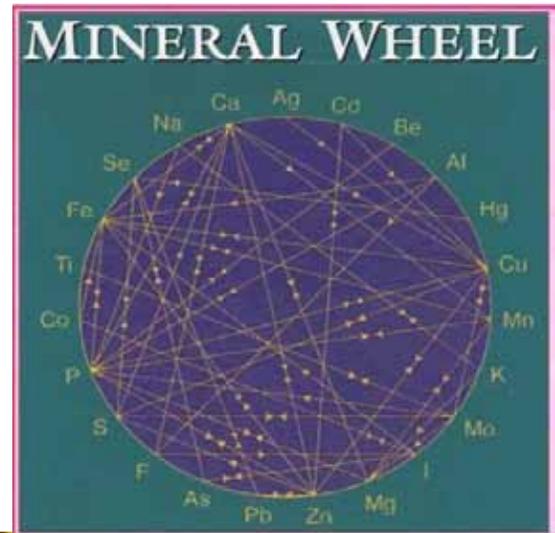


MINERALS AND YOU



MINERALS AND YOU

Overview:

What are minerals anyway? Minerals are nothing more than elements—the very same elements that graced the periodic table inside your high school chemistry text book, Chromium, magnesium, iron, zinc, and so on. They are the elements that comprise the entire universe, this earth, and everything on it including you. Your body is truly a masterpiece formed from these same elements. As such, it is important to constantly replenish your body with the elements it expends on a daily basis. Chemical and electrical processes are occurring within your body at every moment. These processes can only function correctly if the proper balance of minerals is continually being supplied to your system. Iron for your blood, Sulfur for your muscles, calcium for your bones, and an aggregation of many other elements in balanced trace amounts help to ensure the proper function of your body.

Minerals are the nutrients that exist in the body, and are as essential as our need for oxygen to sustain life. Minerals are also found in organic and inorganic combinations in food. In the body only 5% of the human body weight is mineral matter, vital to all mental & physical processes & for total well being. They are most important factors in maintaining all physiological processes, are constituents of the teeth, bones, tissues, blood, muscle, and nerve cells.

Acting as catalysts for many biological reactions within the human body, they are necessary for transmission of messages through the nervous system, digestion, & metabolism or utilization of all nutrients in foods. Vitamins cannot be properly assimilated without the correct balance of minerals. For example; calcium is needed for vitamin "C" utilization, zinc for vitamin "A", magnesium for "B" complex vitamins, selenium for vitamin "E" absorption, etc.

Every living cell depends on minerals for proper structure and function. Minerals are needed for the formation of blood and bones, the proper composition of body fluids, healthy nerve function, and proper operation of the cardiovascular system, among others. Like vitamins, minerals function as co-enzymes, enabling the body to perform its functions including energy production, growth and healing. Because all enzyme activities involve minerals, they are essential for the proper utilization of vitamins and other nutrients. Nutritionally, minerals are grouped into two categories: bulk or essential minerals, also called macro minerals, and trace minerals or micro minerals. Macro minerals such as calcium and magnesium are needed by the body in larger amounts. Although only minute quantities of trace minerals are needed, they are nevertheless important for good health. Micro minerals include boron, chromium, iron, zinc, and many others. Minerals are very important in keeping the blood and tissue fluids from either becoming too acid or too alkaline and they allow other nutrients to pass into the bloodstream, and aid in transporting nutrients to the cells. They also draw chemicals in & out of the cells. A slight change in the blood concentration of important minerals can rapidly endanger life.

Minerals are essential for good health. The body utilizes over 80 minerals for maximum function. Because our plants and soils are so nutrient depleted, even if we eat the healthiest foods, we are not getting all the minerals we need. Evidence of mineral malnutrition are various minor and serious health conditions such as energy loss, premature aging, diminished senses, and degenerative diseases like osteoporosis, heart disease, and cancer. In many cases, these could be

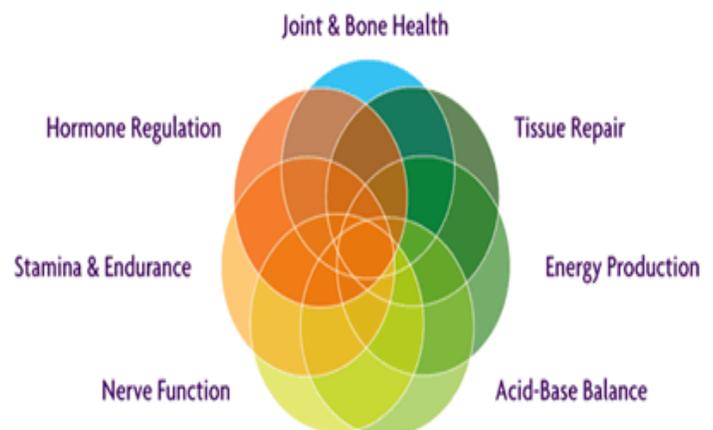
prevented with proper mineral supplementation. The more you learn about the benefits of minerals, the more you will be able to take charge of your own health!

Many times, minerals are discussed separately, but it is important to note that their actions within the body are interrelated; no single mineral can function without the others, since they are synergistically related. They are the electrolytes to the body, that is; they carry the electrical current through the body. There is much proof that the body is run electrically, and minerals are the conductor of these currents. They provide the necessary charge or "ionization" of positive or negative electrical molecules. Ions keep the "human battery" charged. If a person is lacking in minerals or deficient in any particular one, they can become run down very rapidly.

A diet rich in green vegetables and fruits, and whole grains grown in fertile soil may afford some assurance of minerals, but much of our soil today is depleted and lacking in essential nutrients. Adding mineral-trace mineral supplements to the diet, will provide some insurance. If there is a problem with poor digestion & assimilation, the best method might be to add liquid minerals to the diet, to afford easier absorption & rapid assimilation. Liquid minerals from the sea, a natural source, have shown beneficial results in the shortest length of time. Sea water has been shown to have the same chemical balance as the human blood, so may be used quite adequately in the human body. Having the proper balance of minerals in the body can make the difference between disease or sickness and optimum health.

Minerals thus play an important role in every bodily function and are present in every human cell. Although the amount needed may be small, without even that trace of the mineral, dysfunction is bound to occur at some level in the body. A zinc deficiency may show up in ridged fingernails with white spots. Lack of Sulfur can cause lack-luster hair and dull-looking skin. Less obvious deficiencies may surface as fatigue, irritability, loss of memory, nervousness, depression and weakness. Minerals also interact with vitamins. Magnesium, for instance, must be present in the body for utilization of B-complex, C and E vitamins. Sulfur also works with the B-complex vitamins. The body needs all the trace minerals in proper balance. Coffee, tea, alcohol, excess salt and many drugs can rob the body of minerals or make them ineffective. Industrial pollutants cause toxic minerals to enter the body. Minerals at toxic levels also have the effect of destroying the usefulness of other vitamins and minerals. Exercise improves the activity of certain vitamins and minerals while stress and fatigue work against them.

A well-balanced diet provides as abundance of minerals and vitamins. In refining cereals, grains and sugar, we have robbed them of their natural vitamins and minerals. The dietary sources of these nutrients are whole grains, cereals, bran and germ. It is the bran and germ which are removed in processing. To obtain a balance of nutrients, it is, therefore, necessary



to avoid refined and processed foods but an intake of adequate green leafy vegetables which are an excellent source of many nutrients should be ensured.

A New Plague: Mineral Imbalance

Because your body requires nearly two thirds of all the elements currently known to man in order to maintain health, keeping these minerals in balance is a complex yet incredibly vital task. The events of everyday living demand a continual ingestion of minerals. There are 92 known elements, 22 hypothesized others, and hundreds of isotopic variations. It's no wonder that scientists are only now beginning to discover the effects and inter-relationships of minerals in our human systems, such as how minerals help maintain a Healthy balance and what adverse effects are created by a mineral imbalance.

The Stripping of Mother Earth

Traditionally, eating fresh grains, fruits, and vegetables grown in nutrient-rich soil has been the primary supply for the full spectrum of ionically charged minerals. Unfortunately in today's world, naturally occurring, nutrient rich soil is becoming more and rarer. Eons of vegetation growth and aggressive modern farming techniques have brought many of the earth's minerals to the surface where they have been washed away. Synthesized fertilizers are routinely applied to farms and fields where minerals have been depleted. But man made fertilizers provide only enough mineral substance to support basic plant life. Numerous trace minerals so essential to human life aren't replenished.



Where have all the Minerals gone?

Many of the trace elements once abundant in soil have been washed into the oceans. In the oceans they are found in their proper proportions—the same basic proportions that are found in healthy human bodies. Even today, these life-sustaining sea waters cannot be recreated by science. All elements necessary to support human life are ionically charged and in perfect balance—prime for being absorbed into the cells of your body. In a few surviving inland seas such as the Great Salt Lake of Western North America, these essential elements exist in highly concentrated, salubrious proportions. This healthy, intricately balanced proportion of minerals and trace elements found in sea water is beneficial to the human body.

What Are Ionically Charged Minerals?

An ionic mineral is a mineral or element that has a positive or negative charge. On the molecular level, that means the element has either too many or too few electrons. This unstable ionic state allows the element to bond readily with water, making it possible for the body to absorb it. In this state, an element has specific positive or negative electrical signatures that cause a dynamic

equilibrium to take place. The body can then facilitate changes to move nutrients to the areas that need them.

The Importance of Ionic Minerals

Every second of every day your body relies on ionic minerals and trace minerals to conduct and generate billions of tiny electrical impulses. Without these impulses, not a single muscle, including your heart, would be able to function. Your brain would not function and the cells would not be able to use osmosis to balance your water pressure and absorb nutrients. To ensure you are getting the ionically charged electrolytes your body needs, only choose ionic mineral supplements.

“Experts estimate that 90 percent of Americans suffer from mineral imbalance and deficiency.”



The Key Role of Absorption

You cannot benefit from minerals unless you can absorb them. The absorption of minerals primarily takes place within the small intestines. As food matter passes through the intestines, minerals transfer into the blood stream through the walls of the intestines. This can only happen if the minerals are ionically charged. Although stomach acid helps ionize the minerals in foods, a mineral supplement should contain already naturally ionized minerals to be fully absorbed.

The Secret of Life in a Dead Inland Sea

Western North America’s Great Salt Lake is the world’s oldest inland sea. A remnant of the last great Ice Age, the Great Salt Lake has been collecting and concentrating the minerals and trace elements of the surrounding Rocky Mountains for tens of thousands of years. The result is nutrient rich waters which contain over 70 ionically charged minerals and trace elements that are eight to ten times more concentrated than regular sea water—in precisely the same proportion as healthy human fluids. It is from this source that Trace Minerals Research harvests the elements and trace minerals that go into every product.

MINERALS: ITS BIOLOGICAL FUNCTIONS

BORON

At first, boron may seem like an unimportant, uncommon and boring element. But boron is actually required by the body in very small amounts, and is



necessary for good health. Though it is commonly known that calcium builds strong bones, boron is also important. Bones are not just the dead, white, stone-like things we see on skeletons. In our bodies bones are constantly breaking down and being rebuilt. They also have a constant blood supply and are very much "alive". Without small amounts of boron, bones would slowly break down and become brittle.

This element is also necessary to allow the brain to function properly. In fact, boron can increase mental alertness. According to a series of studies recently conducted by the US Department of Agriculture, low boron intakes by humans caused decreased brain activity. The studies showed that people on low boron diets also had lower brain performance on attention and short-term memory tests.

Our bodies also need boron in very small amounts to allow calcium, magnesium and phosphorus to function properly. So in a sense, boron is also necessary for many other body functions and we can not survive without it. Deficiency of boron in the body leads to **osteoporosis (as shown in Figure 1)**, nausea, diarrhea, arthritis etc.

CALCIUM

The human body needs calcium more than any other mineral. A man weighing 70 kg contains one kg of calcium. About 99 per cent of the quantity in the body is used for building strong bones and teeth and the remaining one per cent is used by the blood, muscles and nerves. Calcium performs many important functions. Without this mineral, the contractions of the heart would be faulty, the muscles would not contract properly to make the limbs move and blood would not clot. Calcium stimulates enzymes in the digestive process and coordinates the functions of all other minerals in the body.

Calcium is found in milk and milk products, whole wheat, leafy vegetables such as lettuce, spinach and cabbage, carrots, watercress, oranges, lemons, almonds, figs and walnuts. A daily intake of about 0.4 to 0.6 grams of calcium is considered desirable for an adult. The requirement is larger for growing children and pregnant and lactating women. Deficiency may cause porous and fragile bones, tooth decay, heart palpitations, muscle cramps, **insomnia** and irritability.

A large increase in the dietary supply of calcium is needed in tetany and when the bones are decalcified due to poor calcium absorption, as in **rickets (shown in figure 2)**, osteomalacia and the malabsorption syndrome. Liberal quantity of calcium is also necessary when excessive calcium has been lost from the body, as in hyperparathyroidism or chronic renal disease.

CHLORIDE

Chloride mineral is found mainly in the body fluids surrounding cells. Its major role is to work with the other electrolyte family members to control the flow of body fluids



in the veins as well as throughout the body, and maintain the proper electrolyte balance. Chloride mineral helps to reduce excess acid levels. Chlorides act as neutralizing agents and their work helps to bring the acid and alkaline level back into balance. Inside the stomach, chloride is found in the form of hydrochloric acid. Hydrochloric acid is an important component of the digestive process. It helps break foods down so they can be properly absorbed by the small intestines. In the liver, chloride may also help in the process of removing waste.

A diet of unprocessed natural foods provides enough chloride for human health. A pinch of table salt contains about 250 mg, one-third of the Recommended Daily Allowance. Excessive vomiting can reduce the stomach's chloride level upsetting its pH balance and causing sweating, diarrhea, loss of appetite, slow and shallow breathing, listlessness, and muscle cramps. Although toxic in large amounts, excess chloride is excreted in urine, preventing potentially dangerous accumulation. Deficiency of Chloride leads to hair and tooth loss, chronic diarrhea and vomiting, trauma, renal disease, low blood pressure.



CHLORINE

In the human body, chlorine is liberated by the interaction of common salt, taken along with food, and hydrochloric acid liberated in the stomach during the process of digestion. It is essential for the proper distribution of carbon dioxide and the maintenance of osmotic pressure in the tissues. This food element is necessary for the manufacture of glandular hormone secretions. It prevents the building of excessive fat and auto-intoxication. Chlorine regulates the blood's alkaline-acid balance and works with Potassium in a compound form. It aids in the cleaning out of body waste by helping the liver to function.

Chlorine is found in cheese and other milk products, green leafy vegetables, tomatoes, all berries, rice, radishes, lentils, coconuts and egg yolk. No dietary allowance has been established, but an average intake of daily salt will ensure adequate quantity of chlorine. Deficiency of this mineral can cause **loss of hair (as shown in figure 3)** and teeth.



CHROMIUM

When we think of chromium, our brains may generate images of everything from the shiny finish on our first bicycle to the brilliant chrome rally wheels on the 66 Mustang GT. The last thing that comes to mind is a substance that we actually need to eat in order to stay healthy.

Chromium, in fact, is an element that is essential to good human health. It does many important things in the body. Most significantly, it is a vital component of a molecule that works with insulin to stabilize blood sugar levels. In other words, it helps our bodies absorb energy from the food we eat and stabilizes the level of energy that we feel throughout the day.

Our bodies need sufficient quantities of chromium to make many of the large ^{Figure} biological molecules that help us live. This vital element can also help increase muscle mass while reducing fat mass in our bodies. It helps cells, such as heart muscle cells absorb the energy they need to work properly.

Unfortunately, it is often difficult to get enough chromium in our diets. People who exercise frequently have especially high demands for this element.

Scientists estimate that 90% of all Americans don't get enough chromium from their diet. Foods that are high in chromium include whole grain breads, brown rice, cheese and lean meats. Chromium is also in many (but not all) multi-vitamins and supplements, but the body absorbs chromium much better from food. And, the deficiency of chromium leads to frequent hunger and urination, **dizziness (as shown in figure 4)**, cold hands etc.

COBALT

Cobalt is a component of vitamin B12, a nutritional factor necessary for the formation of red blood cells. Recent research in vitamin B12 has shown that its pink color is attributed to the presence of cobalt in it. The presence of this mineral in foods helps the synthesis of hemoglobin and the absorption of food iron. The best dietary sources of cobalt are meat, kidney and liver. All green leafy vegetables contain some amount of this mineral. No daily allowance has been set. Only a very small amount up to 8 mcg is considered necessary. Deficiency of this disease leads to Anemia, nerve disorders, **scaly skin (as shown in figure 5) etc.**

COPPER

There ^{are} ^{Figure} approximately 75 to 150 mg. of copper in the adult human body. Newborn infants have higher concentrations than adults. Liver, brain, kidney, heart, and hair contain relatively high concentration. Average serum copper levels are higher in adult females than in males. Serum copper levels also increase significantly in women both during pregnancy and when taking oral contraceptives.

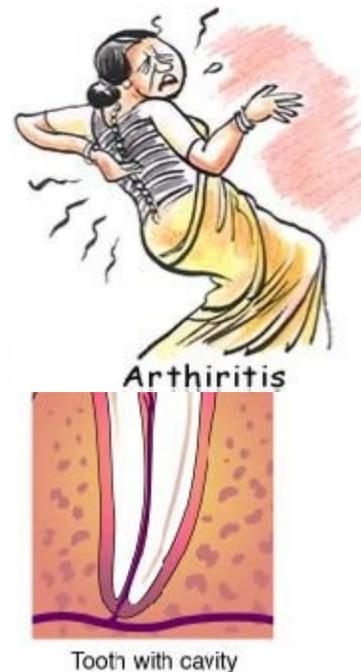
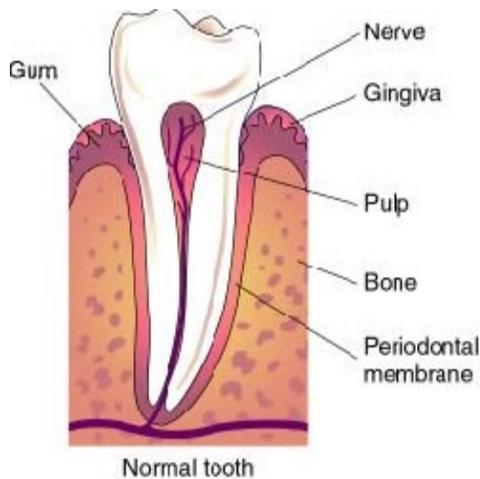


This mineral helps in the conversion of iron into hemoglobin. It stimulates the growth of red blood cells. It is also an integral part of certain digestive enzymes. It makes the amino acid tyrosine usable, enabling it to work as the pigmenting factor for hair and skin. It is also essential for the utilization of vitamin C. Copper is found in most foods containing iron, especially in almonds, dried beans, peas, lentils, whole wheat, prunes and egg yolk. The recommended dietary allowance has not ^{Figure} been established but 2 mg is considered adequate for adults. A

copper deficiency may result in bodily weakness, digestive disturbances, **hair baldness (as shown in figure 6)** impaired respiration etc.

FLUORINE

Fluorine is the element that prevents diseases from decaying the body. It is a germicide, and acts as an antidote to poison, sickness and disease. There is a strong affinity between calcium and fluorine. These two elements, when combined, work particularly in the outer parts of bones. They are found in the enamel of the teeth and the shiny, highly polished bone surface. Deficiency of fluorine causes tooth decay (as shown in figure 7). Fluorine is found in goat's milk, cauliflower, watercress, garlic, beets, and cabbage, spinach and pistachio nuts.



Figure

GERMANIUM

Germanium is a trace element that is highly beneficial for good human health. In fact, germanium has many important medicinal properties. In the body, germanium attaches itself to oxygen molecules. This has the unexpected effect of making our bodies more effective at getting oxygen to the tissues in our body. The increased supply of oxygen in our bodies helps to improve our immune system. It also helps the body excrete harmful toxins.



The increased supply of oxygen in our bodies caused by germanium has many other exciting effects as well. Taking germanium supplements is effective in **treating arthritis**, food allergies, elevated cholesterol levels, high blood pressure, and even cancer. Germanium can also be used to control pain in the human body.

Perhaps the most exciting thing about germanium is that it can stimulate the human immune system to fight cancer cells. This is exciting for two reasons. First, and most obvious, it helps fight cancer - one of the most deadly diseases in the world. But more importantly, it is not toxic to human cells. In fact, germanium is completely harmless to human cells, even cancer cells. Since it works by stimulating our immune system, which fights the cancer, it doesn't damage the rest of the body like many other cancer treatments. Testing of new cancer treatments with germanium are underway and perhaps we will soon

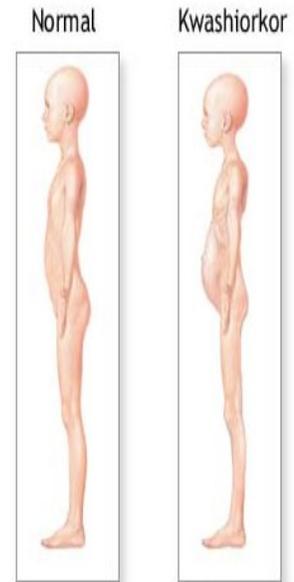
see new, less damaging, cancer treatments using the element germanium.

IODINE

The chief store-house of iodine in the body is the thyroid gland. The essential thyroxin, which is secreted by this gland, is made by the circulating iodine. Thyroxin is a wonder chemical which controls the basic metabolism and oxygen consumption of tissues. It increases the heart rate as well as urinary calcium excretion. Iodine regulates the rate of energy production and body weight and promotes proper growth. It improves mental alacrity and promotes healthy hair, nails, skin and teeth.

The best dietary sources of iodine are kelp and other seaweeds. Other good ^{Figure} sources are turnip greens, garlic, water cress,

pineapples, pears, artichokes, citrus fruits, egg yolk and sea foods and fish liver oils. The recommended dietary allowances are 150 mg per day for adult males and adult females. Deficiency can cause **goiter (as shown in figure 8)** and enlargement of the thyroid gland. Small doses of iodine are of great value in the prevention of goiter in areas where it is endemic and are of value in treatments, at least in the early stages. Larger doses have a temporary value in the preparation of patients with hyperthyroidism for surgical operation.



IRON



Iron is an important mineral which enters into the vital activity of the blood and glands. Iron exists chiefly as hemoglobin in the blood. It distributes the oxygen inhaled into the lungs to all the cells. It is the master mineral which creates warmth, vitality and stamina. It is required for a healthy complexion and for building up resistance in the body.

The chief sources of iron are grapes, raisins, spinach, all green vegetables, whole grain, cereals, dried beans, dark colored fruits, beets, dates, liver and egg yolk. The Indian Council of Medical Research has recommended an allowance of 10 to 15 mg of iron in a balanced diet for an adult. Iron deficiency is generally caused by severe blood loss, malnutrition, infections and by excessive use of drugs and chemicals. Deficiency of dietary iron may cause nutritional - anemia, lowered resistance to disease, kwashiorkor **(as shown in figure 9)**, general run down condition, pale complexion, shortness of ^{Figure} breath on manual exertion and loss of interest in sex.

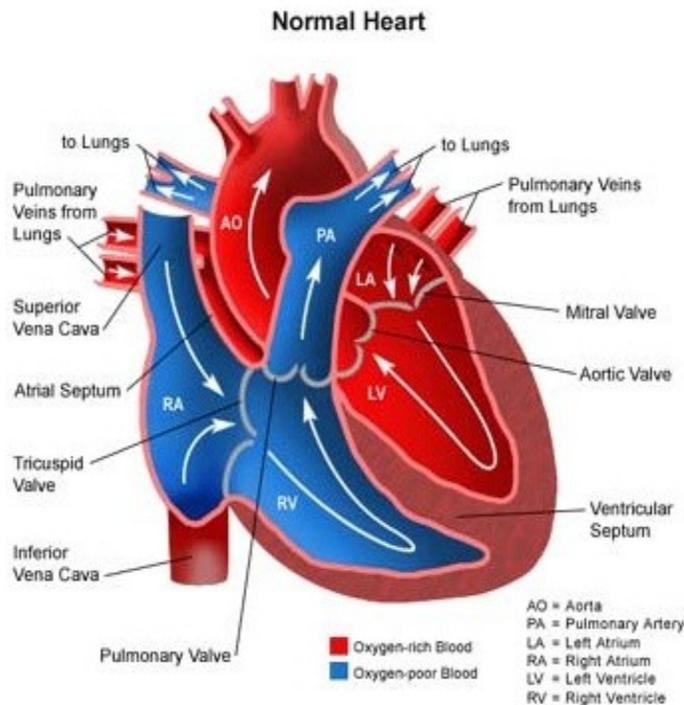
Iron is the classic remedy for ~~anemia~~ anemia. However, there are several forms of anemia, and iron deficiency anemia is only one. If one is taking iron pills due to insufficient intake of iron in the normal diet, one

should also take at least 40.0 mg. of folic acid or folate every day, along with 10 to 25 mg. of vitamin B12. Both these vitamins are essential in building healthy blood cells.

LITHIUM

Lithium helps in preventing eating disorders, prevents behavior disorders and promotes healthy bowel movements. It is a trace element that mediates the transmission of nerve cells by

regulating the membrane potential. It has a sedative and non-hypnotic action. It is used in prevention of both manic and depressive mood swings. Lithium stimulates the elimination of urea and uric acid. Deficiency of Lithium brings behavior disorders, insomnia, depression, anxiety, gout and various types of pain syndromes.



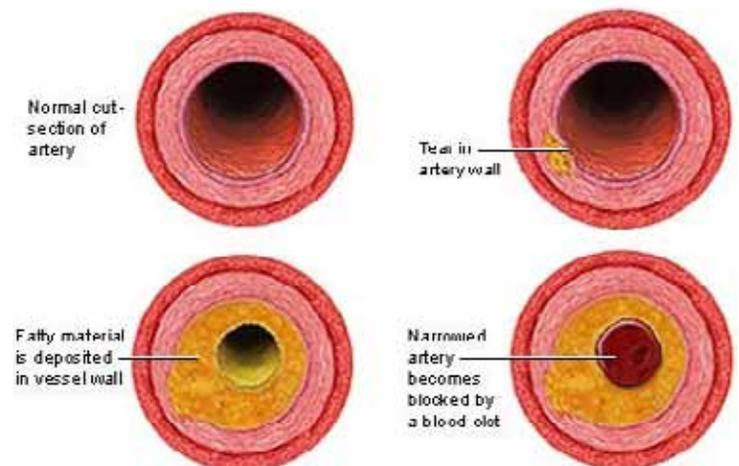
MANGANESE

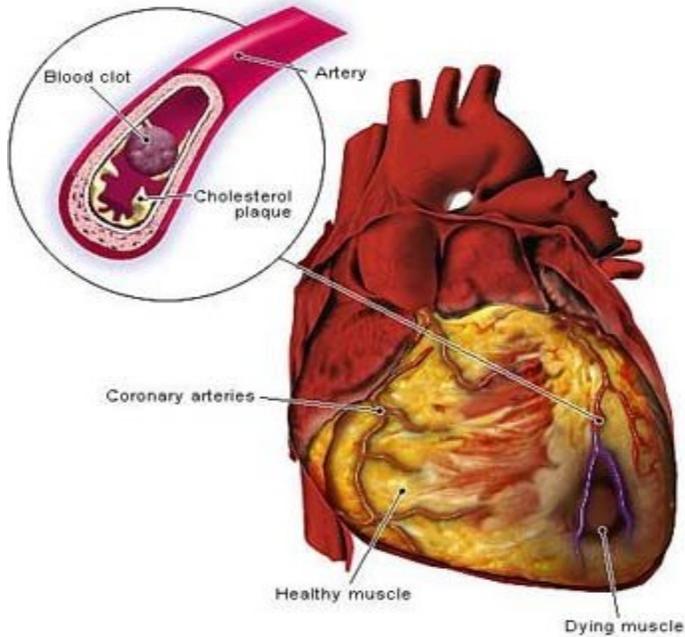
The human body contains 30 to 35 mg. of manganese, widely distributed throughout the tissues. It is found in the liver, pancreas, kidney, pituitary gland. This mineral helps nourish the nerves and brain and aids in the coordination of nerve impulses and muscular actions. It helps eliminate fatigue and reduces nervous irritability. Manganese is found in citrus fruits, the outer covering of nuts, grains, in the green

leaves of edible plants, fish and raw egg yolk. No official daily allowance of manganese has been established, but 2.5 to 7 mg. is generally accepted to be the average adult requirement. A deficiency of this mineral can lead to dizziness, poor thinking, poor memory, osteoporosis, **atherosclerosis (as shown in figure 10)** etc.

MAGNESIUM

All human tissues contain small amounts of magnesium. The adult human body contains about 25 gms of this mineral. The greater part of this amount is present in bones in combination with phosphate and carbonate. Bone ashes contain less than one per cent magnesium. About one-fifth of the total magnesium in the body is present in the soft tissues, where it is mainly bound to protein. Next to potassium, magnesium is the predominant metallic cation in living cells. The bones seem to provide a reserve supply of





Figure

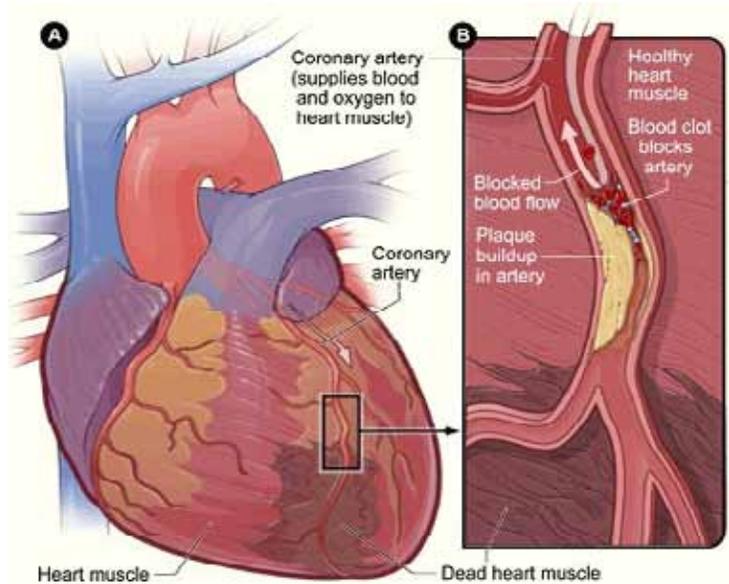
this mineral in case of shortage elsewhere in the body.

Biochemists call magnesium the "cool, alkaline, refreshing, sleep promoting mineral." Magnesium helps one keep calm and cool during the sweltering summer months. It aids in keeping nerves relaxed and normally balanced. It is necessary for all muscular activity. This mineral is an activator for most of the enzyme systems involving carbohydrate, fat and protein in energy producing reactions. It is involved in the production of lecithin which prevents building up of cholesterol and consequent

arteriosclerosis. Magnesium promotes a healthier cardiovascular system and aids in fighting depression. It helps prevent calcium deposits in kidneys and gallstones and also brings relief from indigestion.

Magnesium is widely distributed in foods. It is a part of the chlorophyll, in green vegetables. Other good sources of this mineral. are nuts, soybeans, alfalfa, apples, figs, lemons, peaches, almonds, whole grains, brown rice, sunflower seeds and sesame seeds. The adult Recommended Dietary Allowance for magnesium is 350mg per day for men and 280mg for women. Deficiency can lead to kidney damage and kidney stones, muscle cramps, arteriosclerosis, heart attack (as figure 11 shows the functioning of normal heart and figure 12 & figure 13 shows blockage in heart which leads to heart attack), epileptic seizures, nervous irritability, marked depression and confusion, impaired protein metabolism and premature wrinkles.

Chronic alcoholics often show a low plasma magnesium concentration and a high urinary output. They may, therefore, require magnesium therapy especially in an acute attack of delirium tremens. Magnesium has also proved useful in bladder and urinary problems and in epileptic seizures. This mineral together with vitamin B6 or pyridoxine has also been found effective in the prevention and treatment of kidney stones. Magnesium can be taken in therapeutic doses up to 700 mg a day.



Figure

MOLYBDENUM

Molybdenum (pronounced mo-*lyb*-den-um) is necessary for good health, though in extremely small amounts. Molybdenum is found in all tissues of the human body, but tends to be the most concentrated in the liver, kidneys, skin and bones. It is required for proper function of several chemicals in the human body. Some of these chemicals have very important job of allowing the body to process the iron and nitrogen in our diets. Molybdenum is believed to be important in helping our cells grow. Also, small amounts of dietary molybdenum have been credited with promoting healthy teeth. Some evidence suggests that molybdenum might reduce the risk of some types of asthma attacks.

A deficiency of molybdenum in our diets can cause mouth and gum disorders and can contribute to getting cancer. Variety of diseases are commonly caused or worsened by molybdenum deficiency. These include ~~aene, allergies, asthma, athlete's foot, Bell's palsy, bladder infection, candidiasis, canker sores, depression, diabetes, eczema, gulf war syndrome, viral hepatitis, herpes simplex, liver cirrhosis~~ (as shown in figure 14), ~~lupus, Lyme disease, multiple sclerosis, and prostatitis~~.

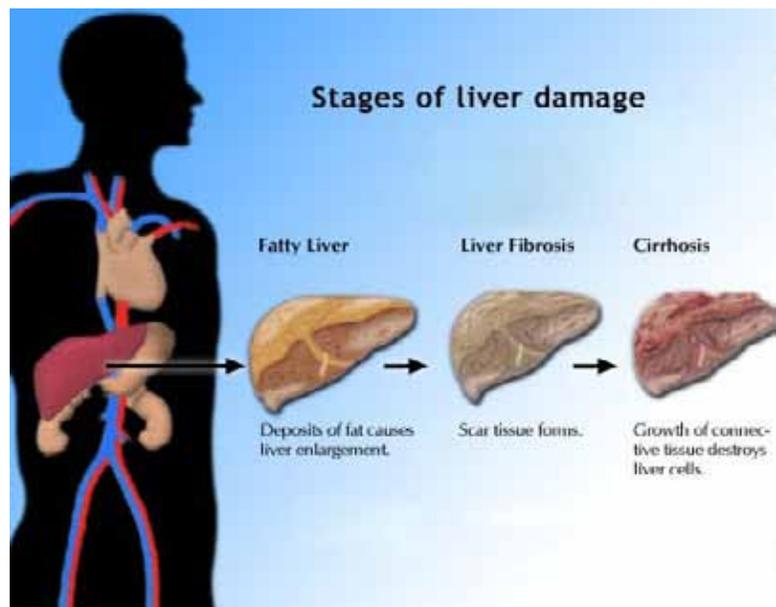
NICKEL

Figure 14

Nickel is known to be an essential trace element for several species of animals. Experimental research shows that when chickens and rats are fed a diet that lacks nickel, they develop liver problems. If they are fed a normal diet, the symptoms do not appear. Animals are not the only ones that need this element to function properly. Bacteria use nickel to make special chemicals called enzymes. These enzymes are necessary for bacteria to function properly.

Though many scientists suspect that nickel is necessary for good human health, it has not been proven. People with certain liver and kidney diseases are known to have low levels of nickel in their bodies. Also, excess nickel in the body is associated with a high

incidence of heart disease, thyroid disease and cancer. In both of these cases, the significance of the amount of nickel in the body is unknown. Some scientists think that nickel affects hormones, cell membranes and chemicals called enzymes. Whatever the case, nickel certainly appears to affect human health, even though we do not know exactly how. Good sources of nickel include chocolate, nuts, fruits and vegetables. Meat is typically low in this interesting element.

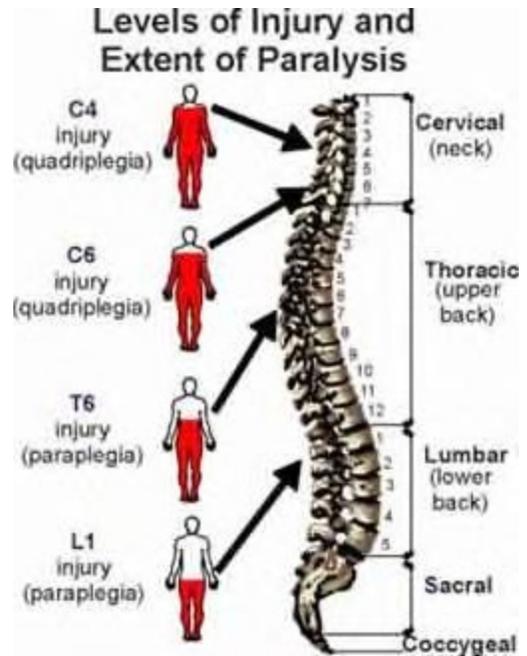


NITROGEN

Nitrogen is another important element. It plays an important role in digestion of food and growth. As you may know, almost 80% of the air we breathe is made up of nitrogen. But humans cannot use the nitrogen in the air we breathe, that nitrogen is in the wrong form. We have to get nitrogen, in a different form, from the food that we eat. Fortunately, there is plenty of nitrogen in food to nourish our bodies.

Nitrogen is found in large amounts in all kinds of food. Spaghetti, salads, breakfast cereal, hamburgers and even cookies have lots of nitrogen in the form that your bodies need. When your body digests this food and makes it into energy, the first step is to remove nitrogen atoms from the molecules in the food. While your body is busy digesting the rest of this food and making it into energy, these nitrogen atoms are already being used to help you grow. One specific time that this is especially important is during pregnancy. When a woman is pregnant, the nitrogen removed from food during digestion is needed to help the fetus to grow properly. By term, the mother and infant will have accumulated over a pound of nitrogen.

It is also worth noting that in the plant kingdom, nitrogen is one of the 3 main elements that make plant life possible. (Potassium and phosphorus are the other two, and you may hear them referred to collectively as N-P-K whenever talking about key plant nutrients.



PHOSPHORUS

It combines with calcium to create the calcium-phosphorus balance necessary for the growth of bones and teeth and in the formation of nerve cells. This mineral is also essential for the assimilation of carbohydrates and fats. It is a stimulant to the nerves and brain.

Phosphorus is found in abundance in cereals, pulses, nuts, egg yolk, fruit juices, milk and legumes. Usually about one gram of phosphorus is considered necessary in the daily diet. A phosphorus deficiency may bring about loss of weight, retarded growth, reduced sexual powers and general weakness. It may result in poor, internalization of bones, deficient nerve and brain function. While taking calcium in therapeutic doses for calcium deficiency conditions or for treating certain ailments, it is advisable to take the calcium supplement in which phosphorus has been added in the correct proportions. This is necessary as calcium cannot achieve its objectives unless phosphorus is present in a proper balance.

POTASSIUM

Figure 15

Potassium is essential to the life of every cell of a living being and is among the most generously and widely distributed of all the tissue minerals. It is found principally in the intracellular fluid where it plays an important role as a catalyst in energy metabolism and in the synthesis of glycogen and protein. The average adult human body contains 120 g. as potassium and 245 g. as potassium chloride. Out of this body potassium, 117 g. is found in the cells and 3 g. in the extra cellular compartment.

Potassium is important as an alkalizing agent in keeping a proper acid alkaline balance in the blood and tissues. It is essential for muscle contraction and therefore important for proper heart function. It promotes the secretion of hormones and helps the kidneys in detoxification of blood. Potassium prevents female disorders by stimulating the endocrine hormone production. It is involved in the proper functioning of the nervous system and helps overcome fatigue. It also aids in clear thinking by sending oxygen to the brain and assists in reducing blood pressure. Potassium is widely distributed in foods. All vegetables especially green leafy vegetables, grapes, oranges, lemons, raisins, whole grains, lentils, sunflower seeds, nuts, milk, cottage cheese and butter-milk are rich sources. Potatoes, especially potato peelings, and bananas are especially good sources.

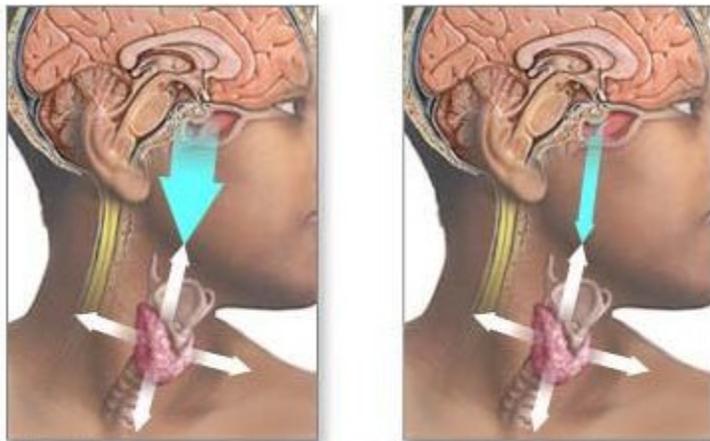
Potassium requirements have not been established but an intake of 2000mg per day is estimated as approximately the minimum need. Potassium deficiency may occur during gastrointestinal disturbances with severe vomiting and diarrhea, abdominal distention, acute muscular weakness, paralysis (**as shown in figure 15**), pins and needles, loss of appetite, low blood pressure, intense thirst, drowsiness, confusion and eventually coma diabetic acidosis and potassium losing nephritis. It causes undue nervous and body tiredness, palpitation of the heart, cloudiness of the mind, nervous shaking of the hands and feet, great sensitivity of the nerves to cold, and excessive perspiration of the feet and hands.

In simple cases of potassium deficiency, drinking plenty of tender coconut water daily can make up for it. It is advisable to consume plenty of figs, apricots, prunes, almonds and tomatoes during the use of oral diuretics. Potassium rich foods should be restricted during acute renal failure and Addison's diseases.

SELENIUM

Despite selenium's reputation as a toxic heavy metal, this element is actually very important to good human health. Selenium is an important part of a molecule in the body that protects blood cells from certain damaging chemicals. Together with vitamin E, selenium helps our immune system produce antibodies, which is obviously an immensely important task. Selenium helps keep the pancreas and heart functioning properly. This remarkable element is also needed to make our tissues elastic. Imagine, for instance, if our skin was not elastic; we'd have loose skin draping all over our bodies. It may be cool to have loose clothes draping all over our bodies, but people might make fun of you if you had that much loose skin. Sufficed to say that selenium is a very important element for our bodies.

A deficiency of this vital trace element has been linked to the development of leukemia, arthritis, **hypothyroidism (as shown in figure 16)**, and other diseases. Researchers have also found that the lower



Primary hypothyroidism:
thyroid can't produce
amount of hormones
pituitary calls for

Secondary hypothyroidism:
thyroid isn't being
stimulated by pituitary
to produce hormones

the concentration of selenium in the blood stream, the higher the risk of developing many types of cancer. In fact, some researchers tout selenium as being a powerful cancer-preventing substance. High selenium intake has also been correlated with a dramatically lower incidence of heart disease.

The amount of selenium in food is dependent on the amount of the element in the environment where the food is from. Fish, grains and Brazil nuts are considered to be good dietary sources of selenium. However, in the current global marketplace it is difficult

to know whether the food you eat comes from selenium-rich or selenium-poor growing areas. As with virtually all elements, it is easy to get enough selenium from a well balanced diet.

SILICON

This is known as the "beauty mineral" as it is essential for the growth of skin, hair shafts, nails and other outer coverings of the body. It also makes the eyes bright and assists in hardening the enamel of the teeth. It is beneficial in all healing processes and protects body against many diseases such as tuberculosis, irritations in mucous membranes and skin disorders.

Silicon is found in apples, cherries, grapes, asparagus, beets, onions, almonds, honey, peanuts and the juices of the green leaves of most other vegetables. No official dietary allowance has been established for this mineral. Deficiency can lead to soft brittle nails, ageing symptoms of skin such as wrinkles, thinning or loss of hair, poor bone development, insomnia, osteoporosis.

SODIUM

Sodium chloride, the chemical name for common salt, contains 39 per cent of sodium, an element which never occurs in free form in nature. It is found in an associated form with many minerals especially in plentiful amounts with chlorine. The body of a healthy person weighing about 65 kg contains 256 g. of sodium chloride. Of this the major part, just over half, is in the extra cellular fluid. About 96 g. is in bone and less than 32 g in the cells.

Sodium is the most abundant chemical in the extra cellular fluid of the body. It acts with other electrolytes, especially potassium, in the intracellular fluid, to regulate the osmotic pressure and maintain a proper water balance within the body. It is a major factor in maintaining acid-base equilibrium, in transmitting nerve impulses, and in relaxing muscles. It is also required for glucose absorption and for the transport of other nutrients across cell membranes. Sodium can help prevent catarrh. It promotes a clear brain, resulting in a better disposition and less mental fatigue. Because of its influence on calcium, sodium can also help dissolve any stones forming within the body. It is also essential for the production of hydrochloric acid in the stomach and plays a part in many other glandular secretions.

There is some natural salt in every food we eat. Vegetable foods rich in sodium are celery, cucumbers, watermelon, lemons, oranges, grapefruit, beet tops, cabbage, lettuce, corn, lady's fingers, apple, berries, pears, squash, pumpkin, peaches, lentils, almonds and walnuts. Animal food sources include shell fish, lean beef, kidney, bacon and cheese. The sodium chloride requirements for persons living in the tropics have been estimated at 10 to 15 g. per day for adults who are engaged in light work and 15 to 20 g. for those engaged in hard work. The requirements of children are from five to 10 g. and those for adolescent boys and girls from 10 to 25 g.

Both deficiency and excess of salt may produce adverse effects on the human body. Deficiencies of sodium are, however, rare and may be caused by excessive sweating, prolonged use of diuretics, or chronic diarrhea. Deficiency may lead to nausea, muscular weakness, heat exhaustion, mental apathy and respiratory failure. Over supply of sodium is a more common problem because of over use of dietary sodium chloride or common salt. Too much sodium may lead to water retention, high blood pressure, stomach ulcers, stomach cancer, hardening of arteries and heart disease.

In case of mild deficiency of sodium chloride, taking a teaspoon of common salt in one half litre of water or any fruit juice quickly restores the health. In severe conditions, however, administration of sodium chloride in the form of normal saline by intravenous drip may be resorted to. The adverse effects of excessive use of sodium chloride can be rectified by avoiding the use of common salt.

SULFUR

The Sulfur mineral is an amazing mineral that has a historical reputation for curing many ailments and alleviating the symptoms of many conditions. In third place behind calcium and phosphorus, Sulfur is the most abundant mineral in the human body. Every single living cell inside the body contains an element of Sulfur and it is also a component of amino acids which are seen as the building blocks of the body.

Sulfur also plays a significant role in the production of collagen, skin's best ally. Collagen is actually present in the skin's connective tissues and these tissues help maintain the skin's elasticity. Collagen also helps wounds heal better and faster.

Sulfur is also involved in cellular respiration, which in simple terms means it helps the cells use oxygen efficiently. The end results of this bodily function are improved cell activity and brain function.

Sulfur helps the body rid itself of toxins which is why it's known as a detoxifier. That's important because over time, toxins can build up inside the body and cause the immune system to weaken, or create an overall feeling of lethargy or even impair the body's own built-in cleansing system, the kidneys and liver. When the body is detoxified, it feels rejuvenated.

Sulfur has many anti aging properties and it helps relieve the symptoms associated with age related conditions such as arthritis. Sulfur has been used to relieve the symptoms of skin conditions such as eczema, psoriasis, diaper rash, hemorrhoids, dry scalp and acne. In fact, countless ointments, creams, lotions and other types of skin care products contain Sulfur.

The main sulfur containing foods are radishes, carrots, cabbage, cheese, dried beans, fish and eggs. There is no recommended dietary allowance. But a diet sufficient in protein will generally be adequate in sulfur. Since most people get sufficient quantities of Sulfur from their diets, instances of Sulfur deficiency are extremely rare. Symptoms of Sulfur Deficiency may include skin problems or disorders, muscle pain, nerve disorders, circulatory trouble, arthritis, inflammation, damages resulting from free radicals, stress, infection, constipation and wrinkles.

TIN

Tin is possibly an essential element for animals, but no specific role for tin in human health has been identified. Some scientists suspect that extremely small quantities of tin are necessary for some species of animals, such as rats, to grow and develop correctly. Some nutritional supplement retailers suggest that a deficiency in tin can cause baldness in humans, but that has not been proven. Actually, no specific function of any kind for tin has been identified in humans.

TITANIUM

Very little has been written on the biological role of titanium. Titanium has no known biological use in humans, although it is known to act as a stimulant. In some plants, titanium is used in chemical energy production. Titanium is used in prosthetics because it won't react with the biological tissues in the body.

TUNGSTEN

Opinions are mixed about the need for tungsten in plant and animal life processes, although it has been proved to be necessary for certain bacteria. This element has a small function in biological processes. Tungsten is used by certain non-oxygen consuming bacteria in extremely hot ocean environments, such as in hot ocean sediments and deep-sea ocean vents. The bacteria in these environments use tungsten to produce special chemicals called enzymes, which are necessary for certain life processes. Exactly how

tungsten is used by these unique and interesting bacteria is quite complex and beyond the scope of this discussion.

It is not known if humans need tungsten for good health. Tungsten is thought to be used by a small number of enzymes in a fashion similar to molybdenum. Here's how it might be important.

The enzymes described above are in a class of enzymes that perform important tasks for human health. However, the enzymes in this class that humans use incorporate molybdenum, not tungsten, into their structures. Some sources indicate that tungsten is important to humans. But their reasoning is faulty: (a) tungsten is in some of the enzymes of enzyme class "x" (b) some enzymes of class "x" are important to human health (c) therefore, tungsten is important to human health.

VANADIUM

Vanadium has recently been declared by some scientists to be essential for good human health. It is believed that vanadium is involved in helping the body convert some foods into energy. It has also been suggested that diabetics may benefit from vanadium when trying to stabilize blood sugar levels. This element is also thought to help bones and teeth form properly.

There is not a great deal of scientific knowledge as to the exact importance of vanadium. Actually, no specific symptoms of vanadium deficiency have been identified in human beings. It is possible that not getting enough of this element may affect the body's ability to control blood sugar levels and contribute to developing diabetes or hypoglycemia (abnormally low blood sugar levels). Some scientists suspect that a deficiency of this mineral may increase the chance of getting kidney and heart disease. Some research has also shown that vanadium may slow the growth of tumors and provide protection against the development of breast cancer. But more research is clearly needed to determine its exact role in human health.

As is the case with most, if not all, of the biologically important elements, it is easy to get enough of this element from a healthy, balanced diet. Good sources of vanadium include seafood, mushrooms, olives, whole grain breads, carrots and vegetable oils.

ZINC

There are about 2 g. of zinc in the body where it is highly concentrated in the hair, skin, eyes, nails and testes. It is a constituent of many enzymes involved in metabolism. Zinc is a precious mineral. Our need for this mineral is small, but its role in growth and well-being is enormous, starting before birth. It is needed for healthy skin and hair, proper healing of wounds, successful pregnancies and male virility. It plays a vital role in guarding against disease and infection. It is needed to transport vitamin A to the retina. There are 156 enzymes that require zinc for their functioning. It has long been known that growth and sexual maturity depend on zinc.

The main dietary sources of zinc are milk, liver, beans, meat, whole grains, nuts and seeds. The recommended dietary allowance of zinc is 15 mg daily.

Deficiency can result in weight loss, [skin diseases](#), and loss of hair, poor appetite, diarrhea and frequent infection. Those suffering from rheumatoid arthritis may have a zinc deficiency. Heavy drinkers lose a lot of zinc in their urine.

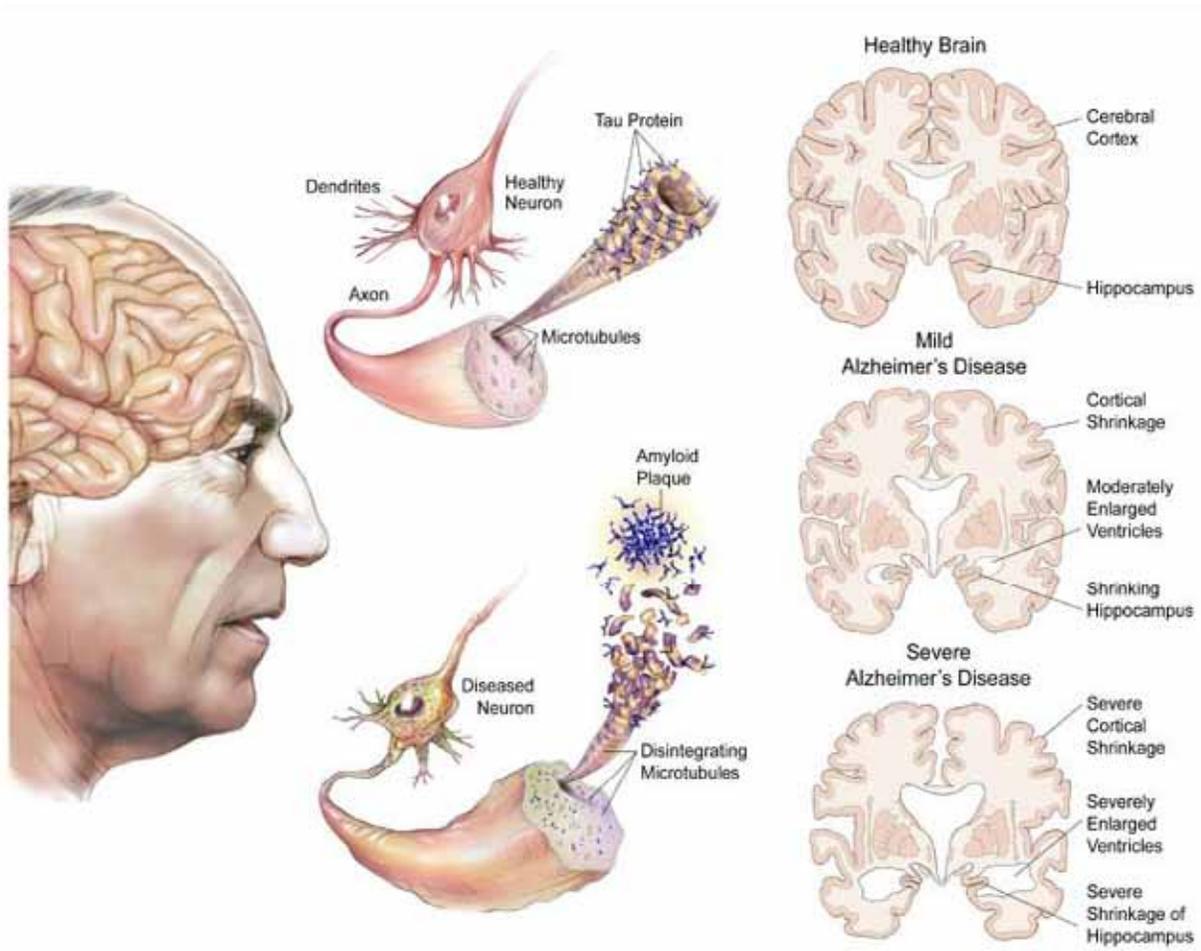


Figure 17

Zinc deficiency may contribute to copper excess. Studies also show that zinc can inhibit amyloid-induced production in neuronal filaments. Zinc deficiency is widespread in the population due to depleted soils and refined food diets. Copper excess and zinc deficiency are common on hair mineral analysis tests and it will have a bad impact on the brain. Thus, zinc deficiency leads to **Alzheimer disease** and symptoms of this disease usually begin with short-term memory loss and at times other mental disorders including depression, anxiety, delusions, odd behaviors and hallucinations.