proteins are produced and marketed presently in powder form by using special filtering and vacuum technology. I will not repeat it since it was presented in detail in related whey part. Only what I want is to underline the importance of whey proteins once more. Alpha lactalbumin, beta lactoglobulin and immunoglobulin enter into the structure of antibodies which protect us against various diseases and disorders. Lactopherrin binds iron and carriers it through the mucosa of bowel and transfers it into blood circulation. I want to underline the deathly important function of whey protein, lactopherrin that only iron rich nutrition in prevention against anemia may not be properly sufficient. There is no need to worry about high quality iron in animal origin products such as red meat and red meat products; sausage, salami, pastrami, fish meat and marine products, egg and egg added products, poultry meat and poultry meat products. Because meat has got its own iron carrier that iron in the mentioned meat products can be transferred effectively through the mucosa of bowel and given into blood stream. The mentioned products which are fiber free in addition to iron transfer factor increases the bioavailability of iron in meat. Therefore, the protection against anemia and supplementation of blood can only be possible by meat, meat, meat and again meat since egg is also another meat (as it is accepted as meat in Food Science). Plant origin products do not have the mentioned iron transfer factor. Additionally, they have got rich amounts of fiber which can bind iron and excretes it out of metabolism by the means of feces and urine. The absence of iron transfer factor and the rich fiber composition are the two initial factors of the lower bioavailability of iron in these products. Other food group which is very lower in iron capacity and deprived of iron is milk and dairy products. In spite of their rich nutritious capacity with high quality amino acids, calcium, B complex and $B_{12}$, folate, folic acid, sugar, water and whey proteins, unfortunately, the same group is very poor in the consideration of iron and protection against anemia with iron. But, this does not mean that the individual who suffered with anemia should avoid from milk and dairy product consumption because of their poor iron capacity. Milk and dairy product consumption in low fat amounts is a must and a cornerstone for a healthy nutrition and life style as in combination with regular sport and exercise. Some people I know and some of my students are coming to me and asking for whether milk

and dairy consumption is suitable for such people who suffers anemia. You do not consume milk and dairy products if your target is to supply iron and the protection against anemia. If your targets are iron and protection against anemia, consumption of milk and dairy product will be completely useless and never be effective since they are very poor of iron. On the other hand, they are calcium, vitamins; A, D, E and K and B complex and high quality protein rich products. For this reason, you should never neglect to consume milk and dairy products in low fat amount. Of course, you should be protected against anemia with high quality iron at the same time. At this point, your alternative is only one, meat, meat, meat and meat. But always remember that, timings for milk and meat consumptions should be separated since casein in milk and dairy products can also bind iron in meat and meat products. It may be better to consume yogurt one or two hours after meat consumption that iron in meat products can be digested during this time until milk or dairy product consumption without binding with casein of milk and dairy product. Similarly, drinking milk and all other dairy products may better be consumed, not together with meat and meat products, but one or two hours after meat and meat product consumptions.

Another important whey protein, lactopherrin, works for prevention against anemia in milk and dairy products which are rather deprived of iron. The supernatant accumulates above cheese coagulate during cheese production and it is often separated and heated above 80 °C. Whey proteins are coagulated by the effect of heating process and form another type of cheese which is called 'whey cheese'. As you easily predict, this cheese is very rich from the point of whey proteins. Lactoferrin as a whey protein is in very rich amounts in the cheese. I recommend you to consume this cheese with a drink rich in vitamin C and a plant origin food rich in iron (but in poor bioavailability and quality since it is in plant origin). This approach can increase the bioavailability of iron in plant origin. Because lactopherrin from whey cheese binds iron in plant origin which is in poor bioavailability and quality and transfers it through bowel mucosa and gives it to blood stream by the support of vitamin C. Otherwise, iron from plant origin food product can be excreted out of metabolism by the means of feces and urine without absorption. Vitamin C (ascorbic acid) can enhance the transfer of lactoferrin and iron in plant origin and low quality. Briefly, poor quality iron in plant origin can also be utilized by your metabolism if you consume a vitamin C rich drink such as a fresh orange juice as combined with whey cheese during the consumption of a plant origin meal rich in poor quality iron such as spinach, broccoli, Brussels sprout or eggplant.



In spite of its high nutritional capacity and importance from the point of public health, some people may not tolerate milk and dairy products. Whenever they consume milk and dairy products they suffer from gas, diarrhea, allergy and stomach pain problems which may be defined a kind of dysphasia. The disorder is called as lactose intolerance. Lactose is milk sugar and is consisted of two simple sugars which are glucose and galactose. Normally, human metabolism decomposes lactose into glucose and galactose by stomach acid and intestinal enzymes, but especially by the effect of lactase enzyme in the cavity of stomach and bowel. Glucose and galactose are absorbed through the mucosa cells of bowel. But, some metabolism can not make this digestion due to lack of lactase enzyme. Some metabolisms are incapable of producing this enzyme which decomposes lactose into glucose and galactose. Lactose without decomposing into glucose and galactose is transferred into the end part of thick intestine, colon. Lactose in colon is attacked by harmful microorganisms in colon and decomposed into potassium hydroxide, ammonia, histamine and histidine, briefly allergic substances which cause gas, diarrhea, itching and pain problems. Sometimes genetic factors but sometimes any kind of defect such as ulcer and gastritis or an operation may deplete the function of bowel and stomach mucosa to produce this enzyme. What can people do with lactose intolerance? Drinking milk may always cause this tolerance since lactose sugar is exist in drinking milk but yogurt, kefir or cheese do not have lactose. Because, lactose is naturally decomposed into glucose and galactose during production and finally lactic acid is produced from glucose. The increased acidity also decomposes lactose residues into glucose and galactose. Therefore, person with lactose intolerance may accept yogurt or cheese or kefir while not tolerating drinking milk. Also, some producers add lactase enzyme into milk after pasteurization which can minimize the problem. These types of milks may be advised for such consumers with lactose intolerance.

Milk contains phosphor, sodium, sulfur, magnesium, zinc, copper, flor, aluminum, iron, barium, selenium, titorium, vanadium, lithium, barium, manganese and cobalt. But iron, mangan, iodine and manganese are in very insufficient amounts while selenium and zinc as important antioxidants are in enough amounts.

Milk and dairy products may be accepted as satisfied from the point of B vitamins and $B_{12}$. Women milk is rich of vitamins E and C while cow milk is richer in B complex. Vitamin A exists in fat part of milk since it is a fat soluble vitamin. The amount depends on the fat content of milk and dairy product. Here, you may face with a conflicting situation that milk fat is important because some of important antioxidants which decrease cholesterol and bad cholesterol, TNF, toxic radical production are fat soluble such as vitamins A, D, E and K and they only should be exist in fat and taken into body by fat. Otherwise, they can not be digested without fat because of their fat soluble character. On the other hand, the fat in milk and dairy products like all other fats are rich in saturated fats which increase cholesterol and oxidative stress risk. The solution that I also mentioned above is the preference and buying of milk and dairy products, not skimmed, not completely fatless but low fatty milk and dairy products to be able to supply fat soluble important antioxidant vitamins A, D, E and K as combined with regular sport and exercise. Low fat amount coming from milk and dairy product consumption may be tolerated with sport and exercise. Remember that sport and exercise is the best natural protective action which can burn cholesterol and converts it into beneficial compounds. Sport and exercise in men and women converts cholesterol into testosterone and testosterone into muscle. Briefly, you can produce muscle instead of fat by the means of sport and exercise. The increase of muscle volume naturally decreases the ratio of fat. Fat % decrease causes significantly important decreases in the risk of disease and disorder formations.

Milk has got many enzymes. Lipase decomposes fats into fatty acids, protease which decomposes proteins into amino acids, amilose which decomposes amilose, lysosome which decomposes cell membrane, peroxidase which decomposes hydrogen peroxide into water and oxygen, xanthine oxidase which reduces aldehyde and catalase which decomposes hydrogen peroxide. Because of the rich enzyme concentration of milk, fresh milk just collected is always very liable to decomposition and spoilage. Proteins, sugars and fats with other compounds are immediately decomposed and this results in change of chemical composition. The decomposition of fats, proteins and sugars into simple compounds, in other words, the digestion of these complex compounds into simple compounds triggers the proliferation and activity of microorganisms because microorganisms can utilize these simple compounds for their metabolism. Therefore, milk which has got high enzyme concentration can easily be decomposed and spoiled by the invasion of many microorganism species. For this reason, milk which is just collected is pasteurized at high temperatures to inactivate these enzymes and microorganisms which are responsible for the decomposition and spoilage of milk. Pasteurization is deathly important for milk and dairy product hygiene since it not only decomposes and inactivates enzymes responsible for milk decomposition but also kills harmful bacteria species and many other pathogens such as *Listeria, Staphylacoccus, Escherichia coli, Klebsiella, Streptococcus, Pseudomonas* and *Clostridium* which cause important and life threatening food poisoning and infection in human metabolism. Unfortunately, not only harmful enzymes and microorganisms, but also beneficial microorganisms which can increase sensory and microbial quality of milk and dairy product with enzymes and destroy harmful bacteria species and increase microbial quality are also destroyed by the effect of heat application. Anyway, heat application is a must since it is the most effective way to eliminate hazardous microorganisms and enzymes for milk and human. Heat application is applied with two applications. These technologies are pasteurization and sterilization. Heat is applied at 62. 8 °C, as long as 30 minutes and this pasteurization technique is called as 'Low Temperature Long Time (LTLT)'. Sometimes heat may be applied at 72 °C, as long as 15 minutes which is called as 'High Temperature Short Time (HTST)' pasteurization. Finally, heat is applied in a third type technology which is highest as among others with 80-90 °C heat levels as long as 1-3 minutes which is called as ultra high temperature pasteurization. Briefly, pasteurization is three types which are, LTLT, HTST and UHT. Sterilization is differed from pasteurization with its very high temperature levels when compared with pasteurization. 135-140 and even 150 °C heat levels are applied but within very short time periods such as 1-4 seconds which is called 'Ultra High Temperature (UHT)'. Because both UHT pasteurization and sterilization is called UHT, these two technologies may be confused. Therefore, producer should declare it on the label whether the product is UHT (sterilized one) or UHTP (Ultra High Temperature Pasteurization). The most frequently asked question at this point from reader and public is the type of preference between the mentioned two technologies. Which is better for my health, pasteurized one or sterilized one? Not matters. It depends on your preference. Because of very higher temperature than pasteurization, not only bacteria species but their resist forms which are called as spore and additionally heat resist microorganisms which are called as thermophiles with viruses are killed in sterilization. Therefore, sterilized milk has got very longer shelf life such as 3-4 months at 4-7 °C under refrigerated circumstances (not opened, lid closed). Pasteurization uses very lower heat temperatures as mentioned, therefore its microbial quality is worse than sterilization and many heat resist microorganisms, viruses and spore forming may alive and escape which decreases the shelf life of these products. For this reason, pasteurized milk should be consumed within 48 hours (2 days) under refrigerated circumstances at 4-7 °C. On the other hand, nutritional capacity and profile does not change that protein content, fat content, sugar content are all the

same in two technologies. Because of higher temperatures of sterilization, proteins, sugars and fats may have decomposed more but this is an advantage rather than disadvantage. Protein does not lose from its weight only decomposed into amino acids which are digested easier. Fats are decomposed into fatty acids and sugars are decomposed into simple sugars which increase their bioavailability, digestion degree which may be encountered as and advantage. These changes do not affect the amount of protein, fat and sugar only change their form while converting them into simple form which may be digested much easier. Sterilization may have got only one disadvantage that because of very excessive heat temperature, some amount of calcium and very minute amounts of minerals and vitamins which are water soluble may escape by the means of water vapor. But, these losses do not exceed 1.4-1.7 %. The preference is yours. If you want to consume milk for a very long time such as for months (3 or 4 months) under fridge conditions with a higher microbial quality, your option should be sterilized (UHT) but if you want to consume a milk for a short time such as 2 days under fridge conditions with higher sensory quality and lower microbial quality, your option should be pasteurized.

Freezing point of milk is -0.530—0.575 °C, below of freezing point of water, because of the nutrients, vitamins and minerals it contains. The addition of water into milk raises the level close to 0 °C which indicates water addition into drinking milk. Boling point changes between 100.15 and 100.17 °C while acidity is pH 6.5 and 6.9. Women milk is at pH 7.0-7.5 which is much more alkali than cow milk due to its higher milk protein, casein amount.

The most important and rich microbial flora of milk is *Streptococcus. Streptococcus thermophilus* can decompose milk protein casein with acidity and therefore very important in milk and dairy product technology. The combination of this bacterium with another important probiotic *Lactobacillus bulgaricus* are used in cheese and yogurt production as combined due to the same mentioned function of bacteria. The two bacteria are called as probiotic which means beneficial, non pathogen bacteria for human and animal metabolism. Probiotics have appeared as an important application platform of healthy living and anti-aging as I have indicated in related parts although there are still many conflicting studies as related to their definite effects. Many studies agree and confirm the beneficial effects of these bacteria species but some serious studies underline that they should be consumed with the processed foods for very long time periods such as two, three years to be able to show beneficial and protective effects against diseases and disorders. Advertisements in media and on television such as the 'wonderful'!! 'Anti-aging effect', 'digestion improving', 'cholesterol decreasing' with many others within only 7-10 days are not correct and possible! Probiotics are beneficial and non pathogen bacteria species. They are natural flora of human and animal metabolism, in bowel, in stomach and in blood. But, they exist as together with pathogen bacteria species as in a balance. Probioptics and harmful bacteria species always balance each other and this balance is called 'heomostacie'. Any kind of imbalance such as the domination of non pathogenic probiotics to pathogen or opposite, the domination of pathogen to nonpathogenic probiotics may result in disease or disorder. We do not know what would happen in the case of probiotic invasion in metabolism. Probiotics are claimed by many scientific researches that these bacteria species in the cavity of bowel and stomach consume excess amount of cholesterol, nitrite, nitrate, bad cholesterol, saturated fat, trans fat, salt, sugar, carcinogen and allergic substance and decrease their amounts significantly. Therefore, they act like fibers as in the same effect mechanism and they protect human against cardiovascular diseases and disorders, cancer, allergy, dysphagia, diabetes, hypertension and oxidative stress. But this does not mean that probiotic rich foods should be consumed in exaggeratedly high amounts

as supplemented with probiotic tablets. As I have just indicated, the abnormally high intakes of probiotics and invasion of metabolism followed by long time periods such as 2-4 years may result in important diseases and disorders such as allergic syndrome. The clear example for this is the cholesterol that excess amount of cholesterol is always hazardous since it causes vessel calcification and hypertension with many other cardiovascular diseases and disorders. But, normal amount of cholesterol supply is a must for healthy living since cholesterol is the main structural component of vitamin D, serotonin, dopamine, melatonin, adrenalin, estrogen, testosterone and bile acids. Briefly, normal amount of cholesterol is a must because it is required for some important metabolic hormone productions, vitamin and acid productions which are responsible for productivity, sexual performance and characteristics, calcium binding capacity of bones and muscles and finally protein synthesis. Life can not be without normal amount of cholesterol that I had mentioned it in related part as you remember. Too much probiotic consumption increases the ratio of probiotics in bowel and stomach cavity. The increased amount of probiotics consumes much more cholesterol in blood and can decrease blood cholesterol level in blood below very low and insufficient levels. The results may be the decrease in estrogen and testosterone, serotonin, dopamine, melatonin, vitamin D, adrenalin and bile acid production levels which result in insomnia, Parkinson, depression, hypertension, cardiovascular diseases and disorders and infertility. The cholesterol example is the only one which may appear by the invasion of metabolism by probiotics. There may be many other diseases and disorders like allergy. Many scientists claim that the exaggeration of probiotic use and consumption by the means of processed foods or tablets can form an allergic reaction. Briefly, there should be a balance in metabolism in every cell, every tissue, every organ and every body system. Any kind of imbalance from probiotics or from harmful bacteria flora can result in various kinds of important diseases, disorders or syndromes. Yogurt, cheese and kefir also kımız which is a traditional Kafkas and Russian dairy product are all produced by the addition of different types of probiotic combinations. Most common types of probiotics are *Lactobacillus* and *Streptococcus, Bifidobacter, Leuconostoc* and their serotypes are also used in the production of these processed milk and dairy products. Followed by pasteurization, cooling and their addition into milk, lactose is decomposed into glucose and galactose and lactic acid is produced in milk. Lactic acid accumulation increases acidity and pH drops from 6.8-6.9 to 3.8-3.9 in many dairy products such as yogurt and cheese. The high acidity of these dairy products is the initial protection against many harmful microorganisms since many microorganisms can not grow at high acidic levels. Most of the microorganisms and especially bacteria species prefer neutral pH 6.9-7.1 levels. Probiotics do not only serve to acidity and increase the shelf life of the dairy product by inhibiting microbial growth, but also they decompose fats, proteins and sugars into simple substances and form new compounds which increase taste, flavor, aroma, texture and tenderness of the product. I should advise you that you should avoid from probiotic tablets. Many people use these tablets due to their cholesterol decreasing, fat and sugar decreasing and digestive improving effects. As I have indicated, the metabolism should be avoided from probiotic invasion since it may result in imbalance of microorganisms among each other which may bring out many diseases and disorders. On the other hand, some amount of probiotic supply from out into body by the means of fermented foods may help to decrease cholesterol, TNF, allergy, diabetes, dysphagia, constipation, hypertension and oxidative stress as long as probiotic consumption should not exceed abnormally high levels. What I try to mention here is the importance and preference of natural probiotic rich food consumption. Regular daily consumption of cheese and yogurt is very beneficial for your metabolism because of their rich calcium content but they may also be helpful in reducing cholesterol, toxic radical, salt, sugar, TNF, fat, salt with their probiotics because these microorganisms consume all the mentioned harmful substances in stomach and bowel

cavities. No need to take probiotic tablets. They may even be dangerous as I have indicated. But, regular consumption of cheese and yogurt is very clever, conscious and effective protective actions. The only risk may be the saturated fat that you should prefer low fatty ones which also ables to utilize fat soluble vitamins A, D, E and K. Another problem at this point is the loss of fat soluble vitamins A, D, E and K, calcium, folate and folic acid due to heat which is applied during pasteurization. Many producers add these missing important vitamins and minerals and replace them. You can understand these additions from the label of product written as 'iron fortified' or 'Ca fortified' or 'Folate fortified'. **Do prefer these enriched milk products in low fat amount.** This preference can supply the important vitamin and mineral composition of the dairy product to you by minimizing saturated fat risk.

In spite of its rich nutritional profile and probiotic benefit, the rich nutritional composition of milk and dairy products also attracts pathogen microorganisms. *Brucella* which causes infertility in men and abort in pregnant, *Pseudomonas* spp. which causes decomposition and spoilage of milk and dairy product under refrigerated conditions and chronic upper respiratory track infections, *Klebsiella* which is responsible from lung inflammation, *Escherichia coli* O157:H7 which causes gastrointestinal food infection many times results in death are the initial and most common types of problems in dairy industry which threats consumer. The main protective action as a consumer should be the preference of pasteurized or sterilized milk and dairy products which are preserved and marketed under cool conditions at 4-7 °C free of excess sunlight during marketing. *Salmonella, Escherichia, Clostridium, Staphylococcus, Yersinia, Mycobacterium* and *Shigella* are in fecal origin and therefore can easily contaminate milk during milking if milking is not applied under hygienic conditions. Briefly, raw milk is a convenient media for all kinds of pathogens. For all these reasons, pasteurization and cooling are deathly important for a safe product for consumer. Pasteurization and sterilization kill many microorganisms and destroy their enzymes with their high heat temperature applications. Cooling never kills but it stops the microbial activity. Bacteria species, yeast and molds can not show their metabolic activities properly and they begin to slow their proliferation. Cooling does never kill but decreases microbial activity and inhibits microbial proliferation. Fermentation, the conversion of lactose into lactic acid and increase in acidity due to lactic acid production also increase the shelf life of the product and cause to produce a safe product since microorganisms do not like highly acidic conditions. Therefore, a well technology application, in other words, properly fermented, sterilized or pasteurized, properly cooling and marketing under hygienic conditions do not give you any harm and they are safe as long as you consume them within their shelf life under refrigerated conditions.

Women milk contains more lactose and less casein than cow milk. In the case of modification of cow milk into women milk, newborn may suffer from constipation because of less lactose amount of cow milk. Therefore, lactose is added into cow milk. Women milk has got lower amount of casein than cow milk but this is not a disadvantage. The decrease in casein as milk protein naturally increases the ratio of milk water proteins (whey proteins). This is a gift of God to pregnant and mothers during breastfeeding since whey proteins are more important even than milk protein, casein, because they enter into the structure of antibodies which protect newborn and protect infant against diseases and disorders.

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| Cow milk; | dry matter content: 12.5% |
| | fat content: 3.5% |
| | lactose: 4.7% |
| | casein:78% |
| | nitrogen containing bases: 5% |
| Women milk; | dry matter content: 11.7% |
| | fat content: 3.5% |
| | lactose: 6.5% |
| | casein:28 |
| | nitrogen containing bases: 17% |

One of the most frequently question as related to milk and dairy product is the difference of dry milk with drinking milk. There is no difference. Dry milk is the concentrated powder form without water. Water part of milk is evaporated by the excess heat level during dry milk production. Heat between 142 and 145 °C is applied while milk is poured on the surface of cylinders rotating around their centers in 12-19 cycle/min. Dried milk is scratched from cylinder surface and collected, hermetically closed. The technique is called as 'cylinder drying'. In the other technique which is called as 'spraying', milk with higher fat content is sprayed into an atmosphere at 88 °C while milk with less fat amount is sprayed at 82 °C. Because of the lower heat levels in spray drying, the shelf life is lower as 1-1.5 years whereas it is much longer in cylinder method as 1.5-2 years. But, the higher heat application causes less solubility of dried particles in water while spray dried particles can dissolve in water much easier due to lower heat application in cylinder technique. Dry milk should be kept tightly closed without sunlight and humidity since humid conditions with light may oxidize fat part in dried milk and can cause microbial contamination. Otherwise, dry milk is rarely contaminated and very resist against microbial contaminants, food poisoning and infection because of its very poor water content (1-2 %). Most of the microorganisms can not grow, proliferate and show their activities in these very low water contents. As easily can be understood from the production mechanism, the process is based on heat application, condensation and evaporation. The only difference with drinking milk is the water existence in drinking milk. But, milk powder is always treated with water, diluted for its consumption which gives it the original milk form. Followed by dilution with water, dry milk is no more different than normal drinking milk, completely the same from the point of protein content, sugar and fat. Very minute decreases form in water soluble fat content, vitamin and minerals but most of dried milk products in commercial platform is sold by vitamin, mineral and protein enrichments which also eliminate this problem.

The milk which is just collected may be encountered as sterilize since there are important bactericidal (killing bacteria) agents in it. Lactenin $L_1$ kills an important pathogen for human, *Streptococcus pyogenes*, Lactenin $L_2$ kills *Streptococcus pyogenes* and *Streptococcus agalactia*, Agglutinins destroy a wide range of bacteria by sinking and binding them with fat particles while the inhibitors of the end period of lactation (milking period) can kill pathogens which are very resist to high heat levels such as *Bacillus stereothermophilus* and *Bacillus subtilis*. Finally, lisosim kills many bacteria species by destroying lipoprotein structures of cell membranes. Therefore, fresh milk just collected, can be encountered as sterile due to the existence of the inhibitors; lactenin $L_1$, lactenin $L_2$, Aglutinin, lizozim and lactation end period inhibitors. But

all these inhibitors are destroyed and inactivated during sterilization and pasteurization. Also, before these applications they enter into reaction with oxygen and decrease in concentration. Bacteria and other microorganisms contaminate milk immediately followed by milking and collection period which also decreases the amount of these inhibitors. Anyway, although they decrease the amount of the inhibitors which protect milk against contamination and increase its shelf life, the sterilized effect of the inhibitors continues for only 1-2 hours. The microbial contamination and oxidation causes great looses in the amounts of these inhibitors but microbial contamination because of the rich nutritional capacity of milk continues as increased manner. Therefore, pasteurization or sterilization is definitely required although they inactivate these beneficial inhibitors which prolong the shelf life of the product.

Another important and most commonly consumed dairy product is butter. It will be better for me to explain you the production mechanism of butter to evaluate its nutritional value and harmful effects on metabolism. The production of the product is based on the separation of cream from milk followed by milking, collecting and transferring into factory under tightly closed and cooled conditions. The cream part which is separated is treated with sodium bicarbonate to neutralize high acidity in cream. The cream neutralized is treated with water vapor to eliminate flouring agents which give nasty, spoiled aroma and flavor to the product. This process is called as 'vacreation'. Vacreated cream is finally treated with probiotics, in other words, starter culture (beneficial bacteria species) such as; *Streptococcus lactis, Streptococcus cremoris, leuconostoc lactis, Leuconostoc dextranicum, Streptococcus lactis* sups. *diaceylactis*. They are non pathogen bacteria species but they also cause beneficial sensory changes on aroma, flavor, taste and texture of the cream by converting milk sugar lactose into lactic acid and converting lactic acid into butyric acid and diacetyl. Diacetyl and butyric acid are the two main components which give the peculiar aroma and flavor to the product. During the production of these end products due to the starter activity, water droplets form in the product. Separation of these water droplets is made by mixing cream with minute amount of salt and by the addition of cold water. Salt and low heat level combine with fat particles and water is released out of the cream bulk. The fat content in the final product is 88-99%. Because of the separation of water content by the mentioned treatment, butter has got very low amount of water which is not convenient for bacterial growth and activity. Also, diacetyl and butyric acid increase the total acidity of the end product. For all these reasons, microorganisms can not proliferate and show their activity which makes butter very resist against spoilage and deterioration. The spoilage of butter is possible with only water, sun light and mineral contamination such as copper and iron. Therefore, butter should be taken under fridge conditions as free of water, mineral and sun light.

One of the most frequently asked question is about relation between butter, cholesterol and health. Butter is fat; the cream part of milk, as easily can be understood from the mentioned production mechanism above. Fats are mainly composed of saturated fatty acids, especially pamitic and stearic acids which may then be converted into cholesterol by liver followed by their consumption and digestion. Butter is also rich in cholesterol since it is directly prduced from milk cream. Therefore, there is always a close relation with cholesterol and butter consumption. Cholesterol may increase because of butter consumption if it is consumed in large quantities without control and without sport and exercise. In fact, it is not so easy to say that butter consumption is definitely dangerous and has got harmful effects on human metabolism because of its high saturated fatty acid content and cholesterol level without considering various factors. As I have indicated in cholesterol related part, cholesterol factor depends on many factors such as age, sex, profession,

activity, lifestyle, alcohol and nicotine habit, metabolic diseases, obesity and finally nutrition style, of course. Cholesterol is a must since it acts importantly in the production of many important vitamin, acid, hormones but excess amount of it can cause vessel calcification and forms diseases and disorders due to the vessel calcification. You will remember from the related part that the most important point which is neglected many times is the structure of cholesterol that cholesterol can not be absorbed properly from the mucosa of bowel since it has got a waxy structure. Therefore, the intake of saturated fats especially palmitic and stearic acids which can be converted into cholesterol is more important criteria than cholesterol which has got very lower bioavailability and digestion capability. Not only cholesterol, but also saturated fatty acid amount is also very high in butter. But either cholesterol or saturated fat can be converted into energy and especially cholesterol can be converted into testosterone (male sex hormone) in both sexes by the means of sport and exercise and testosterone can trigger muscle production. This means that butter can be included to the sport kitchen for the persons who make regular sport and exercise and they can show much more tolerance to the cholesterol of butter and other products because of sport and exercise. On the other hand, as mentioned in related part, cancer, diabetes, obesity, inactivity, alcohol and nicotine increase the risk of suffering with cholesterol. Other people who are not suffered and complicated with these factors and diseases can consume butter every day without exaggeration in normal amounts as long as they make regular sport and exercise. It is not possible to give amount of butter which can be consumed daily, as I mentioned it depends on metabolism, activity and velocity of the sport and exercise. We know many people around us who consume 10 and 15 eggs daily, but because they make weight lifting and body building sports, their cardiac tissue and vessels are healthy without any problem. On the other hand, a person who does not make any sport and who is very inactive can be suffered from serious metabolic diseases and disorders with even one or two egg consumption daily.

Saturated fat which can be converted into cholesterol and also cholesterol itself are not the only harmful compounds which increase the formation possibility of metabolic diseases and disorders. Trans fatty acids are claimed even much more harmful than cholesterol and saturated fatty acids. They form during the solidification process of oil by hydrogen gas to form margarine. People know margarine as healthy and free of cholesterol because it is oil, which means it is in plant origin. But, hydrogen atoms which penetrate from hydrogen gas into oil during the solidification process of oil in margarine production forms new fatty acids which are called as trans fatty acids. They are even much more digestible than cholesterol and they can be absorbed in greater amounts. Therefore, they can adhere on surface of vessels and cause vessel calcification, hypertension and other cardiovascular problems. Also excess amounts of trans fatty acids can enter into cytoplasm and mutate the genome of the cell and can cause cancer while some of excess amount of trans fatty acids can be converted into sugar and can cause diabetes. On the other hand, butter is honest and most people know that butter may be dangerous for health since it is an animal origin product which has got high fatty acid and cholesterol contents. Margarine describes itself as plant origin product and therefore people thinks that margarine is not dangerous for metabolism because it is in plant origin and free of saturated fat. First, if there is a solid structure in the product in lipid origin, whether in oil or fat, the solid structure and density of solid structure indicate to the amount of saturated fatty acid and trans fatty acid. You should always remember that the more saturated fatty acid and trans fatty acid, the more solid concentration of lipid will form but if the lipid content is consisted of a rich unsaturated fatty acid composition, the solid density will decrease and liquid structure will be dominant. Animal fats which are consisted of saturated

fats are solid under room temperatures. Similarly trans fatty acids form solid texture under room temperatures. Only unsaturated fatty acids form liquid structure because they are unsaturated. According to this explanation, I think, you will be able to understand the misdirection of people by wrong advertisements claiming that 'margarine is beneficial for health, it is in plant origin, free of cholesterol...'. Margarine is free of cholesterol because it is in plant origin but what about trans fatty acid composition and rich saturated fatty acid content of it? If we have to make a comparison between butter and margarine, butter may appear as even much healthier than margarine since it is produced by milk. Minute amounts of milk proteins with important essential amino acids and especially fat soluble vitamins A, D, E and K exist in butter naturally.

# SHELLFISH AND SHELLFISH POISONINGS

Water is one of the most common vessels through which food poisoning and infections are spread. Certain *Vibrio* bacterium species and Shellfish toxins can be identified as the most significant in the transfer of harmful bacteria to humans in waterborne diseases. Several kinds of microscopic marine algae are notoriously poisonous to humans who consume them through shellfish. These organisms are tiny, single celled plants which resemble regular land plants. They capture and use the sun's energy to grow. Poisonings from shellfish are due to the consumption of these harmful algae, especially during 'red tide'. The red tide is the discoloration of water which forms as a result of the various pigments in algae blooms. Effect mechanisms differ according to the type of the biotoxin such as *Prorocentrum minimum* toxins, domoic acid (*Pseudo nitzschia*) toxins, TTX (tetradotoxines) and ST (Saxitoxines) which block sodium channels whereas Brevetoxins (BT) lead to uncontrolled Na+ influx into the cell. The clinic view may be defined as the sum of gastrointestinal, upper respiratory, pulmonary and neurological disorders and is severe in many cases. In spite of the implications for human and animal health, unfortunately, we are still faced with a lack of adequate data in 'bacteria and algae' related shellfish poisoning. The question still remains unanswered whether the toxin producer is the algae itself or the bacteria which use these algae as host. Despite the uncertainty in this area, we have got enough detailed data about chemical structures of shellfish toxins and their contamination pathways. However, another problem waiting for us is the deficiency of bioassays in determination and lack of standardization of monitoring systems in countries which require urgent studies and improvements. All bioassays which are presently used seem to have limited sensitivity, high cost and kit depending and interference problems. The deficiencies of marine bioassays in determination and selectivity may result in greater problems, especially in regard to global warming which raises surface water temperatures and decreases deep sea temperatures which may stimulate the growth of some harmful surface and deep water algae species. We have neither standardizations in shellfish toxin monitoring nor high sensitive biotoxin determination and protection in most countries except Italy, New Zealand and Ireland. Before the critic of the risk, I want to give essential details as related to particular toxic dinoflagellates, their clinic, prognosis and treatment in this part of the book which may help for your evaluation about shellfish for a healthy life style and nutrition.

Sea water, vital to life on earth, supports a plethora of complex and varied life. Despite its crucial importance to humans and other living creatures, sea water may also act as the transmitter of pathogen bacterial and viral agents of shellfish-associated illnesses such as Hepatitis A, Norwalk, *Vibrio parahaemolyticus*, *Vibrio vulnificus* and also toxins of planktonic algae which are dinoflagellates in most cases. These dinoflagellates which are the main causative agents with their toxins use shellfish as hosts. For example: clams, mussels, oysters, scallops-cockles, starfish and crustaceans.

Several microscopic marine algae are notoriously poisonous to human who consumes them through shellfish. The growth of algae is an essential life process, as it is the first step in transferring solar energy into aquatic food. The huge varieties of algae are typically subject to annual cycles of growth and decay. These organisms thrive and multiply principally during spring and summer, in response to increased light intensity and salinity and also nutrients in ocean water. During the growth period or blooming, each single algae cell may replicate itself one million times in two to three weeks. During blooming, shallow seawater tends to become discolored by the sheer concentration of algae seeking the sunlight. This

discoloration is a result of the various pigments which the plants use to trap sunlight and this discoloration depends on the amount of algae present. The water reflects shades of pink, violet, orange, yellow, green, brown or red. Since red is the most common pigment, the phenomenon has come to be called 'red tide'. This 'red tide' is the main indicator for the presence of dinoflagellates which increases the chance of toxins being passed on through shellfish. Red tides are most common in the waters of North America, Europe, Africa, Asia and Japan. The poisonings associated with shellfish are due to contaminated shellfish consumption during red tide. Most species contributing to algal blooms are harmless but some species are poisonous to animals. Often, the algae themselves are unaffected as they are the filter feeders like shellfish for whom micro-algae is the principal diet. However, these toxins are fatal for carnivores including humans. But in spite of the harmful dinoflagellates being most common in cold waters, a few unusual identifications have also been made in warmer, neritic and tropical waters such as *Prorocentrum minimum*(Heil, Glibert and Fan 2005), a bloom-forming dinoflagellate in the Caspian sea, Black sea, Azov sea and Aral sea (Marasovic and others 1998). A small group of *Prorocentrum minimum* clones acts as sodium channel blockers, producing neurological symptoms in mice, characterized with convulsions, spasms with pronounced palpitations and death within minutes.

**Factors which effect toxin production and prognosis**

Shellfish become toxic especially during blooming phase when environmental conditions are most ideal. A bloom begins as a small population of toxic dinoflagellate cells in the lag phase or in the form of resting cysts, residing in the bottom sediment (Hall 1982). Environmental conditions, required for the blooming are salinity, water temperature, nutrient density and sunlight. Raised water temperatures, sufficient amounts of nutrients combined with sunlight and salt trigger cysts germination in the lag phase. During blooming, the growth is rapid with a tremendous increase in algae number. This is known as the lag phase. After blooming, as a result of $CO_2$ and nutritional wastes, the number tends to decline. This is the start of the stationary phase, but also involves the highest algae number. The dead cysts or the ones which do not bloom, settle down to the bottom or constitute a nutrient potential for it. High amounts of nutrition always trigger the blooming and low phosphorus concentration and low temperature increase toxicity. This may be because the cells continue saxitoxin production but reduced cell reproduction prevents toxin transfer to newly produced cells (Anderson and others 1985). Wind, waves and the temperature level are the other most important factors in the severity and transmission of shellfish poisoning. The wind and waves can transfer the aerosol of toxins and blooms long distances (Hortsman and others 1991; Pierce and others 2004). Toxin free shellfish and dinoflagellate dominated beaches and shores can also be contaminated by toxic shellfish by the effects of water current and wind in the same direction while opposing wind and currents disperse the algae, decreasing the toxic density (Smayda and Shimizu 1993). The resistance of clams is one of the important factors in the severity of shellfish poisonings which changes from clam species to species. Soft shell clams (e.g. *Mya arenaria*) and blue shell clams from areas exposed to red tides are much more resistant to saxitoxin than others and therefore accumulate toxins at greater rates than sensitive clams (Bricelj and others1990, 2005). The allowable limit enforced by the FDA for saxitoxin is 80 μg/100 g whereas *Mytilus edulis*, a blue shell clam found in Alaska, can accumulate 20.000 μg/100 g saxitoxin. The fish species which concentrates and transmits the dinoflagellate toxins is also important. From these kinds of fish which concentrates and transmits dinoflagellate toxins, the purple fish, can be considered to be one of the most unusual in appearance of all fish

which belong to the tetraodontiformes order. It can be easily distinguished by its round plump body which has given it the name 'blow fish' or 'swell fish'. The spines in body of the fish are unseen when they are calm but when predators approach, the spines immediately become visible as the fish causes its body to swell. The same fish, when highly agitated, fills a special sac inside its body with air or water. This inflation causes the fish to take on a balloon like appearance. They originate in the fresh waters of Southeast Asia, but they can also live in full saltwater. Tetradotoxin (TTX) is present in high concentrations in liver of this fish with progressively decreasing amounts in ovaries, intestines and skin (Tsunenari, Uchimura and Kanda 1980). TTX poisoning can occur from the ingestion of a wide range of fish from the tetraodontiformes, especially the puffer fish (Meler and White 1995).

Another red-tide causing organism, *Karenia brevis*, formerly known as *Gymnodinium breve* and *Ptycodiscus brevis*, cause shellfish poisonings, especially in Florida, New Zealand, North Carolina and the Gulf of Mexico. The most dangerous and important attribute of *K. brevis* is its fragile structure which can easily be broken by waves causing its toxins to be released. Therefore, not only the location and the species but also toxin releasing capability due to structural difference should be concerned as another important factor in these kinds of poisonings.

Another important factor which affects the severity of shellfish poisoning is the location of toxins in shellfish. The bowel and the intestinal tract of shellfish accumulate and store the toxins. As a result, the fish provided they are eviscerated in the usual manner will have got lower risk. Therefore, evisceration and cleaning process prior to cooking is an important factor which may give significant protection against shellfish poisoning.

Saxitoxins are concentrated in the viscera and occasionally in the mantle and siphon of marine bivalves. **Therefore, the elimination of viscera by hand, especially siphon, prior to cooking may decrease the severity of poisoning. This separation of siphon prior to cooking is extremely important in decreasing the toxicity since cooking does not completely destroy saxitoxins** (Morse 1977). **Also, shellfish consumption should be one or two days after harvest but should not be just after harvest since saxitoxins penetrate from gill and viscera into the siphon and accumulate here after a period of time. A clear example is that two victims developed paralyses due to shellfish consumption that they had eaten clams which had not had their siphons removed whereas others had no illness because of the removal of siphon prior to cooking.**

Briefly, the factors which determine the contamination risk and severity are as follows; the amount of toxic algae, the toxin content in each cyst, transformation rate to more or less toxic forms, the feeding rate, retention and excretion rate of marine biotoxin by shellfish, avoidance of toxic algae by the shellfish, evisceration and cleaning process prior to cooking, difference in molecular structure and species of dinoflagellate, fish and shellfish.

**Effect mechanisms, clinic, pathogenesis and treatment of marine biotoxins:**

Brevetoxins open voltage gated sodium (+Na)ion channels in cell membranes, leading to uncontrolled Na+ influx into the cell (Purkerson and others 1999) which alters the membrane properties of excitable cells and enhances the inward

flow of Na+ into the cell. Brevetoxins can also pass through cell membranes including the blood brain barrier, mucosa and skin (Kirkpatrick and others 2004). These toxins release acetylcholine followed by Na+ influx which causes smooth tracheal muscle contraction as well as massive mast cell degranulation. The histamine release of degranulated mast cells is the main cause of the asthma which results from Brevetoxin Shellfish Poisoning. Lipid solubility of the concerned toxins indicates the possibility of the brain damage which is sometimes associated with brevetoxications (Kirkpatrick and others 2004). Depolarization of the nerve cells by brevetoxins disrupts respiratory, digestive and cardiac function. Therefore, brevetoxins are also cardio and hepatotoxins (Rodriguez-Rodriguez and Maldonado 1996). Fish, birds and mammals are susceptible to brevetoxins (Bossart and others 1998). Red tide toxin aerosol inhalation and ingestion from contaminated seawater caused 149 manatee deaths in the Gulf of Mexico. Pulmonary hemorrhage and edema, meningitis (inflammation of brain membranes), hemolytic anemia (blood cell damage and decrease in blood cell number) and catarrhal rhinitis (inflammation of the nose or nasal membranes) were the main cause of death among the manatees and showed the respiratory tract, liver and kidneys as the primary targets of brevetoxins in mammalian metabolism (Trainer and Baden 1995). The respiratory disorder is usually rapidly reversible by leaving the beach or contaminated water (Steidinger and Baden 1984). Whether the inhalation of aerosolized brevetoxins can result in neurological or immunologic system dysfunctions aside from the upper respiratory is not known and needs further study (Fleming and others 2001; Benson and others 1999). The severity of pulmonary, gastrointestinal and neurological symptoms during Brevetoxification depends on the toxin concentration in the aerosol. Broncocontractions can be blocked by verapamil, atropine and tetrodotoxin (Jeglitsch and others 1998). Histamine antagonists such as chlorpheniramine and the early intravenous administration of mannitol can be effective in the early stages of brevetoxifications (Mattei and others 1999). Monoclonal antibodies and antidotes are other protective treatments (Templeton and others 1989b). Cromolyn and chlorpheniramine prevent the immune system's mast cells from rupturing when they come into contact with an allergen and stabilize these mast cells and prevent them from bursting and releasing histamines. Other pharmaceutical products which are commonly used in the treatment of Brevetoxifications are calcium channel blocker verapamil, sodium channel blocker tetrodotoxin, Na+influx blocker atropin and acethylcholine blocker beta 2-agonists (Trainer and others 1991; Singer and others 1998; Watanabe and others 1988). Canning does not decrease brevetoxin concentration in bivalves (Viviani 1992). Successful ozone-assisted depuration of red tide contaminated shellfish, both killing the organism and inactivating the toxin, has been reported whereas ultraviolet and chlorine were unsuccessful (Baden and others 1995; Fletcher and others 1998; Roderick 1997). These toxins can not be easily removed by food preparation procedures such as heat and acidity (Baden and Trainer 1993). The brevetoxin concentrations in contaminated clams have been reported to be 78-120 μg/mg (Poli and others 2000). The main symptoms of NSP are a collection of gastrointestinal and neurological problems such as; nausea, diarrhea, abdominal pain, paresthesia (abnormal skin sensations usually associated with peripheral nerve damage), vertigo (dizziness), incoordination, bradycardia (unusually slow heart beat), dilated pupils, convulsions and headache.

**Withdrawal time of shellfish toxins (Depuration)**

After a period of time, the shellfish toxins are cleared by shellfish. This is called 'depuration'. The time required for depuration varies from between 20-50 days and depends on genetic and environmental factors.

The type of the tissue, species, food availability and the media, the level of non toxic algae, particulate concentration, temperature, salinity and nutrient content of water media are the main factors which determine the degree of depuration. The toxins in the gastrointestinal tract are eliminated much more readily than the toxins bound in tissues which explain the importance of the type of the tissue. Another important factor is the species. The factors mentioned previously which effect toxin production and prognosis mentioned above also act importantly in depuration. Higher tolerance of blue clams such as *Mytilus edulis* to STX which have a one week to six month retention time is a good example of the importance of the species where toxicity and depuration are concerned. Another important factor for depuration is the media. DSP toxins drop to acceptable levels more quickly in the aquaculture pond than natural media. This indicates the importance of media and food availability in the media (Hallegraeff and others 1995). In the Netherlands, mussel marine toxins disappeared after 4 weeks at 14-15 °C water temperature (Hungerford and Wekell 1992) while they decreased from only 7.2 to 1.8 mg/g only at 1.4-3 °C in Swedish coastal waters (Edebo and others 1988b) which shows the importance of heat in the depuration process.

**Can increases in surface water temperature during global warming be an added contributor to the threat of shellfish poisonings?**

In the last decade, water surface temperatures have increased from 1 to 3 °C due to global warming. When the same longitude and latitude intersections, for example 60N-30W, 30N-150W, 15S-120W and 39S-90W are randomly selected, 1 to 3 °C increases in surface water temperature (NODC, ?) of these intersections between 1998 and 2005 are striking. It is not very difficult to predict the hazardous effect of water temperature increase from global warming when the data related to heat and dinoflagellate multiplication and toxin production is evaluated. One clear example of this relation is the high multiplication rate of *Gymnodinium catenatum* at 20-25 °C whereas it cannot grow below 10 °C (Nagasoe and others 2006). Also Bravo and others (1994) observed a high rate of growth in the same organism at 22-28 °C in Spanish southern coastal waters but little or no germination in the cold waters of northwest Spain. Similarly, from 60 different combinations of temperature (10-30 °C) and salinity (10-40), under saturated irradiance, *Cochlodinium polykrikoides*, harmful red-tide dinoflagellate, exhibited maximum growth rate at 25 °C with a salinity of 34. The same organism could grow in all temperatures between 15-30 °C in salinities from 20 to 36 but could not grow at 10 °C or lower than 10 °C without respect to salinity (Kim and others 2004). *Alexandrium monilatum* was another dinoflagellate which grew faster up to 31 °C (Juhl 2005). Slight increases of surface water temperatures especially from 1998 to 2005 of 1 to 3 °C mentioned above means an increase 6 to 9 °C or more in the next three decades. The increase in volume of Gulf Stream from global warming is another important factor which increases water surface temperatures.

I want to share the effect of global warming in increasing the occurrence rate of shellfish poisonings which will increase more and more in a very near future unless we do not take the protective actions against global warming without loosing any more time. Melting of huge amounts of ice in the Arctic region increases the fresh water amount on the surface which creates a warm, less dense stream. This stream begins from just below the Arctic region and the north Atlantic, and it circulates through the south Atlantic, Western Europe, North Africa, the coasts of India and China, north Australia and New Zealand and returns to the Arctic region. Through this circulation, by the effect of UV rays, gases, radiation

and also heat, significant amounts of water are evaporated and become more salty and dense. The second stream is created because its high density and salt content circulates deep below, not on the surface. This deep stream, cold and in high density, makes its circulation through north Australia, the coasts of China and India, north Africa, western Europe and returns back to the Arctic region to gain more fresh water because of the ice melting in the Arctic. This cycle will continue endlessly as long as the ice in the Arctic region continues to melt. The threat at this point is the global warming which triggers temperature increases in Arctic regions, resulting in a higher volume of fresh water which is less salty and less dense and therefore less cold. In other words, the Gulf Stream increases water surface temperature. This increase of water surface temperature through the action of the Gulf Stream may stimulate dinoflagellate growth which tends to grow on surface in higher temperatures such as; orders of *Gonyaulacales, Gymnodiniales, Peridinales* with *Pyrodinium bahamense* var. *compressum* and *Polysphaeridium zoharyii* of southeast Asian waters(Furio and others 2006) and the orders of *Littorinimorpha* (e.g. *Bembicum nanum* and *Polinices* sp.) and *Basammatophora* (e.g. *Siphonaria zelandica*) (Przeslawski and Benokendorff 2005). Cyanobacteria are another risk which should be strongly concerned in a world globally warming. As previously mentioned above, whether Cyanobacteria or the algae is the main toxin producer still remains as a question. But the risk which appears clearly is the risk of the stimulated growth of Cyanobacteria by the effect of global warming whose maximum toxin production is between 18-25 °C (Runnegar and others 1983; Watanabe and Oishi 1985; Ohtake and others 1989). Under these circumstances and possibilities, it is not so difficult to guess that there might be an increase in the contribution of Cyanobacteria to the toxin production of algae or an increase in its toxin production. Soon we will have to face the risk of some types of surface harmful algal blooms stimulated by increased Gulf Stream volume from global warming, a theory but always a great possibility, which has the potential to turn into reality in the very near future. The second threat may be the deep cold stream's stimulating effect on some algal blooms which require cold temperatures found in deep waters such as tropical *Halimeda tuna* on the Conch Reef of Florida (Smith and others 2004). Just because these two mentioned risks are due to global warming, in both depth and surface waters (the stimulation of surface and deep algal blooming caused by the mentioned effect of global warming) shellfish poisoning will become a more and more prominent problem over time, with higher mortalities.

**What can be done?**

In reality, preventive measures are very limited and restricted because toxic dinoflagellates are numerous and can easily contaminate vast areas of sea by the effect of wind and waves. One common problem is that certain algal species which have never occurred in a certain area before may suddenly appear there and then rapidly cause problems. Some countries monitor the presence of only one or two algal species. With the exception of Italy, other countries close their harvest areas only once the toxins have been detected in the shellfish. However, in line with Italy's procedure, the shellfish areas should be closed when the number of cells of certain algal species exceeds safe concentrations. The principal strategy in the prevention of marine intoxication should be effective monitoring so that contaminated products do not reach the market. Unfortunately, this may not yield a complete protection. Even weekly sampling and monitoring may be insufficient for complete protection since several factors complicate efficient monitoring, such as: 1. The cell numbers of toxin producing algae needed to produce toxic mussels vary considerably 2. The time period of toxicity varies with region and episode 3. Implicated toxins and algae may be different according to the region 4. The simultaneous presence

of marine toxins, especially DSP and PSP toxins complicate monitoring 5. Toxicity of contaminated mussels can vary several folds within different depths, even at the same sampling location and 6. Not only bivalves but also other seafood like oysters might also be contaminated although at a lower level.

The reason for sharing the detailed information about shellfish and shellfish poisonings with you is to be able to explain that there is not too much thing for us to do as consumers. It seems that governments should take the protective actions. But we as consumers should know that these food materials are one of the initial marine origin foods having got the highest food poisoning risk. The worst is that we, consumers, can not understand whether a shellfish is toxic or not. Buying them from well known and buying culture shellfish may be protective up to a level but unfortunately, it is also not definitely effective. A bloom can easily escape and contaminate the cultured shellfish from even thousands of kilometers by the means of wind and waves. You can not understand from appearance or odor of shellfish whether it is toxic or not. The other critic side of the view is that many of us like and enjoy the taste of these foods and they are also very nutritious with their high content of zinc, selenium, high quality protein and vitamins B. But, the very rich content of cholesterol and bad cholesterol of these foods should always have been taken into consideration especially by the persons with hypertension, cardiovascular disease and disorder, diabetes and cancer. Global warming seems to increase the occurrence rate of these poisonings. No one can guarantee that even cultured ones are free of toxins because of the reasons mentioned above. For all these reasons, I can not include shellfish into a healthy life style and nutrition in spite of their rich nutrient and antioxidant capacity except the cultured and carefully preserved ones.

Countries should have an efficient computerized communication system among them to be able to warn each other as quickly as possible in the case of harmful algae blooming and contamination risk. Any country which detects harmful algae blooming and contamination should close its harvest area and take it under quarantine and inform the problem to the other countries immediately via the computerized system. These three measures, one might guess, will require great organization, financial investment and labor but this action should be taken as soon as possible to be able to try and prevent increased cases of shellfish poisoning in the future.

**What should be done when you see a person suffered from shellfish poisoning and inhalation problem due to poisoning;**

*Make the person in a vertical position, the person should be turned over in such a position that the position of body should be vertical, on arms and neck should be pushed upper to be able to open upper respirator ways including pharynx and larynx. This may help for easier inhalation. Artificial inhalation may be applied until doctor arrival.

**Destruction of marine biotoxins:**

Transfer of shellfish to waters free of toxic organisms for self-depuration, vertical displacement of mussels in the water column as a means of minimizing toxin accumulation, ozone treatment, salinity stress, electric shock, reduced pH, chlorination and cooking, all appeared to be unsafe, too slow and economically unfeasible, yielding products

unacceptable in appearance and taste. The most effective method for toxin destruction seems only rigorous boiling at 100 °C for as long as 163 minutes. The final result is about 90% toxin elimination from $CO_2$ and acetic acid super critical atmosphere creation (Gonzales and others 2002). But, of course as a consumer, this application due to its excess heat and long time also seems impossible.

The harmful effects of toxic dinoflagellates and shellfish as their hosts on humans such as the sum of pathogenesis on neurons, the pulmonary-upper respiratory and digestive systems are very clear. Unfortunately, we are still lacking a uniform bioassay which is high in accuracy and low in cost. Controlling and 'monitoring of the harvest areas is still insufficient for many countries. A co-operative monitoring system between the countries concerned is urgently needed. This seems to be the only protection which we can provide at the moment. If urgent protective action against global warming is not taken immediately; it may lead to the risk of excess growth of dinoflagellate whose growth is stimulated by higher temperatures on surface and lower temperatures in depth of water which is created by global warming. It is noteworthy that canning, heating, fermentation, ultraviolet and chlorine do not destroy shellfish toxins, whereas $CO_2$ and acetic acid super critical atmosphere is found effective in depuration (Gonzales et al. 2002). High Hydrostatic Pressure as combined with $CO_2$ and acetic acid super critical atmosphere, HHP solely on its own and combined with acidity may be performed in the very near future to determine whether the concerned applications have any detrimental effect on marine origin biotoxines. We face with an important reality. Because of the stimulating and triggering effect of global warming on dinoflagellate growth risk, the implementation of a uniform monitoring program and an effective destruction method is immediately required. A computerized communication system between countries near sea should be constituted without wasting any more time. This strategy should be followed by food hygienists, food technologists, food scientists, marine scientists and educators. Further studies on depuration and elimination of shellfish toxins such as HHP and acidity sole and combined use with or without super critical atmosphere, should be undertaken without fail.

# ANTI-AGING AND AGING FOODS IN PREVENTIVE MEDICINE

The relation of anti-aging and aging foods on our health as complementary to medical treatment is based on oxidation like in many diseases and disorders. Thus, I want to remind you oxidation once more. Human, like all other mammalian, consume food and inhale oxygen. Foods are digested in stomach by the effect of stomach acid and in intestine by the effect of enzymes. Decomposed particles are absorbed through the mucosa of intestine and transferred into blood circulation. Nutrients; Carbohydrates, Fats, Oils and Proteins which are decomposed, digested and transferred into blood reach into each cell of organism and combusted by dissolved oxygen to yield energy. This combustion which is called 'oxidation' involves many complicated biochemical reactions. Oxidation may be considered as the most important reaction in universe since all metabolic activities are utilized by using this energy while energy is not the only end product but also free toxic peroxy radical compounds (FTPRC) with their harmful effects form additionally. The accumulation of FTPRC around the cell wall can wound, even rupture the cell which results in increase of wound cells. The increase of wound cells cause the damage on tissues and organs which causes 'aging'. Limitation and decrease in the rate of these compounds are the initial protection mechanism against 'Aging'. Cholesterol, excess sugar and biogenic amines, trigliserid, Low Density Lipoprotein (LdL; bad cholesterol), Very Low Density Lipoprotein (VLdL), Oxidized Low Density Lipoprotein (OLdL), Trans Fatty Acids (TFA), carcinogens, salt, Polycyclic Aromatic Hydrocarbones (PAH), formaldehyde, some of the food additives such as phosphate, nitrite and nitrate, saturated fatty acids and excess of unsaturated fatty acids, homocystein, benzapyren, uric acid and the concerned FTPRC give damage to cell membranes. The wounded cells form wounded and older tissues and organs which initiates 'Aging' and 'Disease' process. Their accumulation inside the wall of vessel, decreases diameter size of the vessel, increases blood pressure (hypertension) and decreases blood supply into the cell which also result in aging or death of the cell.

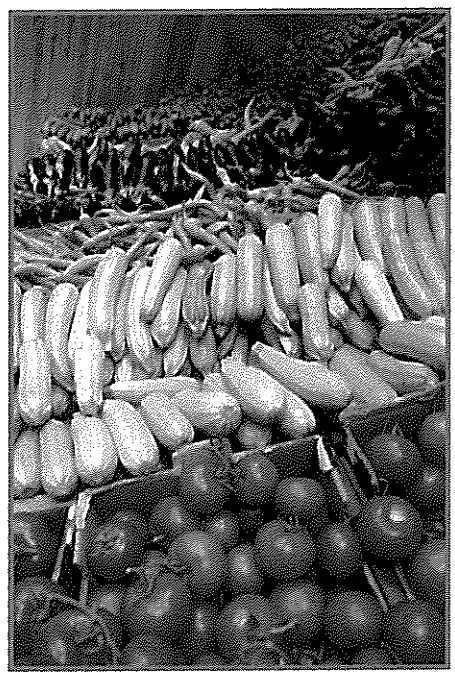
**Cosmetics and medicines.** They seem different at the first look but they are completely in the same function. Both aim to heal infected or wounded area. Both are taken in some periods of time in life. Cosmetics may be applied in different times of the day and most of the medicines are taken during disease or disorder. But, food is consumed all through the day and all through life. It is the main compound and also the main material of oxidation in energy production. In the consideration of their energy (calorie) producing potential, they appear as incomparable must for living. Nevertheless, we always face with their adverse and aging effects on our bodies because of FTPRC which are produced by them during oxidation in addition to energy, as indicated above. FTPRC are only one side of the food picture. The other side involves many other aging factors and compounds in foods which are;

- Trans fatty acids of margarines,
- Saturated fat, LdL, OLdL, VlDL, biogen amines of meat and fatty dairy products,
- Omega 6 fatty acids of nuts,
- Saturated and unsaturated fats, trans fatty acids, salt, PAH and benzopyrenes of fast food,
- Fat, nitrite and nitrate, phosphate, biogenic amines of meat and dairy products,
- Polycyclic aromatic hydrocarbons of fried and fumed products,
- Formaldehyde and salt of 'fumed and cured products', phosphate, salt, nitrite and nitrate of cured products.

All the mentioned substances above as indicated in many parts of the book decrease diameter size of the vessel and interrupt blood supply into the cell by accumulating inside of the cell wall (atherosclerosis). Any kind of the concerned calcification of the vessel and interruption or decrease of blood transfer amount into the cell means the formation of the wound or death cell which is also defined as 'aging'.

Medical and Nutrition platform have carried out many researches to slow the Aging process for years. All indicated to a very few effective protective compounds in food origin in slowing and minimizing Aging process which are consisted of;

- fiber,
- antioxidant,
- anti-aging proteins and
- anti-aging fatty acids, whereas anti-aging proteins (whey) and anti-aging fatty acids (omega 3) act by increasing glutathione protective layer around cell membrane and antioxidants act by decreasing directly the production rate of FTPRC. Fibers directly bind the toxic radicalss and other harmful cmpounds and help for their elemination from body.



**An anti-aging food may be your cosmetic without spending too much money!**

Medicine use is always regarded as a late application since they are generally used after the very late stage of infection or wound formation. Until medicine's effect, most of the cells and tissues will have effected adversely while many of them will already have been wounded or died. On the other hand cosmetics in all periods of living can be applied especially from dermis region (skin), many times as in the form of cream and they have got an anti-aging effect with their antioxidants. Unfortunately, this effect may be up to an extent since the structure of the main carrier of many cream cosmetics is fat and therefore only fat soluble antioxidants are used namely A, D, E and K. Nevertheless vitamins B, C, folic acid and folate as water soluble antioxidants are lacking in cosmetics. Another problem we face with the cosmetics is the limited absorption into blood through the skin layer since some of the cream structure may not be properly absorbed and penetrated into deeper part and finally transferred into blood. On the other hand, various kinds of foods are rich in;

- both vitamins C, B, folate, folic acid which are water soluble antioxidants,
- vitamines A, D, E and K fat soluble antioxidants and also; glutathione increasers such as; Mg, Ca, Se and Zn while Gingko biloba, Coenzyme Q10, Whey proteins, Omega 3 poly unsaturated fats can inhibit and restrict the production rate of FTPRCs (Free Toxic Peroxy Radical Compounds) and act as anti-aging. The most important point at this stage is the direct entrance of food with its wide range of antioxidants into blood while it is limited for many of the cosmetics.

It should always be concerned that our data for today defines free toxic peroxy radicals as the main aging and disease predisposed factors. Excess rate of oxidative stress with excess amount of FTPRC may rupture cell membrane, enter into cytoplasm, react with DNA, mutate it and may cause cancer. Excess of them may be converted into allergens and sugar which may result in Diabetes and allergy. They may cause rheumatoid arthritis followed by their accumulation in joints. They are the main causative agents of Alzheimer, Parkinson, depression, cardiovascular disease and hypertension since they are responsible for the calcification of brain and coronary vessel. For all these reasons, foods and cosmetics which aim to deplete free toxic peroxy radical production meet in the same function, 'aging', while foods are much more effective in anti-aging potential than cosmetics. Man or woman, you, can benefit from anti-aging effects of water soluble vitamins; B complex and C while many cosmetics are free of them since their carrier substance is fat and thus, they often contain only fat soluble antioxidants; vitamins A, D, E and K. You can benefit both fat soluble and additionally water soluble antioxidants only as long as you consume different kinds of foods in a wide range which includes both water and fat soluble antioxidants.

Briefly, Aging is a natural process and irreversible because an organism has to produce energy but also harmful free toxic peroxy radicals while taking similar harmful compounds from aging foods such as cholesterol, trans fatty acids, Omega 6, salt, homocyteine, biogenic amines, salt, food additives, allergens such as gluten, sugar, excess of saturated and unsaturated fat, PAH and benzopyrene.

**We have got very limited options to slow Aging process**, they are;

- by inhibiting the production rate of free toxic peroxy radicals,
- by limiting the intake of harmful (aging) foods mentioned above into body by controlling nutrition,
- by consuming plenty amount of fiber and fluid for binding and excreting these harmful substances. These preventions will be complementary to the cosmetic use. Otherwise, while we use the benefits of cosmetics, herbals or any other similar supplements, we will continue to aging by producing high amount of these harmful compounds in food origin such as cholesterol, trans fat, free toxic peroxy radicals, omega 6 and many food additives and will naturally limit the proper anti-aging effect of cosmetics. It should not be neglected that these two are the complementary parts of a whole; 'cosmetics, herbals and other anti-aging supplements' and 'food'. Without one, the other will not always be in its proper desired effect. Therefore, all anti-aging supplement use in life should be accomplished with a strict control of food and nutrition. First, media should be educated and then person and public should be educated by the media which may enhance the anti-aging effect of cosmetics.

One of the best ways to compare the anti-aging effect of food and cosmetic is to consider about their administration to the body. Most of the cosmetics are applied to skin surface. The effect is maintained by the penetration of the main substance into skin from the cream since most of the cosmetics are in cream form. Many times, fat soluble vitamins such as Vitamin A and its precursor beta carotene, vitamins E, D and K are used as the main antioxidant ingredients of cosmetics in order to protect skin cells against oxidation and its free toxic peroxy radical damage. But, one important factor at this point is always neglected. The penetration of these types of antioxidants from the cream or similar cosmetics into surface skin cells can be possible up to an extent whereas further penetration for these cells into deeper layers of tissues and muscles seem impossible. Therefore penetration of the protective antioxidant ingredients of the cosmetics, especially in case of their administrations to skin surface, is always very limited. If the fastest effect is required, the best way to administer of the medicine is intra-venose (into the vessel) that enables the direct entrance of medicine and its main effective substance into blood. Otherwise, intra-dermal (under skin) and intra-muscular (into the muscle) administrations are always slower than intra-venose administration when the effect is concerned. Likewise, the effect of the cosmetics applied from skin surface which commonly preferred by both sexes are currently alike with intra-dermal or intramuscular medicine administrations. Should only the medicine concerned pass from dermis and muscle, then it can reach to blood and show its proper effect for the cell and this is the main criteria for the late and limited effects of cosmetics. A food can be concerned as like a medicine administered intra-venose since it is directly absorbed through the mucosa of bowel and intestine and transferred into blood followed by its absorption by the effect of enzymes and gastric acid. The food digested may decrease in yield since some of it may be converted to urine and feces and excreted out of body but digested food can be defined as the direct part of the concerned food body in animal or plant origin which is absorbed and transferred completely into blood. Briefly, a food can always be utilized like a medicine which is administered intra-venous and therefore, food can always show its effect faster with a greater effect than any cosmetics applied from skin surface.

Most of the cosmetics do not contain ascorbic acid (vitamin C) and also B vitamins since they are soluble in water, not in fat. Most of the cosmetics are in cream form and therefore fat is used as the main carrier and media in these types of

products. This factor enhances the use of fat soluble antioxidants such as vitamin A, D, E and K as the main anti-aging ingredients instead of vitamins B and C. Very few cosmetics rarely contain sodium ascorbate and similar salts of vitamin C. But, in case of the use of food with anti-aging purpose, not only fat soluble vitamins but also B and C water soluble vitamins can also be taken into the body and show their anti-aging effect on body. In fact the cooperation of the fat soluble vitamins in great amounts in cosmetics especially in cream form is not an extraordinary situation. Fat is always in adaptation and good harmony with skin layer as a natural part of it. This enables the perfect penetration and absorption of fat containing creams into skin. This harmony and perfect absorption of fat by skin is the main reason for the use of great amounts of fat soluble vitamins such as vitamins A, D, E and K since these vitamins can easily be dissolved properly in fat media of cream, opposite to the water soluble vitamins; B and C. The use of the salt of ascorbic acid such as sodium ascorbate is to protect the cream and fat part of the cosmetic against oxidation, but not the body and it is always negligible in amount. Briefly, the deprivation of most of the cosmetics in water soluble vitamins B and C is more important disadvantage especially in the consideration of vitamin C (ascorbic acid) since it is the most versatile vitamin in function. Collagen (connective tissue) production, healthy dental structure, serotonin (relaxing hormone) production, lowering total cholesterol, lowering bad cholesterol (LdL:Low Density Lipoprotein) while increasing good cholesterol (HdL: High density Lipoprotein), lowering sugar concentration in blood and protection against Diabetes, protection against cancer by reducing free toxic peroxy radical production, enhancing Ca absorption through bowel and intestinal mucosa and protection against osteoporosis and osteomalasia, anti-clotting (diluting blood) and lowering blood pressure and protection against hypertension, increasing of glutathione around each cell, leading to the longevity of cell are some of these important functions of vitamin C ( Lancet 2002; Aikawa et al. 1998; Berliner and Heinecke 1996; Buettner and Jurkiewicz 1996; Duffy et al. 1999; Ström and Cotgreave 1995; Esterbauer et al. 1990; Fukumoto et al.2001; Heitzer et al.2001; Etherton et al. 2004; Libby and Aikawa 2002; Maeda et al. 2000). The most important at this point is not to forget the existence of this important vitamin in some foods such as citrus fruits that the consumption of which results in anti-aging effect by improving hearth, vessel, bone, muscle and also hormonal balance of body. The consideration and definition of anti-aging is always made by public as the fit appearance of body and stretched skin especially in face and neck. Of course 'anti-aging' is more than that! Anti-aging is a misprint since opposite of aging is impossible with today's science and technology, while slow aging or slowing aging process can be possible by controlling and improving blood profile with it's sugar, cholesterol, fat and protein profile, improving bone and muscle strength by the means of sport and exercise. By the way, anti-aging or with its correct definition **'slow-aging' (or healthy aging)** is the sum of physical, physiological and mental health. Imbalance of hormones or any kind of physiological problem in behavior might have stimulated fat combustion by oxygen to yield free toxic peroxy radicals which can accumulate around cells and cause aging by rupturing or wounding them. On the other hand, too much cholesterol, too much sugar, salt, allergens, potassium, sodium, trans fatty acids, polycyclic aromatic hydrocarbons, urethane, too much fat and oil, omega 6 fatty acids, all, can kill the cells, tissues and organs by rupturing or wounding the cell wall directly or by their accumulating on the walls of the vessels and interrupting blood stream. **Anti-aging is the longevity of cell. The longer the cells will alive and be healthy the slower the aging will be. This is always a rule in anti-aging concept. Therefore, the damage to the cell and the damage made by all the components or substances which defect cells is the main causative agents of aging. Therefore, for the maintenance of anti-aging, cells should be protected against all harmful components and substances. That is why anti-aging is more than a stretched skin and a fit body appearance. It is the control**

**of blood cholesterol, sugar, fat, trans fatty acids, salt, allergens, carcinogens, heterocyclic amines, urethane, LdL, VLdL, homocyteine, OLdL (oxidised low density lipoprotein or oxidized cholesterol). It is the protection against cardio vascular diseases, diabetes, cancer, osteoporosis and osteomalasia, allergy, renal failure and all other metabolic diseases which result in cell wound and loss and finally aging.** While cosmetics are deprived from soluble vitamins; B and C and have very limited absorption levels by the cells, food appears as one of the most powerful and effective cosmetic with its proper absorption and direct transfer into the blood and protective effect against metabolic diseases mentioned above which may also delay aging.

Not only food is an important anti-aging factor in case of its proper and correct selection and consumption, but also correct food and nutrition is always complementary to the anti-aging and cosmetics. There is always a limit for cosmetics in their antioxidant and anti-aging effects while the body exposures to many free toxic peroxy radicals and their harmful effects by the means of foods and nutrition. Therefore, spending lots of money for cosmetics and herbals or vitamin and mineral tablets never means anything as long as you take aging and harmful food and food components into your body and as long as you do not know which foods and food components are anti-aging. Food, cosmetic, herbal, vitamin and mineral supplements always complete each other as the parts as integrating and forming the whole body of an apple. Fiber rich foods with their fibers, Omega 3 fatty acids with their antioxidant effects, antioxidant rich foods with their vitamins bind excess amount of free toxic peroxy radicals and inhibit free toxic peroxy radical production. They protect the cells, tissues and organs by the concerned effect against damage caused by these radical compounds. This important and protective effect as combined with the use of cosmetics, herbals and vitamin and mineral supplements enhances the anti-aging capacity of cosmetics. Otherwise, cosmetics with their limited absorption and effect can only be restricted within a stretched skin appearance while the cell, tissue and organs as the internal body components may continue to be damaged, wounded and aged. Briefly, the dermis and skin anti-aging in cosmetic origin should always be combined and enhanced by the protective anti-aging of internal body components (organs, bones, muscles..) by anti-aging (much better and correct definition; slow-aging) foods origin which brings 'the protection against metabolic diseases, the longevity and health'

**Glutathione is** one of the greatest antioxidants and anti-agings. This mukoprotein protects each cell against free toxic peroxy radicals and all other harmful metabolites such as cholesterol, sugar, fat, trans fatty acids, salt, allergens, carcinogens, heterocylic amines, urethane, LdL (Low Density Lipoprotein; bad cholesterol), VLdL (Very Low Density Lipoprotein), homocyteine, OLdL (Oxidized Low Density Lipoprotein; oxidized bad cholesterol) by surrounding cell wall and creating a thick wall around it. The harder and thicker is it the harder and much more difficult is the penetration and transfer of these mentioned harmful components into cell. Therefore, one of the fundamentals of anti-aging is glutathione increase around each cell. Especially, it decreases in accordance with aging. Apart from sport and exercise, soluble vitamins; B and C with folate and folic acid, fat soluble vitamins; A, D, E and K, Omega 3 fatty acids, Whey proteins, resveratrol (grape seed extract), Mg, Se, Zn, Ca, soy proteins (Daidzein and Genistein), Isoflavones, DHEA, Ginkgo biloba are the initial food components which increase glutathione. The hardness of the cell wall by the means of glutathione decreases the cell wall damage due to free toxic peroxy radicals and other harmful substances significantly. Therefore, the cell walls and cell membranes have got longer longevity if they have got thicker or sufficient amounts of

glutathione. In fact, most of the cosmetics presently are produced by the additions of Ca, Mg, Se, Zn, A,D,E and K, Gingko biloba, Omega 3 and even folic acid and folate which are scientifically not correct and have not any importance in practice. As mentioned previously, vitamins B and C are water soluble and have got no importance in cosmetics since the carrier of most cosmetics is fat. The same situation exists for folate and folic acid which are water soluble too. Advertisements on TV and radio claims hair growing effect of the special solutions for hair which contain folate and folic acid and B complex They may make some protection for hair up to an extend, but definitely they should not be exaggerated since the mentioned water soluble vitamins in those solutions will not be able to be absorbed from skin while only fat soluble vitamins A, D, E and K will be absorbed from skin by the means of cosmetics. These types of solutions and cosmetics containing water soluble vitamins may be rinsed away from skin surface and hair follicles can be deprived of these substances after a very short time of cosmetic application. B, C, folic acid and folate, all these water soluble vitamins can be absorbed and transferred directly as in the highest yield by the means of foods rich in these vitamins rather than cosmetic solutions. Any risk such as rinsing away from the skin surface of the water soluble vitamin and very negligible penetration of these kinds of solutions into skin cells never happens in case of food intake. Because B, C, folate and folic acid rich foods are directly absorbed through bowel and intestine mucosa and directly transferred into blood. Therefore, their bioavailability is very higher than cosmetics. Only fibers and some antagonists of vitamins might have bound some amount of these vitamins before their absorption but these amounts are not too high since we consume these kinds of foods in greater amounts. Because of the limited surface penetration of vitamins A, D, E and K in cream cosmetics and also limited absorption of vitamins B, C, folate and folic acid in cosmetics, anti-aging effect of cosmetics is very limited. Therefore, the antioxidants of cosmetics can only increase glutathione concentrations especially on surface skin cells but not in deeper tissues. Fortunately and differentially, foods rich in all these vitamins since they can enter into blood directly can increase glutathione concentrations on both surface and deeper tissues. It will be better to remind and underline that anti-aging or in much more correct word; 'slow aging' does not only mean a stretched skin or fit appearance but also it means 'cell, organ and deeper tissue health'. Appearance can only be the result of wellness of organs, deeper tissues and each cell. Otherwise, the result is only appearance rather than anti-aging. One of the best ways of anti-aging is glutathione increase by the means of antioxidants mentioned above and also this approach will be complementary to cosmetic use, enhancing their anti-aging effects at a significantly important rate.

One of the most important organs which act importantly on 'aging' is liver. Any kind of microorganism such as yeast, mold, bacteria and viruses, harmful compounds such as Free toxic peroxy radicals, excess cholesterol, bad cholesterol (LdL), homocytein; a toxic amino acid in blood, excess salt, sugar and fat in blood profile, trans fatty acids, polycyclic aromatic hydrocarbons, food additives; nitrite, nitrate, phosphate, Aspartame, Saccharin and many others and formaldehyde are all inactivated by liver followed by their entrance into body. P-450 cytochrome enzymes in liver play an important role in destruction of these harmful compounds. Destruction may be sulfur adding or oxidation or hydrogenization. In case of any damage in liver tissue caused by free toxic peroxy radicals because of excess oxidative stress, all the mentioned harmful compounds and free toxic peroxy radicals can not be destroyed properly by these mechanisms by liver enzymes which results in entrance of them into blood circulation. The result is severely important since these harmful compounds can reach to far distances and can affect the other tissues and organs harmfully. The concentration of these harmful compounds can accumulate in blood and around cell walls which forms significant

increases in number of wounded cells. Wrinkles are the natural result of the concerned increase of the harmful radicals in the wounded cells. Briefly, liver health is a must for anti-aging since the protection of all cells, tissues and organs depends on it as mentioned above. At this stage, the enrichment of diet with sulfur containing foods may act as anti-aging because of sulfur use in the destruction of these harmful compounds by liver enzymes. As complementary to use of cosmetics and other anti-aging supplements, the consumption of **sulfur rich foods** such as mushroom, cauliflower, garlic, onion, apple, broccoli, Brussels sprout, artichoke, celery, parsley and spinach in plenty amounts can show a significantly important anti-aging effect.

In case of anti-aging, skin health and cosmetics, not only women for ages but also both sex have become the target groups for ages. Especially, fat soluble vitamins which do not rinse away from the skin and can be absorbed through skin up to an extend appear as the initial antioxidants and anti-aging components in composition of these types of products. But also folic acid, folate, vitamins, B complex and C vitamins briefly water soluble antioxidants as the other important antioxidants and anti-aging substances are also used in cosmetics. But scientifically, the use of water soluble antioxidants in fat based cosmetics does not mean anything since they are water soluble and can be rinsed away from skin in time. Their absorption rate is also very limited when compared with fat soluble vitamins because fat soluble vitamins can use fat in cream cosmetics as an inter agent during their absorptions while water soluble antioxidants can not use fat as a transmitter. Therefore, public and media should also be educated about useless of water soluble antioxidant participations in cream cosmetics. On the other hand, in case of fat soluble antioxidant rich cosmetic use as combined with fat soluble vitamin rich nutrition, the required maximum effect can be obtained. For this purpose, apricot, peach, dark green leafy vegetables, avocado, dairy products such as cheese and yogurt, fatty fish meat such as ocean salmon can be consumed. But, it should be underlined importantly that fat soluble vitamin supplements should not be administered since they can cause liver and kidney fattening which results in aging. Therefore, fat soluble vitamins should be supplied only from the combined use of fat soluble antioxidant rich cosmetics and foods but not from supplements. The use of fat soluble antioxidants in cream cosmetics are far from liver and kidney fattening risk since they can only show their effects on skin and at very limited border to enter into blood circulation and they can not reach other organs in great amounts. Note that, in consideration of fat soluble vitamin supplements, there is no standardization that many companies can use exaggeratedly high amounts whereas very few of manufacturers avoid mega doses.

One of the most important musts which should be done in all periods of life is fiber rich food nutrition. Fibers are the insoluble or very poorly soluble fragments of plants; cereals, legumes, fruits and vegetables such as seed, leaf, root and skin. Until 1980-1990, public always preferred to consume fiber free foods. This was due to the misinformation and lack of information about them. Especially, bread and other pasta products were produced by the separation of seed (embryo) part of cereal to be able to avoid from discoloration. Later studies revealed the rich nutritious status of these fragments and by 1980-90s most of pasta products were produced without separation of seed and also skin part which is also rich in B antioxidants, protein and fiber. The nutritious status of fiber in B complex or in protein may be neglected in consideration of anti-aging since fibers bind them and prevent their absorption through gastro digestive track. Therefore, an important volume of protein and vitamin may be excreted with fibers as in form of feces and urine. But, most of the responsible part of fibers and fiber rich foods is due to its mentioned binding effect. Perhaps non selectively

proteins, vitamins B complex, C, A, D, E, K, Mg, Se, Zn and many other important antioxidants, essential amino acids and essential fats which act importantly in anti-aging are partially bound but most of the harmful compounds such as cholesterol, sugar, fat, trans fatty acids, salt, allergens, carcinogens, heterocyclic amines, urethane, LdL, VLdL, homocyteine, OLdL.. which cause aging are also bound by these compounds. Briefly, we face with one important advantage of fiber rich nutrition that cause anti-aging while one disadvantage like decreasing bioavailability of some anti-aging nutrients. One important approach at this state can be strongly advised that fiber free rich foods should always be consumed 1-2 hours before or after meal times after digestion completed. This approach may minimize the risk of binding of important anti-aging antioxidants, proteins and fats with fibers. Although in medical platform and media, fiber rich pasta products and bread are often advised, they should not be consumed during meal times, but should be consumed separately after sometime out of meal time which can minimize the concerned risk. Two plateful green leafy, one or two slices of fiber bread or similar pasta product consumption in everyday life can bind harmful compounds responsible for aging before their absorption and can act strongly as anti-oxidant. As it has just been mentioned, these compounds should be avoided during meal times since they can also bind important anti-aging nutrients of meal.

Proteins as the structural components of blood, hormone, muscle, bone, nerve, cell, antibody and enzymes have got an important role, not only for the preparation and production but also for aging and anti-aging. These nutrients are divided into two groups in origin as animal and plant origin proteins. Since the important and essential amino acids such as lysine, valine and methionine are exist completely and in sufficient amounts in the composition of animal origin proteins, they are unrivaled. Lysine which is required especially for body length, valin for nerve tissue, methionine for muscle development, phenylalanine and arginine for blood, tyrosine and tryptophan for liver functions are exist in completely high amounts in these proteins but also in higher bioavailability because animal origin proteins are free of fiber. Especially, fiber existence that binds the important essential amino acids and absence of protein carriers in digestion decreases absorption degree of plant origin proteins. Therefore, especially for child, elderly and sport target groups, nutrition rich in animal proteins are vitally important. On the other hand, in the consideration of anti-aging proteins, animal origin proteins do not appear as beneficial since they are always integrated with fat in less or high amounts. Animal fat contains cholesterol and bad cholesterol in various amounts. Animal fat is also a great source of free toxic peroxy radical compounds. The significantly important role of animal origin rich nutrition has always been responsible for cardiovascular diseases and disorders including stroke and hypertension, diabetes, cancer and aging with its cholesterol and free toxic peroxy radical producing capacity. In fact, animal proteins with its mentioned important and essential amino acids can not be accepted as responsible for these adverse effects since they stimulate cell division and can even enhance the anti-aging effect. But cholesterol, bad cholesterol, homocystein and high triglyceride counts in these proteins act as aging opposite to animal origin proteins. The separation or simmering process prior to cooking and preparation can be very helpful in reduction of these harmful compounds. Nevertheless, some cholesterol, bad cholesterol and homocystein still continue to exist since they are tightly integrated with the meat tissue. Except elderly, sport and child target groups, others above 30 should prefer plant origin proteins. This approach can help the reduction in the rate of free toxic peroxy radical production, cholesterol and homocystein amounts in blood profile and can enhance anti-aging effect. But while doing this, lack of these high quality proteins with their vitally important essential amino acids may result in lack of progress and development especially cell and tissue repair. The concerned result may even act as

an important aging factor. Briefly, elimination of animal origin proteins from nutrition can act as anti-aging by decreasing cholesterol, bad cholesterol and homocystein, but also act as aging because of deprivation of cell and tissue progress and repair. The solution at this stage seems the addition of fish meat as the main protein source while excluding red meat origin proteins. The great antioxidant capacity of fish meat with its Omega 3, selenium, zinc, calcium, magnesium, and vitamins A, D, E and K may reduce cholesterol, bad cholesterol and homocystein amounts in blood profile and acts as anti-aging. The concerned approach which uses fish meat as the main animal origin protein source instead of red meat and poultry can contribute at a significantly important level to the anti-aging effect of cosmetics. But fish meat is not the only animal origin protein act as anti-aging. Another important animal origin protein is whey proteins.

Although animal origin proteins and especially dairy products in high fat amount are aging products because of their cholesterol, trans fatty acid, saturated fatty acid, Omega 6 fatty acid, homocyteine and low density lipoprotein (bad cholesterol), the evaluation of them and approach to them in concept of anti-aging seems very complicated because same products are also rich sources of fat soluble vitamins (A, D, E and K), Mg, whey proteins, essential amino acids and peptides which all act as anti-aging. The question at this point is whether they are aging or anti-aging. The answer depends on some important factors such as life style, nutrition type, genetic factors, and especially age. Age is more important than other factors since younger can highly tolerate to cholesterol and low density lipoprotein (bad cholesterol) than older by converting cholesterol and bad cholesterol to bile acids (important in protein digestion), testosterone (important not only for sexuality but also muscle and bone production), adrenalin (responsible for vessel tonicity), Vitamin D (one of the greatest antioxidants, anti-aging), serotonin (relaxing hormone and also an anti-aging), dopamine (for muscle coordination-another anti-aging) and methionine (sleep improver-another anti-aging). Not only younger age but also an active life and sport and exercise can convert significantly high amounts of cholesterol and bad cholesterol to testosterone. Testosterone is anti-aging because of its great muscle improver potential. An active person, for example a sales manager who is used to travelling long distances, a person who makes one hour high velocity fitness everyday can tolerate even two or three eggs while it may be a disaster for an employee who works in a bank and does not make sport and exercise. Similarly, a seventeen years old boy who is also active, can show higher tolerance to fatty meat and dairy products than seventy years old man by converting excess cholesterol and bad cholesterol to testosterone, vitamin D, bile acids, serotonin, dopamine and melatonin. Briefly, even fatty dairy products can act as anti-aging with their fat soluble vitamins (A,D,E and K), Mg, whey proteins, essential amino acids and peptides as long as a person is active, young, close to sport and exercise, free of alcohol and tobacco use, free of cardio diseases and diabetes and if not obese. If age is older than thirties and if person is far from sport and exercise, if alcohol, tobacco use, cardio diseases and diabetes accompanied with life, even minute amounts of omega 6, cholesterol, bad cholesterol and homocystein can act as aging. Under these circumstances, fatty dairy products and milk and fatty red meat and its products should be avoided as also indicated in previous paragraph.

**Whey proteins** are the proteins in water part of milk. They are rich in cheese and yogurt sera. Until 1990s, because of the great concern and preference of milk protein casein as one of the great proteins, these proteins were neglected. Researches indicated that they are even superior to casein, meat proteins, in high bioavailability and complete in essential amino acids. There is one attribute which makes them greater than others in anti-aging concept is that they are the only

animal origin proteins which can decrease cholesterol besides fish meat proteins. Another advantage of these proteins in anti-aging is their glutathione increasing effect. As indicated previously, glutathione is an important antioxidant barrier around cell wall. It acts as anti-aging by interrupting the entrance of free toxic peroxy radicals, cholesterol, homocyteine, allergen, salt, trans fatty acid, bad cholesterol, nitrite, nitrate, saccharin, aspartame and other carcinogen food additives and many other harmful substances. Whey proteins alpha lactalbumin, beta lactoglobulin, laktoferrin and immunoglobulin are used in the production of antibodies which defense immune system against diseases and disorders. Therefore, participation of these proteins can act as anti-aging by supplying immune system. Any kind of application, nutrient or approach such as whey proteins which strength immune system always results in anti-aging because disease and disorder are the main corner stones which cause aging.

**A huge number of people all over the world are using herbal products and food supplements for preventive, therapeutic and anti-aging purposes. The manufacturers of these supplements are not required to submit proof of safety and efficacy in many countries. The adverse effects and the interactions among food, herbal remedy and medicine are largely unknown. Ginkgo biloba, ginseng, soy and soy products, tablets of ginger, garlic and parsley, Co-enzyme Q10, Omega 3, Vitamin C and B, Coumadin, Aspirin and Tabochan which may act as anti-aging in case of their correct use and application under control. But they can act as anti-clotting and increase internal bleeding risk in case of their combined use. Ginseng, St. Jhon's Wort (*Hpericum perforatum*), Ephedrine and Kava are commonly preferred anti-aging herbals but have got important side effects such as nausea, dizziness, hypertension, myocardial dysfunction, arrhythmia, insomnia and nervousness which are not well known by public. One of the important threatening concerns is the exaggeration of anti-aging food supplements and herbal remedies without consideration of their interactions with medicines as in case of Omega 3 use. The very long chain Polyunsaturated Fatty Acids (PUFAs) ($C_{18}$-$C_{22}$) and n-3 omega PUFAs, seem to be widely accepted in today's life and nutrition style because of their beneficial effects on metabolism. (Schacky et al. 1999; Schoene 2001; Shoda et al. 1996; Simopoulos et al. 1991; Simopoulos 2002; Brude et al. 1997; Clarke et al. 1999; Wenefried et al. 2001). Especially, the protective effect of the concerned fatty acids, against cardiovascular and inflammatory diseases including cancer have made them incomparably more beneficial than other dietetics. Unfortunately, lack of studies related to their effect on serum profile on human metabolism, the application dose and the side effects with/without omega 6 PUFAs, have left us with crucial questions to be clarified. We still do not know the correct doses of n-3 omega with their possible contraindications when combined with other medicines and supplements. But all of interactions among food, medicine and herbal are not all in negative manner. Calcium tablet (another important anti-aging with it's contribute to bone and muscle progress) alone intake is ineffective if not taken as combined with one of C, B,A, D, Mg, Se and Zn.** Although solutions are limited because of countless interactions among food, herbal and medicine, we have made a start to gain an important data as related to some of these important interactions. All scientific findings claim one important result. The doctor should know and make the decision about anti-aging food supplement and herbal medicine as in cooperation with food engineers and dietitians and also patient should determine the foods which may cause interaction with the concerned medicine.

**Magnesium** is an important anti-aging mineral since it enters into more than 300 enzymes which regulate energy

producing biochemical reactions. Whole grain and non refined cereal products and dark green leafy vegetables (because of their chlorophyll) and also nuts should be included to anti-aging diets.

**Selenium** is another important anti-aging mineral, but its contribution to anti-aging is special with its important participation with thyroid production. Thyroid is one of the most important hormones since it regulates fat and sugar entrance into cell. Therefore, nutrition of cell, energy production and sugar and fat control in blood profile depend on thyroid hormone. For this reason, selenium insufficiency can result in fattening and diabetes which are the strongest predisposed factors of aging. Selenium rich foods are; nuts, non-refined and whole cereals, fish and marine and soy and soy products which should be a part of anti-aging diet.

**Zinc** is another mineral which enters into the structure of enzymes that are required for cell division. In case of its deficiency, skin problems like acne and eczema, delayed wound healing and hair loss may form. Therefore dairy products, lentils, beans, yeast and yeast added products, seeds and whole grain products, fish and marine should be included to anti-aging diet.

One of the great disadvantages we face with about **Vitamin D** and anti-aging is the restricted number of vitamin D rich foods on earth. There are two basic types of vitamin D. Ergosterol is the basic building block of vitamin D in plants. Cholesterol is the basic building block of vitamin D in humans. When ultraviolet light from the sun hits the leaf of a plant, ergosterol is converted into ergocalciferol, or vitamin $D_2$. When ultraviolet light hits the cells of our skin, one form of cholesterol found in our skin cells - called 7-dehydrocholesterol - can be converted into cholecalciferol, a form of vitamin $D_3$. Finally $D_2$ and $D_3$ are converted to main vitamin D form in body by liver and released into blood by the same organ. Vitamin D deficiency stimulates parathyroid hormones and causes over function of these hormones which results in calcium release from the bones into blood. This situation increases the risk of atherosclerosis (calcification of vessel) and by the means of atherosclerosis, causes hypertension and aging. Hypertension is always the base of aging since it interrupts sufficient amount of blood entrance into cell. Calcium loss in bone density increases calcium concentration in blood and calcium competes with sugar and limits sugar entrance into cell. Therefore, parathyroidism due to vitamin D deficiency may cause diabetes which is a well known contributor to aging. Whole egg, fish and marine, yeast and yeast added products and drinking milk and fortified cereals should be included to anti-aging diet to decrease the risk of vitamin D deficiency.

Osteokalsin, the surface proteins of cortical bone plays the most important role by taking free calcium from blood and sticking it to cortex part of bone followed by their stimulation by the effect of sport and exercise or action. The enzymes which are required for the production of these proteins are produced by this vitamin. Therefore, vitamin K deficiency may result in osteokalsin deficiency and osteoporosis. Osteoporosis may result in osteomalacia that both are the significantly important contributors to aging. For this reason, vitamin K rich foods such as dark green leafy (asparagus, spinach, broccoli, Brussels sprout, parsley), celery, kelp, Avocado, Tomato, cauliflower, beans, peppers, papaya, strawberry and cabbage should be included to anti-aging diet to avoid from the deficiency of this important anti-aging vitamin.

**Vitamin E (tocopherols)** appear as one of the most important anti-aging nutrients since it protects skin cells against the damage of UV light. Vitamin E from vitamin E rich foods can reach to skin followed by its absorption and is oxidized by UV instead of fat deposits of skin. This antioxidant effect of vitamin E ables the control of free toxic peroxy radicals in skin and therefore it acts directly as anti-aging. Therefore, a diet and life style deprived of vitamin K is incomplete in desired effect. K rich foods are seeds, nuts and dark green leafy vegetables.

$B_{12}$ vitamin not only enters into structure of enzymes which are required for DNA synthesis of red blood cells and their proliferation but also it acts importantly in formation of myelin coat. Myelin coat is a protective coat which surrounds nerve and protects it against harmful effects of free toxic peroxy radicals and other harmful compounds. Therefore, this vitamin is required both for the protection against pernicious anemia and also neurological disorders. The proliferation and healing of cells and also skin cells can only be possible by blood supply. Therefore, pernicious anemia is always one of the causes of aging by interrupting of cell nutrition and proliferation which may result in aging. For this reason, animal origin products especially liver, kidney, meat, fish meat, drinking milk, cheese and egg should not be neglected. Note that plant origin foods are always deprived of this vitamin since $B_{12}$ is taken into body by the means of very small organisms called bacteria and produced as an end product followed by fermentation by bacteria in gastro digestive track of animal and human. Therefore, plant origin products always have got very minute amounts of this important vitamin ( Cowie et al. 1997; Braunwald .1997; Poehlman et al.1994; Riley and Elborn1991;Bates et al. 1999).

**Folic acid and folate**, as being differentially from $B_{12}$, they do not participate in the formation of myelin coat, but they are in synergism with $B_{12}$ vitamin in the synthesis of DNA of red blood cells. The anti-aging effect of $B_{12}$ can be increased if $B_{12}$ vitamin rich foods are consumed as combined with folate and folic acid rich foods such as; beans, peas, lettuces, seeds, spinach, green leafy and citrus fruits (Khot et al. 2003; Greenland et al. 2003; Hansson 2005; Willerson and Ridker 2004; Smith et al. 2004).

Briefly, cosmetics and other anti-aging supplements including herbals, vitamins and minerals have appeared as a tremendously strong and big industry, serving to protect human against the harmful effects of free toxic peroxy radicals. Unfortunately, most of them administer water soluble antioxidants which may rinse away from skin surface or fat which can not penetrate into the deeper tissues properly. Therefore, a lifestyle which refers to only cosmetics and similar anti-aging supplements will have to be limited in effect. As combined, a conscious regulation about lifestyle and nutrition should be made. The main steps to enhance the anti-aging effect of cosmetics and other anti-aging supplements may be summarized as follows;

1. Antioxidant rich foods which decrease the production rate of free toxic peroxy radicals,

2. Increase of the consumption rate of fiber and fiber rich products; note that consumption should be in different times with protein and antioxidant rich foods,

3. Fish meat, shellfish and whey proteins should be dominated to supply high quality protein requirement in higher

bioavailability and in lower oxidative stress while other protein supplies may be integrated with high or low amount of oxidants,

4. Especially $B_{12}$, B komplex, vitamin C, folate and folic acid, the water soluble ones which are very limited in amount and proper effect in many of cosmetics should be supplied from green leafy and citrus fruits in daily life,

5. It should not be neglected that milk and dairy products should not be in high fat amounts but also not fatless since fat is the media for fat soluble antioxidants such as vitamins A, D, E and K. Therefore, milk and dairy products in low fat amounts should be preferred while doing daily sport and exercise,

6. Some of the herbal remedies and food supplements such as Omega 3, Gingko biloba, ephedrine, kava, Ginseng, St. John's Wort, Echinacea, Valerian tablets and also parsley, garlic, coriander and ginger tablets as in their combined and alone uses, may have got serious side effects and interactions. For this reason, the selection and use of the concerned herbal remedies or food supplements should be under doctor control but rather than these supplements, foods in their native forms should be preferred, and finally,

7. Always natural should be preferred rather than processed, since processed foods usually have got higher amounts of salt, nitrite, nitrate, phosphate, potassium, free toxic peroxy radical, sugar, fat, trans fatty acids, polycyclic aromatic hydrocarbons, benzapyren and formaldehyde all of which increase the risk of oxidative stress and metabolic disease occurrence rate such as cancer, diabetes and hepatitis, but also aging.

# FOOD AND LIFESTYLE AGAINST HYPERTENSION:

Hypertension is the increase of pressure which is applied on the wall of blood vessel. Under normal conditions, blood applies a pressure on the wall as a natural result of a liquid material, blood. The blood is pumped by the contraction of cardiac muscle into the vessel which will circulate all other parts of the body. The blood accumulated in the cavities of heart applies a pressure during this plumb. This first pressure applied on the wall of cardiac vessel as a result of bthe first lood pump is very higher which is called as systolic pressure. That should never be higher than 12. After contraction of cardiac muscle to be able to pump blood into cardiac vessel, the same cardiac muscles pass to the relaxation stage. As an expected result, the blood residues left in blood vessels turn back into the cavities in heart due to the relaxation of cardiac muscles and the pressure of the blood during this phase is much lower than systolic pressure. This pressure is called as diastolic pressure and should never be higher than 8. Briefly, your tension should be 12-8 (12 systolic and 8 diastolic) and should never be higher than 12 and lower than 8. What happens if they are out of these limits? First, the higher levels of these two counts indicate to a higher pressure applied by the blood on the wall of blood vessel while blood is pumped into the vessel and turned back into the cavities of heart. How can the pressure of blood on the wall of vessel increase? One of the initial and most common factors is calcification of vessels, in other words atherosclerosis. If the coronary vessel is calcified and its diameter decreases due to the calcification (atherosclerosis), the blood in it can not pass, can not be easily pumped, accumulates in the cavity of blood vessel and apply the mechanical pressure against the wall of blood vessel. As a natural result, the pressure of blood increases which is called as hypertension. In conclusion, the protection against hypertension can only be possible by the protection against calcification. I indicated in every part of the book that you should target to keep blood liquid. In other words, you should keep its density lower as long as you live. All antioxidants help for diluting blood and keeping its density lower. Omega 3 fatty acids, Ginkgo biloba, selenium, calcium, magnesium, zinc, whey proteins and all vitamins which are strong antioxidants at the same time, A, B, C, D, E and K dilute blood. Cholesterol and bad cholesterol and homocyteine decrease in amount by the effect of the mentioned antioxidant vitamins and minerals and whey proteins which contribute a natural blood thinning. The consumption of plenty amounts of antioxidants decrease the production rate of toxic radicals. The decrease of toxic radicals in your blood by the means of antioxidants also contributes to thin the blood. On the other hand, alcohol and alcohol containing products are blood thinning which can mislead people and be misunderstood by many people. Alcohol is produced by the fermentation of carbohydrates by yeast, a single cell organism. Yeast is added into the carbohydrate containing food source which may be rice, grape, barley or any other cereal, fruit, vegy, briefly a carbohydrate source. These single cell creatures convert carbohydrate into organic acids, carbon dioxide and alcohol. The production principle of bread making is also based on fermentation by yeast. Yeast, *Saccharomyces cerevisiae*, is added into the flour as combined with water and salt. Yeast produces alcohol and carbon dioxide in dough during fermentation by yeast. Carbon dioxide enlarges the dough volume and forms baking while alcohol is eliminated by the effect of heat during baking. These single cell creatures change the structure of carbohydrates and decompose them and convert them into the smallest structural components called glucose. Followed by, glucose is decomposed. On the other hand, protein residues and fat residues in the same plant content are decomposed by the yeast activity. During the decomposition of the complex nutrients by yeast, some important antioxidant compounds pass into the liquid part, to the end product, which is alcoholic beverage itself. The most known example is wine that many antioxidants in grape like resveratrol and quercetin pass from the

skin and seed part of grape into alcoholic beverage. Briefly, wine may be defined as a rich product in antioxidant capacity. Hence, there are many researches and claims that alcohol improves cardiovascular health, dilutes blood, gives an ease to the blood circulation and helps for preventing hypertension. Media and research claims always present the alcoholic beverages like wine with their effects which support cardiovascular health. On the other hand, the regular consumption of alcohol even in minute amounts has been shown as toxic on brain tissue and liver as I mentioned in the related part. You may heal one part of your body but you will have wounded another important part of your body at the same time. For this reason, you should consider and evaluate a food product from every point, not with its one side. Briefly, no matter how it improves your cardiovascular health and may help for preventing against hypertension, regular consumptions of alcoholic beverages can not be advised in a healthy life style and nutrition. Alcohol and its status in nutrition will be discussed in more detailed in the related part.

The protein supply and the type of protein source is another important contributor in the formation and progress of hypertension. Under normal conditions, proteins have never got an effect on the formation of hypertension, other cardiovascular diseases and disorders and also many other important metabolic diseases and disorders as long as they are not consumed in large quantities. Large quantities may be decomposed by liver and purine base products may be produced in body. The compounds may accumulate in joints and can cause gout disease which will be analysed in the related chapter of the book. But, normally, proteins do not cause any important metabolic disease and disorder as long as they are consumed in large quantities. So, proteins are always concerned in cholesterol, bad cholesterol origin diseases, obesity, cancer, diabetes and cardiovascular diseases and disorders. But the real answer is not the proteins themselves. Instead, the answer is the fats and oils which are so closely integrated with proteins in food structure. Many times, you may think that you can reduce this risk by buying low fatty or non fatty food products but no matter how you pay attention in the selection of food products, less or high amounts of fat or oil will be definitely exist in the product since proteins and fats and oils are exist in the product as closely integrated with each other. Although that is low fatty, even fattles meat and fatless ground red meat contains some invisible fat globules. There is no process to separate these invisible fat globules which are very closely integrated with meat proteins including heat, simmering, grilling, smoking, curing and fermentation. Some of these food processes can only decrease the amount of fat or oil but can never completely remove them. For all these reasons, the dominance of especially red meat and its products, milk and dairy products and poultry and its products increase the risk for the occurrence of cardiovascular diseases like hypertension, stroke, diabetes, cancer and many other metabolic diseases and disorders not because proteins but fats and oils they contain which are closely integrated to the proteins in the food structure. As long as you consume these animal origin foods in large quantities, the fat and oil globules especially cholesterol and bad cholesterol may adhere to the walls of the vessels and can accumulate and decrease the diameter size of blood vessel and hence may cause hypertension. Be careful that hypertension may be concerned as a disease or as the precursor, the starting point, for many other metabolic diseases and disorders since it interrupts the blood supply into tissues and organs. Hypertension is the predisposed factor that prepares all the factors for the progress of hypertension. You should always remember that two factors are very important in the prevention against hypertension. 1. Your blood density should not be too high; its solid concentration should not be high. You should keep blood in low density. You should consume blood thinning foods like onion, garlic, celery, artichoke, tomato, apple, strawberry, sweet potato, mushroom, all green leafy vegetables like parsley, lettuce, fatty fish, whey proteins, seasonings

(spices) especially ginger and coriander, citrus fruits like orange, lemon and kiwi. 2. You should consume antioxidant and fiber rich foods. Fibers directly bind excess of cholesterol, bad cholesterol, homocyteine, salt, trans fatty acids, polycyclic aromatic hydrocarbons, saturated and unsaturated fatty acids, nitrite and nitrate and also many other carcinogens, biogenic amines which are the compounds all of which may adhere to the walls of blood vessels and accumulate there, decrease the diameter of blood vessel and may cause hypertension. The more fiber consumption, the more you can bind these harmful compounds and so the thinner you can keep the blood and decrease the solid concentration of blood. Antioxidants; vitamins A, B, C, D, E and K, folate, folic acid, the minerals selenium, magnesium, calcium and zinc, ginkgo biloba, omega 3 fatty acids, isoflavone rich foods especially two food groups; nuts up to an extend and spices. Always remember that salt which is composed of two minerals sodium and chlor is oxidant and increase the rate of oxidation indirectly since these minerals give electron and trigger the formation of free toxic peroxy radical compounds. You should minimize salt and the consumption of all food products rich in salt content. For example cured products like pickles are produced by adding plenty amounts of salt so they are very rich in salt content. Instead, you can produce your own pickle yourself at home by using very low amount of salt while keeping the amount of garlic and vinegar higher. Remember that your daily salt intake should not exceed one teaspoonful. All the salt content which you require for all your body functions are already exist in foods in their natural form. You do not need to add any extra salt during the preparations of meals. But, unfortunately we are used to adding salt in plenty amounts because of its great contribute to flavor, taste and aroma of the food product and meal. But, if you use spices like coriander, ginger, mint, cinnamon, cumin, black pepper and red pepper instead salt, you can replace the missing flavor, taste and aroma of your meal. The important attribute and health benefit of spices is their rich isoflavone content. These isoflavones will help for decreasing cholesterol and bad cholesterol while protecting you against cancer. Isoflavones and their rich sources; nuts and spices (seasonings) thin the blood and helps for diluting blood. Therefore, prevention against hypertension may be possible by the increase of isoflavones; nuts and seasonings and reducing salt content in diet. Isoflavones suppress TNF, an important protein substance which acts importantly in the progress of cancer. Isoflavones are strong antioxidants which increase the concentration of the protective barrier, glutathione, which covers the surround of cell. Hence, isoflavones are the substances which are one of the initial parts of anti-aging. They dilate blood vessels and increase their elasticity. All these effects can help for the easier blood circulation. Hypertension can be prevented or the risk for the occurrence of hypertension may be lower by the participation of isoflavones in the diet. Unfortunately, many of us know these effects of isoflavones and many of us do consume rich in isoflavones. **It is very easy to understand whether a food or food product is rich in isoflavone or not. The initial indicator is the color. The dark, intense color tones are the clearest indicator for the rich isoflavone content. Spices are colorful and they have got intense and characteristic color tones. All dark green leafy vegetables, all fruits having dark and intense red, yellow, blue, green color tones are the rich sources of isoflavones because isoflavones are the coloring compounds of plant origin foods. A dark green leafy vegetable is green because of the chlorophyll, another important isoflavone, responsible for the green color of the plant. Thus, the rich concentration of isoflavones causes to a dense and characteristic, strong color formation in the plant.**

Animal origin proteins are one of the rich sources of fats and oils. The high quality protein and amino acid content of these products should never be disregarded, especially in youth, elderly and childhood. But, after forties, the body, its muscles, hormones, bones, blood, brain, all organs and tissues will have complete their progress by the functions of these

high quality proteins and amino acids in animal origin. We do know presently a correct nutrition style confirmed by food science and nutrition that the nutrition style and life style should not be fixed and should be able to change with aging. What I mean is that the nutrition for youth is not the same with the nutrition of elderly. A young body always requires more protein in animal origin since muscles, bones, blood and hormone systems are still in progress. The bones are supposed to be taller while muscles are supposed to gain weight and strong. Especially proteins in animal origin which are complete in all essential amino acids are essential for these aims. Also, the rich content of B vitamins, especially $B_{12}$, folate and folic acid, calcium, selenium, zinc and especially iron in high quality in meat and meat origin products support the progress of muscles, blood and hormone production while $B_{12}$, folate, folic acid and magnesium in rich contents in meat and meat origin products may help for prevention against anemia. Although these types of animal origin products including milk and dairy products, poultry, fish and marine are closely integrated with fats and oils and may have got a potential risk from the point of hypertension and health, the tolerance of a young body against cholesterol, bad cholesterol, fats and oils in these products are always higher than the other age groups which I had also mentioned in other parts of the book. A young body can easily deplete excess amounts of fats, oils, cholesterol and bad cholesterol by converting them into beneficial substances like vitamin D, adrenalin and noradrenaline, bile acids, estrogen, testosterone, serotonin, melatonin, omega 3 and dopamine. The production rate of all the mentioned beneficial and essential substances is very high for a young body when compared with a body at forties. This is the main reason for the higher tolerance of a young body to fat, oil, cholesterol and bad cholesterol. Briefly, the animal origin protein dominated nutrition should have been followed by children and youth. Opposite, after 30, the person should be conscious that the tolerance of the body to cholesterol, bad cholesterol, fat and oil tends to be lower and hence, the restriction in fat, oil and cholesterol intake should be done immediately especially during marketing and in the selection of food products.

The restriction of fats, oils, cholesterol and bad cholesterol in the prevention against hypertension will always give you the benefit to be protected against many other diseases and disorders, especially renal failure, stroke, Alzheimer and Parkinson since the calcified vessels by the accumulation of the hazardous mentioned substances on the walls of blood vessels is the main reason for these diseases like hypertension. A person with hypertension should select the products very low in fat or oil. Especially, red meat and its products and also milk and dairy products are at the top of the higher risk food products from the point of health and anti-aging with their significantly important cholesterol, bad cholesterol, homocyteine and saturated fat content. **Do not forget that, when you buy a red meat bulk, you should better select it from the back and round of the carcass since leg, round and loin parts are the red meat parts which have got the lowest connective tissue (collagen) and highest water content. Hence, their texture are much better, juiciness is much better and these parts are lower in cholesterol, saturated fat and bad cholesterol when compared with the front part, chest, short rib and short plate parts. The initial advantage of the back parts, loin and leg parts is the superficial fat covers. The fat always accumulates on the surface of these parts (the bulks in the fourth order of the picture below) so that you can easily separate it when you come home manually by using a knife. But the other parts contain fat not on surface, instead inside, as closely integrated with protein particles.**

In the fat and oil restriction, fish oils, fish and marine products are an exception that only omega 3 fatty acids which are exist in great contents in fish and marine origin products decrease cholesterol. Omega 3 fatty acids in fish and marine

dilate blood vessels, thin the blood. These fatty acids are antioxidant and decrease free toxic peroxy radical production rate and therefore decrease the accumulation rate of toxic radicals on the walls of blood vessels which also makes an important protection against hypertension. I want to mark some important points which are very effective in decreasing hypertension and protection against hypertension some of which were also indicated in other parts of the book.

- Calcium is not only an essential mineral which protects you against osteoporosis and osteomalacia but it also helps for decreasing cholesterol.

- Alcohol, salt, fried products, fast food, cured products, processed products, canned products and nicotine are the great contributors to hypertension.

- Blood diluting antioxidant vitamins A, B, C, D, E and K, Coenzyme Q10, Ginkgo biloba, Omega 3 fatty acids, and minerals; calcium, magnesium, selenium and zinc have got hypertension decreasing effects.

- Preference of natural and raw food consumption where it is possible like vegetable and fruit mix salads is a cornerstone to protect you against hypertension.

- No matter how they are low in fat, red meat and its products are at the top of the high risk foods in the consideration of hypertension.

- Spice replacement with salt is another cornerstone and a very effective protective action to lower your hypertension with the rich isoflavone content of spices. Spices are blood thinning substances and vasodilators (the substances that increase the diameter size of the vessel).

- The tablets of; Ginkgo biloba, omega 3, Coenzyme Q10, selenium, magnesium, zinc, vitamin C, arginine (an amino acid), calcium, ginger, coriander, celery, artichoke, strawberry, leukopen, resveratrol (grape seed extract) may be administered to lower hypertension. But, only one of them should be decided and supplied since two of them if taken as combined daily, may cause internal bleeding risk since all of them are anticoagulant (anti-clotting, blood thinning).

- Regular sport and exercise is an essential in the prevention against hypertension since sport and exercise can melt the accumulated fat and decrease its concentration in muscle and blood by converting it into energy and eliminate this energy out of body before its conversion into fat.

- Fibers soluble or insoluble bind the excess of cholesterol, bad cholesterol, saturated and unsaturated fat and excrete them out of body as in the form of urine and feces. Thus, fiber rich nutrition is always very protective against hypertension and many other diseases and disorders in cholesterol and hypertension origin.

# DIETARY ETHANOL: SHOULD IT BE INCLUDED IN A HEALTHY LIFE STYLE AND NUTRITION?

Dietary ethanol which is taken into body by the means of food products is first absorbed in stomach and intestine and then transferred into blood by 80 % while 2 % is inhaled by lungs and up to 20 % accumulates in stomach. The blood ethanol is converted into lactate and lactate is converted into pyruvate. The end product pyruvate is converted into uric acid by bowel and excreted out of body by the means of urine. On the other hand, blood ethanol participates in the structure of acetyl-CoA which is a compound vitally acts in energy production. Alcohol dehydrogenase, the enzyme in blood and tissues produces NADH, NAD, acetaldehyde (oxygen radicals), new antigens, fibril compounds and some end products formed by lipid oxidation. The reason for the explanation of alcohol metabolism with its initial details is necessary to be able to understand its effects on body since these effects are closely related to the metabolism. As it can clearly be understood, ethanol taken into body by the means of foods first accumulates up to 80 % in blood and enters into the structure of acetyl-CoA, the first compound to produce energy in body which means that alcohol gives energy. But, its energy potential may cause a great energy loss in the long run. People who consumes alcohol regularly in moderate or plenty amounts always talk about its energy benefit. While ethanol contributes to acetyl-CoA reproductions and energy production, it is constantly converted into acetaldehyde which triggers oxidation and free toxic peroxy radical production by forming oxygen radicals. The worst side is the formation of fibril compounds which defects tissues especially lungs and liver and new antigens which weak immune system by these free toxic radical compounds. Lactate which is produced by ethanol in blood is converted into pyruvate and uric acid which results in increase of uric acid concentration in blood increases the risk for the formation of gout disease while increasing the risk of renal failure because uric acid is one of the worse compounds which can easily calcify the filtering vessels of kidneys.

Uric acid crystals which accumulate in blood produced by blood ethanol shows its adverse effect not only on kidneys but also on brain that brain is the initial organ which is most adversely affected by dietary ethanol.

The conversion of dietary ethanol into uric acid, antigens, free toxic peroxy radical compounds, oxygen radicals and fibril compounds also exist in the cells of stomach which covers the surface of stomach. Hence, stomach cells are defected, wounded by the effect of these harmful substances while some of them die. The wounded, inflammatory stomach surface cells which form by the effect of ethanol and its decomposition in stomach cells is the main reason for gastritis and ulcer formation due to ethanol consumption.

The brain damage due to alcohol shows its adverse effects first with relieving anxiety followed by slur speech. Coordination in walking is reduced, judgment is impaired and finally uninhibited behaviour is encouraged. Ethanol also triggers the production of diuretic hormone while inhibiting antidiuretic hormone which sometimes may cause strong dehydration in body. Note that water is the natural media in each cell for the process of oxidation and energy production by oxidation. Cells can not produce oxidation and energy production without energy and die as a natural result of dehydration. Briefly, diuretic effect of alcohol will have killed many cells in our body due to energy loss and dehydration.

Two initial and critic questions which are commonly discussed in alcohol issue are 1. What amount is moderate? and 2. What amount is toxic? Although many of people use the terms of 'moderate amounts', none of us know these moderate amounts!

An important factor in alcohol toxemia is the residue of ethanol as mg per ml. The table below shows the mg residue concentration per ml and the symptoms which are observed in those concentrations. It seems very clear that the toxicity and the severity increase with the increase in alcohol residue concentration per ml of blood. For example, 50 ml ethanol residue/ml can be metabolized within 2 or 3 h while no symptom is observed but 200-250 mg/ml, 300,350 and 500 mg/ml can be metabolized over 6-10 hours and days while increasing the risk of lethargic behaviour and coma.

Another important factor which affects the toxicity of alcohol is the time period and the daily amount of alcohol consumption. 15 year alcohol consumption as approximately 80 g/day has been claimed as a reason to form cirrhosis (the defects on liver cells and the loss of these cells followed by inflammation or toxicity in liver). In fact, the dietary ethanol amounts do not need to be higher to be able to cause toxic effects. Even 20 and 40 g daily alcohol consumptions may cause cirrhosis in women and men, respectively.

The toxicity of liver by ethanol first decreases the concentration of thiamine coenzyme, an enzyme which regulates the production of thiamine. Thiamine, an important member of B complex, enters into the structure of enzymes which are responsible for nerve cell and blood cell proliferation. Especially, nerve cells decrease in number and become susceptible to the defects caused by free toxic radicals and other harmful compounds followed by thiamine deficiency. Retinol, a vitamin A substance, is mobilized from liver bound to retinol binding protein (RBP). But, the damage in liver by ethanol directly decreases the concentration of retinol binding protein which in turn decreases vitamin A concentration and may cause vitamin A deficiency. The vitamin is vitally important in boosting immune system and also for visual health. Cornea, the layer which covers the surface of eye, is covered by a layer made by a solid particle (keratin) in vitamin A deficiency, the thickness of the layer increases which may not be treated. The disorder is called as Xerophthalmia. Briefly, ethanol toxemia may also cause to visual health problems like cataract and Xeropthalmia by causing retinol and vitamin A deficiency. Another important disorder due to ethanol toxicity is Pellagra. Ethanol decreases the absorption level of niacin and may cause niacin deficiency. Pellagra which is caused by niacin deficiency is an important disease since blood and muscle cells decrease and energy loss may appear.

The liver damage in ethanol toxicity shows its one of adverse effects on bones and muscles since the defected liver tissue can not convert the precursor of vitamin D, cole and ergocalciferol into vitamin D. Thus, vitamin D deficiency is inevitable in ethanol toxicity. Vitamin D is an essential vitamin which enhances Ca absorption through bowel mucosa. Anyone who aims Ca supplementation by the means of tablets should pay attention that Ca should have been exist in the tablet as combined with vitamin D. **Always Ca and vitamin D combined tablets as in one formula should have been preferred since Ca bioavailability is the highest as combined with vitamin D. Ca can not be bound to bone surface and enter into muscle cells in case of vitamin D deficiency.** In conclusion, ethanol causes vitamin D deficiency and vitamin D deficiency causes Ca deficiency, osteoporosis (density loss in bone) and osteomalacia (density loss in both

bones and muscles) and fibromyalgia (a chronic condition characterized by a widespread pain in muscles, ligaments, tendons as well as fatigue and multiple tender points-places on body where slight pressure causes pain.

In case of regular alcohol consumption, not only vitamin D, members of vitamin B complex, vitamin A but also vitamin C (ascorbic acid) like many others can not be absorbed through bowel mucosa. Instead, there is another energy source, ethanol, which can easily be absorbed instead of vitamins and minerals. Hence, alcohol is always absorbed first, in front of vitamin C and vitamin C deficiency forms. It should be noted that the damage in liver caused by ethanol is another important contributor to vitamin C deficiency since this important vitamin is produced in liver. Vitamin C is a strong, the most versatile vitamin. It increases serotonin (relaxing hormone) and may protect against stress and depression, manic depression and anxiety. It increases dopamine, the hormone responsible for the bone and muscle coordination) and may protect against Parkinson and Alzheimer. The vitamin decreases cholesterol and bad cholesterol while increasing good cholesterol (HdL), dilutes blood and increases the thickness of the antioxidant protective barrier around the cell membranes. Briefly, the vitamin is a strong anti-aging compound and an essential vitamin to improve cardiovascular health. Vitamin C reduces TNF (Tumor Necrosis Factor) which significantly decreases the risk for tumor formation. Vitamin C enters into the enzymes which are responsible for dental restoration and production of collagen (the connective tissue) and hydroxyprolin (the precursor of collagen). Finally, it increases the production of melatonin, the hormone and neurotransmitter which is responsible for sleeping process. Therefore, the vitamin is an essential for the protection against Parkinson, Alzheimer, depression, cardiovascular diseases and disorders like stroke and hypertension, anxiety, insomnia, bone and muscle disorders, immune and dental disorders. This important vitamin is also depleted by the effect of ethanol and one or some of the mentioned diseases and disorders may form due to dietary ethanol consumption and vitamin C deficiency due to ethanol.

Dietary ethanol interrupts the turnover of glutathione, the antioxidant protective layer which protects against many harmful compounds such as cholesterol, salt, sugar, fat, bad cholesterol and homocyteine by surrounding cell membrane. Glutathione decrease shows its effect on body as aging. For this reason, ethanol taken into body by the means of foods has got an aging effect in the long run rather than anti-aging.

Dietary ethanol is converted into lactate, pyruvate and then acetaldehyde and acetate. Finally, acetate is converted into fatty acids to build up triglycerides (the complex fatty acids). No matter how dietary ethanol in low or moderate intakes cause blood thinning and cholesterol-bad cholesterol lowering effect, on the other hand, it slowly increases the serum triglyceride concentration which in turn is the initial cause of liver, heart, kidney and pancreas fattening.

One of the hazardous effects of dietary ethanol is on kidneys. Some media claims that the blood thinning and cholesterol and bad cholesterol reducing effect make some protection on kidneys which may be correct. But, acetate and acetaldehyde which accumulate in blood and exceed standard levels are directly converted into uric acid. Uric acid increase is an initial factor in the formation and progress of renal failure since uric acid crystals can easily accumulate on the walls of filtering membranes of kidneys.

The toxicity of dietary alcohol changes according to sex that the thickness and surface area of gastric mucosa, a barrier for preventing alcohol entrance, is more than in women which is the initial reason for the higher tolerance of men to alcohol. For this reason, the equal amount of dietary alcohol may cause more toxic and harmful effects on female body.

The damage caused by dietary ethanol on Fat Binding Proteins (FABP) in the cytosol of hepatocytes (liver cells) increases the free fat globules in liver tissue since the damaged FABPs can not decompose and metabolize complex fat globules. The free fat globules transmitted into liver tissue causes a great damage in liver.

Alcohol is also a great contributer in the formation of malnutrition. 1 g of carbohydrate or 1 g of protein gives 4 Kcal energy while the same amount of fat or oil gives 9 Kcal, the energy amount of more than 2 times of the equal amount of carbohydrate or protein. This excess energy coming from fats and oils sometimes may not be excreted out and it accumulates in body as in the fat form. When the energy status of dietary ethanol is concerned, 1 g of dietary ethanol gives 7 Kcal of energy potential which is very close to the energy potential of fats or oils. People who consume alcohol regularly, no matter how they are in low or moderate amounts, get used to supplying energy from alcohol by accepting it as the initial and the easiest source of energy. Because dietary ethanol gives a high rate of energy easily, proteins, carbohydrates, fats and oils and vitamins which are very close to fats in structure are not properly absorbed through bowel mucosa.

As previously mentioned above, ethanol is converted into acetaldehyde and toxic radicals which are strong inflammatory agents are produced from these toxic radicals. This process shows itself in a different manner in liver tissue that microsomal ethanol oxidative system in liver synthesis collagen by using these toxic radicals. Hence, collagen starts to accumulate in liver among liver cells which results in liver failure. The mentioned disorder is called as 'liver fibrosis'. The disease not only defects the liver cells but also mitochondria, the energy producing organelles, in these cells. The result is inevitably, the energy depletion and fatigue. Liver damage caused by dietary ethanol is an important reason for the energy depletion and chronic fatigue which is often complained by regular alcohol users. The picture below shows the tissue filled with fibrils which are very poor in function. The appearance of abnormal liver tissue clearly shows the important toxic effect of dietary alcohol.

Dietary alcohol also activates phospholipase C which stimulates inositol triphosphate 3. Inositol trisphosphate 3 inhibits gamma-aminobutyric acid (GABA). Under normal conditions, gamma aminobutyric acid (GABA) ables Ca release from endoplasmic reticulum which significantly decreases serum Ca concentration. The decrease in Ca concentration increases the speed for the formation of osteoporosis and osteomalacia. As clearly can be understood from these explanations, dietary ethanol shows its adverse and harmful effect on bones and muscles two ways 1. It competes with Ca in foods and absorbed instead of Ca and 2. It inhibits Ca release from cells (ER: endoplasmic reticulum of the cell) and decreases Ca concentration in blood.

Dietary ethanol is detoxified in two ways; by the effect of an enzyme called alcohol dehydrogenase or by another detox enzyme system in liver, P450 cytochrome.

Another organ which is adversely affected by dietary ethanol is stomach. The cells which cover the surface of both stomach and intestines are decomposed by the effect of alcohol. Cells are surrounded with a cell membrane and the structure of cell membrane is lipoprotein, half protein and half lipid. Alcohol melts lipid. Lipid decomposition in lipoprotein structure of the membranes of cells is the main cause of wounds of stomach cells. The wounded cells which cover the surface of stomach can not accumulate gastric acid thus the cells release acid. The increase in gastric acid secretion increases the solubility of iron which results in increase of iron absorption by bowel mucosa. Briefly, dietary ethanol may cause iron toxicity by increasing iron absorption. Note that iron toxicity is one of the worst toxicities since it can contribute to tumor formation.

One argument about dietary ethanol besides its amount and addiction is the target group. Although there are some arguments about dietary alcohol and its amounts for addiction, what seems clear is that the dietary ethanol toxicity can not be predicted since many factors play important role in the toxicity. One clear example is the sex difference which was also mentioned above. The protective stomach-alcohol barrier (like brain-blood barrier) is thicker in men than in women which is the main reason for the greater tolerance of men to alcohol. Similarly, the same protective layer which slows and decreases the absorption of dietary ethanol through the mucosa of bowel is not enough thick in children and adolescents which also makes children and adolescents as the other susceptible target groups to dietary ethanol toxicity. Acetaminophen, $CCl_4$, cocaine, pentobarbital, corticosteroids, anti-acids, paracetamol, niton and alcohol itself with some others are the initial medicine substances and harmful compounds which defect and decrease the thickness of the barrier. Therefore, persons who take medications, cocaine and nicotine addicted persons are the other target groups which show more susceptibility to dietary ethanol toxicity and less tolerance to drunkenness.

Another risk about dietary ethanol toxicity is the probability of stroke. In spite of many scientific claims that show the cholesterol and bad cholesterol reducing and blood thinning effect of alcohol, there is another possibility which can not be disregarded. Assume that there is already a clot which blocks and closes the diameter and cavity of blood vessel. Followed by blood dilution by the effect of alcohol, the possibility for clot fragmentation may increase and the fragments separated from clot may move and close the diameter of an important brain or coronary (the vessels which feed and supply blood for heart) vessels (emboli) which may result in stroke or cardiac spasm or ventricular or arterial fibrosis. Briefly, blood diluting effect may show its beneficial effect on persons who follows cholesterol and bad cholesterol low or free diets but others may face with stroke or life threatening cardiovascular diseases and disorders in case of cholesterol, bad cholesterol, trans fat, saturated fat, salt and sugar rich diets as combined with alcohol consumption since the mentioned harmful compounds are the structural compounds for clot formation. Alcohol may decompose and cause fragmentation of the clot which may result in stroke and life threatening cardiovascular diseases and disorders.

Here below is the list of some hazards of alcohol. Alcohol may be an origin in the formation of diabetes, hepatitis, ulcer, gastritis, osteoporosis, osteomalacia, cardiac spasm, Alzheimer, Parkinson, thrombosis (clot formation which closes the cavity of blood vessel), emboli, arterial and ventricular fibrosis.

**Hazards of Alcohol**

- Diabetes (type 2/noninsulin dependent)
- Nonviral hepatitis
- Carditis
- Severe psychological depression
- Kidney, bladder, prostate and pancreas damage and the risk of cancer
- Impaired immun response
- Brain disase and central nervous system damage
- Malnutrition
- Bone deterioration and osteoporosis
- Feminization and sexual impotence in men
- Skin rashes and sores
- Increased risk of death from all causes

Regular dietary ethanol alcohol intake may increase some types of cancer, especially esophageal cancers. The gastric acid increase followed by gastritis and ulcer due to alcohol degenerative effect shows its first harmful effect on surface of oesophagus. Alcohol residues may cause to esophageal tears due to retching and vomiting which is called as Mallory-Weiss syndrome. Another risk for esophagus is the risk for the formation of episodic ruptured esophageal varicose.

Acetaldehyde which forms due to dietary alcohol oxidation in blood triggers the oxidation of especially B complex vitamins such as folate, folic acid and $B_{12}$. These vitamins enter into the structures of the enzymes responsible for blood cell proliferation. Therefore, the deficiency of $B_{12}$, folate and folic acid due to alcohol is an important factor which cause anemia.

Dietary ethanol may dilute blood and decrease cholesterol and bad cholesterol as mentioned above all of which are proven by scientific researches. But, the other side of the relation between heart and alcohol is different. Super oxide dismutase, catalase, glutathione reductase, vitamin E and ascorbic acid (vitamin C) are the enzymes and vitamins in antioxidant activity and they protect cardiac tissue (heart) against oxidation with its free toxic peroxy radical compounds which are inflammatory. Dietary ethanol and its end product acetaldehyde oxidize the mentioned vitamins and minerals. The protection of heart by these important antioxidants becomes weaker. In conclusion, in spite of cholesterol and bad cholesterol reducing and blood thinning effect, the low or moderate intakes of dietary ethanol has to be reconciled with the possible counteracting influence of prooxidative effect of alcohol on cardiovascular system.

Ca intake in sufficient amounts by the means of Ca rich foods like milk and dairy products, fish meat, soy and soy products and dark green leafy vegetables is a must for the protection against osteoporosis and osteomalacia. Many of us know the importance and necessity of Ca in bone and muscle health but the importance of vitamin D, which should be combined with Ca, is not commonly known. Vitamin D is the main vitamin that enhances Ca absorption from bowel mucosa and increases Ca binding to bone and muscle while parathyroid hormone is the main hormone in similar effect.

Unfortunately, dietary ethanol depletes Ca and vitamin D concentrations by decreasing their absorption levels since it is absorbed before them. No matter how dietary ethanol improves heart and blood circulation, it is an antagonist which depletes Ca, vitamin D and parathyroid hormone concentrations and increases the risk of osteoporosis and osteomalacia due to Ca, vitamin D and parathyroid deficiency.

The main argument about the status of dietary ethanol in healthy living and life style is mainly because of the antioxidant substances which are naturally produced during the production of alcoholic beverages. Resveratrol is the antioxidant in grape skin and seeds, an antioxidant which is 20 times more than vitamin C and 50 times more than vitamin E in antioxidant capacity. Phenols and polyphenols, the compounds which are not only the antioxidants but also they are the substances which can decompose nitrite, a strong carcinogen, into diazophenols and decrease the risk for cancer types in stomach and bowel origin. Phenols and polyphenols like resveratrol are isoflavones which thin blood, increase the diameter size of blood vessels, decrease cholesterol and bad cholesterol and homocystein (the initial substances which are responsible for the formation of hypertension since they can easily accumulate on the walls of blood vessels) and finally increase serotonin (the relaxing hormone). They are exist in rich amounts in rice, grape, corn, briefly in the material which produce ethanol via to fermentation, yeast and bacterial activity. Finally, flavon and flavonoids in these raw materials and in the end product (alcoholic beverage) are some other strong antioxidants which may prevent body against cardiovascular diseases and disorders and cancer with their similar effects. Flavon and flavonoids decompose hetero cyclic amines which may exist in cured, fumed, cured and fumed products which are strong carcinogens. These substances increase the risk of cancers especially in stomach and bowel origin like nitrite and nitrate in processed foods. In conclusion, dietary ethanol may have got some important beneficial effects on body with its mentioned antioxidants, while it may cause harmful effects on heart, liver, brain and pancreas. Some authorities and media advise to use dietary alcohol in moderate amounts due to its rich antioxidant capacity with the mentioned antioxidants above. The problem appears at this point. Because the 'moderate amount', whatever it is, differs and changes depending on alcohol intake, alcohol, accumulation level as mg per ml of blood, metabolism, sex, age and the thickness of stomach-alcohol mucosa layer. It is impossible to determine each of these criteria during alcohol consumption. One last and important question which is still waiting to be highlighted is 'what amount of dietary alcohol' causes addiction since the amounts here to be investigated may change due to the thickness of stomach-alcohol mucosa barrier, the accumulative level of dietary alcohol, sex, age, any disease or disorders in stomach and bowel, any other diseases and disorders like diabetes, renal failure, liver failure or arthritis which can easily increase the harmful potential of dietary alcohol on body even in moderate amounts. As a result, a food is supposed to increase the overall quality of body. A product in nutrition and consumption which can cause harmful effects on some organs while showing some beneficial effects on some others should be taken out of the list.

Finally, the last important question is the maximum amount which can be tolerated and the amount which does not jump into ethanol metabolism but only shows antioxidant activity. This question is also waiting to be highlighted and still unclear. In conclusion, there is no need to take an antioxidant rich but also very harmful product on some organs into body. Instead, prefer grape, especially purple grape and consume plenty amounts of this fruit. By consuming this fruit, you may have supplied the same rich antioxidant content of alcohol; resveratrol, quercetin, flavon and flavonoids without any risk.

## CALORIE/100 G LEVELS FOR SOME FOODS

| | | | | | |
|---|---|---|---|---|---|
| Gelatin | 33.5 | Mint | 245 | Peanut oil | 884 |
| Cacao | 299 | Cinnamon | 261 | Olive oil | 884 |
| Ketchup | 106 | Colchicum | 310 | Fish oil | 900 |
| Currant | 54 | Ginger | 347 | Inner fat (tallow) | 758 |
| Dry yeast | 282 | Tail fat | 902 | Quail egg | 158 |
| Tomato paste | 98 | Turmeric | 354 | Plain butter | 890 |
| Vinegar | 12 | Noodle | 388 | Mayonnaise | 390 |
| Tahini | 595 | Tarhana | 316 | Sour Cream | 134 |
| Pickle | 10 | Phyllo | 152 | Soy sauce | 68 |
| Olive | 144-207 | Oat powder | 388 | Baking powder | 78 |
| Bay leaf | 313 | Sun flower oil | 584 | Chips (potato) | 568 |
| Dill | 253 | Hazelnut oil | 884 | Red meat broth tablet | 120 |
| Mustard | 469 | Hash oil | 884 | Green pea soup (ready) | 295 |
| Hash | 533 | Flaxseed oil | 534 | Tomato soup (ready) | 219 |
| Coconut | 525 | Margarine | 720 | Yeast (not dry) | 86 |
| Black pepper | 255 | Corn oil | 900 | | |
| Clove | 323 | Vegetable oil | 900 | | |
| Thyme | 276 | Palm oil | 884 | | |

| | |
|---|---|
| Red chili pepper | 318 |
| Cumin | 375 |
| Parsley | 276 |
| Lentil | 235 |
| Oat | 318 |
| Ice cream | 193 |
| Caramel | 399 |
| Locum | 240 |
| Marmalade | 278 |
| Candy (fruit) | 316 |
| Molasses (grape) | 293 |
| Sugar | 385 |
| Halvah | 516 |
| Barley | 349 |
| Bran | 213 |
| Bulgur | 357 |
| Rye | 350 |
| Bread (wheat) | 276 |
| Bread (rye) | 243 |
| Cotton oil | 884 |
| Soy oil | 884 |
| Sesame oil | 884 |
| Starch | 362 |
| Popcorn | 386 |
| Flour | 368 |
| Rice | 363 |
| Onion (dry) | 347 |
| Onion (green) | 36 |
| Turnip | 30 |
| Radish | 19 |
| Turnip (black) | 30 |
| Sweet potato | 75 |
| Clover | 49 |
| Cheese (white) | 235 |
| Cheddar | 403 |
| Whey cheese | 215 |
| Gruyere cheese | 413 |
| Cream cheese | 349 |
| turkey egg | 171 |
| goose egg | 185 |
| duck egg | 185 |
| chicken egg white | 49 |
| chicken egg yolk | 369 |
| whole egg | 158 |
| honey | 315 |
| chocolate | 477-528 |
| okra | 36 |
| okra (dry) | 266 |
| green pepper | 22 |
| pimiento | 93 |
| tomato (red) | 22 |
| tomato (green) | 24 |
| mallow | 47 |

| | | | | | |
|---|---|---|---|---|---|
| Sandwich bread | 298 | cow's milk | 35-61 | artichoke | 53 |
| Bread stick | 392 | goat milk | 69 | dry bean | 274 |
| Semolina | 371 | lamb milk | 108 | green bean | 32 |
| Cracker | 384-433 | buffalo milk | 97 | carrot | 42 |
| Macaroni | 369 | soy milk | 33 | dandelion | 53 |
| Corn flakes | 386 | dry milk | 362-496 | cucumber | 14-15 |
| Corn mushed | 386 | yogurt | 50-62 | pumpkin | 19-26 |
| Cauliflower | 27 | Avocado | 167 | Grape | 67 |
| Celery | 40 | Quince | 57 | Grape (dry) | 289 |
| Asparagus | 26 | Blackberry | 58 | Grape juice | 67 |
| Spinach | 26 | Strawberry | 37 | Sour cherry | 58 |
| White cabbage | 24 | Mulberry | 93 | Kiwi | 30 |
| Brussels sprout | 63 | Apple | 58 | Fava bean | 72 |
| Collard | 45 | Apple juice | 47 | Lamb meat, low fat | 247 |
| Red cabbage | 31 | Redgage | 66 | lamb meat, medium fat | 263 |
| Mushroom | 28 | Grapefruit | 41 | lamb meat, fatty | 310 |
| Green cabbage | 14 | Grapefruit juice | 39 | Goat meat | 145 |
| Parsley | 44 | Date | 274 | beef meat, low fatty | 225 |
| Corn | 96 | Fig | 80 | beef meat, medium fat | 263 |

| | | | | | |
|---|---|---|---|---|---|
| Eggplant | 25 | Fig (dry) | 274 | beef meat, high fat | 301 |
| Potato | 76 | Watermelon | 26 | Ham | 182 |
| Chard | 33 | Melon | 33 | Braised meat | 670 |
| Leeks | 52 | Apricot | 51 | Pastrami | 250-269 |
| Rocket | 33 | Apricot(dry) | 260 | Salami | 450 |
| Garlic | 137 | Cherry | 70 | Sausage | 322 |
| Parsley | 32 | Lemon | 27 | Fermented sausage | 452 |
| Chestnut | 131-245 | Banana | 85 | Turkey meat | 160 |
| Chickpea | 360 | Pomegranate | 63 | Goose meat | 371 |
| Pineapple | 52 | orange | 49 | Duck meat | 404 |
| Pear | 61 | Peach | 38 | Chicken meat | 15 |
| Chicken meat (chest) | 114 | Mackerel | 159 | | |
| Chicken meat (lean) | 125 | Caviar | 262 | | |
| Roaster layer of chicken | 349 | Lobster | 91 | | |
| Liver (chicken) | 129 | Shrimp | 91 | | |
| Liver (beef) | 140 | Mussel | 95 | | |
| Heart (beef) | 124 | Veal meat (low fatty) | 95 | | |
| Almond | 598 | Veal meat (medium fat) | 190 | | |
| Kidney bean | 349 | | | | |

| | |
|---|---|
| Black-eyed pea | 343 |
| Walnut | 651 |
| Pine nut | 635 |
| Hazelnut | 634 |
| Queil meat | 192 |
| Pigeon meat | 294 |
| Pheasant | 181 |
| Rabbit meat | 162 |
| Trout | 168 |
| Fish meal | 336 |
| Turbot meat | 193 |
| Sword fish meat | 164 |
| Sea bass meat | 93 |
| Sturgeon meat | 96 |
| Sardine | 160 |

# SOME FOODS WITH THEIR CARBOHYDRATE AMOUNTS (G/100G)

| **Cereals** | **Carbohydrate (g)** |
|---|---|
| Rice (2/3) glass | 78.9 |
| Macaroni (1 glass) | 76.3 |
| Wheat flour (1 tea glass) | 75.5 |
| Corn (2/3 glass) | 72 |
| Bread (white) | 53.1 |
| **Fruits** | |
| Banana (2) | 23.2 |
| Black mulberry (1/2 glass) | 19.8 |
| Fig (2-3) | 17.8 |
| Grape (tea glass) | 16.2 |
| Blackberry (1/2 glass) | 15.9 |
| Pomegranate (half of small size) | 14.7 |
| Quince (1/2) | 14.1 |
| Apple (1 medium) | 14.0 |
| Cherry (1 glass) | 13.8 |
| Mandarin (2) | 11.0 |
| Orange (1 small size) | 10.1 |
| Peach (1 small size) | 13.3 |

| | |
|---|---|
| **Legume** | |
| Green pea (2/3 glass) | 61.6 |
| Lentil (2/3 glass) | 57.4 |
| Black-eyed pea (2/3 glass) | 57.2 |
| Kidney bean (2/3 glass) | 57.0 |
| Chickpea (2/3 glass) | 56.7 |
| Bean (2/3 glass) | 55.9 |
| Fava bean (2/3 glass) | 53.7 |
| Soy bean (2/3 glass) | 33.5 |
| Chestnut (3/4 glass) | 43.6 |
| **Vegetables** | |
| Potato (1 small size glass) | 17.5 |
| Green bean (1 small size glass) | 13.0 |
| Okra (1 small size glass) | 8.7 |
| Carrot (1 medium) | 8.0 |
| **Sugars** | |
| Table sugar (1 small size glass) | 99.5 |
| Honey (4-5 tablespoon) | 78.4 |
| Molasses (6-7 tablespoon) | 70.6 |
| Marmalade (4-5 tablespoon) | 75.1 |

## SOME FOODS WITH THEIR PROTEIN CONTENTS (G/100G)

| | |
|---|---|
| Veal meat | 19.1 |
| Lamb meat | 16.5 |
| Fish meat | 14.8-26.3 |
| Chicken meat | 18.6 |
| Liver | 19.2 |
| Green pea | 24.2 |
| Dry bean | 22.3 |
| Lentil | 24.7 |
| Chickpea | 20.5 |
| Soy bean | 34.1 |
| Walnut | 14.8 |
| White cheese | 16.8 |
| Cheddar | 27.0 |
| Milk (medium fat) | 3.3 |
| Yogurt | 3.4 |
| Egg | 12.1 |
| Bread | 12.7 |
| Rice | 6.7 |

**Important note:** When you compare the protein contents of lentil with animal origin foods from the list above, you will see that lentil has got more protein content than veal meat, lamb meat, fish meat, chicken meat, liver and egg. I had mentioned in the related part, but I need to remind it once more since it is very important. Plant origin foods may have got higher protein contents. But, these foods have got fibers which bind some of protein while animal origin foods are free of fiber. This means that the proteins in animal origin foods can be absorbed more than the proteins in plant origin. Additionally, the protein binding factor (PBF) which binds the proteins in animal origin foods and transfers it through bowel to give them into blood is not exist in plant origin foods. Absence of this protein factor in plant origin foods is another reason for the lower bioavalibility of proteins in plant origin. In conclusion, having got higher protein does not mean anything without considering bioavailability. Bioavailability is much higher in proteins of animal origin foods than the proteins of plant origin foods.

# VITAMIN $B_6$ CONTENT (MG) OF SELECTED FOODS PER COMMON MEASURE, USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE, RELEASE 17

(Only the foods which have got more than 0.10 mg vitamin $B_6$ are included to the list below)
(the food products written in red color are the richest ones)

09027 Apricots, canned, heavy syrup pack, with skin, solids and liquids 258g 1 cup 0.139
09024 Apricots, canned, juice pack, with skin, solids and liquids 244g 1 cup 0.132
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 168g 1 cup 0.186
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 120g 1 medium 0.133
09040 Bananas, raw 150g 1 cup 0.551
20006 Barley, pearled, cooked 157g 1 cup 0.181
20005 Barley, pearled, raw 200g 1 cup 0.520
16006 Beans, baked, canned, plain or vegetarian 254g 1 cup 0.213
16008 Beans, baked, canned, with franks 259g 1 cup 0.119
16010 Beans, baked, canned, with pork and sweet sauce 253g 1 cup 0.215
16011 Beans, baked, canned, with pork and tomato sauce 253g 1 cup 0.159
16015 Beans, black, mature seeds, cooked, boiled, without salt 172g 1 cup 0.119
16025 Beans, great northern, mature seeds, cooked, boiled, without salt 177g 1 cup 0.207
16033 Beans, kidney, red, mature seeds, cooked, boiled, without salt 177g 1 cup 0.212
16038 Beans, navy, mature seeds, cooked, boiled, without salt 182g 1 cup 0.251
16043 Beans, pinto, mature seeds, cooked, boiled, without salt 171g 1 cup 0.392
16051 Beans, white, mature seeds, canned 262g 1 cup 0.197
22905 Beef stew, canned entree 232g 1 cup 0.299
13050 Beef, chuck, blade roast, separable lean and fat, trimmed to 1/4" fat, all grades, cooked, braised 85g 3 oz 0.221
13058 Beef, chuck, blade roast, separable lean only, trimmed to 1/4" fat, all grades, cooked, braised 85g 3 oz 0.246
13348 Beef, cured, corned beef, canned 85g.05 3 oz 0.11
23578 Beef, ground, 75% lean meat / 25% fat, patty, cooked, broiled 85g 3 oz 0.298
23573 Beef, ground, 80% lean meat / 20% fat, patty, cooked, broiled 85g 3 oz 0.312
23568 Beef, ground, 85% lean meat / 15% fat, patty, cooked, broiled 85g 3 oz 0.325
13073 Beef, rib, whole (ribs 6-12), separable lean and fat, trimmed to 1/4" fat, all grades, cooked, roasted 85g 3 oz 0.196
13085 Beef, rib, whole (ribs 6-12), separable lean only, trimmed to 1/4" fat, all grades, cooked, roasted 85g 3 oz 0.230
13869 Beef, round, bottom round, separable lean and fat, trimmed to 1/8" fat, all grades, cooked, braised 85g 3 oz 0.366
23605 Beef, round, bottom round, separable lean only,trimmed to 1/8" fat, all grades, cooked, braised 85g 3 oz 0.392
13878 Beef, round, eye of round, separable lean and fat, trimmed to 1/8" fat, all grades, cooked, roasted 85g 3 oz 0.316
23598 Beef, round, eye of round, separable lean only, trimmed to 1/8" fat, all grades, cooked, roasted 85g 3 oz 0.339
23610 Beef, top sirloin, separable lean only, trimmed to 1/8" fat, all grades, cooked, broiled 85g 3 oz 0.536
13327 Beef, variety meats and by-products, liver, cooked, pan-fried 85g 3 oz 0.873
11087 Beet greens, cooked, boiled, drained, without salt 144g 1 cup 0.190
09055 Blueberries, frozen, sweetened 230g 1 cup 0.136
07008 Bologna, beef and pork 56.7g 2 slices 0.168
07014 Braunschweiger (a liver sausage), pork 56.7g 2 slices 0.187
18376 Bread crumbs, dry, grated, seasoned 120g 1 cup 0.205
21005 Breakfast items, biscuit with egg and sausage 180g 1 biscuit 0.198
11091 Broccoli, cooked, boiled, drained, without salt 156g 1 cup 0.312

11093 Broccoli, frozen, chopped, cooked, boiled, drained, without salt 184g 1 cup 0.239
11090 Broccoli, raw 88g 1 cup 0.154
11099 Brussels sprouts, cooked, boiled, drained, without salt 156g 1 cup 0.278
11101 Brussels sprouts, frozen, cooked, boiled, drained, without salt 155g 1 cup 0.448
20011 Buckwheat flour, whole-groat 120g 1 cup 0.698
20010 Buckwheat groats, roasted, cooked 168g 1 cup 0.129
20013 Bulgur, cooked 182g 1 cup 0.151
20012 Bulgur, dry 140g 1 cup 0.479
11117 Cabbage, chinese (pak-choi), cooked, boiled, drained, without salt 170g 1 cup 0.282
11120 Cabbage, chinese (pe-tsai), cooked, boiled, drained, without salt 119g 1 cup 0.211
11110 Cabbage, cooked, boiled, drained, without salt 150g 1 cup 0.169
11112 Cabbage, red, raw 70g 1 cup 0.146
11114 Cabbage, savoy, raw 70g 1 cup 0.133
18116 Cake, gingerbread, prepared from recipe 74g 1 piece 0.141
11655 Carrot juice, canned 236g 1 cup 0.512
11128 Carrots, canned, regular pack, drained solids 146g 1 cup 0.164
11131 Carrots, frozen, cooked, boiled, drained, without salt 146g 1 cup 0.123
11124 Carrots, raw 110g 1 cup 0.152
11136 Cauliflower, cooked, boiled, drained, without salt 124g 1 cup 0.215
11138 Cauliflower, frozen, cooked, boiled, drained, without salt 180g 1 cup 0.158
11135 Cauliflower, raw 100g 1 cup 0.222
11144 Celery, cooked, boiled, drained, without salt 150g 1 cup 0.129
08147 Cereals ready-to-eat, wheat, shredded, plain, sugar and salt free 46g 2 biscuits 0.531
01164 Cheese sauce, prepared from recipe 243g 1 cup 0.109
01012 Cheese, cottage, creamed, large or small curd 210g 1 cup 0.141
01013 Cheese, cottage, creamed, with fruit 226g 1 cup 0.154
01016 Cheese, cottage, lowfat, 1% milkfat 226g 1 cup 0.154
01015 Cheese, cottage, lowfat, 2% milkfat 226g 1 cup 0.172
01014 Cheese, cottage, nonfat, uncreamed, dry, large or small curd 145g 1 cup 0.119
01019 Cheese, feta 28.35g 1 oz 0.120
01036 Cheese, ricotta, whole milk 246g 1 cup 0.106
07017 Chicken roll, light meat 56.7g 2 slices 0.119
05058 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, batter 140g 1/2 breast 0.602
05059 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, flour 98g 1/2 breast 0.568
05064 Chicken, broilers or fryers, breast, meat only, cooked, roasted 86g 1/2 breast 0.516
05044 Chicken, broilers or fryers, dark meat, meat only, cooked, fried 84g 3 oz 0.311
05068 Chicken, broilers or fryers, drumstick, meat and skin, cooked, fried, Flour 49g 1 drumstick 0.171
05073 Chicken, broilers or fryers, drumstick, meat only, cooked, roasted 44g1 drumstick 0.172
05022 Chicken, broilers or fryers, giblets, cooked, simmered 145g 1 cup 0.576
05040 Chicken, broilers or fryers, light meat, meat only, cooked, fried 84g 3 oz 0.529
05098 Chicken, broilers or fryers, thigh, meat only, cooked, roasted 52g 1 thigh 0.182
05101 Chicken, broilers or fryers, wing, meat and skin, cooked, fried, batter 49g 1 wing 0.147
05028 Chicken, liver, all classes, cooked, simmered 19.6g 1 liver 0.148
05126 Chicken, stewing, meat only, cooked, stewed 140g 1 cup 0.434
16058 Chickpeas (garbanzo beans, bengal gram), mature seeds, canned 240g 1 cup 1.135*
16057 Chickpeas (garbanzo beans, bengal gram), mature seeds, cooked, boiled, without salt 164g 1 cup 0.228
22904 Chili con carne with beans, canned entree 222g 1 cup 0.282
11159 Coleslaw, home-prepared 120g 1 cup 0.151

11162 Collards, cooked, boiled, drained, without salt 190g 1 cup 0.243
11164 Collards, frozen, chopped, cooked, boiled, drained, without salt 170g 1 cup 0.194
11174 Corn, sweet, yellow, canned, cream style, regular pack 256g 1 cup 0.161
20025 Cornmeal, self-rising, degermed, enriched, yellow 138g 1 cup 0.538
20020 Cornmeal, whole-grain, yellow 122g 1 cup 0.371
20028 Couscous, dry 173g 1 cup 0.190
11192 Cowpeas (Blackeyes), immature seeds, cooked, boiled, drained, without salt 165g 1 cup 0.107
11196 Cowpeas (blackeyes), immature seeds, frozen, cooked, boiled, drained, without salt 170g 1 cup 0.161
16064 Cowpeas, common (blackeyes, crowder, southern), mature seeds, canned, plain 240g 1 cup 0.108
15137 Crustaceans, crab, alaska king, cooked, moist heat 85g 3 oz 0.153
15141 Crustaceans, crab, blue, canned 135g 1 cup 0.203
15140 Crustaceans, crab, blue, cooked, moist heat 85g 3 oz 0.153
15142 Crustaceans, crab, blue, crab cakes 60g 1 cake 0.102
11206 Cucumber, peeled, raw 280g 1 large 0.143
11205 Cucumber, with peel, raw 301g 1 large 0.120
11208 Dandelion greens, cooked, boiled, drained, without salt 105g 1 cup 0.168
09087 Dates, deglet noor 178g 1 cup 0.294
05142 Duck, domesticated, meat only, cooked, roasted 221g 1/2 duck 0.553
01123 Egg, whole, raw, fresh 58g 1 extra large 0.083
01057 Eggnog 254g 1 cup 0.127
11210 Eggplant, cooked, boiled, drained, without salt 99g 1 cup 0.085
21047 Entrees, fish fillet, battered or breaded, and fried 91g 1 fillet 0.093
21061 Fast foods, burrito, with beans and cheese 93g 1 burrito 0.121
21063 Fast foods, burrito, with beans and meat 115g.5 1 burrito 0.185
21098 Fast foods, cheeseburger, large, single patty, with condiments and Vegetables 219g 1 sandwich 0.285
21094 Fast foods, cheeseburger, regular, double patty and bun, plain 160g 1 sandwich 0.224
21092 Fast foods, cheeseburger, regular, double patty, plain 155g 1 sandwich 0.248
21090 Fast foods, cheeseburger, regular, single patty, with condiments 113g 1 sandwich 0.113
21102 Fast foods, chicken fillet sandwich, plain 182g 1 sandwich 0.200
21229 Fast foods, chicken, breaded and fried, boneless pieces, plain 106g 6 pieces 0.157
21042 Fast foods, chili con carne 253g 1 cup 0.329
21070 Fast foods, chimichanga, with beef 174g 1 chimichanga 0.278
21127 Fast foods, coleslaw 99g 3/4 cup 0.109
21012 Fast foods, croissant, with egg, cheese, and bacon 129g 1 croissant 0.116
21074 Fast foods, enchilada, with cheese 163g 1 enchilada 0.391
21021 Fast foods, english muffin, with egg, cheese, and canadian bacon 137g 1 muffin 0.147
21106 Fast foods, fish sandwich, with tartar sauce and cheese 183g 1 sandwich 0.110
21024 Fast foods, french toast sticks 141g 5 sticks 0.254
21077 Fast foods, frijoles with cheese 167g 1 cup 0.200
21111 Fast foods, hamburger, regular, double patty, with condiments 215g 1 sandwich 0.366
21108 Fast foods, hamburger, regular, single patty, with condiments 106g 1 sandwich 0.118
21129 Fast foods, hush puppies 78g 5 pieces 0.101
21078 Fast foods, nachos, with cheese 113g 6-8 nachos 0.203
21025 Fast foods, pancakes with butter and syrup 232g 2 pancakes 0.116
21138 Fast foods, potato, french fried in vegetable oil 169g 1 large 0.605
21138 Fast foods, potato, french fried in vegetable oil 85g 1 small 0.304
21139 Fast foods, potato, mashed 80g 1/3 cup 0.184
21026 Fast foods, potatoes, hashed brown 72g 1/2 cup 0.166

21121 Fast foods, roast beef sandwich, plain 139g 1 sandwich 0.264
21053 Fast foods, salad, vegetable, tossed, without dressing, with cheese and Egg 217g 1-1/2 cups 0.109
21054 Fast foods, salad, vegetable, tossed, without dressing, with chicken 218g 1-1/2 cups 0.436
21124 Fast foods, submarine sandwich, with cold cuts 228g 1 sandwich, 6" roll 0.137
21125 Fast foods, submarine sandwich, with roast beef 216g 1 sandwich, 6" roll 0.324
21126 Fast foods, submarine sandwich, with tuna salad 256g 1 sandwich, 6" roll 0.230
21033 Fast foods, sundae, hot fudge 158g 1 sundae 0.126
21082 Fast foods, taco 263g 1 large 0.368
21083 Fast foods, taco salad 198g 1-1/2 cups 0.218
21086 Fast foods, tostada, with beans, beef, and cheese 225g 1 tostada 0.247
15011 Fish, catfish, channel, cooked, breaded and fried 85g 3 oz 0.161
15017 Fish, cod, Atlantic, canned, solids and liquid 8g5 3 oz 0.240
15192 Fish, cod, Pacific, cooked, dry heat 85g 3 oz 0.
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 127g 1 fillet 0.305
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 85g 3 oz 0.204
15034 Fish, haddock, cooked, dry heat 150g 1 fillet 0.519
15034 Fish, haddock, cooked, dry heat 85g 3 oz 0.294
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 159g 1/2 fillet 0.631
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 85g 3 oz 0.337
15041 Fish, herring, Atlantic, pickled 85.05g 3 oz 0.145
15058 Fish, ocean perch, Atlantic, cooked, dry heat 85 3g oz 0.230
15058 Fish, ocean perch, Atlantic, cooked, dry heat 5g0 1 fillet 0.135
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 149g 1 fillet 0.402
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 85g 3 oz 0.230
15232 Fish, roughy, orange, cooked, dry heat 85g 3 oz 0.294
15077 Fish, salmon, chinook, smoked 85.05g 3 oz 0.236
15084 Fish, salmon, pink, canned, solids with bone and liquid 85g 3 oz 0.255
15086 Fish, salmon, sockeye, cooked, dry heat 85g 3 oz 0.186
15086 Fish, salmon, sockeye, cooked, dry heat 155g 1/2 fillet 0.339
15088 Fish, sardine, Atlantic, canned in oil, drained solids with bone 85.05g 3 oz 0.142
15111 Fish, swordfish, cooked, dry heat 106g 1 piece 0.404
15111 Fish, swordfish, cooked, dry heat 85g 3 oz 0.324
15241 Fish, trout, rainbow, farmed, cooked, dry heat 85g 3 oz 0.337
15128 Fish, tuna salad 205g 1 cup 0.166
15121 Fish, tuna, light, canned in water, drained solids 85g 3 oz 0.297
15126 Fish, tuna, white, canned in water, drained solids 85 g 3 oz 0.184
15221 Fish, tuna, yellowfin, fresh, cooked, dry heat 85g 3 oz 0.882
07024 Frankfurter, chicken 45g 1 frank 0.144
18268 French toast, frozen, ready-to-heat 59g 1 slice 0.293
09097 Fruit cocktail, (peach and pineapple and pear and grape and cherry), canned, juice pack, solids and liquids 237g 1 cup 0.121
09404 Grapefruit juice, pink, raw 247g 1 cup 0.109
09126 Grapefruit juice, white, frozen concentrate, unsweetened, diluted with 3 volume water 247g 1 cup 0.109
09125 Grapefruit juice, white, frozen concentrate, unsweetened, undiluted 207g 6-fl-oz can 0.319
09128 Grapefruit juice, white, raw 247g 1 cup 0.109
07028 Ham, sliced, extra lean 56.7g 2 slices 0.261
07029 Ham, sliced, regular (approximately 11% fat) 56.7g 2 slices 0.187
11226 Jerusalem-artichokes, raw 150 g 1 cup 0.115
11234 Kale, cooked, boiled, drained, without salt 130g 1 cup 0.179

11236 Kale, frozen, cooked, boiled, drained, without salt 130g 1 cup 0.112
11242 Kohlrabi, cooked, boiled, drained, without salt 165g 1 cup 0.254
17012 Lamb, domestic, leg, whole (shank and sirloin), separable lean and fat, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 0.128
17014 Lamb, domestic, leg, whole (shank and sirloin), separable lean only, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 0.145
17024 Lamb, domestic, loin, separable lean and fat, trimmed to 1/4" fat, choice, cooked, broiled 85g 3 oz 0.110
17027 Lamb, domestic, loin, separable lean only, trimmed to 1/4" fat, choice, cooked, broiled 85g 3 oz 0.136
17034 Lamb, domestic, rib, separable lean only, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 0.1
17048 Lamb, domestic, shoulder, arm, separable lean only, trimmed to 1/4" fat, choice, cooked, braised 85g 3 oz 0.110
11247 Leeks, (bulb and lower leaf-portion), cooked, boiled, drained, without Salt 104g 1 cup 0.118
09153 Lemon juice, canned or bottled 244g 1 cup 0.105
16070 Lentils, mature seeds, cooked, boiled, without salt 198g 1 cup 0.352
11250 Lettuce, butterhead (includes boston and bibb types), raw 163g 1 head 0.134
11252 Lettuce, iceberg (includes crisphead types), raw 539g 1 head 0.226
11040 Lima beans, immature seeds, frozen, baby, cooked, boiled, drained, without salt 180g 1 cup 0.207
11038 Lima beans, immature seeds, frozen, fordhook, cooked, boiled, drained, without salt 170g 1 cup 0.207
16073 Lima beans, large, mature seeds, canned 241g 1 cup 0.219
16072 Lima beans, large, mature seeds, cooked, boiled, without salt 188g 1 cup 0.303
14315 Malted drink mix, chocolate, with added nutrients, powder 21g 3 heaping tsp 0.917
14316 Malted drink mix, chocolate, with added nutrients, powder, prepared with whole milk 265g 1 cup 1.015*
14309 Malted drink mix, natural, with added nutrients, powder 21g 4-5 heaping tsp 0.763
14310 Malted drink mix, natural, with added nutrients, powder, prepared with whole milk 265g 1 cup 0.861
09181 Melons, cantaloupe, raw 160g 1 cup 0.115
09184 Melons, honeydew, raw 170g 1 cup 0.150
09184 Melons, honeydew, raw 160g 1/8 melon 0.141
01111 Milk shakes, thick vanilla 313g 11 fl oz 0.131
01095 Milk, canned, condensed, sweetened 306g 1 cup 0.156
01097 Milk, canned, evaporated, nonfat 256g 1 cup 0.141
01096 Milk, canned, evaporated, without added vitamin A 252g 1 cup 0.126
01102 Milk, chocolate, fluid, commercial, 250g 1 cup 0.100
01104 Milk, chocolate, fluid, commercial, lowfat 250g 1 cup 0.103
01103 Milk, chocolate, fluid, commercial, reduced fat 250g 1 cup 0.103
16112 Miso 68.75g 1 cup 0.137
19305 Molasses, blackstrap 20g 1 tbsp 0.140
15173 Mollusks, scallop, mixed species, cooked, breaded and fried 93g 6 large 0.130
11261 Mushrooms, cooked, boiled, drained, without salt 156g 1 cup 0.148
11269 Mushrooms, shiitake, cooked, without salt 145g 1 cup 0.231
11271 Mustard greens, cooked, boiled, drained, without salt 140g 1 cup 0.137
20112 Noodles, egg, spinach, cooked, enriched 160g 1 cup 0.182
12078 Nuts, brazilnuts, dried, unblanched 28.35g 1 oz (6-8 nuts) 0.029
12586 Nuts, cashew nuts, oil roasted, with salt added 28.35g 1 oz (18 nuts) 0.092
12167 Nuts, chestnuts, european, roasted 143g 1 cup 0.711
12179 Nuts, coconut meat, dried (desiccated), sweetened, shredded 93 1 cup 0.252
12120 Nuts, hazelnuts or filberts 28.35g 1 oz 0.160
12632 Nuts, macadamia nuts, dry roasted, with salt added 28.35g 1 oz (10-12 nuts) 0.102
12652 Nuts, pistachio nuts, dry roasted, with salt added 28.35g 1 oz (47 nuts) 0.361
12155 Nuts, walnuts, english 28.35g 1 oz (14 halves) 0.152
20033 Oat bran, raw 94g 1 cup 0.155
11279 Okra, cooked, boiled, drained, without salt 160g 1 cup 0.299

11283 Onions, cooked, boiled, drained, without salt 210g 1 cup 0.271
11283 Onions, cooked, boiled, drained, without salt 94g 1 medium 0.121
11282 Onions, raw 110g 1 whole 0.162
09207 Orange juice, canned, unsweetened 249g 1 cup 0.219
09209 Orange juice, chilled, includes from concentrate 249g 1 cup 0.134
09215 Orange juice, frozen concentrate, unsweetened, diluted with 3 volume Water 249g 1 cup 0.110
09214 Orange juice, frozen concentrate, unsweetened, undiluted 213g 6-fl-oz can 0.332
09200 Oranges, raw, all commercial varieties 180g 1 cup 0.108
16089 Peanuts, all types, oil-roasted, with salt 28.35g 1 oz 0.131
09257 Pears, canned, heavy syrup pack, solids and liquids 76g 1 half 0.011
09254 Pears, canned, juice pack, solids and liquids 76g 1 half 0.011
11301 Peas, edible-podded, cooked, boiled, drained, without salt 160g1 cup 0.230
11303 Peas, edible-podded, frozen, cooked, boiled, drained, without salt 160g 1 cup 0.278
11308 Peas, green, canned, regular pack, drained solids 170g 1 cup 0.109
11313 Peas, green, frozen, cooked, boiled, drained, without salt 160g 1 cup 0.181
11670 Peppers, hot chili, green, raw 45g 1 pepper 0.125
11819 Peppers, hot chili, red, raw 45g 1 pepper 0.228
11334 Peppers, sweet, green, cooked, boiled, drained, without salt 136g 1 cup 0.317
14334 Pineapple and grapefruit juice drink, canned 250g 8 fl oz 0.105
14341 Pineapple and orange juice drink, canned 250g 8 fl oz 0.117
09273 Pineapple juice, canned, unsweetened, without added ascorbic acid 250g 1 cup 0.240
09270 Pineapple, canned, heavy syrup pack, solids and liquids 254g 1 cup 0.188
21226 Pizza, meat and vegetable, regular crust, frozen 79g 1 serving 0.118
09278 Plantains, cooked 154g 1 cup 0.370
09277 Plantains, raw 179g 1 medium 0.535
09292 Plums, dried (prunes), stewed, without added sugar 248g 1 cup 0.541
11672 Potato pancakes, home-prepared 76g 1 pancake 0.288
11399 Potato puffs, frozen, prepared 79g 10 puffs 0.182
11414 Potato salad, home-prepared 250g 1 cup 0.353
11674 Potato, baked, flesh and skin, without salt 202g 1 potato 0.628
11373 Potatoes, au gratin, home-prepared from recipe using butter 245g 1 cup 0.426
11363 Potatoes, baked, flesh, without salt 156g 1 potato 0.470
11364 Potatoes, baked, skin, without salt 58 g 1 skin 0.356
11365 Potatoes, boiled, cooked in skin, flesh, without salt 136g 1 potato 0.407
11367 Potatoes, boiled, cooked without skin, flesh, without salt 156g 1 cup 0.420
11367 Potatoes, boiled, cooked without skin, flesh, without salt 135g 1 potato 0.363
11403 Potatoes, french fried, frozen, home-prepared, heated in oven, without Salt 50g 10 strips 0.154
11370 Potatoes, hashed brown, home-prepared 156g 1 cup 0.736
11379 Potatoes, mashed, dehydrated, prepared from flakes without milk, whole milk and butter added 210g 1 cup 0.210
11657 Potatoes, mashed, home-prepared, whole milk added 210g 1 cup 0.487
11371 Potatoes, mashed, home-prepared, whole milk and margarine added 210g 1 cup 0.519
11387 Potatoes, scalloped, dry mix, prepared with water, whole milk and butter 245g 1 cup 0.103
11372 Potatoes, scalloped, home-prepared with butter 245g 1 cup 0.436
05306 Poultry food products, ground turkey, cooked 82g 1 patty 0.320
09294 Prune juice, canned 256g 1 cup 0.558
11424 Pumpkin, canned, without salt 245g 1 cup 0.137
11423 Pumpkin, cooked, boiled, drained, without salt 245g 1 cup 0.108
09298 Raisins, seedless 145g 1 cup 0.252

16103 Refried beans, canned (includes USDA commodity) 252g 1 cup 0.360
20037 Rice, brown, long-grain, cooked 195g 1 cup 0.283
20046 Rice, white, long-grain, parboiled, enriched, dry 185g 1 cup 0.647
20045 Rice, white, long-grain, regular, cooked 158g 1 cup 0.147
20044 Rice, white, long-grain, regular, raw, enriched 185g 1 cup 0.303
07069 Salami, cooked, beef and pork 56.7g 2 slices 0.119
07072 Salami, dry or hard, pork, beef 20g 2 slices 0.100
07073 Sandwich spread, pork, beef 15g 1 tbsp 0.018
21097 Sandwiches and burgers, cheeseburger, large, single meat patty, with bacon and condiments 195g 1 sandwich 0.312
06931 Sauce, pasta, spaghetti/marinara, ready-to-serve 250g 1 cup 0.432
11439 Sauerkraut, canned, solids and liquids 236g 1 cup 0.307
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 32g 1/4 cup 0.257
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 28.35g 1 oz 0.228
14347 Shake, fast food, vanilla 333g 16 fl oz 0.173
19042 Snacks, potato chips, barbecue-flavor 28.35g 1 oz 0.176
19045 Snacks, potato chips, made from dried potatoes, light 28.35g 1 oz 0.222
19046 Snacks, potato chips, made from dried potatoes, sour-cream and onionflavor 28.35g 1 oz 0.135
19411 Snacks, potato chips, plain, salted 28.35g 1 oz 0.187
19811 Snacks, potato chips, plain, unsalted 28.35g 1 oz 0.187
19422 Snacks, potato chips, reduced fat 28.35g 1 oz 0.190
19043 Snacks, potato chips, sour-cream-and-onion-flavor 28.35g 1 oz 0.189
19062 Snacks, trail mix, regular, with chocolate chips, salted nuts and seeds 146g 1 cup 0.378
19061 Snacks, trail mix, tropical 140g 1 cup 0.458
06230 Soup, clam chowder, new england, canned, prepared with equal volume milk, commercial 248g 1 cup 0.126
06359 Soup, tomato, canned, prepared with equal volume milk, commercial 248g 1 cup 0.164
06559 Soup, tomato, canned, prepared with equal volume water, commercial 244g 1 cup 0.112
06067 Soup, vegetable, canned, chunky, ready-to-serve, commercial 240g 1 cup 0.192
16120 Soy milk, fluid 245g 1 cup 0.235
11451 Soybeans, green, cooked, boiled, drained, without salt 180g 1 cup 0.108
16109 Soybeans, mature cooked, boiled, without salt 172g 1 cup 0.402
22401 Spaghetti with meat sauce, frozen entree 283g 1 package 0.198
20125 Spaghetti, whole-wheat, cooked 140g 1 cup 0.111
11658 Spinach souffle, home-prepared 136g 1 cup 0.120
11461 Spinach, canned, drained solids 214g 1 cup 0.214
11458 Spinach, cooked, boiled, drained, without salt 180g 1 cup 0.436
11464 Spinach, frozen, chopped or leaf, cooked, boiled, drained, without salt 190g 1 cup 0.258
11642 Squash, summer, all varieties, cooked, boiled, drained, without salt 180g 1 cup 0.117
11641 Squash, summer, all varieties, raw 113g 1 cup 0.246
11644 Squash, winter, all varieties, cooked, baked, without salt 205g 1 cup 0.330
11488 Squash, winter, butternut, frozen, cooked, boiled, without salt 240g 1 cup 0.166
11647 Sweet potato, canned, syrup pack, drained solids 196g 1 cup 0.122
11512 Sweet potato, canned, vacuum pack 255g 1 cup 0.484
11508 Sweet potato, cooked, baked in skin, without salt 146g 1 potato 0.418
11510 Sweet potato, cooked, boiled, without skin 156g 1 potato 0.257
09220 Tangerines, (mandarin oranges), canned, light syrup pack 252g 1 cup 0.106
18361 Toaster pastries, brown-sugar-cinnamon 50 g1 pastry 0.213
18362 Toaster pastries, fruit (includes apple, blueberry, cherry, strawberry) 52g 1 pastry 0.202
11540 Tomato juice, canned, with salt added 243g 1 cup 0.270

11546 Tomato products, canned, paste, without salt added 262g 1 cup 0.566
11547 Tomato products, canned, puree, without salt added 250g 1 cup 0.315
11549 Tomato products, canned, sauce 245g 1 cup 0.238
11531 Tomatoes, red, ripe, canned, whole, regular pack 240g 1 cup 0.216
11529 Tomatoes, red, ripe, raw, year round average 180g 1 cup 0.144
21088 Tostada with guacamole 130.5g 1 tostada 0.131
05286 Turkey and gravy, frozen 142g 5-oz package 0.142
05292 Turkey patties, breaded, battered, fried 64g 1 patty 0.128
05296 Turkey roast, boneless, frozen, seasoned, light and dark meat, roasted 85.05g 3 oz 0.230
05188 Turkey, all classes, dark meat, cooked, roasted 84g 3 oz 0.302
05172 Turkey, all classes, giblets, cooked, simmered, some giblet fat 145g 1 cup 0.842
05186 Turkey, all classes, light meat, cooked, roasted 84 3g oz 0.454
05168 Turkey, all classes, meat only, cooked, roasted 140g 1 cup 0.644
05180 Turkey, all classes, neck, meat only, cooked, simmered 152g 1 neck 0.319
11569 Turnip greens, cooked, boiled, drained, without salt 144g 1 cup 0.259
11575 Turnip greens, frozen, cooked, boiled, drained, without salt 164g 1 cup 0.110
11565 Turnips, cooked, boiled, drained, without salt 156g 1 cup 0.105
17095 Veal, leg (top round), separable lean and fat, cooked, braised 85g 3 oz 0.306
17112 Veal, rib, separable lean and fat, cooked, roasted 85g 3 oz 0.213
11578 Vegetable juice cocktail, canned 242g 1 cup 0.339
11581 Vegetables, mixed, canned, drained solids 163g 1 cup 0.129
11584 Vegetables, mixed, frozen, cooked, boiled, drained, without salt 182g 1 cup 0.135
18403 Waffles, plain, frozen, ready-to-heat, toasted (includes buttermilk) 33g 1 waffle 0.295
09326 Watermelon, raw 286g 1 wedge 0.129
20080 Wheat flour, whole-grain 120g 1 cup 0.409

Note that;

- The recommended daily dose of vitamin $B_6$ is 1.3-1.5 mg.

- Potato may seem rich in vitamin $B_6$ as clearly can be seen from the list above but it is a vegetable which means that it is rich in soluble and insoluble fibers. These fibers may bind vitamin $B_6$ and decrease its bioavalibility. But, turkey, fish, duck and chicken, the sources in animal origin as free of fiber not only have got very rich contents of the vitamin, but the bioavalibility of the viamin in these sources is very higher than the foods in plant origin since they are free of fiber.

- Interestingly, in addition to many other vitamins and minerals, vitamin $B_6$ is also rich in malt and malted drinks and foods.

- Nuts may seem to you a healthy food since they are very rich in vitamin $B_6$ and many other vitamins and minerals, but as you easily remember from the related part, the rich vitamin and mineral content is not enough to be able to make this group as healthy because of their rich harmful omega 6 content. Therefore, never consume nuts in plenty amounts, may be seven or eight, a handful, but not more than that!

# VITAMIN B-12 (MCG:MICROGRAMS) CONTENT OF SELECTED FOODS PER COMMON MEASURE USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE , RELEASE 17

**(Only the foods which have got higher amounts of vitamin B-12 than 0.10 mcg are included to the list below)**
(the food products written in red color are the richest ones)

14006 Alcoholic beverage, beer, light 354g 12 fl oz 0.32
18003 Bagels, egg 71g 3-1/2" bagel 0.11
18003 Bagels, egg 89g 4" bagel 0.14
22905 Beef stew, canned entree 232g 1 cup 0.86
13050 Beef, chuck, blade roast, separable lean and fat, trimmed to 1/4" fat, all grades, cooked, braised 85g 3 oz 1.94
13058 Beef, chuck, blade roast, separable lean only, trimmed to 1/4" fat, all grades, cooked, braised 85g 3 oz 2.10
13348 Beef, cured, corned beef, canned 85.05g 3 oz 1.38
13350 Beef, cured, dried 28.35g 1 oz 0.67
23578 Beef, ground, 75% lean meat / 25% fat, patty, cooked, broiled 85g 3 oz 2.39
23573 Beef, ground, 80% lean meat / 20% fat, patty, cooked, broiled 85g 3 oz 2.32
23568 Beef, ground, 85% lean meat / 15% fat, patty, cooked, broiled 85g 3 oz 2.24
13073 Beef, rib, whole (ribs 6-12), separable lean and fat, trimmed to 1/4" fat, all grades, cooked, roasted 85g 3 oz 2.16*
13085 Beef, rib, whole (ribs 6-12), separable lean only, trimmed to 1/4" fat, all grades, cooked, roasted 85g 3 oz 2.47
13869 Beef, round, bottom round, separable lean and fat, trimmed to 1/8" fat, all grades, cooked, braised85g 3 oz 1.55
23605 Beef, round, bottom round, separable lean only,trimmed to 1/8" fat, all grades, cooked, braised 85g 3 oz 1.61
13878 Beef, round, eye of round, separable lean and fat, trimmed to 1/8" fat,all grades, cooked, roasted 85g 3 oz 1.33
23598 Beef, round, eye of round, separable lean only, trimmed to 1/8" fat, all grades, cooked, roasted 85g 3 oz 1.39
13930 Beef, top sirloin, separable lean and fat, trimmed to 1/8" fat, all grades,cooked, broiled 85g3 oz 1.35
23610 Beef, top sirloin, separable lean only, trimmed to 1/8" fat, all grades,cooked, broiled 85g 3 oz 1.43
13327 Beef, variety meats and by-products, liver, cooked, pan-fried 85g 3 oz 70.66*
07008 Bologna, beef and pork 56.7g 2 slices 1.03
07014 Braunschweiger (a liver sausage), pork 56.7g 2 slices 11.39*
18079 Bread crumbs, dry, grated, plain 28.35g 1 oz 0.10
18023 Bread, cornbread, dry mix, prepared 60g 1 piece 0.10
18024 Bread, cornbread, prepared from recipe, made with low fat (2%) milk 65g 1 piece 0.10
21005 Breakfast items, biscuit with egg and sausage 180g 1 biscuit 1.37
21023 Breakfast items, french toast with butter 135g 2 slices 0.36
18090 Cake, boston cream pie, commercially prepared 92 g 1 piece 0.15
18101 Cake, chocolate, prepared from recipe without frosting 95g 1 piece 0.15
18134 Cake, sponge, prepared from recipe 63g 1 piece 0.23
18140 Cake, yellow, commercially prepared, with chocolate frosting 64g 1 piece 0.11
18141 Cake, yellow, commercially prepared, with vanilla frosting 64g 1 piece 0.10
19071 Candies, carob 28.35g 1 oz 0.28
19087 Candies, confectioner's coating, white 170g 1 cup 1.07
19120 Candies, milk chocolate 44g 1 bar (1.55 oz) 0.27
19126 Candies, milk chocolate coated peanuts 40g 10 pieces 0.18
19132 Candies, milk chocolate, with almonds 41g 1 bar (1.45 oz) 0.14

01046 Cheese food, pasteurized process, american, without di sodiumphosphate 28.35g 1 oz 0.36
01164 Cheese sauce, prepared from recipe 243g 1 cup 0.85
01048 Cheese spread, pasteurized process, american, without di sodiumphosphate 28.35g 1 oz 0.11
01004 Cheese, blue 28.35 g1 oz 0.35
01007 Cheese, camembert 38g 1 wedge 0.49
01009 Cheese, cheddar 28.35g 1 oz 0.24
01012 Cheese, cottage, creamed, large or small curd 210g 1 cup 1.30
01013 Cheese, cottage, creamed, with fruit 226g 1 cup 1.20
01016 Cheese, cottage, lowfat, 1% milkfat 226g1 cup 1.42
01015 Cheese, cottage, lowfat, 2% milkfat 226g 1 cup 1.60
01014 Cheese, cottage, nonfat, uncreamed, dry, large or small curd 145g 1 cup 1.20
01168 Cheese, low fat, cheddar or colby 28.35g 1 oz 0.14
01029 Cheese, mozzarella, part skim milk, low moisture 28.35g 1 oz 0.65
01026 Cheese, mozzarella, whole milk 28.35g 1 oz 0.65
01030 Cheese, muenster 28.35g 1 oz 0.42
01032 Cheese, parmesan, grated 5g 1 tbsp 0.11
01042 Cheese, pasteurized process, american, with di sodium phosphate 28.35g 1 oz 0.20
01044 Cheese, pasteurized process, swiss, with di sodium phosphate 28.35g 1 oz 0.35
01035 Cheese, provolone 28.35g 1 oz 0.41
01037 Cheese, ricotta, part skim milk 246g 1 cup 0.71
01036 Cheese, ricotta, whole milk 246g 1 cup 0.84
01040 Cheese, swiss 28.35g 1 oz 0.95
18147 Cheesecake commercially prepared 80g 1 piece 0.14
22906 Chicken pot pie, frozen entree 217g 1 small pie 0.15
05058 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, batter 140g 1/2 breast 0.42
05059 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, flour 98g 1/2 breast 0.33
05064 Chicken, broilers or fryers, breast, meat only, cooked, roasted 86g 1/2 breast 0.29
05044 Chicken, broilers or fryers, dark meat, meat only, cooked, fried 84g 3 oz 0.28
05067 Chicken, broilers or fryers, drumstick, meat and skin, cooked, fried, batter 72g 1 drumstick 0.20
05068 Chicken, broilers or fryers, drumstick, meat and skin, cooked, fried, flour 49g 1 drumstick 0.16
05073 Chicken, broilers or fryers, drumstick, meat only, cooked, roasted 44g 1 drumstick 0.15
05022 Chicken, broilers or fryers, giblets, cooked, simmered 145g 1 cup 13.69*
05040 Chicken, broilers or fryers, light meat, meat only, cooked, fried 84g 3 oz 0.30
05092 Chicken, broilers or fryers, thigh, meat and skin, cooked, fried, batter 86g 1 thigh 0.24
05098 Chicken, broilers or fryers, thigh, meat only, cooked, roasted 52g 1 thigh 0.16
05101 Chicken, broilers or fryers, wing, meat and skin, cooked, fried, batter 49g 1 wing 0.12
05277 Chicken, canned, meat only, with broth 142g 5 oz 0.41
05028 Chicken, liver, all classes, cooked, simmered 19.6g 1 liver 3.30
05126 Chicken, stewing, meat only, cooked, stewed 140g 1 cup 0.36
22904 Chili con carne with beans, canned entree 222g 1 cup 1.44
14177 Chocolate-flavor beverage mix, powder, prepared with whole milk 266g 1 cup 1.06
14196 Cocoa mix, no sugar added, powder 15g 1/2 oz envelope 0.24
14192 Cocoa mix, powder 28.35g 3 heaping tsp 0.37
14194 Cocoa mix, powder, prepared with water 206g 1 serving 0.37
18104 Coffeecake, cinnamon with crumb topping, commercially prepared,enriched 63g 1 piece 0.11
15137 Crustaceans, crab, alaska king, cooked, moist heat 85g 3 oz 9.78*
15138 Crustaceans, crab, alaska king, imitation, made from surimi 85g 3 oz 1.36

15141 Crustaceans, crab, blue, canned 135g 1 cup 0.62
15140 Crustaceans, crab, blue, cooked, moist heat 85g 3 oz 6.21*
15142 Crustaceans, crab, blue, crab cakes 60g 1 cake 3.56*
15148 Crustaceans, lobster, northern, cooked, moist heat 85g 3 oz 2.64*
15152 Crustaceans, shrimp, mixed species, canned 85.05g 3 oz 0.95
15150 Crustaceans, shrimp, mixed species, cooked, breaded and fried 45g 6 large 0.84
15150 Crustaceans, shrimp, mixed species, cooked, breaded and fried 85g 3 oz 1.59
18248 Doughnuts, cake-type, plain (includes unsugared, old-fashioned) 47g 1 medium 0.13
18257 Eclairs, custard-filled with chocolate glaze, prepared from recipe 100g 1 eclair 0.34
01143 Egg substitute, liquid 62.75g 1/4 cup 0.19
01128 Egg, whole, cooked, fried 46g 1 large 0.64
01129 Egg, whole, cooked, hard-boiled 50g 1 large 0.56
01131 Egg, whole, cooked, poached 50g 1 large 0.64
01132 Egg, whole, cooked, scrambled 61g 1 large 0.47
01123 Egg, whole, raw, fresh 58g 1 extra large 0.75
01123 Egg, whole, raw, fresh 44g 1 medium 0.57
01123 Egg, whole, raw, fresh 50g 1 large 0.64
01125 Egg, yolk, raw, fresh 16.6g 1 large 0.32
01057 Eggnog 25g4 1 cup 1.14
21047 Entrees, fish fillet, battered or breaded, and fried 91g 1 fillet 1.01
21051 Entrees, pizza with pepperoni 71g 1 slice 0.18
21061 Fast foods, burrito, with beans and cheese 9g3 1 burrito 0.45
21063 Fast foods, burrito, with beans and meat 115.5g 1 burrito 0.87
21098 Fast foods, cheeseburger, large, single patty, with condiments and vegetables 219g 1 sandwich 2.56
21094 Fast foods, cheeseburger, regular, double patty and bun, plain 160g 1 sandwich 1.92
21092 Fast foods, cheeseburger, regular, double patty, plain 155g 1 sandwich 2.31
21093 Fast foods, cheeseburger, regular, double patty, with condiments and vegetables 166g 1 sandwich 1.93
21090 Fast foods, cheeseburger, regular, single patty, with condiments 113g 1 sandwich 0.94
21102 Fast foods, chicken fillet sandwich, plain 182g 1 sandwich 0.38
21229 Fast foods, chicken, breaded and fried, boneless pieces, plain 106g 6 pieces 0.35
21042 Fast foods, chili con carne 253g 1 cup 1.14
21070 Fast foods, chimichanga, with beef 174g 1 chimichanga 1.51
21043 Fast foods, clams, breaded and fried 115g 3/4 cup 1.10
21127 Fast foods, coleslaw 99g 3/4 cup 0.18
21012 Fast foods, croissant, with egg, cheese, and bacon 129g 1 croissant 0.86
21015 Fast foods, danish pastry, cheese 91g 1 pastry 0.23
21017 Fast foods, danish pastry, fruit 94g 1 pastry 0.24
21074 Fast foods, enchilada, with cheese 163g 1 enchilada 0.75
21021 Fast foods, english muffin, with egg, cheese, and canadian bacon 137g1 muffin 0.67
21077 Fast foods, frijoles with cheese 167g 1 cup 0.68
21114 Fast foods, hamburger, large, double patty, with condiments and vegetables 226g 1 sandwich 4.07*
21111 Fast foods, hamburger, regular, double patty, with condiments 215g 1 sandwich 3.33*
21108 Fast foods, hamburger, regular, single patty, with condiments 106g 1 sandwich 1.09
21118 Fast foods, hotdog, plain 98g 1 sandwich 0.51
21119 Fast foods, hotdog, with chili 114g 1 sandwich 0.30
21120 Fast foods, hotdog, with corn flour coating (corndog) 175g 1 corn dog 0.44
21129 Fast foods, hush puppies 78g 5 pieces 0.17

21028 Fast foods, ice milk, vanilla, soft-serve, with cone 103g 1 cone 0.21
21078 Fast foods, nachos, with cheese 113 g 6-8 nachos 0.82
21130 Fast foods, onion rings, breaded and fried 83g 8-9 rings 0.12
21025 Fast foods, pancakes with butter and syrup 232g 2 pancakes 0.23
21121 Fast foods, roast beef sandwich, plain 139g 1 sandwich 1.22
21053 Fast foods, salad, vegetable, tossed, without dressing, with cheese and egg 217g 1-1/2 cups 0.30
21054 Fast foods, salad, vegetable, tossed, without dressing, with chicken 218g 1-1/2 cups 0.20
21059 Fast foods, shrimp, breaded and fried 164g 6-8 shrimp 0.15
21124 Fast foods, submarine sandwich, with cold cuts 228g 1 sandwich, 6" roll 1.09
21125 Fast foods, submarine sandwich, with roast beef 216g 1 sandwich, 6" roll 1.81
21126 Fast foods, submarine sandwich, with tuna salad 256g 1 sandwich, 6" roll 1.61
21033 Fast foods, sundae, hot fudge 158g 1 sundae 0.65
21082 Fast foods, taco 263g 1 large 1.60
21082 Fast foods, taco 171g 1 small 1.04
21086 Fast foods, tostada, with beans, beef, and cheese 225g 1 tostada 1.13
15011 Fish, catfish, channel, cooked, breaded and fried 85g 3 oz 1.61
15017 Fish, cod, Atlantic, canned, solids and liquid 85g 3 oz 0.89
15192 Fish, cod, Pacific, cooked, dry heat 85g 3 oz 0.88
15027 Fish, fish portions and sticks, frozen, preheated 57g 1 portion (4" x 2" x 1/2") 1.03
15027 Fish, fish portions and sticks, frozen, preheated 28g 1 stick (4" x 1" x 1/2") 0.50
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 127g 1 fillet 3.19*
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 85g 3 oz 2.13*
15034 Fish, haddock, cooked, dry heat 85g 3 oz 1.18
15034 Fish, haddock, cooked, dry heat 150g 1 fillet 2.08
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 85g 3 oz 1.16
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 159g 1/2 fillet 2.18
15041 Fish, herring, Atlantic, pickled 85.05g 3 oz 3.63*
15058 Fish, ocean perch, Atlantic, cooked, dry heat 50g 1 fillet 0.57
15058 Fish, ocean perch, Atlantic, cooked, dry heat 85g 3 oz 0.98
15067 Fish, pollock, walleye, cooked, dry heat 85g 3 oz 3.57*
15067 Fish, pollock, walleye, cooked, dry heat 60g 1 fillet 2.52*
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 149g 1 fillet 1.79
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 85g 3 oz 1.02
15232 Fish, roughy, orange, cooked, dry heat 85g 3 oz 1.96
15077 Fish, salmon, chinook, smoked 85.05g 3 oz 2.77*
15084 Fish, salmon, pink, canned, solids with bone and liquid 85g 3 oz 3.74*
15086 Fish, salmon, sockeye, cooked, dry heat 155g 1/2 fillet 8.99*
15086 Fish, salmon, sockeye, cooked, dry heat 85g 3 oz 4.93*
15088 Fish, sardine, Atlantic, canned in oil, drained solids with bone 85.05g 3 oz 7.60*
15111 Fish, swordfish, cooked, dry heat 85g 3 oz 1.72
15111 Fish, swordfish, cooked, dry heat 106g 1 piece 2.14*
15241 Fish, trout, rainbow, farmed, cooked, dry heat 85g 3 oz 4.22*
15128 Fish, tuna salad 205g 1 cup 2.46*
15119 Fish, tuna, light, canned in oil, drained solids 85.05g 3 oz 1.87
15121 Fish, tuna, light, canned in water, drained solids 85 g3 oz 2.54*
15126 Fish, tuna, white, canned in water, drained solids 85g 3 oz 0.99
15221 Fish, tuna, yellowfin, fresh, cooked, dry heat 85g 3 oz 0.51

07022 Frankfurter, beef 45g 1 frank 0.77
07023 Frankfurter, beef and pork 45g 1 frank 0.58
07024 Frankfurter, chicken 45g 1 frank 0.11
18268 French toast, frozen, ready-to-heat 59g 1 slice 0.99
18269 French toast, prepared from recipe, made with low fat (2%) milk 65g 1 slice 0.20
19393 Frozen yogurts, chocolate, soft-serve 72g 1/2 cup 0.21
19293 Frozen yogurts, vanilla, soft-serve 72g 1/2 cup 0.21
07027 Ham, chopped, not canned 21 2 slices 0.19
07029 Ham, sliced, regular (approximately 11% fat) 56.7g 2 slices 0.24
22402 HEALTHY CHOICE Beef Macaroni, frozen entree 240g 1 package 0.12
19270 Ice creams, chocolate 66g 1/2 cup 0.19
19090 Ice creams, french vanilla, soft-serve 86g 1/2 cup 0.43
19095 Ice creams, vanilla 66g 1/2 cup 0.26
19088 Ice creams, vanilla, light 66g 1/2 cup 0.31
19089 Ice creams, vanilla, rich 74g 1/2 cup 0.29
17012 Lamb, domestic, leg, whole (shank and sirloin), separable lean and fat, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 2.20*
17014 Lamb, domestic, leg, whole (shank and sirloin), separable lean only, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 2.24*
17024 Lamb, domestic, loin, separable lean and fat, trimmed to 1/4" fat, choice, cooked, broiled 85g 3 oz 2.10*
17027 Lamb, domestic, loin, separable lean only, trimmed to 1/4" fat, choice, cooked, broiled 85g 3 oz 2.14*
17031 Lamb, domestic, rib, separable lean and fat, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 1.90
17034 Lamb, domestic, rib, separable lean only, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 1.84
17044 Lamb, domestic, shoulder, arm, separable lean and fat, trimmed to 1/4"fat, choice, cooked, braised85g 3 oz 2.19*
17048 Lamb, domestic, shoulder, arm, separable lean only, trimmed to 1/4"fat, choice, cooked, braised 85g 3 oz 2.25*
22247 Macaroni and Cheese, canned entree 252g 1 cup 0.38
14316 Malted drink mix, chocolate, with added nutrients, powder, prepared with whole milk265g 1 cup 1.14
14310 Malted drink mix, natural, with added nutrients, powder, prepared with whole milk 265g 1 cup 1.06
01111 Milk shakes, thick vanilla 313g 11 fl oz 1.63
01094 Milk, buttermilk, dried 6.5g 1 tbsp 0.25
01088 Milk, buttermilk, fluid, cultured, lowfat 245g 1 cup 0.54
01095 Milk, canned, condensed, sweetened 306g 1 cup 1.35
01097 Milk, canned, evaporated, nonfat 256g 1 cup 0.61
01096 Milk, canned, evaporated, without added vitamin A 252g 1 cup 0.40
01102 Milk, chocolate, fluid, commercial, 250g 1 cup 0.83
01104 Milk, chocolate, fluid, commercial, lowfat 250g 1 cup 0.85
01103 Milk, chocolate, fluid, commercial, reduced fat 250g 1 cup 0.85
01092 Milk, dry, nonfat, instant, with added vitamin A 23g 1/3 cup 0.92
01082 Milk, lowfat, fluid, 1% milkfat, with added vitamin A 244g 1 cup 1.07
01085 Milk, nonfat, fluid, with added vitamin A (fat free or skim) 245g 1 cup 1.30
01079 Milk, reduced fat, fluid, 2% milkfat, with added vitamin A 244g 1 cup 1.12
01077 Milk, whole, 3.25% milkfat 244g 1 cup 1.07
15160 Mollusks, clam, mixed species, canned, drained solids 85 g 3 oz 84.06*
15157 Mollusks, clam, mixed species, raw 85g 3 oz 42.02*
15168 Mollusks, oyster, eastern, cooked, breaded and fried 85g 3 oz 13.29*
15167 Mollusks, oyster, eastern, wild, raw 84g 6 medium 16.35*
15173 Mollusks, scallop, mixed species, cooked, breaded and fried 93g 6 large 1.23
18274 Muffins, blueberry, commercially prepared 57g 1 muffin 0.33
20110 Noodles, egg, cooked, enriched 160g 1 cup 0.14

20112 Noodles, egg, spinach, cooked, enriched 160g 1 cup 0.22
18292 Pancakes, plain, dry mix, incomplete, prepared 38g 1 pancake 0.13
22907 Pasta with meatballs in tomato sauce, canned entree 252g 1 cup 0.58
18444 Pie, fried pies, cherry 128g 1 pie 0.10
18319 Pie, fried pies, fruit 128g 1 pie 0.10
18320 Pie, lemon meringue, commercially prepared 113g 1 piece 0.19
18321 Pie, lemon meringue, prepared from recipe 127g 1 piece 0.15
18324 Pie, pecan, commercially prepared 113g 1 piece 0.11
18325 Pie, pecan, prepared from recipe 122g 1 piece 0.21
18326 Pie, pumpkin, commercially prepared 109g 1 piece 0.28
18327 Pie, pumpkin, prepared from recipe 155g 1 piece 0.14
21224 Pizza, cheese, regular crust, frozen 63g 1 serving 0.49
21226 Pizza, meat and vegetable, regular crust, frozen 79g 1 serving 0.49
07065 Pork and beef sausage, fresh, cooked 26g 2 links 0.11
07064 Pork sausage, fresh, cooked 26g 2 links 0.31
07064 Pork sausage, fresh, cooked 27g 1 patty 0.32
10124 Pork, cured, bacon, cooked, broiled, pan-fried or roasted 19 3g medium slices 0.23
10131 Pork, cured, canadian-style bacon, grilled 46.5 2 slices 0.36
10185 Pork, cured, ham, extra lean and regular, canned, roasted 85g 3 oz 0.71
10151 Pork, cured, ham, whole, separable lean and fat, roasted 85g 3 oz 0.54
10153 Pork, cured, ham, whole, separable lean only, roasted 85g 3 oz 0.59
10193 Pork, fresh, backribs, separable lean and fat, cooked, roasted 85g 3 oz 0.54
10009 Pork, fresh, leg (ham), whole, separable lean and fat, cooked, roasted 85g 3 oz 0.58
10011 Pork, fresh, leg (ham), whole, separable lean only, cooked, roasted 85g 3 oz 0.61
10038 Pork, fresh, loin, center loin (chops), bone-in, separable lean and fat, cooked, broiled 85g 3 oz 0.62
10179 Pork, fresh, loin, center loin (chops), bone-in, separable lean and fat, cooked, pan-fried 85g 3 oz 0.62
10042 Pork, fresh, loin, center loin (chops), bone-in, separable lean only, cooked, broiled 85g 3 oz 0.63
10176 Pork, fresh, loin, center loin (chops), bone-in, separable lean only, cooked, pan-fried 85g 3 oz 0.65
10047 Pork, fresh, loin, center rib (roasts), bone-in, separable lean and fat, cooked, roasted 85 3 oz 0.56
10051 Pork, fresh, loin, center rib (roasts), bone-in, separable lean only, cooked, roasted 85g 3g oz 0.58
10205 Pork, fresh, loin, country-style ribs, separable lean and fat, cooked, braised 85g 3goz 0.59
10075 Pork, fresh, shoulder, arm picnic, separable lean and fat, cooked, braised85g 3 oz 0.55
10078 Pork, fresh, shoulder, arm picnic, separable lean only, cooked, braised 85 g 3 oz 0.60
10089 Pork, fresh, spareribs, separable lean and fat, cooked, braised 85g 3 oz 0.92
11672 Potato pancakes, home-prepared 76g 1 pancake 0.14
11379 Potatoes, mashed, dehydrated, prepared from flakes without milk, whole milk and butter added 210g 1 cup 0.23
11657 Potatoes, mashed, home-prepared, whole milk added 210g 1 cup 0.15
11371 Potatoes, mashed, home-prepared, whole milk and margarine added 210g 1 cup 0.15
05306 Poultry food products, ground turkey, cooked 82 1g patty 0.27
19123 Puddings, chocolate, dry mix, instant, prepared with 2% milk 147g 1/2 cup 0.46
19190 Puddings, chocolate, dry mix, regular, prepared with 2% milk 14g2 1/2 cup 0.36
19193 Puddings, rice, ready-to-eat 113.4g 4 oz 0.24
19218 Puddings, tapioca, ready-to-eat 113g 4 oz 0.24
19212 Puddings, vanilla, dry mix, regular, prepared with 2% milk 140g 1/2 cup 0.35
19201 Puddings, vanilla, ready-to-eat 113g 4 oz 0.11
07069 Salami, cooked, beef and pork 56.7g 2 slices 2.07*
07072 Salami, dry or hard, pork, beef 20g 2 slices 0.38

07073 Sandwich spread, pork, beef 15g 1 tbsp 0.17
21097 Sandwiches and burgers, cheeseburger, large, single meat patty, with bacon and condiments 195g 1 sandwich 2.34*
21089 Sandwiches and burgers, cheeseburger, regular, single meat patty, plain 102g 1 sandwich 0.97
21113 Sandwiches and burgers, hamburger, large, single meat patty, with condiments and vegetables 218g 1 sandwich 2.38*
06166 Sauce, homemade, white, medium 250g 1 cup 0.70
07083 Sausage, Vienna, canned, chicken, beef, pork 16g 1 sausage 0.16
14346 Shake, fast food, chocolate 333g 16 fl oz 1.13
14347 Shake, fast food, vanilla 333g 16 fl oz 1.20
19002 Snacks, beef jerky, chopped and formed 19.8g 1 large piece 0.20
19041 Snacks, pork skins, plain 28.35g 1 oz 0.18
19043 Snacks, potato chips, sour-cream-and-onion-flavor 28.35g 1 oz 0.28
06409 Soup, beef noodle, canned, prepared with equal volume water, commercial 244g 1 cup 0.20
06018 Soup, chicken noodle, canned, chunky, ready-to-serve 240g 1 cup 0.31
06419 Soup, chicken noodle, canned, prepared with equal volume water, commercial 241g 1 cup 0.14
06024 Soup, chicken vegetable, canned, chunky, ready-to-serve 240g 1 cup 0.24
06423 Soup, chicken with rice, canned, prepared with equal volume water, commercial 241g 1 cup 0.14
06428 Soup, clam chowder, manhattan, canned, prepared with equal volume water 244g 1 cup 4.05*
06230 Soup, clam chowder, new england, canned, prepared with equal volume milk, commercial 248g 1 cup 10.24*
06416 Soup, cream of chicken, canned, prepared with equal volume water, commercial 244g 1 cup 0.10
06174 Soup, stock, fish, home-prepared 233 1g cup 1.61
06359 Soup, tomato, canned, prepared with equal volume milk, commercial 248g 1 cup 0.45
06471 Soup, vegetable beef, prepared with equal volume water, commercial 244g 1 cup 0.32
22401 Spaghetti with meat sauce, frozen entree 283g 1 package 0.17
11658 Spinach souffle, home-prepared 136g 1 cup 1.36
18361 Toaster pastries, brown-sugar-cinnamon 50g 1 pastry 0.11
21088 Tostada with guacamole 130.5g 1 tostada 0.50
05286 Turkey and gravy, frozen 142g 5-oz package 0.34
05292 Turkey patties, breaded, battered, fried 64g 1 patty 0.14
05296 Turkey roast, boneless, frozen, seasoned, light and dark meat, roasted 85.05g 3 oz 1.29
05188 Turkey, all classes, dark meat, cooked, roasted 84 3g oz 0.31
05172 Turkey, all classes, giblets, cooked, simmered, some giblet fat 145 1 cup 48.21*
05186 Turkey, all classes, light meat, cooked, roasted 84 3g oz 0.31
05168 Turkey, all classes, meat only, cooked, roasted 140g 1 cup 0.52
05180 Turkey, all classes, neck, meat only, cooked, simmered 152g 1 neck 0.35
17095 Veal, leg (top round), separable lean and fat, cooked, braised 85g 3 oz 0.99
17112 Veal, rib, separable lean and fat, cooked, roasted 85g 3 oz 1.24
18403 Waffles, plain, frozen, ready-to-heat, toasted (includes buttermilk) 33 1 waffle 0.83
18367 Waffles, plain, prepared from recipe 75g 1 waffle 0.19
01121 Yogurt, fruit, low fat, 10 grams protein per 8 ounce 227g 8-oz container 1.07
01117 Yogurt, plain, low fat, 12 grams protein per 8 ounce 227g 8-oz container 1.27
01118 Yogurt, plain, skim milk, 13 grams protein per 8 ounce 227g 8-oz container 1.38
01116 Yogurt, plain, whole milk, 8 grams protein per 8 ounce 227g 8-oz container 0.84

Note that;

The recommended daily dose of the vitamin is 2.4-2.6 mcg (Ref: Mayo Clinic) for adults.

- $B_{12}$ is one of the most important members of vitamin B complex since it enters into myelin coat of nerves and acts importantly in the production of enzymes which are responsible for blood proliferation. Therefore, $B_{12}$ in addition to folat and folic acid are the initial vitamins which are essential in the protection against anemia. Myelin coat is a strong barrier around nerve cells which protects them against various kinds of harmful factors such as pressure, heat, salt, cholesterol and toxic substance. As you can clearly remember from the related part about the vitamin, nerves stimulate blood vessels and only after this stimulation blood vessels are contacted and supply blood into the cells and tissues. Especially, joints supply blood followed by a health constriction of blood vessels which can only be maintained by a healthy nerve system. The mentioned healthy nerve system can only be possible by vitamib $B_{12}$. For all these reasons, $B_{12}$ with folat and folic acid is injected in many cases into joint in many forms of arthritis under the control of doctor regularly. $B_{12}$, folat and folic acid rich nutrition protects you from anemia and arthritis while this type of nutrition increases the quality of pregnancy period.

- Very few foods in plant origin contains vitamin $B_{12}$. This vitamin may be defined as an animal origin vitamin since the initial foods and food products which have got higher vitamin $B_{12}$ content are in animal origin. The richest sources as easily can be seen from the list above are; beef, salmon, sardine, lamb, clam, oyster, salami, fast food and turkey. Include these foods into diet as long as you are free of any cardiovascular disease and disorder, diabetes, cancer and any other metabolic disease. Remember that making regular sport and exercise, regular consumption of fruit and vegetable in plenty amounts, avoiding from nicotine and alcohol will increase your tolerance against cholesterol and bad cholesterol of the mentioned foods.

# FE CONTENT OF SELECTED FOODS PER COMMON MEASURE
# USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE, RELEASE 17

(Only the foods which have got more than 1.0 mg Fe are included to the list below)
(the food products written in red color are the richest ones)

11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 168g 1 cup 2.17
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 120g 1 medium 1.55
11015 Asparagus, canned, drained solids 72g 4 spears 1.32
11019 Asparagus, frozen, cooked, boiled, drained, without salt 180g 1 cup 1.01
18005 Bagels, cinnamon-raisin 71 3-1/2" bagel 2.70
18003 Bagels, egg 89 4" bagel 3.54
18003 Bagels, egg 71 3-1/2" bagel 2.83
18001 Bagels, plain, enriched, with calcium propionate (includes onion, poppy, sesame) 71 3g-1/2" bagel 2.53
18001 Bagels, plain, enriched, with calcium propionate (includes onion, poppy, sesame) 89 4" bagel 3.17
19077 Baking chocolate, unsweetened, liquid 28.35g 1 oz 1.18
19078 Baking chocolate, unsweetened, squares 28.35g 1 square 4.93
20006 Barley, pearled, cooked 157g 1 cup 2.09
20005 Barley, pearled, raw 200g 1 cup 5.00
16006 Beans, baked, canned, plain or vegetarian 254g 1 cup 3.00
16010 Beans, baked, canned, with pork and sweet sauce 253g 1 cup 4.20
16011 Beans, baked, canned, with pork and tomato sauce 253g 1 cup 8.20
16015 Beans, black, mature seeds, cooked, boiled, without salt 172g 1 cup 3.61
16025 Beans, great northern, mature seeds, cooked, boiled, without salt 177g 1 cup 3.77
16034 Beans, kidney, red, mature seeds, canned 256g 1 cup 3.23
16033 Beans, kidney, red, mature seeds, cooked, boiled, without salt 177g 1 cup 5.20
16038 Beans, navy, mature seeds, cooked, boiled, without salt 182g 1 cup 4.30
16043 Beans, pinto, mature seeds, cooked, boiled, without salt 171g 1 cup 3.57
11056 Beans, snap, green, canned, regular pack, drained solids 135g 1 cup 1.21
11061 Beans, snap, green, frozen, cooked, boiled, drained without salt 135g 1 cup 1.19
11932 Beans, snap, yellow, canned, regular pack, drained solids 135g 1 cup 1.21
11724 Beans, snap, yellow, cooked, boiled, drained, without salt 125g 1 cup 1.60
11732 Beans, snap, yellow, frozen, cooked, boiled, drained, without salt 135g 1 cup 1.19
16051 Beans, white, mature seeds, canned 262 g 1 cup 7.83
22905 Beef stew, canned entree 232g 1 cup 1.65
13050 Beef, chuck, blade roast, separable lean and fat, trimmed to 1/4" fat, all grades, cooked, braised 85 3g oz 2.63
13058 Beef, chuck, blade roast, separable lean only, trimmed to 1/4" fat, all grades, cooked, braised 85 3g oz 3.13
13348 Beef, cured, corned beef, canned 85.05g 3 oz 1.77
23578 Beef, ground, 75% lean meat / 25% fat, patty, cooked, broiled 85 g oz 2.01
23573 Beef, ground, 80% lean meat / 20% fat, patty, cooked, broiled 85 3g oz 2.11
23568 Beef, ground, 85% lean meat / 15% fat, patty, cooked, broiled 85 3g oz 2.21
13073 Beef, rib, whole (ribs 6-12), separable lean and fat, trimmed to 1/4" fat, all grades, cooked, roasted 85 3g oz 1.99
13085 Beef, rib, whole (ribs 6-12), separable lean only, trimmed to 1/4" fat, all grades, cooked, roasted 85 3 g oz 2.43
13869 Beef, round, bottom round, separable lean and fat, trimmed to 1/8" fat, all grades, cooked, braised 85 3g oz 2.27
23605 Beef, round, bottom round, separable lean only,trimmed to 1/8" fat, all grades, cooked, braised 85 3g oz 2.44

13878 Beef, round, eye of round, separable lean and fat, trimmed to 1/8" fat, all grades, cooked, roasted 85 3g oz 1.95
23598 Beef, round, eye of round, separable lean only, trimmed to 1/8" fat, all grades, cooked, roasted 85 3g oz 2.09
13930 Beef, top sirloin, separable lean and fat, trimmed to 1/8" fat, all grades, cooked, broiled 85 3 g oz 1.47
23610 Beef, top sirloin, separable lean only, trimmed to 1/8" fat, all grades, cooked, broiled 85 3g oz 1.59
13327 Beef, variety meats and by-products, liver, cooked, pan-fried 85 3g oz 5.24*
11087 Beet greens, cooked, boiled, drained, without salt 144g 1 cup 2.74
11084 Beets, canned, drained solids 170g 1 cup 3.09
11081 Beets, cooked, boiled, drained 170g 1 cup 1.34
18016 Biscuits, plain or buttermilk, prepared from recipe 101 4" biscuit 2.93
18016 Biscuits, plain or buttermilk, prepared from recipe 60 2g-1/2" biscuit 1.74
07014 Braunschweiger (a liver sausage), pork 56.7g 2 slices 6.35
18079 Bread crumbs, dry, grated, plain 28.35g 1 oz 1.37
18376 Bread crumbs, dry, grated, seasoned 120g1 cup 5.90
18082 Bread stuffing, bread, dry mix, prepared 100g 1/2 cup 1.09
18023 Bread, cornbread, dry mix, prepared 60g 1 piece 1.14
18024 Bread, cornbread, prepared from recipe, made with low fat (2%) milk 65g 1 piece 1.63
18027 Bread, egg 40g 1/2" slice 1.22
35142 Bread, Indian, fry, made with lard (Navajo) 160g 10-1/2" bread 6.46
35142 Bread, Indian, fry, made with lard (Navajo) 90g 5" bread 3.64
18041 Bread, pita, white, enriched 60g 6-1/2" pita 1.57
18069 Bread, white, commercially prepared (includes soft bread crumbs) 45g 1 cup 1.68
21005 Breakfast items, biscuit with egg and sausage 180g 1 biscuit 3.96
21023 Breakfast items, french toast with butter 135g 2 slices 1.89
11091 Broccoli, cooked, boiled, drained, without salt 156g 1 cup 1.05
11093 Broccoli, frozen, chopped, cooked, boiled, drained, without salt 184g 1 cup 1.12
11099 Brussels sprouts, cooked, boiled, drained, without salt 156g 1 cup 1.87
20011 Buckwheat flour, whole-groat 120g 1 cup 4.87
20010 Buckwheat groats, roasted, cooked 168g 1 cup 1.34
20013 Bulgur, cooked 182g 1 cup 1.75
20012 Bulgur, dry 140g 1 cup 3.44
11117 Cabbage, chinese (pak-choi), cooked, boiled, drained, without salt 170g1 cup 1.77
18096 Cake, chocolate, commercially prepared with chocolate frosting 64g 1 piece 1.41
18101 Cake, chocolate, prepared from recipe without frosting 95g 1 piece 1.53
18116 Cake, gingerbread, prepared from recipe 74g 1 piece 2.13
18119 Cake, pineapple upside-down, prepared from recipe 115g 1 piece 1.70
18126 Cake, shortcake, biscuit-type, prepared from recipe 65g 1 shortcake 1.65
18127 Cake, snack cakes, creme-filled, chocolate with frosting 50g 1 cupcake 1.68
18134 Cake, sponge, prepared from recipe 63g 1 piece 1.00
18102 Cake, white, prepared from recipe with coconut frosting 112g 1 piece 1.30
18139 Cake, white, prepared from recipe without frosting 74g 1 piece 1.12
18140 Cake, yellow, commercially prepared, with chocolate frosting 64g 1 piece 1.33
19120 Candies, milk chocolate 44g 1 bar 1 cup 5.26
11655 Carrot juice, canned 236g 1 cup 1.09
08156 Cereals ready-to-eat, rice, puffed, fortified 14g 1 cup 4.44
08157 Cereals ready-to-eat, wheat, puffed, fortified 12g 1 cup 3.80
08147 Cereals ready-to-eat, wheat, shredded, plain, sugar and salt free 46g 2 biscuits 1.36
08091 Cereals, corn grits, white, regular and quick, enriched, cooked with water, without salt 242g 1 cup 1.45

08164 Cereals, corn grits, yellow, regular and quick, enriched, cooked with water, without salt 242g 1 cup 1.45
08123 Cereals, oats, instant, fortified, plain, prepared with water 177g 1 packet 7.68
08121 Cereals, oats, regular and quick and instant, unenriched, cooked with water, without salt 234g 1 cup 1.59
01037 Cheese, ricotta, part skim milk 246g 1 cup 1.08
09064 Cherries, sour, red, canned, water pack, solids and liquids (includes USDA commodity red tart cherries, canned) 244g 1 cup 3.34
22906 Chicken pot pie, frozen entree 217g 1 small pie 2.06
05058 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, batter 140g 1/2 breast 1.75
05059 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, flour 98g 1/2 breast 1.17
05044 Chicken, broilers or fryers, dark meat, meat only, cooked, fried 84 g3 oz 1.25
05022 Chicken, broilers or fryers, giblets, cooked, simmered 14g 1 cup 10.21
05092 Chicken, broilers or fryers, thigh, meat and skin, cooked, fried, batter 86g 1 thigh 1.25
05277 Chicken, canned, meat only, with broth 142g 5 oz 2.24
05028 Chicken, liver, all classes, cooked, simmered 19.6g 1 liver 2.28
05126 Chicken, stewing, meat only, cooked, stewed 140g 1 cup 2.00
16058 Chickpeas (garbanzo beans, bengal gram), mature seeds, canned 240g 1 cup 3.24
16057 Chickpeas (garbanzo beans, bengal gram), mature seeds, cooked, boiled, without salt 164g 1 cup 4.74
22904 Chili con carne with beans, canned entree 222g 1 cup 5.79
18104 Coffeecake, cinnamon with crumb topping, commercially prepared, enriched 63g 1 piece 1.20
11162 Collards, cooked, boiled, drained, without salt 190g 1 cup 2.20
11164 Collards, frozen, chopped, cooked, boiled, drained, without salt 170g 1 cup 1.90
18151 Cookies, brownies, commercially prepared 56g 1 brownie 1.26
18166 Cookies, chocolate sandwich, with creme filling, regular 10g 1 cookie 1.05
18177 Cookies, molasses 32g 1 cookie, large (3-1/2" to 4" 2.06
20022 Cornmeal, degermed, enriched, yellow 138g 1 cup 5.70
20025 Cornmeal, self-rising, degermed, enriched, yellow 138 g1 cup 6.53
20020 Cornmeal, whole-grain, yellow 122g 1 cup 4.21
20028 Couscous, dry 173g 1 cup 1.87
11192 Cowpeas (Blackeyes), immature seeds, cooked, boiled, drained, without salt 165 g 1 cup 1.85
11196 Cowpeas (blackeyes), immature seeds, frozen, cooked, boiled, drained, without salt 170g 1 cup 3.60
16064 Cowpeas, common (blackeyes, crowder, southern), mature seeds, canned, plain 240g 1 cup 2.33
16063 Cowpeas, common (blackeyes, crowder, southern), mature seeds, cooked, boiled, without salt 172g 1 cup 4.32
15141 Crustaceans, crab, blue, canned 135g 1 cup 1.13
15152 Crustaceans, shrimp, mixed species, canned 85.05g 3 oz 2.33
11208 Dandelion greens, cooked, boiled, drained, without salt 105g 1 cup 1.89
18245 Danish pastry, cheese 71g 1 danish 1.14
18246 Danish pastry, fruit, enriched (includes apple, cinnamon, raisin, lemon, raspberry, strawberry) 71g 1 danish 1.26
09087 Dates, deglet noor 178g 1 cup 1.82
18255 Doughnuts, yeast-leavened, glazed, enriched (includes honey buns) 60g 1 medium 1.22
05142 Duck, domesticated, meat only, cooked, roasted 221g 1/2 duck 5.97
18257 Eclairs, custard-filled with chocolate glaze, prepared from recipe 100g 1 eclair 1.18
01143 Egg substitute, liquid 62.75g 1/4 cup 1.32
01123 Egg, whole, raw, fresh 58g 1 extra large 1.06
18258 English muffins, plain, enriched, with ca prop (includes sourdough) 57g 1 muffin 1.43
18259 English muffins, plain, toasted, enriched, with calcium propionate (includes sourdough) 52g 1 muffin 1.41
21047 Entrees, fish fillet, battered or breaded, and fried 91g 1 fillet 1.92
21061 Fast foods, burrito, with beans and cheese 93g 1 burrito 1.13
21063 Fast foods, burrito, with beans and meat 115.5g 1 burrito 2.45

21098 Fast foods, cheeseburger, large, single patty, with condiments and vegetables 219g 1 sandwich 4.66
21094 Fast foods, cheeseburger, regular, double patty and bun, plain 160g 1 sandwich 3.70
21092 Fast foods, cheeseburger, regular, double patty, plain 155g 1 sandwich 3.41
21093 Fast foods, cheeseburger, regular, double patty, with condiments and vegetables 166g 1 sandwich 3.42
21090 Fast foods, cheeseburger, regular, single patty, with condiments 113g 1 sandwich 2.43
21102 Fast foods, chicken fillet sandwich, plain 182g 1 sandwich 4.68
21042 Fast foods, chili con carne 253g 1 cup 5.19
21070 Fast foods, chimichanga, with beef 174g 1 chimichanga 4.54
21043 Fast foods, clams, breaded and fried 115g 3/4 cup 3.05
21012 Fast foods, croissant, with egg, cheese, and bacon 129g 1 croissant 2.19
21015 Fast foods, danish pastry, cheese 91g 1 pastry 1.85
21017 Fast foods, danish pastry, fruit 94g 1 pastry 1.40
21074 Fast foods, enchilada, with cheese 163g 1 enchilada 1.32
21021 Fast foods, english muffin, with egg, cheese, and canadian bacon 137 g 1 muffin 2.44
21106 Fast foods, fish sandwich, with tartar sauce and cheese 183g 1 sandwich 3.50
21024 Fast foods, french toast sticks 141g 5 sticks 2.96
21077 Fast foods, frijoles with cheese 167g 1 cup 2.24
21114 Fast foods, hamburger, large, double patty, with condiments and vegetables 226g 1 sandwich 5.85*
21111 Fast foods, hamburger, regular, double patty, with condiments 215g 1 sandwich 5.55*
21108 Fast foods, hamburger, regular, single patty, with condiments 106g1 sandwich 2.71
21118 Fast foods, hotdog, plain 98g 1 sandwich 2.31
21119 Fast foods, hotdog, with chili 114g 1 sandwich 3.28
21120 Fast foods, hotdog, with corn flour coating (corndog) 175g 1 corn dog 6.18*
21129 Fast foods, hush puppies 78g 5 pieces 1.43
21078 Fast foods, nachos, with cheese 113g 6-8 nachos 1.28
21025 Fast foods, pancakes with butter and syrup 232g 2 pancakes 2.62
21138 Fast foods, potato, french fried in vegetable oil 169g 1 large 1.32
21138 Fast foods, potato, french fried in vegetable oil 134g 1 medium 1.05
21121 Fast foods, roast beef sandwich, plain 139g 1 sandwich 4.23
21059 Fast foods, shrimp, breaded and fried 164g 6-8 shrimp 2.95
21124 Fast foods, submarine sandwich, with cold cuts 228g 1 sandwich, 6" roll 2.51
21125 Fast foods, submarine sandwich, with roast beef 216g 1 sandwich, 6" roll 2.81
21126 Fast foods, submarine sandwich, with tuna salad 256g 1 sandwich, 6" roll 2.64
21082 Fast foods, taco 263g 1 large 3.71
21082 Fast foods, taco 171g 1 small 2.41
21083 Fast foods, taco salad 198g 1-1/2 cups 2.28
21086 Fast foods, tostada, with beans, beef, and cheese 225g 1 tostada 2.45
15011 Fish, catfish, channel, cooked, breaded and fried 85g 3 oz 1.22
15034 Fish, haddock, cooked, dry heat 85g 3 oz 1.15
15034 Fish, haddock, cooked, dry heat 150g 1 fillet 2.03
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 159g 1/2 fillet 1.70
15041 Fish, herring, Atlantic, pickled 85.05g 3 oz 1.04
15058 Fish, ocean perch, Atlantic, cooked, dry heat 50g 1 fillet 0.59
15058 Fish, ocean perch, Atlantic, cooked, dry heat 85g 3 oz 1.00
15088 Fish, sardine, Atlantic, canned in oil, drained solids with bone 85.05g 3 oz 2.48
15111 Fish, swordfish, cooked, dry heat 106g 1 piece 1.10
15128 Fish, tuna salad 205g 1 cup 2.05

15119 Fish, tuna, light, canned in oil, drained solids 85.05g 3 oz 1.18
15121 Fish, tuna, light, canned in water, drained solids 85g 3 oz 1.30
18268 French toast, frozen, ready-to-heat 59g 1 slice 1.30
18269 French toast, prepared from recipe, made with low fat (2%) milk 65g 1 slice 1.09
09121 Grapefruit, sections, canned, light syrup pack, solids and liquids 254g 1 cup 1.02
11961 Hearts of palm, canned 33g 1 piece 1.03
11226 Jerusalem-artichokes, raw 150g 1 cup 5.10
11234 Kale, cooked, boiled, drained, without salt 130g 1 cup 1.17
11236 Kale, frozen, cooked, boiled, drained, without salt 130g 1 cup 1.22
18505 KELLOGG'S Eggo Lowfat Homestyle Waffles 35g 1 waffle 1.95
17012 Lamb, domestic, leg, whole (shank and sirloin), separable lean and fat, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 1.68
17014 Lamb, domestic, leg, whole (shank and sirloin), separable lean only, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 1.80
17024 Lamb, domestic, loin, separable lean and fat, trimmed to 1/4" fat, choice, cooked, broiled 85g 3 oz 1.54
17027 Lamb, domestic, loin, separable lean only, trimmed to 1/4" fat, choice, cooked, broiled 85g 3 oz 1.70
17031 Lamb, domestic, rib, separable lean and fat, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 1.36
17034 Lamb, domestic, rib, separable lean only, trimmed to 1/4" fat, choice, cooked, roasted 85g 3 oz 1.50
17044 Lamb, domestic, shoulder, arm, separable lean and fat, trimmed to 1/4" fat, choice, cooked, braised 85g 3 oz 2.03
17048 Lamb, domestic, shoulder, arm, separable lean only, trimmed to 1/4" fat, choice, cooked, braised 85g 3 oz 2.30
18375 Leavening agents, yeast, baker's, active dry 7 g 1 pkg 1.16
16070 Lentils, mature seeds, cooked, boiled, without salt 198g 1 cup 6.59
11250 Lettuce, butterhead (includes boston and bibb types), raw 163g 1 head 2.02
11252 Lettuce, iceberg (includes crisphead types), raw 539g 1 head 2.21
11040 Lima beans, immature seeds, frozen, baby, cooked, boiled, drained, without salt 180g 1 cup 3.53
11038 Lima beans, immature seeds, frozen, fordhook, cooked, boiled, drained, without salt 170g 1 cup 3.09
16073 Lima beans, large, mature seeds, canned 241g 1 cup 4.36
16072 Lima beans, large, mature seeds, cooked, boiled, without salt 188g 1 cup 4.49
22247 Macaroni and Cheese, canned entree 252g 1 cup 2.27
20100 Macaroni, cooked, enriched 140g 1 cup 1.96
14315 Malted drink mix, chocolate, with added nutrients, powder 21g 3 heaping tsp 3.65
14316 Malted drink mix, chocolate, with added nutrients, powder, prepared with whole milk 265g 1 cup 3.76
14309 Malted drink mix, natural, with added nutrients, powder 21 4g-5 heaping tsp 3.49
14310 Malted drink mix, natural, with added nutrients, powder, prepared with whole milk 265g 1 cup 3.60
16112 Miso 68.75g 1 cup 1.71
19305 Molasses, blackstrap 20g 1 tbsp 3.50
15160 Mollusks, clam, mixed species, canned, drained solids 85g 3 oz 23.77
15157 Mollusks, clam, mixed species, raw 85g 3 oz 11.88
15168 Mollusks, oyster, eastern, cooked, breaded and fried 85g 3 oz 5.91*
15167 Mollusks, oyster, eastern, wild, raw 84g 6 medium 5.59*
18278 Muffins, blueberry, prepared from recipe, made with low fat (2%) milk 57g 1 muffin 1.29
18279 Muffins, corn, commercially prepared 57g 1 muffin 1.60
18283 Muffins, oat bran 57g 1 muffin 2.39
11264 Mushrooms, canned, drained solids 156g 1 cup 1.23
11261 Mushrooms, cooked, boiled, drained, without salt 156g 1 cup 2.71
20113 Noodles, chinese, chow mein 45g 1 cup 2.13
20110 Noodles, egg, cooked, enriched 160g 1 cup 2.54
20112 Noodles, egg, spinach, cooked, enriched 160g 1 cup 1.74
12061 Nuts, almonds 28.35g 1 oz (24 nuts) 1.22

12585 Nuts, cashew nuts, dry roasted, with salt added 28.35g 1 oz 1.70
12586 Nuts, cashew nuts, oil roasted, with salt added 28.35g 1 oz (18 nuts) 1.72
12167 Nuts, chestnuts, european, roasted 143g 1 cup 1.30
12179 Nuts, coconut meat, dried (desiccated), sweetened, shredded 93g 1 cup 1.79
12104 Nuts, coconut meat, raw 45g 1 piece 1.09
12120 Nuts, hazelnuts or filberts 28.35g 1 oz 1.33
12635 Nuts, mixed nuts, dry roasted, with peanuts, with salt added 28.35g 1 oz 1.05
12147 Nuts, pine nuts, dried 28.35g 1 oz 1.57
12652 Nuts, pistachio nuts, dry roasted, with salt added 28.35g 1 oz (47 nuts) 1.19
20034 Oat bran, cooked 219g 1 cup 1.93
20033 Oat bran, raw 94g 1 cup 5.09
11281 Okra, frozen, cooked, boiled, drained, without salt 184g 1 cup 1.23
11296 Onion rings, breaded, par fried, frozen, prepared, heated in oven 60g 10 rings 1.01
11291 Onions, spring or scallions (includes tops and bulb), raw 100g 1 cup 1.48
09207 Orange juice, canned, unsweetened 249 g 1 cup 1.10
18288 Pancakes plain, frozen, ready-to-heat (includes buttermilk) 36g 1 pancake 1.25
22907 Pasta with meatballs in tomato sauce, canned entree 252g 1 cup 2.34
11301 Peas, edible-podded, cooked, boiled, drained, without salt 160g 1 cup 3.15
11303 Peas, edible-podded, frozen, cooked, boiled, drained, without salt 160g 1 cup 3.84
11308 Peas, green, canned, regular pack, drained solids 170g 1 cup 1.61
11313 Peas, green, frozen, cooked, boiled, drained, without salt 160g 1 cup 2.43
16086 Peas, split, mature seeds, cooked, boiled, without salt 196g 1 cup 2.53
18330 Pie crust, cookie-type, prepared from recipe, graham cracker, baked 239g 1 pie shell 5.19
18335 Pie crust, standard-type, frozen, ready-to-bake, baked 126g 1 pie shell 2.85
18336 Pie crust, standard-type, prepared from recipe, baked 180g 1 pie shell 5.20
18302 Pie, apple, prepared from recipe 155g 1 piece 1.74
18306 Pie, blueberry, prepared from recipe 147g 1 piece 1.81
18309 Pie, cherry, prepared from recipe 180g 1 piece 3.33
18310 Pie, chocolate creme, commercially prepared 113g 1 piece 1.21
18444 Pie, fried pies, cherry 128g 1 pie 1.56
18319 Pie, fried pies, fruit 128g 1 pie 1.56
18321 Pie, lemon meringue, prepared from recipe 127g 1 piece 1.27
18324 Pie, pecan, commercially prepared 113g 1 piece 1.18
18325 Pie, pecan, prepared from recipe 122g 1 piece 1.81
18327 Pie, pumpkin, prepared from recipe 155g 1 piece 1.97
21224 Pizza, cheese, regular crust, frozen 63g 1 serving 1.43
21226 Pizza, meat and vegetable, regular crust, frozen 79g 1 serving 1.07
09277 Plantains, raw 179g 1 medium 1.07
09284 Plums, canned, purple, heavy syrup pack, solids and liquids 258 g1 cup 2.17
09292 Plums, dried (prunes), stewed, without added sugar 248g 1 cup 1.02
10193 Pork, fresh, backribs, separable lean and fat, cooked, roasted 85g 3 oz 1.17
10205 Pork, fresh, loin, country-style ribs, separable lean and fat, cooked, braised 85g 3 oz 1.04
10075 Pork, fresh, shoulder, arm picnic, separable lean and fat, cooked, braised 85g 3 oz 1.37
10078 Pork, fresh, shoulder, arm picnic, separable lean only, cooked, braised 85g 3 oz 1.66
10089 Pork, fresh, spareribs, separable lean and fat, cooked, braised 85g 3 oz 1.57
11672 Potato pancakes, home-prepared 76g 1 pancake 1.19
11399 Potato puffs, frozen, prepared 79g 10 puffs 1.23

11414 Potato salad, home-prepared 250g 1 cup 1.62
11674 Potato, baked, flesh and skin, without salt 202g 1 potato 2.18
11373 Potatoes, au gratin, home-prepared from recipe using butter 245 g 1 cup 1.57
11364 Potatoes, baked, skin, without salt 58 g1 skin 4.08
11372 Potatoes, scalloped, home-prepared with butter 245g 1 cup 1.40
05306 Poultry food products, ground turkey, cooked 82g 1 patty 1.58
09294 Prune juice, canned 256g 1 cup 3.02
11424 Pumpkin, canned, without salt 245g 1 cup 3.41
11423 Pumpkin, cooked, boiled, drained, without salt 245g 1 cup 1.40
09298 Raisins, seedless 145g 1 cup 2.73
09306 Raspberries, frozen, red, sweetened 250g 1 cup 1.62
16103 Refried beans, canned (includes USDA commodity) 252g 1 cup 4.18
20047 Rice, white, long-grain, parboiled, enriched, cooked 175g 1 cup 1.98
20046 Rice, white, long-grain, parboiled, enriched, dry 185g 1 cup 6.59
20049 Rice, white, long-grain, precooked or instant, enriched, prepared 165g 1 cup 1.04
20045 Rice, white, long-grain, regular, cooked 158g 1 cup 1.90
20044 Rice, white, long-grain, regular, raw, enriched 185g 1 cup 7.97
18350 Rolls, hamburger or hotdog, plain 43 1 roll 1.43
18353 Rolls, hard (includes kaiser) 57g 1 roll 1.87
07069 Salami, cooked, beef and pork 56.7g 2 slices 1.51
21089 Sandwiches and burgers, cheeseburger, regular, single meat patty, plain 102g 1 sandwich 2.44
21113 Sandwiches and burgers, hamburger, large, single meat patty, with condiments and vegetables 218 g 1 sandwich 4.93
11439 Sauerkraut, canned, solids and liquids 236g 1 cup 3.47
12516 Seeds, pumpkin and squash seed kernels, roasted, with salt added 28.35g 1 oz (142 seeds) 4.24
12166 Seeds, sesame butter, tahini, from roasted and toasted kernels (most common type) 15g 1 tbsp 1.34
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 28g.35 1 oz 1.08
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 32g 1/4 cup 1.22
14346 Shake, fast food, chocolate 333g 16 fl oz 1.03
19002 Snacks, beef jerky, chopped and formed 19.8g 1 large piece 1.07
19038 Snacks, popcorn, caramel-coated, with peanuts 42g 1 cup 1.64
19047 Snacks, pretzels, hard, plain, salted 60g 10 pretzels 2.59
19062 Snacks, trail mix, regular, with chocolate chips, salted nuts and seeds 146g 1 cup 4.95
19061 Snacks, trail mix, tropical 140g 1 cup 3.70
06007 Soup, bean with ham, canned, chunky, ready-to-serve, commercial 243g 1 cup 3.23
06404 Soup, bean with pork, canned, prepared with equal volume water, commercial 253g 1 cup 2.05
06409 Soup, beef noodle, canned, prepared with equal volume water, commercial 244g 1 cup 1.10
06018 Soup, chicken noodle, canned, chunky, ready-to-serve 240g 1 cup 1.44
06024 Soup, chicken vegetable, canned, chunky, ready-to-serve 240g 1 cup 1.46 244 1 cup 1.63
06230 Soup, clam chowder, new england, canned, prepared with equal volume milk, commercial 248g 1 cup 1.49
06094 Soup, onion mix, dehydrated, dry form 39g 1 packet 1.56
06449 Soup, pea, green, canned, prepared with equal volume water, commercial 250g 1 cup 1.95
06174 Soup, stock, fish, home-prepared 233g 1 cup 0.02
06359 Soup, tomato, canned, prepared with equal volume milk, commercial 248g 1 cup 1.81
06559 Soup, tomato, canned, prepared with equal volume water, commercial 244g 1 cup 1.76
06471 Soup, vegetable beef, prepared with equal volume water, commercial 244g 1 cup 1.12
06067 Soup, vegetable, canned, chunky, ready-to-serve, commercial 240g 1 cup 1.63
06468 Soup, vegetarian vegetable, canned, prepared with equal volume water, commercial 241g 1 cup 1.08

16120 Soy milk, fluid 245g 1 cup 2.70
11451 Soybeans, green, cooked, boiled, drained, without salt 180g 1 cup 4.50
16109 Soybeans, mature cooked, boiled, without salt 172g 1 cup 8.84
22401 Spaghetti with meat sauce, frozen entree 283g 1 package 3.54
20121 Spaghetti, cooked, enriched, without added salt 140g 1 cup 1.96
20125 Spaghetti, whole-wheat, cooked 140g 1 cup 1.48
02029 Spices, parsley, dried 1.3g 1 tbsp 1.27
11658 Spinach souffle, home-prepared 136g 1 cup 1.35
11461 Spinach, canned, drained solids 214g 1 cup 4.92
11458 Spinach, cooked, boiled, drained, without salt 180g 1 cup 6.43
11464 Spinach, frozen, chopped or leaf, cooked, boiled, drained, without salt 190g 1 cup 3.72
11488 Squash, winter, butternut, frozen, cooked, boiled, without salt 240g 1 cup 1.39
09320 Strawberries, frozen, sweetened, sliced 255g 1 cup 1.50
11647 Sweet potato, canned, syrup pack, drained solids 196g 1 cup 1.86
11512 Sweet potato, canned, vacuum pack 255g 1 cup 2.27
11508 Sweet potato, cooked, baked in skin, without salt 146g 1 potato 1.01
11510 Sweet potato, cooked, boiled, without skin 156g 1 potato 1.12
11659 Sweet potato, cooked, candied, home-prepared 105g 1 piece 1.19
20068 Tapioca, pearl, dry 152g 1 cup 2.40
18361 Toaster pastries, brown-sugar-cinnamon 50g 1 pastry 2.02
18362 Toaster pastries, fruit (includes apple, blueberry, cherry, strawberry) 52g 1 pastry 1.81
16126 Tofu, firm, prepared with calcium sulfate and magnesium chloride (nigari) 81g 1/4 block 1.30
16127 Tofu, soft, prepared with calcium sulfate and magnesium chloride (nigari) 120g 1 piece 1.33
11540 Tomato juice, canned, with salt added 243g 1 cup 1.04
11546 Tomato products, canned, paste, without salt added 262g 1 cup 7.81
11547 Tomato products, canned, puree, without salt added 250g 1 cup 4.45
11549 Tomato products, canned, sauce 245g 1 cup 2.50
11533 Tomatoes, red, ripe, canned, stewed 255g 1 cup 3.39
11531 Tomatoes, red, ripe, canned, whole, regular pack 240g 1 cup 2.33
18364 Tortillas, ready-to-bake or -fry, flour 32g 1 tortilla 1.07
05286 Turkey and gravy, frozen 142g 5-oz package 1.32
05292 Turkey patties, breaded, battered, fried 64g 1 patty 1.41
05296 Turkey roast, boneless, frozen, seasoned, light and dark meat, roasted 85.05g 3 oz 1.39
05188 Turkey, all classes, dark meat, cooked, roasted 84g 3 oz 1.96
05172 Turkey, all classes, giblets, cooked, simmered, some giblet fat 145g 1 cup 11.18*
05186 Turkey, all classes, light meat, cooked, roasted 84g 3 oz 1.13
05168 Turkey, all classes, meat only, cooked, roasted 140g 1 cup 2.49
05180 Turkey, all classes, neck, meat only, cooked, simmered 152g 1 neck 3.50
11569 Turnip greens, cooked, boiled, drained, without salt 144g 1 cup 1.15
11575 Turnip greens, frozen, cooked, boiled, drained, without salt 164g 1 cup 3.18
17095 Veal, leg (top round), separable lean and fat, cooked, braised 85g 3 oz 1.12
11578 Vegetable juice cocktail, canned 242g 1 cup 1.02
11581 Vegetables, mixed, canned, drained solids 163g 1 cup 1.71
11584 Vegetables, mixed, frozen, cooked, boiled, drained, without salt 182g 1 cup 1.49
18403 Waffles, plain, frozen, ready-to-heat, toasted (includes buttermilk) 33g 1 waffle 1.48
18367 Waffles, plain, prepared from recipe 75g 1 waffle 1.73
11590 Waterchestnuts, chinese, canned, solids and liquids 140 g 1 cup 1.22

20081 Wheat flour, white, all-purpose, enriched, bleached 125g1 cup 5.80
20082 Wheat flour, white, all-purpose, self-rising, enriched 125g 1 cup 5.84
20083 Wheat flour, white, bread, enriched 137g 1 cup 6.04
20084 Wheat flour, white, cake, enriched 137g 1 cup 10.03
20080 Wheat flour, whole-grain 120g 1 cup 4.66

Note that;

- Recommended daily dose of iron is 10-15 mg for adults. Remember from the related part that iron has a special status for women. They lose significantly important amounts of iron with calcium during premenstrual syndrom every month for an importantly long period of their life. Additionally, menapose and its hormonal imbalance decrease iron binding capacity of metabolism. For all these reasons, women should create iron rich and calcium rich diets in all periods of their life.

- As you can easily remember from the related part, iron exists in nature as in two sources; animal and plant origin. Like calcium, plant origin iron is poor quality iron in lower bioavalibility because of the absence of iron transfer factor, a protein, and existence of fiber, the bioavalibility of iron is always lower in plant origin foods than animal origin foods. Thus, the higher iron amounts of oatbran, soybean, tomato and wheat flour should not be exaggerated. Some amount of iron may be bound with the fibers of these foods.

- Ferro form, two value, of iron is the superior quality form of the mineral which is only exist in fish, crustacean, mollusks, egg, egg added products, red meat and red meat products, poultry and poultry products and offals. Especially, liver comes first at the top of the list as you can notice from the list above. Liver and other offals may be blamed with their higher cholesterol, bad cholesterol, homocytein, trans fatty acid, saturated fatty acids in case of diabetes, cancer and cardiovascular diseases and disorders. But, they are very healthy with their high quality magnesium, folat, folic acid, $B_{12}$, B complex, high quality protein and finally iron. Therefore, I have to remind you once more that, if you are the one who is free of any cardiovascular disease and disorder, diabetes, cancer, atherosclerosis and hypertension, if you are the one who makes regular sport and exercise, if you are not obese and not using alcohol and nicotin, then you can show tolerance to the cholesterol, bad cholesterol and homocytein of liver, other offals and meat.

# CONTENT OF SELECTED VITAMIN C, TOTAL ASCORBIC ACID
# USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE, RELEASE 17

( as mg per Common Measure)
**(Only the foods which have got higher than 5 mg vitamin C are included to the list below)**
(the food products written in red color are the richest ones)

14017 Alcoholic beverage, pina colada, prepared-from-recipe 141g 4.5 fl oz 6.9
09003 Apples, raw, with skin 138g 1 apple 6.3
09403 Apricot nectar, canned, with added ascorbic acid 251g 1 cup 136.5
09027 Apricots, canned, heavy syrup pack, with skin, solids and liquids 258g 1 cup 8.0
09024 Apricots, canned, juice pack, with skin, solids and liquids 244g 1 cup 12.0
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 120g 1 medium 12.0
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 168g 1 cup 16.8
11015 Asparagus, canned, drained solids 72g 4 spears 13.2
11019 Asparagus, frozen, cooked, boiled, drained, without salt 60g 4 spears 14.6
11019 Asparagus, frozen, cooked, boiled, drained, without salt 180g 1 cup 43.9
09040 Bananas, raw 118g 1 banana 10.3
09040 Bananas, raw 150g 1 cup 13.0
16008 Beans, baked, canned, with franks 259g 1 cup 6.0
16010 Beans, baked, canned, with pork and sweet sauce 253g 1 cup 7.6
16011 Beans, baked, canned, with pork and tomato sauce 253g 1 cup 7.6
11056 Beans, snap, green, canned, regular pack, drained solids 135g 1 cup 6.5
11053 Beans, snap, green, cooked, boiled, drained, without salt 125g 1 cup 12.1
11061 Beans, snap, green, frozen, cooked, boiled, drained without salt 135g 1 cup 5.5
11932 Beans, snap, yellow, canned, regular pack, drained solids 135g 1 cup 6.5
11724 Beans, snap, yellow, cooked, boiled, drained, without salt 125g 1 cup 12.1
11732 Beans, snap, yellow, frozen, cooked, boiled, drained, without salt 135g 1 cup 5.5
22905 Beef stew, canned entree 232g 1 cup 10.2
11087 Beet greens, cooked, boiled, drained, without salt 144g 1 cup 35.9
11084 Beets, canned, drained solids 170g 1 cup 7.0
11081 Beets, cooked, boiled, drained 170g 1 cup 6.1
09042 Blackberries, raw 144g 1 cup 30.2
09050 Blueberries, raw 145g 1 cup 14.1
11091 Broccoli, cooked, boiled, drained, without salt 37g 1 spear 24.0
11091 Broccoli, cooked, boiled, drained, without salt 156g 1 cup 101.2
11740 Broccoli, flower clusters, raw 11g 1 floweret 10.3
11093 Broccoli, frozen, chopped, cooked, boiled, drained, without salt 184g 1 cup 73.8
11090 Broccoli, raw 88g 1 cup 78.5
11090 Broccoli, raw 31g 1 spear 27.7
11099 Brussels sprouts, cooked, boiled, drained, without salt 156g 1 cup 96.7
11101 Brussels sprouts, frozen, cooked, boiled, drained, without salt 155g 1 cup 70.8
11117 Cabbage, chinese (pak-choi), cooked, boiled, drained, without salt 170g 1 cup 44.2
11120 Cabbage, chinese (pe-tsai), cooked, boiled, drained, without salt 119g 1 cup 18.8

11110 Cabbage, cooked, boiled, drained, without salt 150g 1 cup 30.2
11109 Cabbage, raw 70g 1 cup 22.5
11112 Cabbage, red, raw 70g 1 cup 39.9
11114 Cabbage, savoy, raw 70g 1 cup 21.7
11655 Carrot juice, canned 236g 1 cup 20.1
11125 Carrots, cooked, boiled, drained, without salt 156g 1 cup 5.6
11124 Carrots, raw 110g 1 cup 6.5
11136 Cauliflower, cooked, boiled, drained, without salt 124g 1 cup 54.9
11136 Cauliflower, cooked, boiled, drained, without salt 54g 3 flowerets 23.9
11138 Cauliflower, frozen, cooked, boiled, drained, without salt 180g 1 cup 56.3
11135 Cauliflower, raw 100g 1 cup 46.4
11135 Cauliflower, raw 13g 1 floweret 6.0
11144 Celery, cooked, boiled, drained, without salt 150g 1 cup 9.1
09064 Cherries, sour, red, canned, water pack, solids and liquids (includes USDA commodity red tart cherries, canned) 244g 1 cup 5.1
05277 Chicken, canned, meat only, with broth 142g 5 oz 2.8
05028 Chicken, liver, all classes, cooked, simmered 19.6g 1 liver 5.5
16058 Chickpeas (garbanzo beans, bengal gram), mature seeds, canned 240g 1 cup 9.1
11159 Coleslaw, home-prepared 120g 1 cup 39.2
11162 Collards, cooked, boiled, drained, without salt 190g 1 cup 34.6
11164 Collards, frozen, chopped, cooked, boiled, drained, without salt 170g 1 cup 44.9
11174 Corn, sweet, yellow, canned, cream style, regular pack 256g 1 cup 11.8
11176 Corn, sweet, yellow, canned, vacuum pack, regular pack 210g 1 cup 17.0
11179 Corn, sweet, yellow, frozen, kernels cut off cob, boiled, drained, without salt164g 1 cup 5.7
16064 Cowpeas, common (blackeyes, crowder, southern), mature seeds, canned, plain 240g 1 cup 6.5
14242 Cranberry juice cocktail, bottled 253g 8 fl oz 89.6
11206 Cucumber, peeled, raw 280g 1 large 9.0
11205 Cucumber, with peel, raw 301g 1 large 8.4
11208 Dandelion greens, cooked, boiled, drained, without salt 105g 1 cup 18.9
21098 Fast foods, cheeseburger, large, single patty, with condiments and vegetables 219g 1 sandwich 7.9
21102 Fast foods, chicken fillet sandwich, plain 182g 1 sandwich 8.9
21127 Fast foods, coleslaw 99g 3/4 cup 8.3
21138 Fast foods, potato, french fried in vegetable oil 134g 1 medium 15.5
21138 Fast foods, potato, french fried in vegetable oil 85g 1 small 9.9
21138 Fast foods, potato, french fried in vegetable oil 169g 1 large 19.6
21026 Fast foods, potatoes, hashed brown 72g 1/2 cup 5.5
21053 Fast foods, salad, vegetable, tossed, without dressing, with cheese and egg 217g 1-1/2 cups 9.8
21054 Fast foods, salad, vegetable, tossed, without dressing, with chicken 218g 1-1/2 cups 17.4
21124 Fast foods, submarine sandwich, with cold cuts 228g 1 sandwich, 6" roll 12.3
21125 Fast foods, submarine sandwich, with roast beef 216g 1 sandwich, 6" roll 5.6
19263 Frozen juice novelties, fruit and juice bars 77g 1 bar (2.5 fl oz) 7.3
09097 Fruit cocktail, (peach and pineapple and pear and grape and cherry), canned, juice pack, solids and liquids 237g 1 cup 6.4
14267 Fruit punch drink, with added nutrients, canned 248g 8 fl oz 73.4
09189 Fruit, mixed, (peach and cherry-sweet and -sour and raspberry and grape and boysenberry), frozen, sweetened 250g 1 cup 187.5
14277 Grape drink, canned 250g 8 fl oz 85.2
09137 Grape juice, frozen concentrate, sweetened, diluted with 3 volume water, with added vitamin C 250g 1 cup 59.7
09136 Grape juice, frozen concentrate, sweetened, undiluted, with added vitamin C 216g 6-fl-oz can 179.5
09404 Grapefruit juice, pink, raw 247g 1 cup 93.9

09124 Grapefruit juice, white, canned, sweetened 250g 1 cup 67.2
09123 Grapefruit juice, white, canned, unsweetened 247g 1 cup 72.1
09126 Grapefruit juice, white, frozen concentrate, unsweetened, diluted with 3 volume water 247g 1 cup 83.2
09125 Grapefruit juice, white, frozen concentrate, unsweetened, undiluted 207g 6-fl-oz can 248.0
09128 Grapefruit juice, white, raw 247g 1 cup 93.9
09112 Grapefruit, raw, pink and red, all areas 123g 1/2 grapefruit 38.4
09116 Grapefruit, raw, white, all areas 118g 1/2 grapefruit 39.3
09121 Grapefruit, sections, canned, light syrup pack, solids and liquids 254g 1 cup 54.1
09132 Grapes, red or green (european type varieties, such as, Thompson seedless), raw 160g 1 cup 17.3
09132 Grapes, red or green (european type varieties, such as, Thompson seedless), raw 50g 10 grapes 5.4
11226 Jerusalem-artichokes, raw 150g 1 cup 6
11234 Kale, cooked, boiled, drained, without salt 130g 1 cup 53.3
11236 Kale, frozen, cooked, boiled, drained, without salt 130g 1 cup 32.8
09148 Kiwi fruit, (chinese gooseberries), fresh, raw 76g 1 medium 70.5
11242 Kohlrabi, cooked, boiled, drained, without salt 165g 1 cup 89.1
09153 Lemon juice, canned or bottled 244g 1 cup 60.5
09152 Lemon juice, raw 47g juice of 1 lemon 21.6
14293 Lemonade, frozen concentrate, white, prepared with water 248g 8 fl oz 12.9
14290 Lemonade, low calorie, with aspartame, powder, prepared with water 237g 8 fl oz 5.9
14297 Lemonade-flavor drink, powder, prepared with water 266g 8 fl oz 34.0
09150 Lemons, raw, without peel 58g 1 lemon 30.7
11250 Lettuce, butterhead (includes boston and bibb types), raw 163g 1 head 6.0
11251 Lettuce, cos or romaine, raw 56g 1 cup 13.4
11253 Lettuce, green leaf, raw 56g 1 cup 10.1
11252 Lettuce, iceberg (includes crisphead types), raw 539g 1 head 15.1
11040 Lima beans, immature seeds, frozen, baby, cooked, boiled, drained, without salt 180g 1 cup 10.4
11038 Lima beans, immature seeds, frozen, fordhook, cooked, boiled, drained, without salt 170g 1 cup 21.8
09161 Lime juice, canned or bottled, unsweetened 246g 1 cup 15.7
09160 Lime juice, raw 38g juice of 1 lime 11.4
14315 Malted drink mix, chocolate, with added nutrients, powder 21g 3 heaping tsp 31.5
14316 Malted drink mix, chocolate, with added nutrients, powder, prepared with whole milk 265g 1 cup 31.8
14309 Malted drink mix, natural, with added nutrients, powder 21g 4-5 heaping tsp 27.2
14310 Malted drink mix, natural, with added nutrients, powder, prepared with whole milk 265g 1 cup 27.6
09176 Mangos, raw 207g 1 mango 57.3*
09176 Mangos, raw 165g 1 cup 45.7*
09181 Melons, cantaloupe, raw 69g 1/8 melon 25.3
09181 Melons, cantaloupe, raw 160g 1 cup 58.7*
09184 Melons, honeydew, raw 170g 1 cup 30.6
09184 Melons, honeydew, raw 160g 1/8 melon 28.8
01095 Milk, canned, condensed, sweetened 306g 1 cup 8.0
01096 Milk, canned, evaporated, without added vitamin A 252g 1 cup 4.8
15160 Mollusks, clam, mixed species, canned, drained solids 85 3g oz 18.8
15157 Mollusks, clam, mixed species, raw 85g 3 oz 11.1
11044 Mung beans, mature seeds, sprouted, cooked, boiled, drained, without salt 124g 1 cup 14.1
11043 Mung beans, mature seeds, sprouted, raw 104g 1 cup 13.7
11261 Mushrooms, cooked, boiled, drained, without salt 156g 1 cup 6.2
11271 Mustard greens, cooked, boiled, drained, without salt 140g 1 cup 35.4

09191 Nectarines, raw 136g 1 nectarine 7.3
12167 Nuts, chestnuts, european, roasted 143g 1 cup 37.2
11279 Okra, cooked, boiled, drained, without salt 160g 1 cup 26.1
11281 Okra, frozen, cooked, boiled, drained, without salt 184g 1 cup 22.4
11283 Onions, cooked, boiled, drained, without salt 210g 1 cup 10.9
11282 Onions, raw 110g 1 whole 7.0
11282 Onions, raw 160g 1 cup 10.2
11291 Onions, spring or scallions (includes tops and bulb), raw 100g 1 cup 18.8
09207 Orange juice, canned, unsweetened 249g 1 cup 85.7*
09209 Orange juice, chilled, includes from concentrate 249g 1 cup 81.9*
09215 Orange juice, frozen concentrate, unsweetened, diluted with 3 volume water 249g 1 cup 96.9
09214 Orange juice, frozen concentrate, unsweetened, undiluted 213g 6-fl-oz can 293.7*
09206 Orange juice, raw 86g juice from 1 orange 43.0
09206 Orange juice, raw 248g 1 cup 124.0*
09200 Oranges, raw, all commercial varieties 131g 1 orange 69.7
09200 Oranges, raw, all commercial varieties 180g 1 cup 95.8
09226 Papayas, raw 304g 1 papaya 187.9*
09226 Papayas, raw 140g 1 cup 86.5*
11297 Parsley, raw 10g 10 sprigs 13.3*
11299 Parsnips, cooked, boiled, drained, without salt 156g 1 cup 20.3
22907 Pasta with meatballs in tomato sauce, canned entree 252g 1 cup 7.6
09241 Peaches, canned, heavy syrup pack, solids and liquids 262g 1 cup 7.3
09238 Peaches, canned, juice pack, solids and liquids 248g 1 cup 8.9
09250 Peaches, frozen, sliced, sweetened 250g 1 cup 235.5*
09236 Peaches, raw 98g 1 peach 6.5
09236 Peaches, raw 170g 1 cup 11.2
09340 Pears, asian, raw 275g 1 pear 10.4
09252 Pears, raw 166g 1 pear 7.0
11301 Peas, edible-podded, cooked, boiled, drained, without salt 160g 1 cup 76.6
11303 Peas, edible-podded, frozen, cooked, boiled, drained, without salt 160g 1 cup 35.2
11308 Peas, green, canned, regular pack, drained solids 170g 1 cup 16.3
11313 Peas, green, frozen, cooked, boiled, drained, without salt 160g 1 cup 15.8
11670 Peppers, hot chili, green, raw 45g 1 pepper 109.1*
11819 Peppers, hot chili, red, raw 45g 1 pepper 64.7
11334 Peppers, sweet, green, cooked, boiled, drained, without salt 136g 1 cup 101.2
11333 Peppers, sweet, green, raw 10g 1 ring 8.0
11333 Peppers, sweet, green, raw 119g 1 pepper 95.7
11333 Peppers, sweet, green, raw 149g 1 cup 119.8*
11823 Peppers, sweet, red, cooked, boiled, drained, without salt 136g 1 cup 232.6*
11821 Peppers, sweet, red, raw 119g 1 pepper 226.1*
11821 Peppers, sweet, red, raw 149g 1 cup 283.1*
11943 Pimento, canned 12g 1 tbsp 10.2
14334 Pineapple and grapefruit juice drink, canned 250g 8 fl oz 115.0*
14341 Pineapple and orange juice drink, canned 250g 8 fl oz 56.3*
09273 Pineapple juice, canned, unsweetened, without added ascorbic acid 250g 1 cup 26.7
09270 Pineapple, canned, heavy syrup pack, solids and liquids 254g 1 cup 18.8
09268 Pineapple, canned, juice pack, solids and liquids 249g 1 cup 23.7

09266 Pineapple, raw, all varieties 155g 1 cup 56.1*
09278 Plantains, cooked 154g 1 cup 16.8
09277 Plantains, raw 179g 1 medium 32.9
09282 Plums, canned, purple, juice pack, solids and liquids 252g 1 cup 7.1
09292 Plums, dried (prunes), stewed, without added sugar 248g 1 cup 7.2
09279 Plums, raw 66g 1 plum 6.3
11672 Potato pancakes, home-prepared 76g 1 pancake 16.7
11399 Potato puffs, frozen, prepared 79g 10 puffs 5.5
11414 Potato salad, home-prepared 250g 1 cup 25.0
11674 Potato, baked, flesh and skin, without salt 202g 1 potato 19.4
11385 Potatoes, au gratin, dry mix, prepared with water, whole milk and butter 245g 1 cup 7.6
11373 Potatoes, au gratin, home-prepared from recipe using butter 245g 1 cup 24.3
11363 Potatoes, baked, flesh, without salt 156g 1 potato 20.0
11364 Potatoes, baked, skin, without salt 58g 1 skin 7.8
11365 Potatoes, boiled, cooked in skin, flesh, without salt 136g 1 potato 17.7
11367 Potatoes, boiled, cooked without skin, flesh, without salt 135g 1 potato 10.0
11367 Potatoes, boiled, cooked without skin, flesh, without salt 156g 1 cup 11.5
11403 Potatoes, french fried, frozen, home-prepared, heated in oven, without salt 50g 10 strips 5.1
11370 Potatoes, hashed brown, home-prepared 156g 1 cup 20.3
11379 Potatoes, mashed, dehydrated, prepared from flakes without milk, whole milk and butter added 210g 1 cup 21.2
11657 Potatoes, mashed, home-prepared, whole milk added 210g 1 cup 13.0
11371 Potatoes, mashed, home-prepared, whole milk and margarine added 210g 1 cup 22.1
11387 Potatoes, scalloped, dry mix, prepared with water, whole milk and butter 245g 1 cup 8.1
11372 Potatoes, scalloped, home-prepared with butter 245g 1 cup 26.0
09294 Prune juice, canned 256g 1 cup 10.5
11424 Pumpkin, canned, without salt 245g 1 cup 10.3
11423 Pumpkin, cooked, boiled, drained, without salt 245g 1 cup 11.5
09306 Raspberries, frozen, red, sweetened 250g 1 cup 41.3
09302 Raspberries, raw 123g 1 cup 32.2
16103 Refried beans, canned (includes USDA commodity) 252g 1 cup 15.1
09310 Rhubarb, frozen, cooked, with sugar 240g 1 cup 7.9
11436 Rutabagas, cooked, boiled, drained, without salt 170g 1 cup 32.0
06931 Sauce, pasta, spaghetti/marinara, ready-to-serve 250g 1 cup 7.7
11439 Sauerkraut, canned, solids and liquids 236g 1 cup 34.7
19013 Snacks, fruit leather, pieces 28.35g 1 oz 15.9
19014 Snacks, fruit leather, rolls 21g 1 large 25.2
19042 Snacks, potato chips, barbecue-flavor 28.35g 1 oz 9.6
19411 Snacks, potato chips, plain, salted 28.35g 1 oz 8.8
19811 Snacks, potato chips, plain, unsalted 28.35g 1 oz 8.8
19422 Snacks, potato chips, reduced fat 28.35g 1 oz 7.3
19043 Snacks, potato chips, sour-cream-and-onion-flavor 28.35g 1 oz 10.6
06024 Soup, chicken vegetable, canned, chunky, ready-to-serve 240g 1 cup 5.5
06094 Soup, onion mix, dehydrated, dry form 39g 1 packet 8.7
06494 Soup, onion, dehydrated, prepared with water 246g 1 cup 0.2
06359 Soup, tomato, canned, prepared with equal volume milk, commercial 248g 1 cup 67.7
06559 Soup, tomato, canned, prepared with equal volume water, commercial 244g 1 cup 66.4
06067 Soup, vegetable, canned, chunky, ready-to-serve, commercial 240g 1 cup 6.0

11451 Soybeans, green, cooked, boiled, drained, without salt 180g 1 cup 30.6
22401 Spaghetti with meat sauce, frozen entree 283g 1 package 15.3
11461 Spinach, canned, drained solids 214g 1 cup 30.6
11458 Spinach, cooked, boiled, drained, without salt 180g 1 cup 17.6
11457 Spinach, raw 30g 1 cup 8.4
11642 Squash, summer, all varieties, cooked, boiled, drained, without salt 180g 1 cup 9.9
11641 Squash, summer, all varieties, raw 113g 1 cup 19.2
11644 Squash, winter, all varieties, cooked, baked, without salt 205g 1 cup 19.7
11488 Squash, winter, butternut, frozen, cooked, boiled, without salt 240g 1 cup 8.4
09320 Strawberries, frozen, sweetened, sliced 255g 1 cup 105.6
09316 Strawberries, raw 166g 1 cup 97.6*
09316 Strawberries, raw 18g 1 strawberry 10.6
09316 Strawberries, raw 12g 1 strawberry 7.1
11647 Sweet potato, canned, syrup pack, drained solids 196g 1 cup 21.2
11512 Sweet potato, canned, vacuum pack 255g 1 cup 67.3
11508 Sweet potato, cooked, baked in skin, without salt 146g 1 potato 28.6
11510 Sweet potato, cooked, boiled, without skin 156g 1 potato 20.0
11659 Sweet potato, cooked, candied, home-prepared 105g 1 piece 7.0
09223 Tangerine juice, canned, sweetened 249g 1 cup 54.8
09220 Tangerines, (mandarin oranges), canned, light syrup pack 252g 1 cup 49.9
09218 Tangerines, (mandarin oranges), raw 84g 1 tangerine 22.4
11540 Tomato juice, canned, with salt added 243g 1 cup 44.5
11546 Tomato products, canned, paste, without salt added 262g 1 cup 57.4
11547 Tomato products, canned, puree, without salt added 250g 1 cup 26.5
11549 Tomato products, canned, sauce 245g 1 cup 17.2
11533 Tomatoes, red, ripe, canned, stewed 255g 1 cup 20.1
11531 Tomatoes, red, ripe, canned, whole, regular pack 240g 1 cup 21.6
11529 Tomatoes, red, ripe, raw, year round average 123g 1 tomato 15.6
11529 Tomatoes, red, ripe, raw, year round average 180g 1 cup 22.9
05172 Turkey, all classes, giblets, cooked, simmered, some giblet fat 145g 1 cup 19.9
11569 Turnip greens, cooked, boiled, drained, without salt 144g 1 cup 39.5
11575 Turnip greens, frozen, cooked, boiled, drained, without salt 164g 1 cup 35.8
11565 Turnips, cooked, boiled, drained, without salt 156g 1 cup 18.1
11578 Vegetable juice cocktail, canned 242g 1 cup 67.0
11581 Vegetables, mixed, canned, drained solids 163g 1 cup 8.2
11584 Vegetables, mixed, frozen, cooked, boiled, drained, without salt 182g 1 cup 5.8
09326 Watermelon, raw 152g 1 cup 12.3
09326 Watermelon, raw 286g 1 wedge 23.2

Note that;

- Recommended daily intake by the U.S. Food and Nutrition Board of the Institute of Medicine for men older than 18 years-old is 90 milligrams per day; for women older than 18 years-old is 75 milligrams per day. But, as you can easily remember from the related part with vitamin C, this vitamin is the most sensitive vitamin to many factors. Chewing, cutting, grinding, cooking, stress, activity, sport and exercise, pollution and hormonal imbalance can

significantly decrease vitamin C. On the other hand, the vitamin can not be stored in body opposite to vitamin A and calcium and higher doses except megadoses can be excreted by the means of urin out of body. Unless, 1500-2000 mg daily megadoses are not taken into body for years, the probability for toxicity is very low. For all these reasons, many scientists advise to raise the mentioned recommended daily doses made by the U.S. Food and Nutrition Board of the Institute of Medicine. You can increase the dose upto 250 and even 500 mg that depends on your living circumstances. If you are the one who live in a polluted area, if you are very close to stress, if the velocity of your sport and exercise is high, if you are the one who runs very active life style, than you can use 250 and 500 mg daily doses of the vitamin.

- Remember from the related part about vitamin C that all green leafy vegetables and citrus fruits are the rich sources of the vitamin while milk and dairy products are deprived of the vitamin due to the oxidation with oxygen and heat application. Other animal origin food sources including meat and meat products have got lower amounts of the vitamin than foods in plant origin. Strawberry may be advised as one of the richest vitamin C source from the list above and then, pineapple, sweet red peppers, orange, parsley, lemon, orange and lemon added foods, parsnip, okra, onion and papaya should be included into daily diet. But, do not forget that especially heat, cutting and grinding processes cause significantly important vitamin C loss in your food. Thus, prefer to consume green leafy vegetables and citrus fruits as in salad form as raw. Note that very little amounts of parsley contain lots of vitamin C as you notice from the list above.

# CONTENT OF SELECTED VITAMIN E (ALPHA-TOCOPHEROL)
# USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE, RELEASE 17

**(as mg per Common Measure)**
**(Only the foods which have got more than 0.5 mg vitamin E are included to the list below)**
(the food products written in red color are the richest ones)

09027 Apricots, canned, heavy syrup pack, with skin, solids and liquids 258g 1 cup 1.55
09024 Apricots, canned, juice pack, with skin, solids and liquids 244g 1 cup 1.46
09032 Apricots, dried, sulfured, uncooked 35g 10 halves 1.52
11012 Asparagus, cooked, boiled, drained 60g 4 spears 0.90
11019 Asparagus, frozen, cooked, boiled, drained, without salt 180g 1 cup 2.16
11019 Asparagus, frozen, cooked, boiled, drained, without salt 60g 4 spears 0.72
09039 Avocados, raw, Florida 28.35g 1 oz 0.75
11028 Bamboo shoots, canned, drained solids 131g 1 cup 0.83
16008 Beans, baked, canned, with franks 259g 1 cup 1.19
16010 Beans, baked, canned, with pork and sweet sauce 253g 1 cup 1.37
16034 Beans, kidney, red, mature seeds, canned 256g 1 cup 1.54
16033 Beans, kidney, red, mature seeds, cooked, boiled, without salt 177g 1 cup 1.54
16043 Beans, pinto, mature seeds, cooked, boiled, without salt 171g 1 cup 1.61
11087 Beet greens, cooked, boiled, drained, without salt 144g 1 cup 2.61
09042 Blackberries, raw 144g 1 cup 1.68
09055 Blueberries, frozen, sweetened 230g 1 cup 1.20
09050 Blueberries, raw 145g 1 cup 0.83
18082 Bread stuffing, bread, dry mix, prepared 100g 1/2 cup 1.40
21005 Breakfast items, biscuit with egg and sausage 180g 1 biscuit 2.84
11091 Broccoli, cooked, boiled, drained, without salt 156g 1 cup 2.26
11093 Broccoli, frozen, chopped, cooked, boiled, drained, without salt 184g 1 cup 2.43
11090 Broccoli, raw 88g 1 cup 0.69
11099 Brussels sprouts, cooked, boiled, drained, without salt 156g 1 cup 0.67
11101 Brussels sprouts, frozen, cooked, boiled, drained, without salt 155g 1 cup 0.79
18127 Cake, snack cakes, creme-filled, chocolate with frosting 50g 1 cupcake 1.09
19087 Candies, confectioner's coating, white 170g 1 cup 1.58
19120 Candies, milk chocolate 44g 1 bar (1.55 oz) 0.89
19126 Candies, milk chocolate coated peanuts 40g 10 pieces 1.38
19132 Candies, milk chocolate, with almonds 41g 1 bar (1.45 oz) 1.84
11655 Carrot juice, canned 236g 1 cup 2.74
11128 Carrots, canned, regular pack, drained solids 146g 1 cup 1.08
11125 Carrots, cooked, boiled, drained, without salt 156g 1 cup 1.61
11131 Carrots, frozen, cooked, boiled, drained, without salt 146g 1 cup 1.47
08084 Cereals ready-to-eat, wheat germ, toasted, plain 7.119g 1 tbsp 1.14
05058 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, batter 140g 1/2 breast 1.48
11162 Collards, cooked, boiled, drained, without salt 190 1 cup 1.67
11164 Collards, frozen, chopped, cooked, boiled, drained, without salt 170g 1 cup 2.13

15141 Crustaceans, crab, blue, canned 135g 1 cup 2.48
15140 Crustaceans, crab, blue, cooked, moist heat 85g 3 oz 1.56
15148 Crustaceans, lobster, northern, cooked, moist heat 85g 3 oz 0.85
15152 Crustaceans, shrimp, mixed species, canned 85.05g 3 oz 0.79
11208 Dandelion greens, cooked, boiled, drained, without salt 105g 1 cup 3.57
18248 Doughnuts, cake-type, plain (includes unsugared, old-fashioned) 47g 1 medium 0.91
05142 Duck, domesticated, meat only, cooked, roasted 221g 1/2 duck 1.55
18257 Eclairs, custard-filled with chocolate glaze, prepared from recipe 100g 1 eclair 2.01
21092 Fast foods, cheeseburger, regular, double patty, plain 155g 1 sandwich 1.19
21229 Fast foods, chicken, breaded and fried, boneless pieces, plain 106g 6 pieces 1.19
21106 Fast foods, fish sandwich, with tartar sauce and cheese 183g 1 sandwich 1.83
21024 Fast foods, french toast sticks 141g 5 sticks 2.33
21025 Fast foods, pancakes with butter and syrup 232g 2 pancakes 1.39
21138 Fast foods, potato, french fried in vegetable oil 134g 1 medium 2.04
21138 Fast foods, potato, french fried in vegetable oil 85g 1 small 1.29
21138 Fast foods, potato, french fried in vegetable oil 169g 1 large 2.57
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 127g 1 fillet 0.84
15041 Fish, herring, Atlantic, pickled 85.05g 3 oz 1.45
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 85g 3 oz 1.33
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 149g 1 fillet 2.32
15077 Fish, salmon, chinook, smoked 85.05g 3 oz 1.15
15088 Fish, sardine, Atlantic, canned in oil, drained solids with bone 85.05g 3 oz 1.74
15119 Fish, tuna, light, canned in oil, drained solids 85.05g 3 oz 0.74
15126 Fish, tuna, white, canned in water, drained solids 85g 3 oz 0.72
19230 Frostings, vanilla, creamy, ready-to-eat 38g 1/12 package 0.80
09100 Fruit cocktail, (peach and pineapple and pear and grape and cherry), canned, heavy syrup, solids and liquids 248g 1 cup 0.99
09097 Fruit cocktail, (peach and pineapple and pear and grape and cherry), canned, juice pack, solids and liquids 237g 1 cup 0.95
11234 Kale, cooked, boiled, drained, without salt 130g 1 cup 1.11
11236 Kale, frozen, cooked, boiled, drained, without salt 130g 1 cup 1.20
09148 Kiwi fruit, (chinese gooseberries), fresh, raw 76g 1 medium 1.11
11242 Kohlrabi, cooked, boiled, drained, without salt 165g 1 cup 0.86
11252 Lettuce, iceberg (includes crisphead types), raw 539g 1 head 0.97
11040 Lima beans, immature seeds, frozen, baby, cooked, boiled, drained, without salt 180g 1 cup 1.15
09176 Mangos, raw 165g 1 cup 1.85
09176 Mangos, raw 207g 1 mango 2.32
04611 Margarine, regular, tub, composite, 80% fat, with salt 14.2g 1 tbsp 0.71
11271 Mustard greens, cooked, boiled, drained, without salt 140g 1 cup 1.69
09191 Nectarines, raw 136g 1 nectarine 1.05
20113 Noodles, chinese, chow mein 45g 1 cup 1.57
20112 Noodles, egg, spinach, cooked, enriched 160g 1 cup 0.93
12061 Nuts, almonds 28.35g 1 oz (24 nuts) 7.33
12078 Nuts, brazilnuts, dried, unblanched 28.35g 1 oz (6-8 nuts) 1.62
12167 Nuts, chestnuts, european, roasted 143g 1 cup 0.72
12120 Nuts, hazelnuts or filberts 28.35g 1 oz 4.26
12635 Nuts, mixed nuts, dry roasted, with peanuts, with salt added 28.35g 1 oz 3.10
12637 Nuts, mixed nuts, oil roasted, with peanuts, with salt added 28.35g 1 oz 2.04
12147 Nuts, pine nuts, dried 8.6g 1 tbsp 0.80

12147 Nuts, pine nuts, dried 28.35g 1 oz 2.65
20033 Oat bran, raw 94g 1 cup 0.95
04053 Oil, olive, salad or cooking 13.5g 1 tbsp 1.94
04042 Oil, peanut, salad or cooking 13.5g 1 tbsp 2.12
04034 Oil, soybean, salad or cooking, (hydrogenated) 13.6g 1 tbsp 1.10
04543 Oil, soybean, salad or cooking, (hydrogenated) and cottonseed 13.6g 1 tbsp 1.65
04511 Oil, vegetable safflower, salad or cooking, oleic, over 70% (primary safflower oil of commerce) 13.6g 1 tbsp 4.64
04518 Oil, vegetable, corn, industrial and retail, all purpose salad or cooking 13.6g 1 tbsp 1.94
04506 Oil, vegetable, sunflower, linoleic, (approx. 65%) 13.6g 1 tbsp 5.59
09214 Orange juice, frozen concentrate, unsweetened, undiluted 213g 6-fl-oz can 1.51
09226 Papayas, raw 140g 1 cup 1.02
09226 Papayas, raw 304g 1 papaya 2.22
11299 Parsnips, cooked, boiled, drained, without salt 156g 1 cup 1.56
09241 Peaches, canned, heavy syrup pack, solids and liquids 262g 1 cup 1.28
09238 Peaches, canned, juice pack, solids and liquids 248g 1 cup 1.22
09250 Peaches, frozen, sliced, sweetened 250g 1 cup 1.55
09236 Peaches, raw 170g 1 cup 1.24
09236 Peaches, raw 98g 1 peach 0.72
16097 Peanut butter, chunk style, with salt 16g 1 tbsp 1.01
16098 Peanut butter, smooth style, with salt 16g 1 tbsp 1.44
16090 Peanuts, all types, dry-roasted, with salt 28.35g 1 oz (approx 28) 2.21
16390 Peanuts, all types, dry-roasted, without salt 28.35g 1 oz (approx 28) 1.96
16089 Peanuts, all types, oil-roasted, with salt 28.35g 1 oz 1.97
11301 Peas, edible-podded, cooked, boiled, drained, without salt 160g 1 cup 0.62
11303 Peas, edible-podded, frozen, cooked, boiled, drained, without salt 160g 1 cup 0.75
11823 Peppers, sweet, red, cooked, boiled, drained, without salt 136g 1 cup 2.24
11821 Peppers, sweet, red, raw 149g 1 cup 2.35
11821 Peppers, sweet, red, raw 119g 1 pepper 1.88
11937 Pickles, cucumber, dill 65g 1 pickle 0.06
18335 Pie crust, standard-type, frozen, ready-to-bake, baked 126g 1 pie shell 3.31
18301 Pie, apple, commercially prepared, enriched flour 117g 1 piece 1.78
18305 Pie, blueberry, commercially prepared 117g 1 piece 1.22
18308 Pie, cherry, commercially prepared 117g 1 piece 0.89
18319 Pie, fried pies, fruit 128g 1 pie 2.20
18320 Pie, lemon meringue, commercially prepared 113g 1 piece 1.20
18326 Pie, pumpkin, commercially prepared 109g 1 piece 1.12
11371 Potatoes, mashed, home-prepared, whole milk and margarine added 210g 1 cup 0.88
11424 Pumpkin, canned, without salt 245g 1 cup 2.60
11423 Pumpkin, cooked, boiled, drained, without salt 245g 1 cup 1.96
09306 Raspberries, frozen, red, sweetened 250g 1 cup 1.80
09302 Raspberries, raw 123g 1 cup 1.07
09310 Rhubarb, frozen, cooked, with sugar 240g 1 cup 0.65
04539 Salad dressing, blue or roquefort cheese dressing, commercial, regular 15.3g 1 tbsp 0.92
04120 Salad dressing, french dressing, commercial, regular 15.6g 1 tbsp 0.78
04133 Salad dressing, french, home recipe 14g 1 tbsp 1.12
04135 Salad dressing, home recipe, vinegar and oil 15.6g 1 tbsp 0.72
04114 Salad dressing, italian dressing, commercial, regular 14.7g 1 tbsp 0.74

04025 Salad dressing, mayonnaise, soybean oil, with salt 13.8g 1 tbsp 0.72
04015 Salad dressing, russian dressing 15.3g 1 tbsp 0.62
04017 Salad dressing, thousand island, commercial, regular 15.6g 1 tbsp 0.62
06166 Sauce, homemade, white, medium 250g 1 cup 0.70
06931 Sauce, pasta, spaghetti/marinara, ready-to-serve 250g 1 cup 5.10
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 28.35g 1 oz 7.40
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 32g 1/4 cup 8.35
19031 Snacks, oriental mix, rice-based 28.35g 1 oz (about 1/4 cup) 1.59
19411 Snacks, potato chips, plain, salted 28.35g 1 oz 2.58
19811 Snacks, potato chips, plain, unsalted 28.35g 1 oz 2.58
19422 Snacks, potato chips, reduced fat 28.35g 1 oz 1.55
06404 Soup, bean with pork, canned, prepared with equal volume water, commercial 253g 1 cup 0.76
06409 Soup, beef noodle, canned, prepared with equal volume water, commercial 244g 1 cup 0.68
06243 Soup, cream of mushroom, canned, prepared with equal volume milk, commercial 248g 1 cup 1.24
06443 Soup, cream of mushroom, canned, prepared with equal volume water, commercial 244g 1 cup 0.95
06359 Soup, tomato, canned, prepared with equal volume milk, commercial 248g 1 cup 1.24
06559 Soup, tomato, canned, prepared with equal volume water, commercial 244g 1 cup 2.32
06067 Soup, vegetable, canned, chunky, ready-to-serve, commercial 240g 1 cup 1.27
16120 Soy milk, fluid 245g 1 cup 3.31
22401 Spaghetti with meat sauce, frozen entree 283g 1 package 2.35
02009 Spices, chili powder 2.6g 1 tsp 0.76
02028 Spices, paprika 2.1g 1 tsp 0.63
11461 Spinach, canned, drained solids 214g 1 cup 4.15
11458 Spinach, cooked, boiled, drained, without salt 180g 1 cup 3.74
11464 Spinach, frozen, chopped or leaf, cooked, boiled, drained, without salt 190g 1 cup 6.73
11457 Spinach, raw 30g 1 cup 0.61
11512 Sweet potato, canned, vacuum pack 255g 1 cup 2.55
11508 Sweet potato, cooked, baked in skin, without salt 146g 1 potato 1.04
11510 Sweet potato, cooked, boiled, without skin 156g 1 potato 1.47
18356 Sweet rolls, cinnamon, commercially prepared with raisins 60g 1 roll 1.19
11540 Tomato juice, canned, with salt added 243g 1 cup 0.78
11546 Tomato products, canned, paste, without salt added 262g 1 cup 11.27
11547 Tomato products, canned, puree, without salt added 250g 1 cup 4.93
11549 Tomato products, canned, sauce 245g 1 cup 5.10
11533 Tomatoes, red, ripe, canned, stewed 255g 1 cup 2.12
11531 Tomatoes, red, ripe, canned, whole, regular pack 240g 1 cup 1.70
11529 Tomatoes, red, ripe, raw, year round average 180g 1 cup 0.97
11529 Tomatoes, red, ripe, raw, year round average 123g 1 tomato 0.66
05292 Turkey patties, breaded, battered, fried 64g 1 patty 0.81
05180 Turkey, all classes, neck, meat only, cooked, simmered 152g 1 neck 0.97
11569 Turnip greens, cooked, boiled, drained, without salt 144g 1 cup 2.71
11575 Turnip greens, frozen, cooked, boiled, drained, without salt 164g1 cup 4.36
11578 Vegetable juice cocktail, canned 242g 1 cup 0.77
04582 Vegetable oil, canola 14g 1 tbsp 2.39
11584 Vegetables, mixed, frozen, cooked, boiled, drained, without salt 182g 1 cup 0.80
11590 Waterchestnuts, chinese, canned, solids and liquids 140g 1 cup 0.70
20080 Wheat flour, whole-grain 120g 1 cup 0.98

Note that;

- The recommended daily dose of vitamin E for adults over 14 is 15-19 mg.

- At the first look from the amounts listed above, papaya, tomato, tomato added food products and asparagus seem not only healthy foods with their rich fiber, vitamin A, beta carotene contents but also they are rich in vitamin E. You may think that they are plant origin and the rich fiber content of these foods may bind some of the vitamin but this vitamin is rarely exist in very few foods. As you can easily see from the list, fish and especially crustaceans and crab are rich in this vitamin but many other animal origin foods are deprived of the vitamin. Nuts have got sufficient amounts of vitamin E, but as I mentioned in many parts of the book, evaluating nuts as completely healthy foods is not scientifically correct since they are very rich in fat, sugar and harmful omega 6 fatty acids in spite of their rich vitamim E and B complex, selenium, zinc and omega 3 content. Briefly, tomato, tomato added foods, asparagus, papaya and crab may help for increasing both vitamin A and E contents of your diet.

# CONTENT OF SELECTED FOODS PER COMMON MEASURE, CALCIUM, CA ( MG)
# USDA, NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE, RELEASE 17

**(Only the foods which have got ≥100 mg Ca are included to the list below)**
(the food products written in red color are the richest ones)

01095 Milk, canned, condensed, sweetened 306g 1 cup 869
01164 Cheese sauce, prepared from recipe 243g 1 cup 756
01097 Milk, canned, evaporated, nonfat 256g 1 cup 742
01037 Cheese, ricotta, part skim milk 246g 1 cup 669
01096 Milk, canned, evaporated, without added vitamin A 252g 1 cup 658
01036 Cheese, ricotta, whole milk 246g 1 cup 509
20025 Cornmeal, self-rising, degermed, enriched, yellow 138g 1 cup 483
01111 Milk shakes, thick vanilla 313g 11 fl oz 457
01118 Yogurt, plain, skim milk, 13 grams protein per 8 ounce 227g 8-oz container 452
20082 Wheat flour, white, all-purpose, self-rising, enriched 125g 1 cup 423
01117 Yogurt, plain, low fat, 12 grams protein per 8 ounce 227g 8-oz container 415
14347 Shake, fast food, vanilla 333g 16 fl oz 406
01110 Milk shakes, thick chocolate 300g 10.6 fl oz 396
14346 Shake, fast food, chocolate 333g 16 fl oz 376
11164 Collards, frozen, chopped, cooked, boiled, drained, without salt 170g 1 cup 357
09310 Rhubarb, frozen, cooked, with sugar 240g 1 cup 348
01121 Yogurt, fruit, low fat, 10 grams protein per 8 ounce 227g 8-oz container 345
21082 Fast foods, taco 263g 1 large 339
14316 Malted drink mix, chocolate, with added nutrients, powder, prepared with whole milk 265g 1 cup 339
18370 Leavening agents, baking powder, double-acting, straight phosphate 4.6g 1 tsp 339
19087 Candies, confectioner's coating, white 170 g 1 cup 338
01057 Eggnog 254g 1 cup 330
14310 Malted drink mix, natural, with added nutrients, powder, prepared with whole milk 265g 1 cup 326
15088 Fish, sardine, Atlantic, canned in oil, drained solids with bone 85.05g 3 oz 325
21074 Fast foods, enchilada, with cheese 163g 1 enchilada 324
01085 Milk, nonfat, fluid, with added vitamin A (fat free or skim) 245g 1 cup 306
06166 Sauce, homemade, white, medium 250g 1 cup 295
11373 Potatoes, au gratin, home-prepared from recipe using butter 245g 1 cup 292
11464 Spinach, frozen, chopped or leaf, cooked, boiled, drained, without salt 190g 1 cup 291
01082 Milk, lowfat, fluid, 1% milkfat, with added vitamin A 244g 1 cup 290
01104 Milk, chocolate, fluid, commercial, lowfat 250g 1 cup 288
01079 Milk, reduced fat, fluid, 2% milkfat, with added vitamin A 244g 1 cup 285
01103 Milk, chocolate, fluid, commercial, reduced fat 250g 1 cup 285
01088 Milk, buttermilk, fluid, cultured, lowfat 245g 1 cup 284
01092 Milk, dry, nonfat, instant, with added vitamin A 23g 1/3 cup 283
01102 Milk, chocolate, fluid, commercial, 250g 1 cup 280
01077 Milk, whole, 3.25% milkfat 244g 1 cup 276
01116 Yogurt, plain, whole milk, 8 grams protein per 8 ounce 227g 8-oz container 275
21078 Fast foods, nachos, with cheese 113g 6-8 nachos 272

11461 Spinach, canned, drained solids 214g 1 cup 272
18369 Leavening agents, baking powder, double-acting, sodium aluminum sulfate 4.6g 1 tsp 270
11162 Collards, cooked, boiled, drained, without salt 190g 1 cup 266
11451 Soybeans, green, cooked, boiled, drained, without salt 180g 1 cup 261
14177 Chocolate-flavor beverage mix, powder, prepared with whole milk 266g 1 cup 253
11575 Turnip greens, frozen, cooked, boiled, drained, without salt 164g 1 cup 249
11458 Spinach, cooked, boiled, drained, without salt 180g 1 cup 245
18016 Biscuits, plain or buttermilk, prepared from recipe 101g 4" biscuit 237
21092 Fast foods, cheeseburger, regular, double patty, plain 155g 1 sandwich 233
11658 Spinach souffle, home-prepared 136g 1 cup 230
01040 Cheese, swiss 28.35g 1 oz 224
21094 Fast foods, cheeseburger, regular, double patty and bun, plain 160g 1 sandwich 224
21082 Fast foods, taco 171g 1 small 221
01044 Cheese, pasteurized process, swiss, with di sodium phosphate 28.35g 1 oz 219
18376 Bread crumbs, dry, grated, seasoned 120g 1 cup 218
18371 Leavening agents, baking powder, low-sodium 5g 1 tsp 217
01035 Cheese, provolone 28.35g 1 oz 214
21088 Tostada with guacamole 130.5g 1 tostada 211
11192 Cowpeas (Blackeyes), immature seeds, cooked, boiled, drained, without salt 165 1 cup 211
01029 Cheese, mozzarella, part skim milk, low moisture 28.35g 1 oz 207
21033 Fast foods, sundae, hot fudge 158g 1 sundae 207
21098 Fast foods, cheeseburger, large, single patty, with condiments and vegetables 219g 1 sandwich 206
01009 Cheese, cheddar 28.35g 1 oz 204
11385 Potatoes, au gratin, dry mix, prepared with water, whole milk and butter 245g 1 cup 203
01030 Cheese, muenster 28.35g 1 oz 203
11569 Turnip greens, cooked, boiled, drained, without salt 144g 1 cup 197
21083 Fast foods, taco salad 198g 1-1/2 cups 192
16051 Beans, white, mature seeds, canned 262g 1 cup 191
18367 Waffles, plain, prepared from recipe 75g 1 waffle 191
21124 Fast foods, submarine sandwich, with cold cuts 228g 1 sandwich, 6" roll 189
21086 Fast foods, tostada, with beans, beef, and cheese 225g 1 tostada 189
21077 Fast foods, frijoles with cheese 167g 1 cup 189
06230 Soup, clam chowder, new england, canned, prepared with equal volume milk, commercial 248g 1 cup 186
21106 Fast foods, fish sandwich, with tartar sauce and cheese 183g 1 sandwich 185
15084 Fish, salmon, pink, canned, solids with bone and liquid 85g3 oz 181
06216 Soup, cream of chicken, prepared with equal volume milk, commercial 248g 1 cup 181
11236 Kale, frozen, cooked, boiled, drained, without salt 130g 1 cup 179
06243 Soup, cream of mushroom, canned, prepared with equal volume milk, commercial 248g 1 cup 179
11281 Okra, frozen, cooked, boiled, drained, without salt 184g 1 cup 177
16109 Soybeans, mature cooked, boiled, without salt 172g 1 cup 175
19305 Molasses, blackstrap 20g 1 tbsp 172
21093 Fast foods, cheeseburger, regular, double patty, with condiments and vegetables 166g 1 sandwich 171
11087 Beet greens, cooked, boiled, drained, without salt 144g 1 cup 164
16126 Tofu, firm, prepared with calcium sulfate and magnesium chloride (nigari) 81g 1/4 block 163
21097 Sandwiches and burgers, cheeseburger, large, single meat patty, with bacon and condiments 195g 1 sandwich 162
18024 Bread, cornbread, prepared from recipe, made with low fat (2%) milk 65g 1 piece 162
01046 Cheese food, pasteurized process, american, without di sodium phosphate 28.35g 1 oz 162

01048 Cheese spread, pasteurized process, american, without di sodium phosphate 28.35g 1 oz 159
19062 Snacks, trail mix, regular, with chocolate chips, salted nuts and seeds 146g 1 cup 159
19190 Puddings, chocolate, dry mix, regular, prepared with 2% milk 142g 1/2 cup 159
06359 Soup, tomato, canned, prepared with equal volume milk, commercial 248g 1 cup 159
11117 Cabbage, chinese (pak-choi), cooked, boiled, drained, without salt 170g 1 cup 158
01042 Cheese, pasteurized process, american, with di sodium phosphate 28.35g 1 oz 156
01015 Cheese, cottage, lowfat, 2% milkfat 226g 1 cup 156
21005 Breakfast items, biscuit with egg and sausage 180g 1 biscuit 155
16010 Beans, baked, canned, with pork and sweet sauce 253g 1 cup 154
21028 Fast foods, ice milk, vanilla, soft-serve, with cone 103g 1 cone 153
19123 Puddings, chocolate, dry mix, instant, prepared with 2% milk 147g 1/2 cup 153
19212 Puddings, vanilla, dry mix, regular, prepared with 2% milk 140g 1/2 cup 151
21012 Fast foods, croissant, with egg, cheese, and bacon 129g 1 croissant 151
21021 Fast foods, english muffin, with egg, cheese, and canadian bacon 137g 1 muffin 151
01004 Cheese, blue 28.35g 1 oz 150
01007 Cheese, camembert 38g 1 wedge 147
11208 Dandelion greens, cooked, boiled, drained, without salt 105g 1 cup 147
18327 Pie, pumpkin, prepared from recipe 155g 1 piece 146
01026 Cheese, mozzarella, whole milk 28.35g 1 oz 143
16011 Beans, baked, canned, with pork and tomato sauce 253g 1 cup 142
18016 Biscuits, plain or buttermilk, prepared from recipe 60g 2-1/2" biscuit 141
21089 Sandwiches and burgers, cheeseburger, regular, single meat patty, plain 102g 1 sandwich 141
01019 Cheese, feta 28.35g1 oz 140
11372 Potatoes, scalloped, home-prepared with butter 245g 1 cup 140
18119 Cake, pineapple upside-down, prepared from recipe 115g 1 piece 138
01016 Cheese, cottage, lowfat, 1% milkfat 226g 1 cup 138
15141 Crustaceans, crab, blue, canned 135g 1 cup 136
18126 Cake, shortcake, biscuit-type, prepared from recipe 65g 1 shortcake 133
16127 Tofu, soft, prepared with calcium sulfate and magnesium chloride (nigari) 120g 1 piece 133
21025 Fast foods, pancakes with butter and syrup 232g 2 pancakes 128
21108 Fast foods, hamburger, regular, single patty, with condiments 106g 1 sandwich 126
01012 Cheese, cottage, creamed, large or small curd 210g 1 cup 126
16038 Beans, navy, mature seeds, cooked, boiled, without salt 182g 1 cup 126
16008 Beans, baked, canned, with franks 259g 1 cup 124
11279 Okra, cooked, boiled, drained, without salt 160g 1 cup 123
16025 Beans, great northern, mature seeds, cooked, boiled, without salt 177g 1 cup 120
21226 Pizza, meat and vegetable, regular crust, frozen 79g 1 serving 120
01013 Cheese, cottage, creamed, with fruit 226g 1 cup 120
01168 Cheese, low fat, cheddar or colby 28.35g 1 oz 118
15058 Fish, ocean perch, Atlantic, cooked, dry heat 85g 3 oz 116
06930 Sauce, cheese, ready-to-serve 63g 1/4 cup 116
21224 Pizza, cheese, regular crust, frozen 63g 1 serving 113
19090 Ice creams, french vanilla, soft-serve 86g 1/2 cup 113
20046 Rice, white, long-grain, parboiled, enriched, dry 185g 1 cup 111
21090 Fast foods, cheeseburger, regular, single patty, with condiments 113g 1 sandwich 111
18278 Muffins, blueberry, prepared from recipe, made with low fat (2%) milk 57g 1 muffin 108
21061 Fast foods, burrito, with beans and cheese 93g 1 burrito 107

19088 Ice creams, vanilla, light 66g 1/2 cup 106
19393 Frozen yogurts, chocolate, soft-serve 72g 1/2 cup 106
11271 Mustard greens, cooked, boiled, drained, without salt 140g 1 cup 104
19293 Frozen yogurts, vanilla, soft-serve 72g 1/2 cup 103
21114 Fast foods, hamburger, large, double patty, with condiments and vegetables 226g 1 sandwich 102
19183 Puddings, chocolate, ready-to-eat 113g 4 oz 102
21120 Fast foods, hotdog, with corn flour coating (corndog) 175g 1 corn dog 102
18102 Cake, white, prepared from recipe with coconut frosting 112g 1 piece 101
21053 Fast foods, salad, vegetable, tossed, without dressing, with cheese and egg 217g 1-1/2 cups 100

Note that;

- Recommended daily dose of calcium for elderly and adolescent is 800-1200 mg(Ref. Mayo Clinic).

- The richest sources are milk and dairy products. The more the solid structure in the dairy product the more the calcium concentration is as I indicated in the related part. Therefore, especially cheese and yogurt are excellent in high quality calcium in higher bioavalibility with greater amounts. Malted foods and products should be included in healthy nutrition and life style since they are also richer in calcium content in addition to their other rich vitamin and mineral contents. But, do not exaggerate its rich vitamin and mineral content because it is also a plant origin food and fibers of malt and malted foods may always bind some amounts of vitamins and minerals and decrease their bioavalibility.

- Young people and child nutrition is very critic since it should be richer in calcium content. Calcium accumulates in their bones and their bones and skleton become greater in density which means longer body lenght and more resistivity against osteoporosis and osteomalacia in their elderly period. Do not blame your child if your child likes to eat fast food. Do not worry as long as they are active and familiar with sport and exercise. They should always consume fast food, especially with their rich calcium cntent. Unfortunately, the quality and bioavalibility of calcium is lower in plant origin foods. Fiber is the initial contributor to this disadvantage of malt and malted foods since these fibers bind some of calcium and decrease its bioavalibility.

# AVERAGE FOLATE CONTENT (MCG/100 G) OF FOODS GROUPED

(the food products written in red color are the richest ones)

| Food Category (n) | Folate (PDS '96) | Folate (SR12 '98) |
|---|---|---|
| Dairy and egg products | 22.3 | 22.3 |
| Spices and herbs | 101.3 | 101.3 |
| Baby foods | 17.8 | 19.0 |
| Fats and oils | 1.6 | 1.6 |
| Poultry products | 46.1 | 46.6 |
| Soups, sauces, gravies | 9.7 | 12.8 |
| Sausages, luncheon meats | 10.2 | 10.2 |
| Breakfast cereals | 256.0 | 263.4 |
| Fruits, fruit juices | 10.0 | 10.0 |
| Pork products | 8.4 7 | 8.4 |
| Vegetables, vegetable products | 43.9 | 43.9 |
| Nuts, seed products | 78.0 | 78.0 |
| Beef products | 12.7 | 12.7 |
| Beverages | 17.0 | 10.7 |
| Finfish/shellfish | 12.6 | 12.6 |
| Legumes, legume products | 166.7 | 167.2 |
| Lamb, veal, game products | 45.5 | 45.7 |
| Baked products | 34.1 | 73.9 |
| Snacks, sweets | 16.6 | 17.8 |
| Cereal grains, pasta | 22.9 | 63.1 |
| Fast foods | 26.3 | 39.3 |
| Meals, entrees, side dishes | 10.5 | 45.0 |

Sources;
Primary Data Set, 1996; (PDS'96)
U.S. USDA Nutrient Database for Standard Reference, Release 12, 1998 (SR12 '98).

Note that;

- The recommended daily dose of the vitamin is 150-220 mcg for adolescent and elderly.
- The vitamin is a must for the protection against anemia.
- The vitamin is essential for the energy production in body.

- Breakfast cereals and legumees may seem the richest from the list above. But this is not too much important since they are in plant origin, rich in soluble and insoluble fiber which may bind some of folat and decrease its bioavalibility. Breakfast cereals are very popular among the persons and especially ladies who make sport and target to be fit. But, breakfast cereals are not a good address no matter how they are rich in vitamin and mineral content. They are rich in fiber and therefore, they may help for being fit and loosing weight, but their rich content of fiber bind many vitamins and minerals in them and decrease their bioavalibility while they also bind proteins and amino acids. The result may be the deprivation of body from many essential vitamins, minerals and proteins. I think, now, you can evaluate their nutritious status in sport platform differently. You will not only have lost weight but also you will have lost your body power and progress. Avoid from the regular and plenty consumptions of breakfast cereals while not neglecting high quality protein, vitamin and mineral rich animal origin foods. According to this explanation, you can easily predict that poultry, beef, fish, dairy and egg may be much better folate sources no matter how they have got lower folate amounts than the mentioned plant origin foods in the list above.

# CONTENT OF SELECTED FOODS PER COMMON MEASURE, MAGNESIUM, MG
# USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE, RELEASE 22

(Only the foods which have got ≥33 mg are included to the list below)
(the food products written in red color are the richest ones)

20011 Buckwheat flour, whole-groat 120g 1 cup 301
19062 Snacks, trail mix, regular, with chocolate chips, salted nuts and seeds 146g 1 cup 235
20012 Bulgur, dry 140g 1 cup 230
20033 Oat bran, raw 94g 1 cup 221
19080 Candies, semisweet chocolate 168g 1 cup 193
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 159g 1/2 fillet 170
20080 Wheat flour, whole-grain 120g 1 cup 166
11461 Spinach, canned, regular pack, drained solids 214g 1 cup 163
20005 Barley, pearled, raw 200g 1 cup 158
11458 Spinach, cooked, boiled, drained, without salt 180g 1 cup 157
12516 Seeds, pumpkin and squash seed kernels, roasted, with salt added 28.35g 1 oz (142 seeds) 156
11464 Spinach, frozen, chopped or leaf, cooked, boiled, drained, without salt 190g 1 cup 156
20020 Cornmeal, whole-grain, yellow 122g 1 cup 155
16109 Soybeans, mature cooked, boiled, without salt 172g 1 cup 148
19061 Snacks, trail mix, tropical 140g 1 cup 134
16051 Beans, white, mature seeds, canned 262g 1 cup 134
16015 Beans, black, mature seeds, cooked, boiled, without salt 172g 1 cup 120
11546 Tomato products, canned, paste, without salt added 262g 1 cup 110
11451 Soybeans, green, cooked, boiled, drained, without salt 180g 1 cup 108
21082 Fast foods, taco 263g 1 large 108
12078 Nuts, brazilnuts, dried, unblanched 28.35g 1 oz (6-8 nuts) 107
11040 Lima beans, immature seeds, frozen, baby, cooked, boiled, drained, without salt 180g 1 cup 101
11087 Beet greens, cooked, boiled, drained, without salt 144g 1 cup 98
16038 Beans, navy, mature seeds, cooked, boiled, without salt 182g 1 cup 96
16103 Refried beans, canned, traditional style (includes USDA commodity) 252g 1 cup 96
16073 Lima beans, large, mature seeds, canned 241g 1 cup 94
11281 Okra, frozen, cooked, boiled, drained, without salt 184g 1 cup 94
19078 Baking chocolate, unsweetened, squares 28.35g 1 square 93
16063 Cowpeas, common (blackeyes, crowder, southern), mature seeds, cooked, boiled, without salt 172g 1 cup 91
15037 Fish, halibut, Atlantic and Pacific, cooked, dry heat 85g 3 oz 91
18283 Muffins, oat bran 57g 1 muffin 89
16025 Beans, great northern, mature seeds, cooked, boiled, without salt 177g 1 cup 89
20034 Oat bran, cooked 219g 1 cup 88
16011 Beans, baked, canned, with pork and tomato sauce 253g 1 cup 86
11192 Cowpeas (Blackeyes), immature seeds, cooked, boiled, drained, without salt 165g 1 cup 86
20010 Buckwheat groats, roasted, cooked 168g 1 cup 86
16043 Beans, pinto, mature seeds, cooked, boiled, without salt 171g 1 cup 86
21077 Fast foods, frijoles with cheese 167g 1 cup 85
11196 Cowpeas (blackeyes), immature seeds, frozen, cooked, boiled, drained, without salt 170g 1 cup 85

20037 Rice, brown, long-grain, cooked 195g 1 cup 84
16010 Beans, baked, canned, with pork and sweet sauce 253g 1 cup 83
16072 Lima beans, large, mature seeds, cooked, boiled, without salt 188g 1 cup 81
16033 Beans, kidney, red, mature seeds, cooked, boiled, without salt 177g 1 cup 80
01095 Milk, canned, condensed, sweetened 306g 1 cup 80
21126 Fast foods, submarine sandwich, with tuna salad 256g 1 sandwich, 6" roll 79
16057 Chickpeas (garbanzo beans, bengal gram), mature seeds, cooked, boiled, without salt 164g 1 cup 79
09125 Grapefruit juice, white, frozen concentrate, unsweetened, undiluted 207g 6-fl-oz can 79
12586 Nuts, cashew nuts, oil roasted, with salt added 28.35g 1 oz (18 nuts) 77
09087 Dates, deglet noor 178g 1 cup 77
20028 Couscous, dry 173g 1 cup 76
12061 Nuts, almonds 28.35g 1 oz (24 nuts) 76
19077 Baking chocolate, unsweetened, liquid 28.35g 1 oz 75
15034 Fish, haddock, cooked, dry heat 150g 1 fillet 75
12585 Nuts, cashew nuts, dry roasted, with salt added 28.35g 1 oz 74
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 127g 1 fillet 74
16008 Beans, baked, canned, with franks 259g 1 cup 73
09214 Orange juice, frozen concentrate, unsweetened, undiluted 213g 6-fl-oz can 72
16034 Beans, kidney, red, mature seeds, canned 256g 1 cup 72
11038 Lima beans, immature seeds, frozen, fordhook, cooked, boiled, drained, without salt 170g 1 cup 71
16070 Lentils, mature seeds, cooked, boiled, without salt 198g 1 cup 71
12147 Nuts, pine nuts, dried 28.35g 1 oz 71
16086 Peas, split, mature seeds, cooked, boiled, without salt 196g 1 cup 71
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 168g 1 cup 71
21082 Fast foods, taco 171g 1 small 70
16058 Chickpeas (garbanzo beans, bengal gram), mature seeds, canned 240g 1 cup 70
01097 Milk, canned, evaporated, nonfat, with added vitamin A and vitamin D 256g 1 cup 69
16006 Beans, baked, canned, plain or vegetarian 254g 1 cup 69
21124 Fast foods, submarine sandwich, with cold cuts 228g 1 sandwich, 6" roll 68
20025 Cornmeal, self-rising, degermed, enriched, yellow 138g 1 cup 68
21086 Fast foods, tostada, with beans, beef, and cheese 225g 1 tostada 68
16064 Cowpeas, common (blackeyes, crowder, southern), mature seeds, canned, plain 240g 1 cup 67
21125 Fast foods, submarine sandwich, with roast beef 216g 1 sandwich, 6" roll 67
12637 Nuts, mixed nuts, with peanuts, oil roasted, with salt added 28.35g 1 oz 67
09277 Plantains, raw 179g 1 medium 66
22904 Chili con carne with beans, canned entree 222g 1 cup 64
12635 Nuts, mixed nuts, dry roasted, with peanuts, with salt added 28.35g 1 oz 64
08121 Cereals, oats, regular and quick and instant, unenriched, cooked with water (includes boiling and microwaving), without salt 234g 1 cup 63
21070 Fast foods, chimichanga, with beef 174 1 chimichanga 63g
15067 Fish, pollock, walleye, cooked, dry heat 85g 3 oz 62
16120 Soymilk, original and vanilla, unfortified 245g 1 cup 61
08147 Cereals ready-to-eat, wheat, shredded, plain, sugar and salt free 46g 2 biscuits 61
01096 Milk, canned, evaporated, with added vitamin D and without added vitamin A 252g 1 cup 60
20013 Bulgur, cooked 182g 1 cup 58
11279 Okra, cooked, boiled, drained, without salt 160g 1 cup 58
11547 Tomato products, canned, puree, without salt added 250g1 cup 58

21138 Fast foods, potato, french fried in vegetable oil 169g 1 large 57
14346 Shake, fast food, chocolate 333g 16 fl oz 57
11674 Potato, baked, flesh and skin, without salt 202g 1 potato 57
11424 Pumpkin, canned, without salt 245g 1 cup 56
11512 Sweet potato, canned, vacuum pack 255g 1 cup 56
21078 Fast foods, nachos, with cheese 113g 6-8 nachos 55
18376 Bread crumbs, dry, grated, seasoned 120g 1 cup 55
15173 Mollusks, scallop, mixed species, cooked, breaded and fried 93g 6 large 55
11370 Potatoes, hashed brown, home-prepared 156g 1 cup 55
15221 Fish, tuna, yellowfin, fresh, cooked, dry heat 85g 3 oz 54
15137 Crustaceans, crab, alaska king, cooked, moist heat 85g 3 oz 54
15141 Crustaceans, crab, blue, canned 135g 1 cup 53
06931 Sauce, pasta, spaghetti/marinara, ready-to-serve 250g 1 cup 53
20089 Wild rice, cooked 164g 1 cup 52
18116 Cake, gingerbread, prepared from recipe 74g 1 piece 52
21083 Fast foods, taco salad 198g 1-1/2 cups 51
11164 Collards, frozen, chopped, cooked, boiled, drained, without salt 170g 1 cup 51
15071 Fish, rockfish, Pacific, mixed species, cooked, dry heat 149g 1 fillet 51
21074 Fast foods, enchilada, with cheese 163g 1 enchilada 51
11008 Artichokes, (globe or french), cooked, boiled, drained, without salt 120g 1 medium 50
20046 Rice, white, long-grain, parboiled, enriched, dry 185g 1 cup 50
16390 Peanuts, all types, dry-roasted, without salt 28.35g 1 oz (approx 28) 50
16090 Peanuts, all types, dry-roasted, with salt 28.35g 1 oz (approx 28) 50
16089 Peanuts, all types, oil-roasted, with salt 28.35g 1 oz 50
21114 Fast foods, hamburger; double, large patty; with condiments and vegetables 226g 1 sandwich 50
15168 Mollusks, oyster, eastern, cooked, breaded and fried 85g 3 oz 49
15029 Fish, flatfish (flounder and sole species), cooked, dry heat 85g 3 oz 49
09278 Plantains, cooked 154g 1 cup 49
11373 Potatoes, au gratin, home-prepared from recipe using butter 245g 1 cup 49
21025 Fast foods, pancakes with butter and syrup 232g 2 pancakes 49
11176 Corn, sweet, yellow, canned, vacuum pack, regular pack 210g 1 cup 48
20022 Cornmeal, degermed, enriched, yellow 138g 1 cup 48
01057 Eggnog 254g 1 cup 48
15086 Fish, salmon, sockeye, cooked, dry heat 155g 1/2 fillet 48
01110 Milk shakes, thick chocolate 300g 10.6 fl oz 48
14210 Coffee, brewed, espresso, restaurant-prepared 60g 2 fl oz 48
14177 Chocolate-flavor beverage mix, powder, prepared with whole milk 266g 1 cup 48
12167 Nuts, chestnuts, european, roasted 143g 1 cup 47
11372 Potatoes, scalloped, home-prepared with butter 245g 1 cup 47
12179 Nuts, coconut meat, dried (desiccated), sweetened, shredded 93g 1 cup 47
09298 Raisins, seedless 145g 1 cup 46
20044 Rice, white, long-grain, regular, raw, enriched 185g 1 cup 46
12120 Nuts, hazelnuts or filberts 28.35g 1 oz 46
01164 Cheese sauce, prepared from recipe 243g 1 cup 46
06007 Soup, bean with ham, canned, chunky, ready-to-serve 243g 1 cup 46
11179 Corn, sweet, yellow, frozen, kernels cut off cob, boiled, drained, without salt 164g 1 cup 46
21138 Fast foods, potato, french fried in vegetable oil 134g 1 medium 46

21042 Fast foods, chili con carne 253g 1 cup 46
11299 Parsnips, cooked, boiled, drained, without salt 156g 1 cup 45
21111 Fast foods, hamburger; double, regular patty; with condiments 215g 1 sandwich 45
14316 Malted drink mix, chocolate, with added nutrients, powder, prepared with whole milk 265g 1 cup 45
21097 Fast foods, cheeseburger; single, large patty; with condiments and bacon 195g 1 sandwich 45
11303 Peas, edible-podded, frozen, cooked, boiled, drained, without salt 160g 1 cup 45
12155 Nuts, walnuts, english 28.35g 1 oz (14 halves) 45
09292 Plums, dried (prunes), stewed, without added sugar 248g 1 cup 45
05142 Duck, domesticated, meat only, cooked, roasted 221g 1/2 duck 44
15067 Fish, pollock, walleye, cooked, dry heat 60g 1 fillet 44
21113 Fast foods, hamburger; single, large patty; with condiments and vegetables 218g 1 sandwich 44
11174 Corn, sweet, yellow, canned, cream style, regular pack 256g 1 cup 44
14347 Shake, fast food, vanilla 333g 16 fl oz 43
11642 Squash, summer, all varieties, cooked, boiled, drained, without salt 180g 1 cup 43
01118 Yogurt, plain, skim milk, 13 grams protein per 8 ounce 227g 8-oz container 43
18330 Pie crust, cookie-type, prepared from recipe, graham cracker, baked 239g 1 pie shell 43
06404 Soup, bean with pork, canned, prepared with equal volume water 253g 1 cup 43
11575 Turnip greens, frozen, cooked, boiled, drained, without salt 164g 1 cup 43
08220 Cereals ready-to-eat, QUAKER, Low Fat 100% Natural Granola with Raisins 50g 1/2 cup 43
15034 Fish, haddock, cooked, dry heat 85g 3 oz 43
22401 Spaghetti with meat sauce, frozen entree 283g 1 package 42
20125 Spaghetti, whole-wheat, cooked 140g 1 cup 42
21098 Fast foods, cheeseburger; single, large patty; with condiments and vegetables 219g 1 sandwich 42
11301 Peas, edible-podded, boiled, drained, without salt 160g 1 cup 42
21063 Fast foods, burrito, with beans and meat 115.5g 1 burrito 42
19056 Snacks, tortilla chips, plain, white corn 28.35g 1 oz 41
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 32g 1/4 cup 41
11658 Spinach souffle 136g 1 cup 41
09270 Pineapple, canned, heavy syrup pack, solids and liquids 254g 1 cup 41
09040 Bananas, raw 150g 1 cup 41
11584 Vegetables, mixed, frozen, cooked, boiled, drained, without salt 182g 1 cup 40
21061 Fast foods, burrito, with beans and cheese 93g 1 burrito 40
11371 Potatoes, mashed, home-prepared, whole milk and margarine added 210g 1 cup 40
14310 Malted drink mix, natural, with added nutrients, powder, prepared with whole milk 265g 1 cup 40
15167 Mollusks, oyster, eastern, wild, raw 84g 6 medium 39
11508 Sweet potato, cooked, baked in skin, without salt 146g 1 potato 39
21059 Fast foods, shrimp, breaded and fried 164g 6-8 shrimp 39
11549 Tomato products, canned, sauce 245g 1 cup 39
11205 Cucumber, with peel, raw 301g 1 large 39
11081 Beets, cooked, boiled, drained 170g 1 cup 39
11436 Rutabagas, cooked, boiled, drained, without salt 170g 1 cup 39
11363 Potatoes, baked, flesh, without salt 156g 1 potato 39
15128 Fish, tuna salad 205g 1 cup 39
01117 Yogurt, plain, low fat, 12 grams protein per 8 ounce 227g 8-oz container 39
20112 Noodles, egg, spinach, cooked, enriched 160g 1 cup 38
19126 Candies, milk chocolate coated peanuts 40g 10 pieces 38
11162 Collards, cooked, boiled, drained, without salt 190g 1 cup 38

11657 Potatoes, mashed, home-prepared, whole milk added 210g 1 cup 38
11252 Lettuce, iceberg (includes crisphead types), raw 539g 1 head 38
01111 Milk shakes, thick vanilla 313g 11 fl oz 38
11414 Potato salad, home-prepared 250g 1 cup 38
06449 Soup, pea, green, canned, prepared with equal volume water 250g 1 cup 38
19132 Candies, milk chocolate, with almonds 41g 1 bar (1.45 oz) 37
01037 Cheese, ricotta, part skim milk 246g 1 cup 37
11385 Potatoes, au gratin, dry mix, prepared with water, whole milk and butter 245g 1 cup 37
21106 Fast foods, fish sandwich, with tartar sauce and cheese 183g 1 sandwich 37
12537 Seeds, sunflower seed kernels, dry roasted, with salt added 28.35g 1 oz 37
15138 Crustaceans, crab, alaska king, imitation, made from surimi 85g 3 oz 37
21088 Tostada with guacamole 130.5g 1 tostada 37
05168 Turkey, all classes, meat only, cooked, roasted 140g 1 cup 36
15111 Fish, swordfish, cooked, dry heat 106g 1 piece 36
22402 Beef Macaroni, frozen entree 240g 1 package 36
09294 Prune juice, canned 256g 1 cup 36
22907 Pasta with meatballs in tomato sauce, canned entree 252g 1 cup 35
11313 Peas, green, frozen, cooked, boiled, drained, without salt 160g 1 cup 35
01103 Milk, chocolate, fluid, commercial, reduced fat, with added vitamin A and vitamin D 250g 1 cup 35
06166 Sauce, homemade, white, medium 250g 1 cup 35
09268 Pineapple, canned, juice pack, solids and liquids 249g 1 cup 35
15017 Fish, cod, Atlantic, canned, solids and liquid 85g 3 oz 35
14297 Lemonade-flavor drink, powder, prepared with water 266g 8 fl oz 35
21102 Fast foods, chicken fillet sandwich, plain 182g 1 sandwich 35
20006 Barley, pearled, cooked 157g 1 cup 35
12142 Nuts, pecans 28.35g 1 oz (20 halves) 34
11387 Potatoes, scalloped, dry mix, prepared with water, whole milk and butter 245g 1 cup 34
20083 Wheat flour, white, bread, enriched 137g 1 cup 34
01121 Yogurt, fruit, low fat, 10 grams protein per 8 ounce 227g 8-oz container 34
12652 Nuts, pistachio nuts, dry roasted, with salt added 28.35g 1 oz (47 nuts) 34
15150 Crustaceans, shrimp, mixed species, cooked, breaded and fried 85g 3 oz 34
11206 Cucumber, peeled, raw 280g 1 large 34
21094 Fast foods, cheeseburger, regular, double patty and bun, plain 160g 1 sandwich 34
19038 Snacks, popcorn, caramel-coated, with peanuts 42g 1 cup 34
20110 Noodles, egg, cooked, enriched 160g 1 cup 34
05058 Chicken, broilers or fryers, breast, meat and skin, cooked, fried, batter 140g 1/2 breast 34
12632 Nuts, macadamia nuts, dry roasted, with salt added 28.35g 1 oz (10-12 nuts) 33
19031 Snacks, oriental mix, rice-based 28.35g 1 oz (about 1/4 cup) 33
21033 Fast foods, sundae, hot fudge 158g 1 sundae 33
15088 Fish, sardine, Atlantic, canned in oil, drained solids with bone 85.05g 3 oz 33
15058 Fish, ocean perch, Atlantic, cooked, dry heat 85g 3 oz 33
11655 Carrot juice, canned 236g 1 cup 33
16112 Miso 68.75g 1 cup 33
11091 Broccoli, cooked, boiled, drained, without salt 156g 1 cup 33
21054 Fast foods, salad, vegetable, tossed, without dressing, with chicken 218g 1-1/2 cups 33
14390 Cocoa mix, with aspartame, powder, prepared with water 192g 1 serving 33
21092 Fast foods, cheeseburger; double, regular patty; plain 155g 1 sandwich 33

01102 Milk, chocolate, fluid, commercial, whole, with added vitamin A and vitamin D 250g 1 cup 33
01104 Milk, chocolate, fluid, commercial, lowfat, with added vitamin A and vitamin D 250g 1 cup 33
09306 Raspberries, frozen, red, sweetened 250g 1 cup 33

Note that;

- Recommended daily dose of the mineral is 100-250 mg (Ref. Mayo Clinic)

- Buckwheat, bulgur, oat bran, wheat flour, spinach, barley, seeds, soybean, tomato, nuts and lima bean may seem to you richest sources of magnesium with their richer magnesium contents in the list above. But, do not forget that they are all plant origin which means that they are rich in soluble and insoluble fibers which may bind magnesium and decrease its bioavalibility. But, below them, you will notice fast food products and especially fish. I can not recommend you the consumption of fast food in plenty amounts regularly that they are very rich in cholesterol, bad cholesterol and homocytein since this nutrition style dominates animal origin products. As you can easily remember from the related part, fast food products are very rich in minerals and vitamins including magnesium and most important is their highest quality and complete protein content in spite of their high content of trans fat, saturated fat, cholesterol, bad cholesterol and homocytein. I will note the same factor. No matter how fast foods are rich in cholesterol and bad cholesterol, if you are free of any cardiovascular disease and disorder, diabetes, cancer and other metabolic diseases and if you are the one who makes regular sport and exercise and consume fruits and vegetables in plenty amounts, do not afraid of cholesterol and bad cholesterol in them. Your regular sport and exercise, the rich magnesium content of fish and fast foods when combined with plenty amount of fruit and vegetable consumption will protect you from the rich cholesterol, bad cholesterol and homocytein content of the same foods.

- Although I indicated importantly in the related part, magnesium is a must for energy production and for the protection against chronic fatique syndrome, it does not mean that more magnesium intake can help for the treatment of energy problem and chronic fatique. Only, the lower doses than recommended daily doses (<100 for adolescent and elderly) may cause energy problem and chronic fatique while megadoses will be ineffective in energy production while causing toxicity.

# VITAMIN A RICH FOOD LIST

| | Micrograms (mcg) | Portion |
|---|---|---|
| Liver (pigs stewed) | 23000 | 100g(3.5 oz) |
| Cod liver oil | 18000 | 100g |
| Liver pate | 7000 | 100g |
| Liver sausage | 2600 | 100g |
| Butter (fortified with A) | 800 | 100g |
| Margarine (fortified with A) | 750 | 100g |
| Ghee | 700 | 100g |
| Faggots | 450 | 100g |
| Cheese (hard) | 330 | 100g |
| Fresh creams (pasteurised) | >200 | 100g |
| Eggs | 200 | 100g |
| Carrots (raw) | 8000 | 100g |
| Sweet potato | 4000 | 100g |
| Capsicum pepper (red) | 3800 | 100g |
| Spinach | 3500 | 100g |
| Curly kale | 3200 | 100g |
| Watercress (too little portion size) | 2500 | 100g |
| Mangoes | 1400 | 100g |
| Apricots | 1200 | 100g |
| Paprica | 360 | 1g |
| Chilli powder | 210 | 1g |

Note that;

- Recommended Daily Dose for Vitamin A is 600-700 mcg.
- Liver is the richest source. Being in animal origin and being free of fiber, increase the bioavalibility of the vitamin significantly and makes the offal as the richest source of the vitamin. No matter how liver is rich in cholesterol and bad cholesterol, if you are free of any cardiovascular disease and disorder, diabetes, cancer and other metabolic diseases and if you are the one who makes regular sport and exercise and consume fruits and vegetables in plenty amounts, do not afraid of cholesterol and bad cholesterol of liver. Your regular sport and exercise, the rich vitamin A content of liver, plenty amount of fruit and vegetable consumption will protect you from the rich cholesterol, bad cholesterol and homocytein content of liver.
- No matter how margarine is rich in vitamin A content with 750 mcg, it is the richest source of trans fatty acids which are even worse than cholesterol, bad cholesterol and homocytein. Trans fatty acids of margarines are the initial causative agents of atherosclerosis (vessel calcification), hypertension and other cardiovascular diseases and disorders. Briefly, avoid margarine use in kitchen in spite of its rich vitamin A content!
- Ghee may be advised instead margarine since it is free of milk solids and a clarified butter but it is only restricted with Indian cookery and foods.

# REFERENCES


Adrogue , H. J.& Madias, N. E. (2007). Sodium and potassium in the pathogenesis of hypertension. The New England Journal of Medicine, 356, 1966-1978

Alavi M, Miller T, Erlandson K, Schneider R, Belas R. 2001. Bacterial community associated with Pfiesteria-like dinoflagellate cultures. Environ Microbiol 3:380–396.

Albright LJ, McCrae SK, May BE. 1986. Attached and free floating plankton in Howe Sound, British Columbia, a Coastal Marine Fjord-Embayment. Appl Environ Microbiol. 51(3):614-621.

Allen LV, Berardi RR and Desimone EM. , editor. Handbook of Nonprescription Medicines. 12. Washington DC, American Pharmaceutical Association; 2000.

Allman, M. A., Pang, D., Mnutr, K. M. K., Hall, D. F. and Favaloro, E. 1996. Cardiovascular risk factors and dietary plant omega-3 verus omega-6 fatty acids. J Am Diet A. 96(9):A75. Suppl:1.

Almeida, J. C., Perassolo, M. S., Camargo, J. L., Bragagnolo, N. & Gross, J. L. 2006. Fatty acid composition and cholesterol content of beef and chicken meat in Southern Brazil. Brazilian Journal of Pharmaceutical Sciences, 42, 109-117

Altekruse, S. F., Tollefson, L. K. 2003. Human Campylobacteriosis: a challenge for the veterinary profession. J Am Vet Med Assoc. 223 (4):445-52

Amor, B. 1998. Reiter'ssyndrome. Diagnosis and clinical features. Rheum Dis Clin North Am. 24(4):677-695

Anderson DM. Coats DW, Tyler MA. 1985. Encystment of the dinoflagellate Gyrodinium uncatenum: temperature and nutrient effects. J Phycol. 21:200–6.

Antalis, C. J., Stevens, L. J., Campbell, M., Pazdro, R., Ericson, K. & Burgess, J. R. (2006). Omega-3 fatty acid status in attention-deficit/ hyperactivity disorder. Prostaglandins Leukotrienes and Essential Fatty Acids, 75, 299-308

APEC. 1997. Report of the task team on algal biotoxin regulations. Dated 21 May 1997. Marine Resource Conservation Working Group, Project on Management of Red Tides and Harmful Algal Blooms (MRT/HAB), Pusan, Republic of Korea.

Arkhipenko, Yu. V. and Sazontova, T. G. 1995. Mechanisms of the cardioprotective effect of a diet enriched with w-3 polyunsaturated fatty acids. Pathophysiol. 2(3): 131-140.

Arkhipenko, Yu. V. and Sazontova, T. G. 1995. Mechanisms of the cardioprotective effect of a diet enriched with w-3 polyunsaturated fatty acids. Pathophysiol. 2(3): 132.

Arkhipenko, Yu. V.& Sazontova, T. G. (1995). Mechanisms of the cardioprotective effect of a diet enriched with w-3 polyunsaturated fatty acids. Pathophysiology, 2, 131-140

Aune T, Yasumoto T, Engeland E. 1991. Light and scanning electron microscopic studies on effects of marine algal toxins toward freshly prepared hepatocytes. J. Toxicol. Environ. Health 34: 1-9.

Awtry EH, Loscalzo J. Aspirin. Circulation. 2000;101:1206–1218.

B. Frei, L. England and B.N. Ames. 1989. Ascorbate is an outstanding antioxidant in human blood plasma, Proc Natl Acad Sci USA 86:6377–6381.

B. Portal, M.J. Richard, C. Coudray, J. Arnaud and A. Favier. 1995. Effect of double-blind cross-over selenium supplementation on lipid peroxidation markers in cystic fibrosis patients. Clin Chim Acta 234:137–146.

Baden D, Fleming LE, Bean, JA. 1995. Marine Toxins In: FA deWolff, editor. Handbook of Clinical Neurology: Intoxications of the Nervous System Part II. Natural Toxins and Medicines. Amsterdam: Elsevier. p141-175.

Baden DG, Trainer VL, 1993. The mode and action of toxins and seafood poisoning. In: Falconer IR, editor. Algal Toxins in Seafood and Drinking San Diego Water. Academic Press. p. 49–74.

Bajpai, P. and Bajpai, P. K. 1993. Eicosapentaenoic acid (EPA) production from microorganisms: a review. J Biotech. 30(2):161-183.

Bajpai, P.& Bajpai, P. K. (1993). Eicosapentaenoic acid (EPA) production from microorganisms: a review. Journal of Applied Biotechnology, 30, 161-183

Baker, D. G., Krakauer, K. A.., Tate, G., Laposata, M. & Zurier, R. B. (2005). Suppression of human synovial cell proliferation by dihomo linolenic acid. Arthritis Rheumatism, 32, 1273-1281

Baker, D. G., Krauker, G. A. T. and Laposata, R. B. Z. 1989. Suppression of human synovial cell proliferation by dihomo ⊠ linolenic acid. Arthritis Rheum. 32:1273-1281.

Bang, H.O., Dyerberg, J.& Nielsen, A. (1971). Plasma lipid and lipoprotein pattern in Greenlandic West-coast Eskimos. Lancet,1,1143-1145.

Barbeau, M. L., Klemp, K. F., Guyton, J. R. and Rogers, K. A. 1997. Dietary fish oil. Influence on lesion regression in the porcine meodel of atherosclerosis. Atheriosc, Thrombos, & Vasc. Biol. 17(4):688-694.

Barbeau, M. L., Klemp, K. F., Guyton, J. R.& Rogers, K. A. (1997). Dietary fish oil. Influence on lesion regression in the porcine model of atherosclerosis. Arteriosclerosis, Thrombosis and Vascular Biology, 17, 688-694

Barber, M. D., Ross, J. A., Vos, A. C., Tisdale, M. J. and Fearon, K. C. H. 1999. The effect of an oral nutritional supplement enriched with fish oil on weight-loss in patients with pancreatic cancer. Br. J. Cancer. 81(1): 80-86.

Barber, M. D., Ross, J. A., Voss, A. C., Tisdale, M. J.& Fearon, K. C. H. (1999). The effect of an oral nutritional supplement enriched with fish oil on weight-loss in patients with pancreatic cancer. British Journal of Cancer, 81, 80-86

Bartlett, H. & Eperjesi, F. 2005. Possible contraindicatons and adverse reactions associated with the use of ocular nutritional supplements. Ophthalmic Physiol Opt. 25(3):179-94.

Bartoli, G. M.& Palozza, P., Luberto, C., Franceschelli, P. & Piccioni, E. (1995). Dietary fish oil inhibits Human erythrocyte Mg, NaK-ATPase. Biochemical and Biophysical Research Communications, 213, 881-887

Bartoli, G. M., Palozza, P., Luberto, C., Franceschelli, P. and Piccioni, E. 1995. Bioch. & Biophysic. Res. Comm.. 213(3):881.

Bashar, S. K.& Mitra, A. K. 2004. Effect of smoking on vitamin A, Vitamin E and other trace elements in patients with cardiovascular disease in Bangladesh: a cross-sectional study. Nutrition Journal. 3:18

Bates SS, Douglas DJ, Doucette GJ, Léger C.1995. Enhancement of domoic acid production by reintroducing bacteria to axenic cultures of the diatom Pseudo-nitzschia multiseries. Nat. Toxins 3:428–435

Bates, D., Cartlidge, N. E., French, J. M., Jackson, M. J., Nightingale, S., Shaw, D. A., Smith, S., Woo, E., Hawkins, S. A. & Millar, J. H. 1989. A double-blind controlled trial of long chain n-3 polyunsaturated fatty acids in the treatment of multiple sclerosis. Neurology, Neurosurgery & Psychiatry with Practical Neurology. 52:18-22

Beilin LJ. Non-steroidal anti-inflammatory medicines and antihypertensive medicine therapy. J Hypertens. 2002;20:849–850. doi: 10.1097/00004872-200205000-00017.

Bell WH, Mitchell R. 1972. Chemotactic and growth responses of marine bacteria to algal extracellular products. The Biol Bull. 143:265-277.

Belluzzi, A. (2001). N-3 and n-6 fatty acids for the treatment of autoimmune diseases. European Journal of Lipid Science and Technology, 103, 399-407

Belluzzi, A. 2001. N-3 and n-6 fatty acids for the treatment of autoimmune diseases. Eur. J. Lipid Sci. Technol. 103:399.

Benson JM, Tischler DL, Baden DG. 1999. Uptake, tissue distribution and excretion of PBTx-3 administered to rats by intratracheal instillation. J Toxicol Environ. Health 56:345–355.

Bhatnagar, D.& Durrington, P. N. (2003). Omega-3 fatty acids, their role in the prevention and treatment of atherosclerosis related risk factors and complications. International Journal of Clinical Practice, 57, 305-14

Bidle KD, Azam F. 2001. Bacterial control of silicon regeneration from diatom detritus: significance of bacterial ectohydrolase and species identity. Limnol Oceanogr 46:1606–1623.

Biegala IC, Kenneway G, Alverca E, Lennon JF, Vaulot D, Simon N. 2002.Identification of bacteria associated with dinoflagellates(dinophyceae) Alexandrium spp.using tyramide signal, amplification-fluorescent in situ hybridization and confocal microscopy. J Phycol 38(2):404-411.

Blot WJ, McLaughlin JK. Over the counter non-steroidal anti-inflammatory medicines and risk of gastrointestinal bleeding. J Epidemiol Biostat. 2000;5:137–142.

Bold JC, Wynne MJ. 1978. Introduction to the Algae: Structure and Reproduction. New Jersey: Prentice Hall. 573p.

Borek, C. (2004). Dietary antioxidants and human cancer. Integrative Cancer Therapies. 3, 333-41

Bortolussi, R. 2008. Listeriosis: a primer. Journal of Canadian Medical Association/CMAJ. 179(8):795-797

Bortolussi, R., Mailman, T. In: Feigin R, Cherry, J., Demmler-Harrison, G. Textbook of Pediatric Infections Diseases. 5th Ed. Philadelphia (PA):WB Saunders;2004, 1330-6

Bossart GD, Baden DG, Ewing R, Roberts B, Wright S. 1998. Brevetoxicosis in manatees (Tnchechus manatus latirostris) from the 1996 epizootic: gross, histopathologic and immunocytochemical features. Tox Path 26(2):276–282.

Braga, M., Gianotti, L., Vignali, A. & Carlo, D. V. (1998). Immunonutrition in gastric cancer surgical patients. Nutrition, 14, 831-835

Braga, M., Gianotti, L., Vignali, A. and Carlo, D. V. 1998. Immunonutrition in gastric cancer surgical patients. Nutrition. 14(11-12):831-835.

Braunwald, E., Fauci, A. S., Isselbacher, K. J., Kasper, D. L., Hauser, S. L., Longo, D. L., L. JJ, editors. Harrison's principles of internal medicine. The McGraw-Hill Companies. 2001.

Bravo I, Anderson DM. 1994. The effects of temperature, growth medium and darkness on excysment and growth of the toxic dinoflagellate Gymnodinium catenatum from northwest Spain. J Plankton Res 16(5):513-525.

Bray, G. A.& Popkin, B. M. (1998). Dietary fat intake does affect obesity. American Journal of Clinical Nutrition, 68, 1157-1173

Bricelj MP, Lee JH, Cambella AD, Anderson DM. 1990. Uptake of Alexandrium fundyense by Mytilus edulis and Mercenaria mercenaria under controlled conditions. In: Graneli E, Sundstrom B, Edler L, Anderson DM editors. Toxic Marin Phytoplankton. New York:Elsevier. p269-274

Bricelj VM, Connell L, Konoksi K, Scott PM, Scheuer T, William AC, Trainer VL. 2005. Sodium channel mutation leading to saxitoxin resistance in clams increases risk of PSP. Nature. 434:763-767

Brude, L. R., Drevon, C. A., Hjerman, I., Seljeflot, I. and Nenseter, M. S. 1997. Peroxidation of low density lipoprotein from male hyperlipidemic smokers suplied with omega-3 fatty acids and antioxidants. Atheroscler. 134(1-2):220.

Brude, L. R., Drevon, C. A., Hjerman, I., Seljeflot, I. and Nenseter, M. S. 1997. Peroxidation of low density lipoprotein from male hyperlipidemic smokers suplied with omega-3 fatty acids and antioxidants. Atheroscler. 134(1-2):220.

Brude, L. R., Drevon, C. A., Hjerman, I., Seljeflot, I., Lund-Katz, S.,Saarem, K., Sandstad, B., Solvoll, K., Halvorsen, B., Arnesen, H.& Nenseter, M. S. (1997). Peroxidation of low density lipoprotein from combined -hyperlipidemic male smokers supplied with omega-3 fatty acids and antioxidants. Arteriosclerosis, Thrombosis and Vascular Biology, 17, 2576-88

C. Berry and A.L. Clark. 2000. Catabolism in chronic heart failure. Eur Heart J. 521–532.

C.J. Bates, A. Prentice, T.J. Cole. 1999. Micronutrients: highlights and research challenges from the 1994 to 1995 National Diet and Nutrition survey of people aged 65 years and over. Br J Nutr :7–15.

Calder, P.C. (2003a). Long-chain n-3 fatty acids and inflammationpotential application in surgical and trauma patients. Brazilian Journal of Medical and Biological Research, 36, 433-46

Capone ML, Sciulli MG, Tacconelli S, Grana M, Ricciotti E, Renda G, Di GP, Merciaro G, Patrignani P. Pharmacodynamic interaction of naproxen with low-dose aspirin in healthy subjects. J Am Coll Cardiol. 2005;45:1295–1301. doi: 10.1016/j.jacc.2005.01.045.

Catalan, J., Moriguchi, T., Slotnick, B., Murthy, M., Greiner, R. S.& Salem, Jr N. (2002). Cognitive deficits in docosahexaenoic acid-deficient rats. Behavioral Neuroscience, 116, 1022-1031

Chandrasekharan NV, Dai H, Roos KL, Evanson NK, Tomsik J, Elton TS, Simmons DL. COX-3, a cyclooxygenase-1 variant inhibited by acetaminophen and other analgesic/antipyretic medicines: cloning, structure, and expression. Proc Natl Acad Sci U S A. 2002;99:13926–13931. doi: 10.1073/pnas.162468699.

Charalabopoulos, K., Kotsalos, A., Batistatou, A., Charalabopoulos, A., Vezyraki, P., Peschos, D., Kalfakakou, V. & Evangelou, A. (2006). Selenium in serum and neoplastic tissue in breast cancercorrelation with CEA. British Journal of Cancer, 95, 674-676

Chen, W. J.& Yeh, S. L. (2003). Effects of fish oil in parenteral nutrition. Nutrition, 19, 275-279

Cherubini, A., Andres-Lacueva, C., Martin, A., Lauretani, F., Di Iorio, A., Bartali, B., Corsi, A., Bandinelli, S., Mattson, M. P.& Ferrucci, L. (2007). Low plasma n-3 fatty acids and dementia in older persons The InCHIANTI study. The Journal of Gerontology Series A: Biological Sciences and Medical Sciences, 62,1120-1126

Cheun BS, Loughran M, Hayashi T, Nagashima Y, Watanabe, E. 1998. Use of a channel biosensor for the assay of paralytic shellfish toxins. Toxicon 36(10):1371-1381.

Chiu, C. J., Klein, R., Milton, R. C., Gensler, G.&Taylor, A. (2009). Does eating particular diets alter the risk of age-related macular degeneration in users of the Age-Related Eye Disease. British Journal of Ophthalmology, 0,1-6

Cho, E., Hung, S., Willett, W. C., Spiegelman, D., Rimm, E. B., Seddon, J. M., Colditz, G. A.& Hankinson, S. E. (2001). Prospectivestudy of dietary fat and the risk of Age-Related Macular degeneration. American Journal of Clinical Nutrition, 73, 209-218

Chong, E. W-T., Kreis, A. J., Wong, T. Y., Simpson, J. A.& Guymer, R. H. (2008). Dietary w-3 fatty acid and fish intake in the primary prevention of age-related macular degeneration. A systematic review and Meta-analysis. Archives Opthalmology,126, 826-833

Chui, D. W., Owen, R. L. 1994. AIDS and the bowel. J Gastroenterol Hepatol. 9(3):291-303

Clark, L. C., Combs, G. F., Turnbull, B. W., Slate, E. H., Chalker, D. K., Chow, J., Davis, L. S., Glover, R. A., Graham, G. F., Gross, E. G., Krongrad, A., Lesher, J. L., Park, H. K., Sanders, B. B., Smith, C. L.,& Taylor, J. R. (1996). Effects of selenium supplementation for cancer prevention in patients with carcinoma of the skin. A randomized controlled trial. Nutritional Prevention of Cancer Study Group. Journal of the American Medical Association, 276, 1957-1963

Clarke, L. H., Clarke, C. R. and Lippman, M. 1999. The inluence ofmaternal diet on breast cancer risk among female offspring. Nutrition. 15(5): 392-401.

Clarke, L. H., Clarke, C. R. and Lippman, M. 1999. The inluence ofmaternal diet on breast cancer risk among female offspring. Nutrition. 15(5): 392-401.

Clarke, L. H., Clarke, C. R.& Lippman, M. (1999). The influence of maternal diet on breast cancer risk among female offspring. Nutrition, 15, 392-401

Clayton, E. H., Hanstock, T. L., Garg, M. L..& Hazell, P. L. (2007). Long chain omega-3 polyunsaturated fatty acids in the treatment of psychiatric illnesses in children and adolescents. Acta Neuropsychiatr. 19, 92-103

Cleland, L. G., James, M. J.& Proudman, S. M. (2003). The role of fish oils in the treatment of rheumatoid arthritis. Medicines. 63, 845-53

Connor, W. E., Neuringer, M.& Lin, D. S. (1990). Dietary effects on brain fatty acid composition the reversibility of n-3 fatty acid deficiency and turnover of docosahexaenoic acid in the brain and turnover of docosahexaenoic acid in the brain, erythrocytes, and plasma of rhesus monkeys. Journal of Lipid Research, 31, 237-247

Cordova J, Cárdenas L, Yudelevich A. 2002. Multiple bacterial infection of Alexandrium catenella (Dinophyceae). J. Plank. Res 24:1–8

D. Steinberg, S. Parthasarathy, T.E. Carew, J.C. Khoo and J.L. Witztum. 1989. Beyond cholesterol: modification of low density lipoprotein that increase its atherogenicity. N Engl J Med 320:915–924.

D.B. Menzal. 1994. The toxicity of air pollution in experimental animals and humans: the role of oxidative stress. Toxicol Lett 72: 269–277.

Danaei, G., Ding, E. L., Mozaffarian, D., Taylor, B., Rehm, J., Murray, C. J. L.& Ezzati, M. (2009). Comparative Risk Assessment of Dietary, Lifestyle, and Metabolic Risk Factors. PLoS Medicine, 6, 4

Dantzer WR, Levin RE. 1997. Bacterial influence on the production of paralytic shellfish toxins by dinoflagellate algae. J. Appl. Microbol. 83:464–469.

Dasgupta, S.& Bhattacharyya, D. K. (2007). Dietary effect of Eicosapentaenoic (EPA) containing soyphspholipid. Journal of Oleo Science, 56, 563-568

Davidson, M. H.& Geohas, C. T. (2003). Efficacy of over the counter nutritional supplements. Current Atherosclerosis Reports, 5, 15-21

de Wardener, Hugh E., Feng J, He. & Graham A, MacGregor. 2004. Plasma sodium and hypertension. Kidney International. 66:2454-2466

Demark-Wahnefried, W., Price, D. T., Polascik, T. J., Robertson, C. N., Anderson, E. E., Paulson, D. F., Walther, P. J., Gannon, M. & Vollmer, R. T. (2001). Pilot study of dietary fat restriction and flaxseed supplementation in men with prostate cancer before surgeryExploring the effects on hormonal levels, prostate-specific antigen, and histopathologic features. Urology, 58, 42-52

Demark-Wahnefried, W., Price, D. T., Polascik, T. J., Robertson, C. N., Anderson, E. E., Paulson, D. F., Walther, P. J., Gannon, M. and Vollmer,

R. T. 2001. Pilot study of dietary fat restriction and flaxseed supplementation in men with prostate cancer before surgery: Exploring the effects on hormonal levels, prostate-specific antigen, and histopathologic features. Urology. 58(1):42-52.

Demark-Wahnefried, W., Price, D. T., Polascik, T. J., Robertson, C. N., Anderson, E. E., Paulson, D. F., Walther, P. J., Gannon, M. and Vollmer, R. T. 2001. Pilot study of dietary fat restriction and flaxseed supplementation in men with prostate cancer before surgery: Exploring the effects on hormonal levels, prostate-specific antigen, and histopathologic features. Urology. 58(1):42-52.

Devore, E. E., Grodstein, F., van Rooij, F. J., Hofman, A., Rosner, B., Stampfer, M. J., Witteman, J. C. M.& Breteler, M. M. (2009). Dietary intake of fish and omega-3 fatty acids in relation to long-term dementia risk. American Journal of Clinical Nutrition, 90, 170-176

Diwadkar-Navsariwaka, V. & Diamond, A. M. (2004). The link between selenium and chemoprevention a case for selenoproteins. Journal of Nutrition, 134, 2899-902

Doucette GJ. 1995. Interactions between bacteria and harmful algae: a review. Nat Toxins 3:65-74.

Douglas DJ, Bates SS, Bourgue LA, Selvin RC. 1993. Domoic acid production by axenic and nonaxenic cultures of the pinnate diatom Nitzschia pungens f. multyiseries. In: Smayda IJ, Shimizu Y editors. Toxic Phytoplankton Blooms in the Sea. Amsterdam: Elsevier p595-600.

Douglas DJ, Bates SS.1992. Production of domoic acid, a neurotoxic amino acid by an axenic culture of the marine diatom Nitzschia pungens f. multiseries. Hasle. Can J Fish Aqua Sci 49:85-90

Dupuis LL, Koren G, Shore A, Silverman ED, Laxer RM. Methotrexate-nonsteroidal antiinflammatory medicine interaction in children with arthritis. J Rheumatol. 1990;17:1469–1473.

Dyall, S. C. & Michael-Titus, A. T. (2008). Neurological benefits of omega-3 fatty acids. Neuromolecular Medicine, 10, 219-235.

E. Braunwald. 1997. Cardiovascular medicine at the turn of the millennium: triumphs, concerns and opportunities. N Engl J Med 337:1360–1369.

E.T. Poehlman, J. Scheffers, S.S. Gottlieb.1994. Increased metabolic rate in patients with congestive heart failure. Ann Intern Med 121:860–862.

Edebo L, Lange S, Li XP, Allenmark S, Lindgren K, Thompson R. 1988b. Seasonal, Geographic and individual variation of okadaic acid content in cultivated mussels in Sweden. Acta Pathol Microbiol Immunol Scand 96:1036-1042.

Eder, K. & Brandsch, C.(2002). The effects of fatty acid composition of rapeseed oil on plasma lipids and oxidative stability of low-density lipoproteins in cholesterol-fed hamsters. European Journal of Lipid Science & Technology, 104, 3-13

Eder, K. and Brandsch, C. 2002. The effects of fatty acid composition of rapeseed oil on plasma lipids and oxidative stability of low-density lipoproteins in cholesterol-fed hamsters. Eur. J Lipid Sci. Techn. 104(1):3

Edwards, R., Peet, M., Shay, J. &. Horrobin, D. (1998). Omega-3 polyunsaturated fatty acids in the diet and in the red blood cell membranes of depressed patients. Journal of Affective Disorders, 48,149-155

Edwards, R., Peet, M., Shay, J. and Horrobin, D. 1998. Omega-3 polyunsaturated fatty acids in the diet and in the red blood cell membranes od depressed patients. J. Affect Disord. 48:153-155.

Ek, K. Ström and I.A. Cotgreave. 1995. The uptake of ascorbic acid into human umbilical vein endothelial cells and its effect on oxidant insult, Biochem Pharmacol 50:1339–1346.

El-seweidy, M. M., El-swefy, S. E., Ameen, R. S. & Hashem, R. M. (2002). Effect of age receptor blocker and/or anti-inflammatory coadministration in relation to glycation, oxidative stress and cytokine production in stz (streptozotocin) diabetic rats. Pharmacological Research, 45, 391-398

El-seweidy, M. M., El-swefy, S. E., Ameen, R. S. and Hashem, R. M. 2002. Effect of age receptor blocker and/or anti-inflammatory coadministration in relation to glycation, oxidative stress and cytokine production in stz(streptozotocin)diabetic rats. Pharmac. Res. 45(5):395-398.

El-seweidy, M. M., El-swefy, S. H., Ameen, R. S. and Hashem, R. M. 2002. Effect of age receptor blocker and/or anti-inflammatory coadministration in relation to glycation, oxidative stress and cytokine production in diabetic rats. Pharmac Res. 45(5):391-398.

Emmanuel, C. O. and Hubbard, V. S. 1993. Essential fatty acids (EFA): Role in pancreatic hormone release and concomitant metabolic effect. J Nutrit Bioc. 4(9): 498.

Emmanuel, C. O.& Hubbard, V. S. (1993). Essential fatty acids (EFA) Role in pancreatic hormone release and concomitant metabolic effect. The Journal of Nutritional Biochemistry, 4, 498-509

Endres, S., Ghorbani, R., Kelley, V. E., Georgilis, K., Lonnemann, G., Van der Meer, J. W. M., Cannon, J. G., Rogers, T. S., Klempner, M. S., Weber, P. C.,Schaefer, E. J., Wolff, S. M. & Dinarello, C. A. (1989). The effect of dietary supplementation with (n-3) polyunsaturated fatty acids on the synthesis of interleukin-1 and tumour necrosis factor by mononuclear cells. New England Journal of Medicine, 320, 265-71

Endres, S., Ghorbani, R., Kelley, VE., Georgilis, K., Lonnemann, G. and Van der Meer, JWM. 1989. The effect of dietary supplementation with (n-3)polyunsaturated fatty acids on the synthesis of interleukin-1 and tumor necrosis factor by mononuclear cells. N. Engl. J. Med. 320:265-73.

Fendrick AM. Assessing the gastrointestinal complications of over-the-counter analgesics. Family Practice Recertification. 2005;27:9–15.

Fenton, W. S., Dickerson, F., Boronow, J., Hibbeln, J. R. & Knable, M. (2001). A placebo-controlled trial of omega-3 fatty acid (ethyl eicosapentaenoic acid) supplementation for residual symptoms and cognitive impairment in schizophrenia. American Journal of Psychiatry, 158, 2071-2074

Fernandez ML, Míguez A, Cacho E, Martínez A. 1996. Detection of okadaic acid esters in the hexane extracts of Spanish mussels. Toxicon 34(30): 381-387.

Fernandez ML. 2000. Regulations for marine microalgal toxins: towards harmonization of methods and limits. S Afr J Mar Sci 22: 339-346.

Field, A. E. , Willett, W. C., Lissner, L.& Colditz, G. A. (2007). Dietary fat and weight gain among women in the nurses health study. Obesity, 15, 967-976

Fleischhacker, W. W. ( 2003). New developments in the pharmacotherapy of schizophrenia. Journal of . Neural Transmission Supplement, 64, 105-17

Fleming LE, Bean JA, Katz D, Hammond R. 2001. The epidemiology of seafood poisoning In:. Hui YH, Kitts DD, editors. Seafood and Environmental Toxins. New York: Marcel Decker p287-310.

Fletcher GC, Hay BE, Scott MF. 1998. Detoxifying Pacific oysters (Crassostrea gigas) of the neurotoxic shellfish poisoning (NSP) produced by G. breve. J. Shellfish Res 17(5):1637–1641

Forman JP, Rimm EB, Curhan GC. Frequency of analgesic use and risk of hypertension among men. Arch Intern Med. 2007;167:394–399. doi: 10.1001/archinte.167.4.394.

Frangou, S., Lewis, M. & McCrone, P. (2006). Efficacy of ethyl-eicosapentaenoic acid in bipolar depression: randomized double-blind place-controlled study. British Journal of Psychiatry, 188,45-50

Frasure-Smith, N., Lesperance, F. & Julien, P. (2004). Major depression is associated with lower omega-3 fatty acid levels in patients with recent acute coronary syndromes. Biological Psychiatry, 55, 891-896

Freeman, M. P. (2000). Omega-3 Fatty Acids in Psychiatry. A Review. Annual Review of Clinical Psychology, 12, 159-165

Freeman, M. P. 2000. Omega-3 Fatty Acids in Psychiatry: A Review. Ann Clin Psy. 12(3): 159-160.

Freeman, M. P., Hibbeln, J. R., Wisner, K. L., Davis, J. M., Mischoulon, D., Peet, M., Keck, P. E. Jr., Marangell, L. B., Richardson, A. J., Lake, L.& Stoll, A. L. (2006). Omega 3 fatty acids: evidence basis for treatment and future research in psychiatry. Journal of Clinical Psychiatry, 67,1954-67

Friedman, A. & Moe, S. 2006. Review of the effects of omega-3 supplementation in dialysis patients. Clin J Am Soc Nephrol. 1:182-192

Furio FE, Kazumi M, Koichiro M, Baula I, Weng K, Ainah C, Puyong A, Srivilai D, Sidhasta BR Yasuwo F. 2006. Assemblage and geographical distribution of dinoflagellate cysts in surface sediments of coastal waters of Sabah, Malaysia. Coast Mar Sci 30(1):62-73

G.K. Hansson.2005. Inflammation, atherosclerosis, and coronary artery disease, N Engl J Med 352:1685–1695.

G.R. Buettner and B.A. Jurkiewicz 1996. Catalytic metals, ascorbate and free radicals: combinations to avoid, Radiat Res 145:532–541.

Gallacher S, Smith EA. 1999. Bacteria and paralytic shelfish toxins. Protist 150:245-255

Garcia Rodriguez LA, Jick H. Risk of upper gastrointestinal bleeding and perforation associated with individual non-steroidal anti-inflammatory medicines. Lancet. 1994;343:769–772. doi: 10.1016/S0140-6736(94)91843-0.

Gavia, M.H., Couto, R.C., Oyama, L.M., Couto, G.E.C., Silveira, V.L.F., Ribeiro, E. B.& Nascimento, C.M.O. (2003). Diets rich in polyunsaturated fatty acids effect on hepatic metabolism in rats. Nutrition, 19, 144-149

Gavia, M.H., Couto, R.C., Oyama, L.M.,Cauto, G.E.C., Silveira, V.L.F., Ribeiro,E.B.and Nascimento, C.M.O. 2003. Diets rich in polyunsaturated fatty acids effect on hepatic metabolism in rats. Nutrition. 19(2): 144.

Gavia, M.H., Couto, R.C., Oyama, L.M.,Cauto, G.E.C., Silveira, V.L.F., Ribeiro,E.B.and Nascimento, C.M.O. 2003. Nutrition. 19(2): 148-149.

Geelen, A., Schouten, J. M., Kamphuis, C., Stam, B. E., Burema, J., Renkema, J. M. S., Bakker, E., Veer, P.& Kampman, E. (2007). Fish consumption, n-3 fatty acids and colorectal cancer: a meta-analysis of prospective cohort studies. American Journal of Epidemiology, 116,1116-1125

Geppert, J., Kraft, V., Demmelmair, H.& Koletzko, B. (2006). Microalgal docosahexaenoic acid decreases plasma triacylglycerol in normolipidaemic vegetarians:a randomised trial.The British Journal of Nutrition, 95, 779-786.

Gessner BD, Middaugh JP,Doucette GJ. 1997. Paralytic Shellfish Poisoning in Kodiak, Alaska. West J. Med 166:351-353.

Gianotti, L, Nespoli, L., Sargenti, M.& Nespoli, A. (2003). Nutritional therapy in surgical patientsan update. Minerva Anestesiologica, 69, 275-280

Gibson, R. A., Neumann, M. A. & Makrides, M. (1997). Effect of increasing breast milk docosahexaenoic acid on plasma and erythrocyte phospholipids fatty acids and neural indices of exclusively breast fed infants. European Journal of Clinical Nutrition, 51, 578-584

Gil, A. (2002). Polyunsaturated fatty acids and inflammatory diseases. Biomed Pharmaceuticals, 56, 388-396

Gil, A. 2002. Polyunsaturated fatty acids and inflammatory diseases. Biomed Phar. 56(8): 388-396.

Gogos, A. C., Ginopoulos, P., Salsa, B., Apostolidou, E., Zoumbos, C. N.& Kalfarentzos, F. (1998). Dietary omega-3 polyunsaturated fatty acids plus vitamin E restore immunodeficiency and prolong survival for reversibly ill patients with generalized malignancy. Cancer, 82, 395-402

Gogos, A. C., Ginopoulos, P., Salsa, B., Apostolidou, E., Zoumbos, C. N. and Kalfarentzos, F. 1998. Dietary omega-3 polyunsaturated fatty acids plus vitamin E restore immunodeficiency and prolong survival dor reversily ill patients with generalized malignancy. Cancer. 82(2):395-402.

Göğüş, U. , Smith, C. 2010. n-3 Omega fatty acids:a review of current knowledge. International Journal of Food Science and Technology. 45:417-436

Goldberg, R. J., Katz, J. (2007). A meta-analysis of the analgesic effects of omega-3 polyunsaturated fatty acid supplementation for inflammatory joint pain. Pain, 129, 210-223

González JC, Fontal OI, Vieytes MR, Vieites JM, Botana LM. 2002. Basis for a new procedure to eliminate diarrheic shellfish toxins from a contaminated matrix. J. Agric. Food Chem. 50:400-405.

Gorjao, R., Azevedo-Martins, A. K., Rodrigues, H. G., Abdulkader, F., Arcisio-Miranda, M., Procopio, J.& Curi, R. (2009). Comparative effects of DHA and EPA on cell function. Pharmacological Therapy, 122, 56-64

Graham GG, Scott KF. Mechanism of action of paracetamol. Am J Ther. 2005;12:46–55. doi: 10.1097/00045391-200501000-00008.

Griffiths, M. A. (1998). Inflammatory bowel disease. Nutrition, 14, 788-791

Griffiths, M. A. 1998. Inflammatory bowel disease. Nutrition. 14(10):788-791.

Gutthann SP, Garcia Rodriguez LA, Raiford DS. Individual nonsteroidal antiinflammatory medicines and other risk factors for upper gastrointestinal bleeding and perforation. Epidemiology. 1997;8:18–24. doi: 10.1097/00001648-199701000-00003.

H. Esterbauer, M. Dieber-Rotheneder, G. Waeg, G. Striegl and G. Jürgens. 1990.Biochemical, structural, and functional properties of oxidized low-density lipoprotein, Chem Res Toxicol 3:77–92.

H. Sies, Oxidative stress: oxidant and antioxidant. Exp Physiol 82 (1997), pp. 291–295.

Hall, 1982. Toxins and toxicity of Protogonyaulax fom the northeast Pacific. Ph. D. Thesis, University of Alaska, p196.

Hallahan, B., Hibbeln, J. R., Davis, J. M. & Garland, M. R. (2007). Omega -3 fatty acid supplementation in patients with recurrent self-harm. British Journal of Psychiatry, 190,118-122

Hallegraeff GM, McCausland MA, Brown RK. 1995. Early warning of toxic dinoflagellate blooms of Gymnodinium catenatum in southern Tasmania. J. Plankton Res 17:1163-1176.

Halliwell B, Bowelteridge JMC. 2000. Free radical in biology and medicine. Oxford: Clarendon Press, Oxford University Press;160–5.

Hamazaki, K., Homura, M., Huan, M., Nishizawa, H., Sawazaki, S., Tanouchi, M., Watanabe, S., Hamazaki, T., Terasawa, K.& Yazawa, K. (2005). Effect of omega-3 fatty acid-containing phospholipids on blood catecholamine concentrations in healthy volunteers; a randomized, placebo controlled, double-blind trial. Nutrition, 21, 705-710

Hardman, W. E. (2004). (n-3) Fatty acids and Cancer Therapy. Journal of Nutrition, 134, 3427-3430

Harris, W. S., Park, Y.&.Isley, W. L. (2003). Cardiovascular disease and long-chain omega-3 fatty acids. Current Opinion in Lipidology, 14, 9-14

Hart RG, Tonarelli SB, Pearce LA. Avoiding central nervous system bleeding during antithrombotic therapy: recent data and ideas. Stroke. 2005;36:1588–1593. doi: 10.1161/01.STR.0000170642.39876.f2.

Hau, M. F., Smelt, A. H. M., Bindels, A. J. G. H., Sijbrands, E. J. F., Laarse, A. V. , Onkenhout, W. , Duyyenvoorde, W. & Princen H. M. G. (1996). Effects of fish oil on oxidation resistance of VLDL in hypertriglycerdidemic patients. Atherosclerosis, Thrombosis and Vascular Biology, 16, 1197-1202

Hawthorne, A. B., Daneshmend, T. K., Hawkey, C. J., Belluzzi, A., Everitt, S.J., Holmes, G. K. T., Malkinson, C., Shaheen, M.Z.& Willars, J.E. (1992). Treatment of ulcerative colitis with fish oil supplementation, a prospective 12 months randomized controlled trial. Bowel, 33, 922-928.

Hayashi, N., Tashiro, T., Yamamori, H., Takagi, K., Morishima, Y., Otsubo, Y., Sugiura, T., Furukawa, K., Nitta, H., Nakajima, N., Suzuki,

N, & Ito, I. (1999). Effect of intravenous w-6 and w-3 fat emulsion on nitrogen retention and protein kinetics in burned rats. Nutrition, 15, 135-139.

Heil CA, Glibert PM, Fan,CL. 2005. Prorocentrum minimum (Pavillard) Schiller –A review of a harmful algal bloom species of growing worldwide importance. Harm Alg 4:449-470

Heine, J., Scheinichen, D., Jaeger, K., Andre, M.& Leuwer, M. (1999). Invitro influence of parenteral lipid emulsions on the respiratory burst of neutrophils. Nutrition, 15, 540-545

Heininger, K. A. (2000). A unifying hypothesis of Alzheimers disease. III. Risk Factors. Human Psychopharmacology Clinical and Experimental, 15, 1-70

Helin-Salmivaara A, Huttunen T, Gronroos JM, Klaukka T, Huupponen R. Risk of serious upper gastrointestinal events with concurrent use of NSAIDs and SSRIs: a case-control study in the general population. Eur J Clin Pharmacol. 2007;63:403–408. doi: 10.1007/s00228-007-0263-y.

Heuberger, R. A., Mares-Perlman, J. A., Klein, R., Klein, B. E., Millen, A. E. & Palta, M. (2001). Relationship of dietary fat to age-related maculopathy in the Third National Health and Nutrition Examination Survey.. Archives of Ophthalmology, 119, 1833-8

Hibbeln, J. R. (2002). Seafood consumption, the DHA content of mothers milk and prevalence rates of postpartum depression, a cross-national, ecological analysis. Journal of Affective Disorders, 69, 15-29

Hibbeln, JR. (1998). Fish consumption and major depression. Lancet, 351, 1213

Hirsh J, Dalen J, Anderson DR, Poller L, Bussey H, Ansell J, Deykin D. Oral anticoagulants: mechanism of action, clinical effectiveness, and optimal therapeutic range. Chest. 2001;119:8S–21S. doi: 10.1378/chest.119.1_suppl.8S.

Hoffman, D. R., Birch, E. E., Birch, D. G. & Uauy, R. D. (1993). Effects of supplementation with omega 3 long-chain polyunsaturated fatty acids on retinal and cortical development in premature infants. American Journal of Clinical Nutrition, 57, 807-812

Hold GL, Smith EA, Rappé MS, Maas EW, Moore ERB, Stroempl C, Stephen JR, Prosser JI, Birkbeck TH, Gallacher S.2001a. Characterisation of bacterial communities associated with toxic and non-toxic dinoflagellates: Alexandrium spp. and Scrippsiella trochoidea. FEMS Microbiol Ecol 37:161–173

Hold GL, Smith EA, Rappé MS, Maas EW, Moore ERB, Stroempl C, Stephen JR, Prosser JI, Birbeck TH, Gallacher S. 2001b. Characterisation of bacterial communities associated with toxic and non-toxic dinoflagellates: Alexandrium spp. and Scrippsiella trochoidea. FEMS Microbiol. Ecol 37:161–173.

Holm, T., Andreassen, A. K., Aukrust, P., Andersen, K., Geiran, O. R., Kjekshus, J., Simonsen, S. & Gullestad, L. (2001). Omega-3 fatty acids improve blood pressure control and preserve renal function in hypertensive heart transplant recipients. European Heart Journal, 22, 428-436

Horrobin, D. F. (2001). Phospholipid metabolism and depression the possible roles of phospholipase A2 and coenzme A-independent transacylase. Human Psychopharmacology, 16, 45-52

Horrobin, D. F., Jenkins, K., Bennett, C. N. & Christie, W. W. (2002). Eicosapentaenoic acid and arachidonic acid:colloboration and not antagonism is the key to biological understanding. Prostaglandins, Leukotrienes and Essent Fatty Acids. 66, 83-90

Horstman DA, McGibbon S, Pitcher GC, Calder D,. Hutchings L, Williams P. 1991. Red tides in False Bay ;1959–1989 with particular reference to recent blooms of Gymnodinium spp. Trans R Soc S Afr 47:611–628.

Hungerford JM, Wekell MM. 1992. Analytical methods for marine toxins. In: Tu AT, editor. Handbook of Natural Toxins. New York: Marcel Dekker 7:441-450.

Ikemoto, A., Ohishi, M., Sato, Y., Hata, N., Misawa, Y., Fujii, Y. & Okuyama, H. (2001). Reversibility of n-3 fatty acid deficiency-induced alterations of learning behaviour in the rat: level of n-6 fatty acids as another critical factor. Journal of Lipid Research, 42, 1655-1663

Institute of Medicine of the National Academies. 2002/2005. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids.Pp. 422-541. The National Academies Press. Washington, D. C. J. Esterbauer, G. Jürgens, O. Queenberger and A. Koller. 1987. Autoxidation of human low density lipoprotein: loss of polyunsaturated fatty acids and vitamin e and generation of aldehydes. J Lipid Res 28: 495–509.

J.A. Berliner and J.W. Heinecke.1996. The role of oxidized lipoproteins in atherogenesis, Free Radica Biol Med :707–727.

J.T. Willerson and P.M. Ridker.2004. Inflammation as a cardiovascular risk factor, Circulation 109:II2–II10.

Jacobs, E. T., Jiang, R., Alberts, D. S., Greenberg, E. R., Gunter, E. W., Karagas, M. R., Lanza, E., Ratnasinghe, L., Reid, M. E., Schatzkin, A., Smith-Warner, S. A., Wallace, K. & Martinez, M. E. (2004). Selenium and colorectal adenomaresults of a pooled analysis. Journal of the National Cancer Institute, 96, 1669-75

Jeglitsch G, Rein K, Baden DG, Adams DJ. 1998. Brevetoxin 3 (PBTx-3) and its derivatives modulate single tetrodotoxin sensitive sodium cells in rat sensory neurons. J. Pharm. Exp. Therap 284(2):516–525.

Jensen, C. L. (2006). Effects of n-3 fatty acids during pregnancy and lactation. American Journal of Clinical Nutrition, 83, 1452-1457.

Jensen, C. L., Voigt, R. G., Prager, T. C., Zou, Y. L., Fraley, J. K., Rozelle, J. C. Turcich, M. R., Llorente, A. M., Anderson, R. E. & Heird, W. C. (2005). Effects of maternal docosahexaenoic acid intake on visual function and neurodevelopment in breastfed term infants. American Journal of Clinical Nutrition, 82, 125-132

Johnson AG, Nguyen TV, Day RO. Do nonsteroidal anti-inflammatory medicines affect blood pressure? A meta-analysis. Ann Intern Med. 1994;121:289–300.

Joy, C. B., Mumby-Croft, R. & Joy, L. A. (2006). Polyunsaturated fatty acid supplementation for schizophrenia. The Cochrane Database of Systematic Reviews, 3, C

Juhl AR. 2005. Growth rates and elemental composition of Alexandrium monilatum, a red-tide dinoflagellate. Harmful Algae 4(2):287-295.

Kaczmarska I, Ehrman JM, Gaudet J, Léger C, Bates SS. 2001. Distribution of epiphytic bacteria on cells of Pseudo-nitzschia multiseries in culture. J. Phycol 37 (Suppl 3):26-27.

Kaufman DW, Kelly JP, Rosenberg L, Anderson TE, Mitchell AA. Recent patterns of medication use in the ambulatory adult population of the United States: the Slone survey. JAMA. 2002;287:337–344. doi: 10.1001/jama.287.3.337.

Kerr DS, Briggs DM, Saba HI. 1999. A neurophysiological method of rapid detection and analysis of marine algal toxins. Toxicon 37:1803-1825.

Kim C, Beckles GL. Cardiovascular disease risk reduction in the Behavioral Risk Factor Surveillance System. Am J Prev Med. 2004;27:1–7. doi: 10.1016/j.amepre.2004.03.008.

Kim D, Matsuyama Y, Nagasoe S, Yamaguchi M, Yoon Y, Oshima Y, Imada N, Honjo T. 2004. Effects of temperature, salinity and irradiance on the growth of the harmful rd tide dinoflagellate Cochlodinium polykrikoides Margalef(Dinophyceae). J Plankton Res 26(1):61-66

Kodama M, Ogata T, Sakamota S, Sato S, Honda T, Miwatani T.1990. Production of paralytic shellfish toxins by a bacterium Moraxella sp. isolated from Protogonyaulax tamarensis. Toxicon 28:707:14.

Kodama M, Ogata T, Sato S. 1988. Bacterial production of saxitoxin. Agriculture and Biological Chemistry. 52:1075-1077.

Köller, M., Senkal, M., Kemen, M., König, W., Zumtobel, V. & Muhr, G. (2003). Impact of omega 3 fatty acid enriched TPN on leukotriene synthesis by leukocytes after major surgery. Clinic Nutrition, 22, 59-64

Kovacic, V., Sain, M. & Vukman, V. (2003). Renal dyslipidemia in patients on chronic hemodialysis. Lijecnicki Vjesnik, 125, 77-80

Kramer, H. J., Stevens, J., Grimminger, F.& Seeger, W. (1996). Fish oil fatty acids and human platelets. Dose-dependent decrease in dienoic and increase in trienoic thromboxane generation. Biochemical Pharmacology, 52, 1211-1217

Kris-Etherton, P. M.& Innis, S. (2007). Position of the American Dietetic Association and Dietitians of Canada:dietary fatty acids. Journal of American Dietetic Association, 107, 1599-1611

Kröger, E., Verreault, R., Carmichael, P. H., Lindsay, J., Julien, P., Dewailly, E., Ayotte, P.& Laurin, D. (2009). Omega -3 fatty acids and risk of dementiathe Canadian study of Health and Aging. American Journal of Clinical Nutrition, 90,184-192

Kromann N, & Green A. (1980) Epidemiologic studies in the Upernavik district, Greenlandincidence of some chronic diseases 1950-1974. Acta Medica Scandinavica, 208, 401-406.

Kuhnlein, H. V., Yeboah, F., Sedgemore, M., Sedgemore, S. & Chan, H. M. (1996). Nutritional qualities of Ooligan GreaseA Traditional Food Fat of British Columbia First Nations. Journal of Food Composition and Analysis, 9, 18-31

Kusunoki, M., Tsutsumi, K., Hara, T. Ogawa, H., Nakamura, T., Miyata, T., Sakakibara, F., Fukuzawa, Y., Suga, T., Kato, K., Hirooka, Y. & Nakaya, Y. (2003). Ethyl icosapentate (omega-3 fatty acid) causes accumulation of lipids in skeletal muscle but suppresses insulin resistance in OLETF rats. Otsuka Long-Evans Tokushima Fatty. Metabolism. 52, 30-34

L.S. Greene. 1999. Asthma, oxidant stress and diet. Nutrition 15:899–907.

Lands, W. E. (1992). Biochemistry and physiology of n-3 fatty acids. FASEB, 6, 2530-2536

Landsberg HJ, Hall S, Johannessen JN, White KD, Conrad SM, Abbott JP, Flewelling LJ, Richardson RW, Dickey RW, Jester EL, Etheridge

SM, Deeds JR, Van.Dolah FM, Leighfield TA, Zou Y, Beaudry CG, Benner RA, Rogers PL, Scott PS, Kawabata K, Wolny JL, Steidinger KA. 2006. Saxitoxin Puffer Fish Poisoning in the United States, with the first report of Pyrodinium bahamense as the putative toxin source. Environ Health Perspect 114(10):1502-1507.

Laure, B.& Marc, B. (2006). n-3 polyunsaturated fatty acids decrease anxiety feelings in a population of substance abusers. Journal of Clinical Psychopharmacology, 26, 661-665

Lauritzen, L., Jorgensen, M. H., Mikkelsen, T. B., Skovgaard, M., Straarup, E. M., Hoy, C. E.& Michaelsen, K. F. (2004). Maternal fish oil supplementation in lactation:effect on visual acuity and n-3 fatty acid content of infant erythrocytes. Lipids, 39,195-206

Leaf, A., Xiao, F. Y., Kang, X. J.& Billman, G. E. (2003). Prevention of sudden cardiac death by n-3 polyunsaturated fatty acids. Pharmacological Therapy, 98, 355-377

Lebeau, T. Robert, & J. M. (2003). Diatom Cultivation and biotechnologically relevant products. Part II current and putative products. Applied Microbiology and Biotechnology, 60, 624-32

Lecerf, J. M. (2009). Fatty acids and cardiovascular disease. Nutrition Reviews, 67, 273-283

Lee, KW. & Lip, GY. H. (2003). The role of omega-3 fatty acids in the secondary prevention of cardiovascular disease. Quarterly Journal of Medicine, 96, 465-480

Levy, R. & Herzberg, G. R. (1996). Effects of a meal of fish oil or corn oil on bile flow and composition in rats previously adapted to diets containing fish oil or corn oil. Nutrition Research, 16, 805-816.

Lewis J, Kennaway G, Franca S, Alverca E. 2001.Bacterium-dinoflagellate interactions: investigative microscopy of Alexandrium spp. (Gonyaulacales, Dinophyceae). Phycologia 40:280–385.

Li, D. (2003). Omega-3 fatty acids and non-communicable diseases. Chinese Medical Journal, 116, 453-8

Lichtenstein, A. H., Appel, L. J., Brands, M., Carnethon, M., Daniels, S., Franklin, B., Kris-Etherton, P., Harris, W. S., Howard, B., Karanja, N., Lefevre, M., Rudel, L., Sacks, F., Van Horn, L., Winston, M.& Wylie-Rosett, J. (2006). Diet and life style recommendations revision 2006: A scientific statement from the American Heart Association Nutrition Committee. Circulation, 114, 82-96

Linseisen, J., Hoffmann, J., Lienhard, S., Jauch, K. W.& Wolfram, G. (2000). Antioxidant status of surgical patients receiving TPN with an n-3 fatty acid containing lipid emulsion supplemented with (-tocopherol. Clinical Nutrition, 19, 177-184

Liu, G., Bibus, D. M., Bode, A. M., Ma, W., Holman, R. T.& Dong, Z. (2001). Omega 3 but not omega 6 fatty acids inhibit AP-1 activity and cell transformation in JB6 cells. Proceedings of the National Academy of Sciences, 98, 7510-7515

Liu, M., Wallin, R. & Saldeen, T. (2001). Effect of bread containing stable fish oil on plasma phospholipid fatty acids, triglycerides, HDL-cholesterol, and malondialdehyde in subjects with hyperlipidemia. Nutrition Research, 21, 1403-1410

Lox, C. D. (1990). The effects of dietary marine fish oils (omega-3 fatty acids) on coagulation profiles in men. Genetic Pharmacology, 21, 241-246

Lu, G., Windsor, S. L. & Harris, W. S. (1999). Omega-3 fatty acids after lipoprotein subfraction distributions and the in vitro conversion f very low density lipoproteins to low density lipoproteins. The Journal of Nutritional Biochemistry, 10, 151-158

M. Aikawa, E. Rabkin, Y. Okada, S.J. Voglic, S.K. Clinton and C.E. Brinckerhoff. 1998. Lipid lowering by diet reduces matrix metalloproteinase activity and increases collagen content of rabbit atheroma: a potential mechanism of lesion stabilization, Circulation 97:2433–2444.

M. Podda, M.G. Traber, C. Weber, L.J. Yan and L. Pakcer. 1998. UV-irradiation depletes antioxidants and causes damage in a model of human skin. Free Rad Biol Med 92:5258–5265.

M. Rice-Evans and N.J. Miller. 1994.Total antioxidant status in plasma and body fluid. Method Enzymol 234:279–293.

M. Riley, J.S. Elborn, W.R. McKane. 1991.Resting energy expenditure in chronic cardiac failure. Clin Sci 80:633–639.

M.R. Cowie, A. Mosterd and D.A. Wood. 1997. The epidemiology of heart failure. Eur Heart J 18;208–225.

MacDonald TM, Wei L. Effect of ibuprofen on cardioprotective effect of aspirin. Lancet. 2003;361:573–574. doi: 10.1016/S0140-6736(03)12509-3.

MacLean, C. H., Newberry, S. J., Mojica, W. A., Khanna, P., Issa, A. M., Suttorp, M. J., Lim, Y., Traina, S. B., Hilton, L., Garland, R.& Morton, S. C. (2006). Effects of omega-3 fatty acids on cancer risk. The Journal of American Medical Association, 295, 403-415

Maes, M., Stevens, WJ., Declerek, LS., Bridts, C. H., Peeters, D., Schotte, C.& Cosyns, P. (1993). Significantly increased expression of T-cell activation markers (interleukin-2 and HLA-DR) in depression:further evidence for an inflammatory process during that illness. Progress in Neuro-Psychopharmacology and Biological Psychiatry, 17, 241-255

Maes, M., Verkerk, R., Vandoolaeghe, E., Vanhunsel, F., Neels, H., Wauters. A., Demedts, P. & Scharpe, S. (1997). Serotonin-immune interactions in major depression:lower serum tryptophan as a marker of an immune-inflammatory response. European Archives of Psychiatry and Clinical Neuroscience, 247, 154-161

Mannisto, S., Smith-Warner, S. A., Spiegelman, D. A., Albanes, D., Anderson, K., Brandt, P. A., Cerhan, J. R., Colditz, G., Feskanich, D., Freudenheim, J. L., Giovannucci, E., Goldbohm, R. A., Graham, S., Miller, A. B., Rohan, T. E., Virtamo, J., Willett, W. J. & Hunter, D. J. (2004). Dietary Carotenoids and Risk of Lung Cancer in a Pooled Analysis of Seven Cohort Studies. Cancer Epidemiology Biomarkers & Prevention, 13, 40-48

Marasovic I, Nincevic Z, Pavela-Vrancid M, Orhanovic S. 1998.A survey of shellfish toxicity in the central Adriatic Sea. J. Mar. Biol. Ass U. K. 78:745-754.

Mattei C, Mologo J, Legrand AM, Benoit E. 1999.Ciguatoxines et brevetoxines: dissection de leurs actions neurobiologiques. J Soc Biol 193 (1):329–344

Meler J, White J. 1995. Handbook of clinical toxicology of animal venoms and poisons. Florida:CRC Press p75-83

Mente, A., Koning,L., Shannon, H. S. & Anand S. S. (2009). A systematic review of the evidence supporting a causal link between dietary factors and coronary heat disease. Archives of Internal Medicine, 169, 659-669

Moorhead, S. M., Dykes, G. A. 2002. Survival of Campylobacter jejuni on beef trimmings during freezing and frozen storage. Lett Appl Microbiol. 34(1):72-6

Morley, R. (1998). Nutrition and cognitive development. Nutrition. 14, 752-754

Morse EV. 1977. Paralytic Shellfish Poisoning. J Am Vet Med Assoc 171(11):1178-80.

Moss L. 2001. Domoic acid: a fascinating marine toxin. Environ Toxicol Pharmacol 9:79-85.

Moyad, M. A. (2003). The use of complementary / preventive medicine to prevent prostate cancer recurrence / progression following definitive therapy part I-lifestyle changes. Current Opinion in Urology, 13, 137-45

MRC/BHF, Heart Protection Study of antioxidant vitamin supplementation in 20,536 high-risk individuals: a randomised placebo-controlled trial, Lancet 360 (2002), pp. 23–33.

N. Maeda, H. Hagihara, Y. Nakata, S. Hiller, J. Wilder and R. Reddick. 2000. Aortic wall damage in mice unable to synthesize ascorbic acid, Proc Natl Acad Sci USA 97:841–846.

Naar J, Bourdelais A, Tomas C, Kubanek J, Whitney PL, Flewelling L, Steidinger K, Lancaster J, Baden DG. 2002. A competitive ELISA to detect brevetoxins from Karenia brevis (formerly Gymnodinium breve) in seawater, shellfish, and mammalian body fluid. Environ Health Perspect 110(2):179–185.

Nagasoe S, Kim D, Shimasaki Y, Oshima Y, Yamaguchi M, Honjo T. 2006. Effects of temperature, salinity and irradiance on the growth of the red tide dinoflagellate Gyrodinium insriatum Freudenthal et Lee. Harmful Algae 5(1): 20-25.

Nageswari, K., Banerjee, R. & Menon, V. P. (1999). Effect of saturated, w-3 and w-6 polyunsaturated fatty acids on myocardial infarction. Journal of Nutritional Biochemistry, 10, 338-344

Nardini, M., DAquino, M. D., Gentili, V., DiFelice, M.& Scaccini, C. (1995). Dietary fish oil enhances plasma and LDL oxidative modification in rats. Journal of Nutritional Biochemistry, 6, 474-480.

Nemets, H., Nemets, B., Apter, A., Bracha, Z. & Belmaker, R. H. (2006). Omega-3 treatment of childhood depression: a controlled, double blind pilot study. American Journal of Psychiatry, 163,1098-1100

Nitenberg, G. & Raynard, B. (2000). Nutritional support of the cancer patientissues and dilemmas. Critical Reviews in Oncology/Hematology, 34, 137-168

Nkondjock, A., Shatenstein, B., Maisonneuve, P. & Ghadirian, P. (2003). Specific fatty acids and human colorectal cancer: an overview. Cancer Detection and Prevention, 27, 55-66

NODC(National Oceonographic Data Center). World Ocean Atlas and World Ocean database. World Ocean Atlas 1998 Figures(WOA98F). Interactive Image Access.

NODC(National Oceonographic Data Center). World Ocean Atlas and World Ocean database. World Ocean Atlas 2005(WOA05). WOA05 figures/temperature.

Novak SM.1998.Foodborne Illness-Chemical Fish and Shellfish Poisoning. Clin Microbiol Newsl 20(3):17-19

Novelli A, Kispert J, Fernandez-Sanchez T, Torreblanca A, Zitko V. 1992. Domoic acid-containing toxic mussels produce neurotoxicity in neuronal cultures through a synergism between excitatory amino acids. Brain Research 577: 41-48

O'Keefe, J. H. Jr., Harris, W. S. (2000). From Inuit to implementation: Omega-3 fatty acids come of age. Mayo Clinic Proceedings, 75, 607-614

O'Keefe, S. F., Proudfoot, F. G.& Ackman, R. G. (1995). Lipid oxidation in meats of omega-3 fatty acid-enriched broiler chickens. Food Research International, 28, 417-424

Ohtake A, Shirai M, Aida T, Mori N, Harada, KI, Matsuura K, Suzuki M, Nakano M. 1989. Toxicity of Microcystis species isolated from natural blooms and purification of the toxin. Appl Environ Microbiol 55:3202-3207.

Onwude, J. L., Lilford, R. J., Hjartardottir, H., Staines, A., Tuffnell, D. (1995). A randomized double blind placebo controlled trial of fish oil in high risk pregnancy. British Journal of Obstetrics & Gynaecology, 102, 95-100

Ouchi, M., Ikeda, T., Nakamura, K., Harino, S.& Kinoshita, S. (2002). A novel relation of fatty acid with age-related macular degeneration. Ophthalmology, 216:363-7

P. Greenland, M.D. Knoll and J. Stamler. 2003. Major risk factors as antecedents of fatal and nonfatal coronary heart disease events, JAMA 290:891–897.

P. Libby and M. Aikawa. 2002.Vitamin C, collagen, and cracks in the plaque, Circulation 105:1396–1398.

P.M. Kris-Etherton, A.H. Lichtenstein, B.V. Howard, D. Steinberg and J.L. Witztum. 2004. Antioxidant vitamin supplements and cardiovascular disease, Circulation 110: 637–641.

P.M. Ridker, N. Rifai, L. Rose, J.E. Buring and N.R. 2002. Cook, Comparison of C-reactive protein and low-density lipoprotein cholesterol levels in the prediction of first cardiovascular events, N Engl J 1557–1565.

Park, S. F. 2002. The physiology of Campylobacter species and its relevance to their role as foodborne pathogens. Int J Food Microbiol. 74(3):177-88

Peet, M., Laugharne, J. D. E., Ahluwalia, N.& Mellor, J. (1997). Fatty acid supplementation in schizophrenic patients. Schizophrenia Research, 24, 209

Peet, M., Murphy, B., Shay, J.& Horrobin, D. (1998). Depletion of omega-3 fatty acid levels in red blood cell membranes of depressive patients. Biological Psychiatry, 43, 315-319

Pereira, S. L., Leonard, A. E., Huang, Y-S., Chuang, L-T.& Mukerji, P. (2004). Identification of two novel microalgal enzymes involved in the conversion of the omega 3-fatty acid, eicosapentaenoic acid, to docosahexaenoic acid. The Biochemical Journal, 384, 357366

Pickett, C. L., Whitehouse, C. A. 1998. The cytolethal distending toxin family. Trends Microbiol. 7(7):292-7

Pierce RH, Henry MS, Higham CJ, Blum P, Sengco MR, Anderson DM. 2004. Removal of harmful algal cells (Karenia brevis) and toxins from seawater culture by clay flocculation. Harmful Algae 3(2):141-148

Piper JM, Ray WA, Daugherty JR, Griffin MR. Corticosteroid use and peptic ulcer disease: role of nonsteroidal anti-inflammatory medicines. Ann Intern Med. 1991;114:735–740.

Poisson, J. P. (1990). Omega-3 polyenoic acidssources, intake. Bibliotheca Nutritio et Dieta, 46, 70-86

Poli M, Mende TJ, Baden DG. 1986. Brevetoxins, unique activators of voltage-sensitve sodium channels bind to specific sites in rat brain synaptosomes. Mol Pharmacol 30: 129-135.

Poli MA, Musser SM, Dickey RW, Eilers PP, Hall S. 2000. Neurotoxic shellfish poisoning and brevetoxin metabolites: a case study from Florida. Toxicon 38(7): 981–993.

Ponnampalam, E. N., Trout, G. R., Sinclair, A. J., Egan, A. R. & Leury, B. J. (2001). Comparison of the color stability and lipid oxidative stability of fresh and vacuum packaged lamb muscle containing elevated omega-3 and omega-6 fatty acid levels from dietary manipulation. Meat Science, 58, 151-161

Pope JE, Anderson JJ, Felson DT. A meta-analysis of the effects of nonsteroidal anti-inflammatory medicines on blood pressure. Arch Intern Med. 1993;153:477–484. doi: 10.1001/archinte.153.4.477.

Prasad, K. (1997). Dietary flax seed in prevention of hypercholesterolemic atherosclerosis. Atherosclerosis, 132, 69-76

Preiss, D. & Sattar, N. (2009). Lipids, lipid modifying agents and cardiovascular risk: a review of the evidence. Clinical Endocrinology, 70, 815-828

Przeslawski R, Benokendorff K. 2005. The role of Surface fouling in the development of encapsulated gastropod embryos. J Molluscan Stud 71(1):75-83

Puiggros, C., Chacon, P., Armadans, J. I., Clapes, J. & Planas, M. (2002). Effects of oleic-rich and omega-3 rich diets on serum lipid pattern and lipid oxidation in mildly hypercholesterolemic patients. Clinical Nutrition, 21, 79-87

Purkerson SL, Baden DG, Fieber LA. 1999. Brevetoxin modulates neuronal sodium channels in two cell lines derived from rat brain. NeuroToxicol 20(6): 909–920.

R. Kohen. 1999.Skin antioxidants: their role in aging and in oxidative stress—new approaches for their evaluation. Biomed Pharmaceother 53:181–192.

Rader, D. J. (2003). Effects of nonstatin lipid medicine therapy on high-density lipoprotein metabolism. The American Journal of Cardiology, Suppl 1, 91, 18-23

Raes, K., Smet, S, De. & Demeyer, D. (2003). Effect of dietary fatty acids as incorporation of long chain polyunsaturated fatty acids and conjugated linolenic acid in lamb, beef and pork meat a review. Animal Feed Science & Technology, 113, 199-221

Raitt, M. H., Connor, W. E., Morris, C., Kron, J., Halperin, B., Chugh, S. S., McClelland, J., Cook, J., MacMurdy, K., Swenson, R., Connor, S. L., Gerhard, G., Kraemer, D. F., Oseran, D., Marchant, C., Calhoun, D., Shnider, R. & McAnulty, J.(2005). Fish oil supplementation and risk of ventricular tachycardia and ventricular fibrillation in patients with implantable defibrillators. The Journal of American Medical Association, 293, 2884-2891

Rennie, K. L., Hughes, J., Lang, R. & Jebb, S. A. (2003). Nutritional management of rheumatoid arthritisa review of the evidence. Journal of Human Nutrition and Dietetics, 16, 97-109

Retterstol, K., Stugaard, M., Gorbitz, C.& Ose, L. (1996). Results of intensive long-term treatment of familial hypercholesterolemia. The American Journal of Cardiology, 78, 1369-1374

Reynolds, K., Lewis, L. B., Nolen, D. L. J., Kinney, G. L., Sathya, B. & He, J. (2003). Alcohol consumption and risk of stroke. Journal of the American Medical Association, 289, 579-588

Roderick, G. E. 1997. Ozone assisted depuration of red tide contaminated shellfish(abstract). J Shellfish Res 16(1):322

Rodriguez-Rodriguez FA, Maldonado C. 1996. Brevetoxin-3 (Pb Tx-3) on mouse liver slices : a histological study . PR Health Sci J 15 : 261–267.

Rokka, T., Allen, K., Valaja, J., & Ryhanen, E.-L. (2002). The effect of a Camelina sativa enriched diet on the composition and sensory quality of hen eggs. Food Research International, 35, 253-256

Rose, D. P. & Connolly, J. M. (1999). Omega-3 fatty acids as cancer chemopreventive agents. Pharmacology % Therapeutics, 83, 3, 217-244

Rump, P., Mensink, R. P. & Kester Dm. Hornstra, G. (2001). Essential fatty acid composition of plasma phospholipids and birth weight:a study in term neonates. American Journal of Clinical Nutrition, 73, 797-806

Runneger MTC, Falconer IR, Jackson ARB, McInnes A. 1983. Toxin production by Microcystis aeruginosa cultures. Toxicon 3:377-380.

Russo, G. L. (2009). Dietary n-6 and n-3 polyunsaturated fatty acids: from biochemistry to clinical implications in cardiovascular prevention. Biochemical Pharmacology, 77,937-46

Ruxton, C. H. S., Reed, S. C., Simpson, M. J. A.& Millington, K. J. (2007). The health benefits of omega-3 polyunsaturated fatty acids: a review of the evidence. Journal of Human Nutrition and Dietetics, 20, 275-285

S.C. Smith Jr., R.V. Milani and D.K. Arnett.2004. Atherosclerotic vascular disease conference: writing group II: risk factors, Circulation 109:2613–2616.

S.J. Duffy, N. Gokce, M. Holbrook, A. Huang, B. Frei and J.F. Keaney Jr.1999.Treatment of hypertension with ascorbic acid, Lancet 354:2048–2049.

S.J. Duffy, N. Gokce, M. Holbrook, L.M. Hunter, E.S. Biegelsen and A.O. Huang. 2001. Effect of ascorbic acid treatment on conduit vessel endothelial dysfunction in patients with hypertension, Am J Physiol Heart Circ Physiol 280:H528–H534.

Santoli, D., Phillips, P. D., Colt, T. L.,& Zurier, R. B. (1990). Suppression of interleukin-2 dependent human T cell growth in vitro byprostaglandin E (PGE) and their precursor fatty acids. Evidence for a PGE-independent mechanism of inhibition by the fatty acids. The Journal of Ciinical Investigation, 85, 424-432

Sarris, G. E., Mitchell, R. S., Billingham, M. E., Glasson, J. R., Cahill, P. D.& Miller, D. C. (1989). Inhibition of accelerated cardiac allograft arteriosclerosis by fish oil. The Journal of Thoracic and Cardiovascular Surgery, 97, 841-854

Sarris, J. (2009). Major depressive disorder and nutritional medicine:a review of monotherapies and adjuvant treatments. Nutrition Reviews, 67,125-131

Sauci., Fahman & Kraut. (1994). Food Composition and Nutrition Tables, 5th. Ed. 1994.

Schacky, C., Angerer, P., Kothny, W., Theisen, K. &. Mudra, H. (1999). The effect of dietary omega-3 fatty acids on coronary atherosclerosis. A randomized, double-blind, placebo-controlled trial. Annals of Internal Medicine, 130, 554-562

Schacky, C., Angerer, P., Kothny, W., Theisen, K. And Mudra, H. 1999. The effect of dieatry omega-3 fatty acdis on coronary atherosclerosis. A randomized, double-blind, placebo-controlled trial. Ann. Int. Med. 130(7):561-562.

Scheiman JM, Fendrick AM. Summing the risk of NSAID therapy. Lancet. 2007;369:1580–1581. doi: 10.1016/S0140-6736(07)60722-3.

Schoene, N. W. (2001). Beyond deficiency: new roles for vitamins. Vitamin E and w-3 fatty acidseffectors of platelet responsiveness. Nutrition. 17, 793-796

Schoene, N. W. 2001. Beyond deficiency:new roles for vitamins. Vitamin E and w-3 fatty acids:effectors of platelet responsiveness. Nutrition. 17(10):793-796.

Scorolli, l., Scalinci, S. Z., Limoli, P. G., Morara, M., Vismara, S., Scorolli, L., Corazza, D.& Meduri, R. (2002). Photodynamictherapy for age related macular degeneration with and without antioxidants. Canadian Journal of Ophthalmology, 37, 399-404

Seddon, j. M., Rosner, B., Sperduto, R. D., Yannuzzi, L., Haller, J. A., Blair, N. P. & Willett, W. (2001). Dietary fat and risk for advanced age-related macular degeneration. Archives of Ophthalmology, 119,1191-1199

Shapiro RL, Altekruse S, Hutwagner L, Bishop R, Hammond R, Wilson S, Ray B, Thompson S, Tauxe RV, Griffin PM. 1998. The role of Gulf Coast oysters harvested in warmer months in Vibrio vulnificus infections in the United States, 1988-1996. J Infect Dis 178(3):752-759

Shimojo RY, Iwaoka WT. 2000. A rapid hemolysis assay for the detection of sodium channel-specific marine toxins. Toxicology 154:1-7.

Shoda, R., Matsueda, K., Yamato, S. and Umeda, N. 1996. Epidemiologic analysis of Chron disease in Japan: increased dietary intake of n-6 polyunsaturated fatty acids and animal protein relates to the increased incidence of chron disease in Japan. Am. J. Clin. Nutr. 63(5):741-745.

Shoda, R., Matsueda, K., Yamato, S.& Umeda, N. (1996). Epidemiologic analysis of Crohn's disease in Japanincreased dietary intake of n-6 polyunsaturated fatty acids and animal protein relates to the increased incidence of Crohn's disease in Japan. American Journal of Clinical Nutrition, 63, 741-745

Shorr RI, Ray WA, Daugherty JR, Griffin MR. Concurrent use of nonsteroidal anti-inflammatory medicines and oral anticoagulants places elderly persons at high risk for hemorrhagic peptic ulcer disease. Arch Intern Med. 1993;153:1665–1670. doi: 10.1001/archinte.153.14.1665.

Silva ES, Sousa I. 1981. Experimental work on the dinoflagellate toxin production. Arq Inst Nac Saude 6:381-387.

Simon CA, Kaiser H, Booth AJ, Britz PJ.2002. The effect of diet and live host presence on the growth and reproduction of Terebrasabella heterouncinata (Polychaeta: Sabellidae). Invertebr Reprod Dev 41(1–3): 277–286.

Simon N, Biegala I, Smith EA, Vaulot D. 2002. Kinetics of attachment of hycotoxin-producing bacterial strains to Alexandrium tamarensis (Dinophyceae) Aquat Microb Ecol 28:249-256

Simopoulos, A. P. (2002a). Omega-3 fatty acids in inflammation and autoimmune diseases. Journal of the American College of Nutrition, 21, 495-505

Simopoulos, A. P. (2002b). The importance of the ratio of omega 6/omega 3 essential fatty acids. Biomedicine & Pharmacotherapy, 56, 365-379

Simopoulos, A. P. (2008). The importance of the omega-6/omega-3 fatty acid ratio in cardiovascular disease and other chronic diseases. Experimental Biology and Medicine, 233, 674-688

Simopoulos, A. P. 2002. The importance of the ratio of omega 6/omega 3 essential fatty acids. Biomed Phar. 56(8): 365-379.

Simopoulos, A. P., Kifer, R. R., Martin, R. E. & Barlow, S. M. (1991). Health effects of w-3 polyunsaturated fatty acids in seafoods. World Review of Nutrition and Dietetics, 66, 488-503

Simopoulos, A.P., Kifer, RR. Martin, RE. and Barlow, SM. 1991. Health effects of w-3 polyunsaturated fatty acids in seafoods. World Rev Nutr Diet. 66:488-503.

Singer LJ, Lee T, Rosen KA, Baden DG, Abraham WM. 1998. Inhaled Florida red tide toxins induce bronchoconstriction (BC) and airway hyperresponsiveness (AHR) in sheep. Am J Respir Crit Care Med 157(3):A158.

Sirois, I., Cheung, A. M. Ward, & W. E. (2003). Biochemical bone strength and bone mass in young male and female rats fed a fish oil diet. Prostaglandines, Leukotrienes and Essential Fatty Acids. 68, 415-421

Slim, R., Hammock, D. B., Toborek, M., Robertson, W. L., Newman, W. J., Morisseau, H. P. C., Watkins, A. B., Saraswathi, V.& Hennig, B. (2001). The role of Methyl-linoleic acid epoxide and diol metabolites in the amplified toxicity of linoleic acid and polychlorinated biphenyls to vascular endothelial cells. Toxicology and Applied Pharmacology, 171, 184-193

Smith DC, Steward GF, Long RA, Azam F. 1995. Bacterial mediation of carbon fluxes during a diatom bloom in a mesocosm. Deep Sea Res 42:75–97.

Smith EJ, Celia S, Peters V, Beach KL, Miller S. 2004. Nutrient and growth dynamics of Halimeda tuna on Conch reef, Florida keys: Possible influence of internal tides on nutrient status and physiology. Limnol Oceanogr 49(6): 1923-1936

Song, C., Lin, A., Bonaccorso, S., Heide, C., Verkerk, R., Kenis, G., Bosmans, E., Scharpe, S., Whelan, A., Cosyns, P., de Jongh, R. & Maes, M. (1998). The inflammatory response system and the availability of plasma tryptophan in patients with primary sleep disorders and major depression. Journal of Affective Disorders, 49, 211-219

Steidinger, KA, Baden DG. 1984. Toxic marine dinoflagellates. In: Spector DL, editor. Dinoflagellates. New York: Academy Press. p201–261.

Stenson, W. F., Cort, D., Rodgers, J. Burakoff, R., Deschryver-Kecskemeti, K., Gramlich, T.L.& Beeken, W. (1992). Dietary supplementation with fish oil in ulcerative colitis. Annals of Internal Medicine, 116, 609-614

Su, K. P., Huang, S. Y., Chiu, C. C. & Shen, W. W.(2003). Omega-3 fatty acids in major depressive disorder. A preliminary double-blind placebo-controlled trial. European Neuropsychopharmacology, 13, 267-271

Suzuki, H., Park, S. J., Tamura, M.& Ando, S. (1998). Effect of the long-term feeding of dietary lipids on the learning ability, fatty acid composition of brain-stem phospholipids and synaptic membrane fluidity in adult micea comparison of sardine oil diet with palm oil diet. Mechanism of Ageing and Development, 101, 119-128

Suzuki, S., Akechi, T., Kobayashi, M., Taniguchi, M., Goto, K., Sasaki, S., Tsugane, S., Nishiwaki, Y., Miyaoka, H. & Uchitomi, Y. (2004). Daily omega-3 fatty acid intake and depression in Japanese patients with newly diagnosed lung cancer. British Journal of Cancer, 90, 787-793

Sweeney, C., Freeman, J., Gee, D. L., Maruyama, C., Waki, M., Tsushima, M.& Hanaoka, M. (1999). Changes in coronary heart disease risk among Japanese exchange students. Journal of American Dietetic Association. Supp:1, 99, A77

T. Heitzer, T. Schlinzig, K. Krohn, T. Meinertz and T. Münzel. 2001.Endothelial dysfunction, oxidative stress, and risk of cardiovascular events in patients with coronary artery disease, Circulation 104:2673–2678.

Tapiero, H., Nguyen Ba, G., Couvreur, P. & Tew, K. D. (2002). Polyunsaturated fatty acids (PUFA) and eicosanoids in human health and pathologies. Biomedical Pharmacotherapy, 56, 215-222

Teitelbaum JS, Zatorre RJ, Carpenter S, Gendron D, Evans AC, Gjedde A, Cashman NR. 1990. Neurologic sequelae of domoic acid intoxication due to the ingestion of contaminated mussels. New Engl J Med 322:1781-87.

Temple WA.1995. Overview of the 1993 New Zealand marine biotoxin crisis. J Nat Toxins 4:181–184.

Temple, J. N. (1996). Dietary fats and coronary heart disease. Biomedicine & Pharmacotherapy, 50, 261-268.

Temple, J. N. (2002). Nutrition and disease: challenges of research design. Nutrition, 18, 343-345

Templeton CB, Poli MA, Solow R. 1989b. Prophylactic and therapeutic use of anti-brevetoxin (PbTx-2) antibody in conscious rats. Toxicon 27:1389–1395.

Theodoratou, E., McNeil, G., Cetnarskyj, R., Farrington, S. M., Tenesa, A., Barnetson, R., Porteous, M., Dunlop, M. & Campbell, H. (2007). Dietary fatty acids and colorectal cancer: A case-control study. American Journal of Epidemiology, 116, 181-195

Thibault P, Pleasance S, Laycock MV.1991. Analysis of paralytic shellfish poisons by capillary electrophoresis. J. Chromatogr 542: 483-501.

Tosteson TR, Ballentine DL, Tosteson CG, Hensley V, Bardales AT. 1989. Associated bacterial flora, growth and toxicity of cultured benthic dinoflagellates Ostreopsis lenticularis and Gambierdiscus toxicus. Appl Environ Microbiol 55(1):137-141.

Trainer VL, Baden DG, Catterall WA. 1995. Detection of Marine Toxins Using Reconstituted Sodium Channels. J AOAC Int 78(2):571-573.

Trainer VL, Baden DG. 1991. An enzyme immunoassay for the detection of Florida red tide brevetoxins. Toxicon 29(11):1387-1394.

Trainer WL, Thomsen WJ, Catterall WA and Baden DG. 1991. Photoaffinity labeling of the brevetoxin receptor on sodium channels in rat brain synaptosomes. Mol Pharmacol 40:988–994.

Trautwein, E. A. (2001). n-3 Fatty acids-physiological and technical aspects for their use in food. European Journal of Lipid Science & Technology, 103, 45-51

Troyer, D.& Fernandes, G. (1996). Nutrition and apoptosis. Nutrition Research, 16, 1959-1987

Truman P, Lake RJ. 1996. Comparison of Mouse Bioassay and Sodium Channel Cytotoxicity Assay for Detecting Paralytic Shellfish Poisoning Toxins in Shellfish Extracts. J. AOAC Int 79(5):1130-1133.

Tsunenari S, Uchimura Y, Kanda M.1980. Puffer poisoning in Japan- a care report. J. Forensic Sci. 25:240-245.

Turner, D. N., Braby, L. A., Ford, J.& Lupton, R. J. (2002). Opportunities for nutritional amelioration of radiation of radiation-induced cellular damage. Nutrition, 18, 904-912

U.N. Khot, M.B. Khot and C.T. Bajzer.2003. Prevalence of conventional risk factors in patients with coronary heart disease, JAMA 290:898–904.

Uribe P. Espejo RT. 2003. Effect of associated bacteria on the growth and toxicity of Alexandrium catenella. Appl Environ Microbiol 69(1):659-662.

US Food & Medicine Administration, CDER. COX-2 selective (includes Bextra, Celebrex, and Vioxx) and non-selective non-steroidal anti-inflammatory medicines (NSAIDs). 2007.

Vernoux JP, Bansard S, Simon JF, Nwal-Amang D, Le-Baut C, Gleizes E, Fremy JM, Lasne MC. 1994. Cooked mussels contaminated by Dinophysis sp.:a source of ocadaic acid.Nat Toxins 2:184-188.

Vernoux JP, Le Baut C, Masselin P, Marais C, Baron B, Choumiloff R, Pronieewski F, Nizard G, Bohec M. 1993. The use of Daphnia magna for detection of okadaic acid in mussel extracts.Food Addit Contam 10:603-8

Villa, B., Calabresi, L., Chiesa, G., Rise, P., Galli, C. & Sirtori, C. R. (2002). Omega-3 fatty acid ethyl esters increase heart rate variability in patients with coronary disease. Pharmaceutical Research, 45, 475-478

Viviani R. 1992. Eutrophication, marine biotoxins, human health. In: Vollenweider RA, Marchetti R, Viviani R, editors. Marine Coastal Eutrophication. Sci. Total Environ Suppl Amsterdam:Elsevier p631–662.

Wahlqvist, M. L. (1998). Nutritional pathways to coronary heart disease. Atherosclerosis, 136, 528.

Ward, Q. W. & Singh, A. (2005). Omega-3/6 fatty acids: Alternative sources of production. Process Biochemistry, 40, 3631

Wardener, H. E. DE.., Feng, J. HE.& Macgregor, G. A. (2004). Plasma sodium and hypertension. Kidney International, 66, 2454-2466

Watanabe T, Lockey RF, Krzanowski JJ. 1988. Airway smooth muscle contraction induced by Ptychodiscus brevis (red tide) toxin as related to a trigger mechanism of bronchial asthma. Immunol. Allergy Pract 10(5):185.

Watanabe, MF, Oishi S. 1985. Effects of environmental factors on toxicity of a cyanobacterium (Microcystis aeruginosa) under culture conditions. Appl Environ Microbiol 49:1342-1344.

Watson SJ, Adamson JM, Shapiro LP. 1996. Pseudo-nitzschia australis has a closely associated epialgal bacterial population. J. Phycol 32 Suppl.:50.

Weber, P.& Raederstorff, D. (2000). Triglyceride lowering effect of omega-3 LC-polyunsaturated fatty acids-a review. Nutrition, Metabolism and Cardiovascular Diseases, 10, 28-37

Whelan, J. & Rust, C. 2006. Innovative dietary sources of n-3 fatty acids. Annu. Rev. Nutr. 26:75-103

Wijendran, V.& Hayes, K. C. (2004). Dietary n-6 and n-3 fatty acid balance and cardiovascular health. Annual Review of Nutrition, 24, 597-615

Wojenski, C. M., Silver, M. J. & Walker, J. (1991). Eicosapentaenoic acid ethyl ester as an antithrombotic agentcomparison to an extract of fish. Biochimica et Biophysica Acta, 1081, 33-38

Woltil, H. A., Beusekom, C. M., Okken-Beukens, M., Schaafsma, A., Muskiet, F. A. J.& Okken, A. (1999). Development of low-birthweight

infants at 1months of age correlates with early intake and status of long chain polyunsaturated fatty acids. Prostaglandines, Leukotrienes and Essential Fatty Acids, 61, 235-241

Wood, O. L., Spark, A. & Spark, A. (1996). Medical nutrition therapy guidelines for treating the breast cancer patient. Journal of the American Dietetic Association, Suppl:1, 96, A35

Y. Fukumoto, P. Libby, E. Rabkin, C.C. Hill, M. Enomoto and Y. Hirouchi. 2001., Statins alter smooth muscle cell accumulation and collagen content in established atheroma of Watanabe heritable hyperlipidemic rabbits, Circulation 103:993–999.

Yahia, A. D., Madani, S., Savelli, L. J., Prost, J., Bouchenak, M.& Belleville, J. (2003). Dietary fish protein lowers blood pressure and alters tissue polyunsaturated fatty acid composition in spontaneously hypertensive rats. Nutrition, 19, 342-346

Yasumoto T, Oshima Y, Yamaguchi, M. 1978. Occurrence of a New Type of Shellfish Poisoning in the Tokohu District. Bull Jap Soc Sci Fish 44(11):1249-1255.

Yehuda, S., Rabinovitz, S. & Mostofsky, D. I. (1999). Essential fatty acids are mediators of brain biochemistry and cognitive functions. Journal of Neuroscience Research, 56, 565-566

Yehuda, S., Rabinovitz, S. & Mostofsky, D. I. 2005. Mixture of essential fatty acids lowers test anxiety. Nutritional Neuroscience, 8, 265-267

Zimmerman, J. (1997). Optimal nutrition for HIV/AIDS Wellness. Journal of the American Dietetic Association, Suppl. 1, 97, A18

Zyriax, B. C. & Windler, E. (2000). Dietary fat in the prevention of cardiovascular disease-a review. European Journal of Lipid Science & Technology, 102, 355-365

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