

**The Necessity of Minerals in Food  
&  
The Role of Elements/Minerals in Life Processes  
Updated 08. 07.12 Work in progress.**

- “There is one rule in the garden that is above all others. You must give to nature more than you take. Obey it, and the Earth will provide you in glorious abundance” - Don Weaver
- “We have everything to gain by re-mineralizing the soil, and everything to lose by failing to do so” - John Haymaker
- “Soil is the basis of all human life and our only for a healthy world: All of life will be either healthy or unhealthy according to the fertility of the soil. Minerals in the soil control the metabolism of cells in plant, animal and man. Diseases are created chiefly by destroying the harmony reigning among mineral substances present in infinitesimal amounts in air, water and food, but most importantly in the soil” - Dr. Alexis Carrel. [Winner of Nobel Prize for Medicine]

## **INTRODUCTION**

The scope of this piece is merely to highlight a field of study that is more or less unknown to most people.

Minerals are the invisible ingredients that play a vital role in almost every reaction that takes place within the billions of cells in our body. Their functions range from enabling enzymes to activating chemical reactions, and from building good bone structure to promoting healthy brain functions.

Everything around us is composed of chemical elements. Elements are the basic building blocks of our lives. Elements combine with one another in different proportions to form everything from the air that we breathe, to the wood that we use to build our homes, to our own bodies

Since the body cannot manufacture minerals itself, we have to ingest minerals from the food we eat. The problem begins here, as today the soil does not contain the essential minerals it once did. All elements have a key function in helping plants and animals live and be healthy. It must immediately be pointed out that science has not discovered the role of each element, but recent research, for instance, highlights the importance of Arsenic (As) in diet and health.

If it is demanded of science to prove the importance of each and every mineral, the task will never be completed. Apart from investigating each mineral, we also have to screen the mineral matrix for possible synergy's that exist.

For instance, Magnesium and Calcium work together as partners in that Mg enhances the absorption of Ca in the intestine.

If that weren't enough, about 300 different enzymes depend on magnesium to perform their duties; particularly those that make adenosine triphosphate (ATP), the fuel that powers our body and those that assist in the construction of DNA and RNA.

A true factorial analysis of the 70+ minerals found in this product will run into  $1.1978571669969892e+100$  permutations. An impossible task. **The holistic ingestion of minerals is a safer option than buying single minerals across the counter.**

To further obfuscate our examination of the need of minerals is the vexing principle that ultra-small doses of a mineral is often essential for life, yet the same mineral in larger doses can be toxic.

Thus we are appointed on gathering empirical data to aid us in this argument.

The departure point is that our minerals get mobilised and become available to us in the foods we eat. Their source is the soil, where the minerals present, get mobilised by bacteria or enzymatic reactions.

All plants do not fix the same amount of any one element. Hence the notion that iron (Fe) is found in spinach and potassium (K) in bananas. However, it is more or less common dictum now, that we have seriously demineralised our soils. Two people can be referred to as the “fathers” of re mineralisation

- German nutritional biochemist Julius Hensel pioneered Soil Remineralisation in the 1880s with his book “Bread from Stones”
- John Haymaker applied this actively in 1976. He remineralised his soil. The following year, in an area of sparse rainfalls and dry summers, with no irrigation, his corn produced 65 bushels per acre, compared to yields of less than 25 from other local farms.

Moreover, when independent analyses were done, Hamaker's corn was found to contain 28% more protein, 47% more calcium, 57% more phosphorus, 60% more magnesium and 90% more potassium than the same type of corn grown with chemical fertilizers nearby. It is safe to assume that the entire mineral profile of his crop increased way above the levels of his neighbors.

Animals use different chemical elements for different functions. For instance, Calcium is used to build strong bones and fluorine makes teeth healthier. As animals consume these elements through daily functioning, the minerals have to be replaced in order to stay healthy and strong. The greatest source of these elements is through food eaten.

For the sake of this article, I am going to switch between human and animal biology. In some cases, benefits to humans can be applied directly to animals, in cases where some of the major elements that animals use to function properly are described in the following paragraphs. Some surprising minor elements are also described.

The full extent of the pathological consequences of marginal or deficient intakes of the trace and ultra-trace elements has not been established, which makes it difficult to tabulate deficiency signs and symptoms, and to give dietary recommendations, for humans. Mineral elements probably are of more practical nutritional importance than currently recognized.

Some elements are used for curing disease like Germanium, Caesium, Gold and Silver. No dietary recommendation seems to exist. However these elements seem to be able to affect cures. Common sense would suggest that modern day diets are lacking in these elements.

Although cross over in the usage of elements between humans and animals can be complex and are not always proven, we as humans occupy the same ecological niche as animals and we can deduce that importance to a human can be interpreted as importance to an animal

Finally, the medical and agricultural fraternity is slowly realising that possibly the biggest lack in diet today is that of minerals. Plant more than double their biomass when grown with a cocktail of minerals – and not the water soluble forms either – people that have consumed this product

With Effective Microbes report on the alleviation of a plethora of niggles and ailments. Although these hardly constitute proper medical research, it points us in a direction that cannot be ignored.

### **Trace Element Effects**

While getting a sufficient amount of trace elements will contribute to overall health and wellness, deficiency of any single trace element can cause a host of problems for a person's health. Some trace element deficiencies are even to blame for mood shifts and mood swings. Trace elements' effects are so far-reaching that they can even affect a person's life expectancy. Sadly; modern methods of cooking, preserving and farming often remove trace elements and other essential minerals from the foods we eat. This is why supplements are often necessary for us to receive all vital trace elements. The body uses minerals as catalysts for every metabolic function, including the absorption of vitamins and other nutrients from the foods we eat. While science is still learning the extent of the role that minerals play, we do know that trace minerals are essential for good health.

### Existing Trace Elements

While the biotic importance of some trace elements is still being discovered and their effects are still being studied, researchers have determined that these trace elements are vital to the health and well-being of people, animals and organisms alike:

Aluminum	Antimony	Barium	Beryllium	Bismuth	Boron
Bromine	Cadmium	Caesium	Cerium	Chromium	Cobalt
Copper	Gallium	Germanium	Gold	Indium	Iodine
Iridium	Iron	Lanthanum	Lead	Lithium	Magnesium
Manganese	Mercury	Molybdenum	Nickel	Niobium	Osmium
Palladium	Platinum	Radium	Rubidium	Selenium	Silicon
Silver	Strontium	Tellurium	Thallium	Thorium	Tin
Titanium	Tungsten	Vanadium	Zinc	Zirconium	

#### Aluminum (Al) In Mineral Powder YES

Until recently, aluminum was thought to be useless to life processes. It is now thought to be involved in the action of a small number of enzymes. For a technical explanation: "it may be involved in the action of enzymes such a succinic dehydrogenase and d-aminolevulinate dehydrase (involved in porphyrin synthesis)."

Even if this element is necessary for some life function, the amount necessary is greatly exceeded by our incidental intake through our drinking water, food, deodorants and some antacids. Aluminum is relatively benign, and it is used in food additives and indigestion pills. It has been linked to Alzheimer's disease and the body has a hard time ridding itself of excess aluminum. Aluminum is somewhat more toxic to plants.

#### Arsenic (As) In Mineral Powder YES

Despite Arsenic's reputation as a highly toxic substance, this element may actually be necessary for good health. Studies of animals such as chickens, rats, goats and pigs show that it is necessary for proper growth, development and reproduction. In these studies, the main symptom of not getting enough arsenic was retarded growth and development. It is suspected, but not known, that arsenic is necessary. It is thought to be necessary for the functioning of the nervous system and for people to grow properly.

#### Boron (B) In Mineral Powder YES

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. 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.

Animals 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 animals could not survive without it.

### **Cadmium (Cd) In Mineral Powder YES**

It is believed that cadmium is a trace element with some necessary role in life processes, although its need and use are not currently understood. It is thought to be involved with the metabolism its status as an essential trace element remains unclear.

### **Calcium (Ca) In Mineral Powder YES**

Calcium is an extremely important element; it is one of the most abundant elements and accounts for 2 to 3 pounds of total body weight. Calcium is important in building and maintaining strong bones and teeth, but it is also important for many other things. It helps control things like muscle growth and the electrical impulses in the brain. This vital element is also necessary to maintain proper blood pressure and it makes blood clot at a wound site. Calcium also enables other molecules to digest food and make energy. Increasing calcium intake in the diet is believed to lower high blood pressure and prevent heart disease. It is also used to treat arthritis.

Lack of Calcium can induce leg cramps, muscle spasms, bones may become brittle and there is even the increased risk of colon cancer. Also, when animals don't get enough calcium in their diets, their bodies will actually use the Calcium that has been stored in their bones. This makes the bones thinner and more brittle. In growing children and teenagers the bones may not develop fully and the person can enter adulthood with brittle bones. Further calcium deficiency can lead to serious problems.

### **Carbon (C) In Mineral Powder YES**

The element carbon is perhaps the single most important element to life. Virtually every part of our bodies is made with large amounts of this element. The carbon atom is ideal to build big biological molecules. The carbon atom can be thought of as a basic building block. These building blocks can be attached to each other to form long chains, or they can be attached to other elements.

This can be difficult to imagine at first, but it may help to think about building with Legos. You can think of carbon as a bunch of red legos attached together to form one long chain of legos. Now, you can imagine sticking yellow, blue and green legos across the tops of the red (carbon) legos. These other colours represent other elements like oxygen, nitrogen or hydrogen. As you stick more and more of these yellow, blue and green legos to the red chain, it would start to look like a skeleton of legos with a "spine" of red legos and "bones" of yellow, blue and green legos. This is a lot like the way that big molecules are made in the body. Without carbon, these big molecules could not be built.

Now, virtually every part of your body is made up of these big molecules that are based around chains of carbon atoms. This is the reason we are known as "carbon based life

forms". Without carbon, our bodies would just be a big pile of loose atoms with no way to be built into a person.

### **Chlorine (Cl) In Mineral Powder YES**

This element is essential to life - we would die without it. Chlorine is found throughout the body; in the blood, in the fluid inside cells and in the fluid between cells.

Along with sodium and potassium, chlorine carries an electrical charge when dissolved in body fluids. This is why these elements are termed "electrolytes". The electrical charge that these elements carry is what allows nerve cells to work. Chlorine also works with potassium and sodium to regulate the amount of fluids in the body and to regulate pH in the body. This vital element also helps muscles flex and relax normally.

Stomach acid is a compound of hydrogen and chlorine (hydrochloric acid, or HCl). Logically, chlorine is extremely important in the proper digestion of food and to absorb the many other elements that are needed for survival. Excessive vomiting can lead to a serious loss of chlorine in the body. This can lead to a dangerous imbalance of pH in the body, which can cause muscle weakness, loss of appetite, dehydration and coma.

It is easy to get enough chlorine from natural, unprocessed foods, and deficiencies of this important element are rare

### **Chromium (Cr)**

Chromium is an element that is essential to good 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 the body to absorb energy from ingested food and stabilizes the level of energy throughout the day.

The body need sufficient quantities of chromium to make many of the large biological molecules that helps life. This vital element can also help increase muscle mass while reducing fat mass. 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 the diet. Frequent exercise creates an especially high demand 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.

### **Cobalt (Co)**

Cobalt is another element that is necessary for good health. While cobalt has no specific function by itself, it forms the core of vitamin B-12. Without cobalt, Vitamin B-12 could not exist. The animal uses this vitamin for numerous of purposes. B-12 is necessary for the normal formation of all cells, especially red blood cells. Vitamin B-12 also helps vitamin C perform its functions, and is necessary for the proper digestion of the food. Additionally, vitamin B-12 prevents nerve damage by contributing to the formation of the protective sheath that insulates nerve cells.

A deficiency of vitamin B-12 can cause red blood cells to form improperly. This can prevent red blood cells from carrying enough oxygen from the animal's lungs to the different parts of its body, thus causing a condition called anemia. Symptoms of anemia include loss of energy, loss of appetite, and moodiness. B12 deficiency can also cause nerve cells to form incorrectly, resulting in irreversible nerve damage. Unlike other B complex vitamins, vitamin B-12 can be stored in the body. Because of this, it is very easy to get enough of this important vitamin in the diet. Deficiencies of B-12 are rare in young people, but do occasionally occur

in adults due to digestive disorders or poor absorption by the digestive system. Strict vegetarians are also at risk of B-12 deficiency, because vegetables do not contain this important vitamin. B-12 is only found in animal sources such as red meat, fish, eggs, cheese and milk. Fortunately for vegetarians, you can also get plenty of vitamin B-12 from most multivitamin pills.

### **Copper (Cu)**

Copper is an element that is very important for good health. Actually, that may be understating the true importance of this element. Copper is critically important for dozens of body functions.

To begin with, copper is a major component of the oxygen carrying part of blood cells. Copper also helps protect cells from being damaged by certain chemicals in our bodies. Copper, along with vitamin C, is important for keeping blood vessels and skin elastic and flexible. This important element is also required by the brain to form chemicals that keep animals awake and alert. Copper is also used to produce chemicals that regulate blood pressure, pulse, and healing.

Current research is looking into other ways copper can affect health, from protecting against cancer and heart disease, to boosting the immune system.

General symptoms of not getting enough copper in the diet include anemia (a condition in which the blood can't supply enough oxygen to the body), arthritis (painful swelling of the joints), and many other medical problems.

The lack of copper intake can cause the medical problems mentioned above and it can even affect life span. Copper is required for proper utilization of iron. Excess copper can significantly reduce absorption. Anemia is a sign of either copper or iron lacking in the dog's diet. Bone abnormalities may also occur with copper deficiency.

Copper is known to suppress pathogens and encourage the growth of beneficial organisms.

### **Germanium (Ge)**

Germanium is a trace element that some believe is highly beneficial to 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. Germanium has been implicated in the promotion of healthy oxygen flow to tissues and normal functioning of immune cells. Many view germanium as a substance that can help maintain healthy balance of body functions.

Germanium Helps to Support: Healthy airways and breathing, Mental health, Healthy cellular replication (of the breast, lung, larynx, and bladder), Liver health, Healthy and normal blood pressure, Healthy uterus, Healthy sinuses, Healthy brain tissue, Healthy blood glucose levels and Cardiovascular health.

Amyloidosis is a group of diseases that result from the abnormal deposition of a particular protein, called amyloid, in various tissues of the body. A mouse strain, ICR/SLC, was involved in spontaneous amyloidosis with high incidence. The amyloid deposition in this strain was seen mainly in the mucosal propria of duodenum and terminal ileum, liver, spleen, adrenal cortices, and renal glomeruli. The mice, orally administered more than 300 mg/kg of organic germanium for 22 months since 5 weeks old, did not develop amyloidosis. Conclusion is that Germanium offers protection against lifestyle (Dietary) diseases.

### **Iron (Fe)**

The element iron has many functions in the body. This element is used by the body to make tendons and ligaments. Certain chemicals in our brain are controlled by the presence or absence of iron. It is also important for maintaining a healthy immune system and for digesting certain things in the food that we eat. In fact, plays a vitally important part of how our body obtains energy from our food.

The iron we obtain from our diet is an essential part of hemoglobin - the part of our blood that carries oxygen. Iron is essential for blood to work efficiently. If we don't get enough iron in our diets, our blood won't carry enough oxygen to our bodies and we can feel tired, have decreased alertness and attention span and our muscles may not function properly. This type of iron deficiency is not uncommon among athletes, especially long distance runners. This is frequently the cause of fatigue among these athletes. If the lack of iron in our bodies is severe, we can get "iron deficiency anemia", which essentially means that our blood won't carry enough oxygen to our bodies so we can function normally. Iron deficiency anemia is probably the most common nutritional disease in the world, affecting at least five hundred million people.

Fortunately, it is easy to get enough iron in your food, if you eat a balanced diet. Many foods contain iron, and eating a wide range of foods can help most people meet their needs for this important element.

### **Magnesium (Mg)**

Magnesium is an element that is required for the proper growth, formation and function of bones and muscles. In fact, Magnesium and Calcium even control how muscles contract. Magnesium prevents some heart disorders and high blood pressure. Higher intake of Magnesium is also associated with improved lung function. Magnesium is used to help convert food into energy and it helps with the absorption of Calcium and Potassium. It also helps normal brain functioning. Magnesium helps to prevent depression.

Magnesium is essential in controlling insulin levels in the blood. This means that it is very important in the amount of energy that the body has to operate. It is suspected that taking extra magnesium might be beneficial for fatigue.

Magnesium is effective in treating numerous heart / lung diseases and has been used for over 50 years. Magnesium is closely associated with calcium and phosphorus [metabolism] both in its distribution and its metabolism.

Activates several enzyme systems and is a constituent of chlorophyll

Actively involved in photosynthesis.

### **Manganese (Mn)**

Manganese is actually an extremely important element that the body uses for a variety of things. For instance, we use it to make chemicals that help us digest the food that we eat.

Manganese also supports the immune system, regulates blood sugar levels, and is involved in the production of energy and cell reproduction. This important element is

also important for bone growth. Additionally, manganese works with vitamin K to support blood clotting. Working with the B-complex vitamins, manganese helps to control the effects of stress while contributing to one's sense of well-being.

It is suspected that not getting enough manganese can cause poor bone formation, affect fertility and the blood's ability to clot. Birth defects can possibly even result when an expecting mother doesn't get enough of this very important element. Some researchers are also looking into a link between poor manganese intake and higher skin cancer rates.

### **Molybdenum (Mo)**

Molybdenum 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 the proper function of several chemicals in the body. Some of these chemicals have the very important job of allowing the body to process the iron and nitrogen in our diets. Molybdenum is believed to be important in helping 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 the diet can cause mouth and gum disorders and can contribute to getting cancer. A diet high in refined and processed foods can lead to a deficiency of molybdenum, resulting in anemia (lack of oxygen in the blood), loss of appetite and weight, and stunted growth in animals.

The amount of molybdenum in plant foods varies significantly and is dependent upon the mineral content of the soil that the plants were grown in.

### **Nickel (Ni)**

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.

Some scientists think that nickel affects hormones, cell membranes and chemicals called enzymes. Whatever the case, nickel certainly appears to affect health, even though we do not know exactly how. Meats are typically low in this interesting element.

### **Phosphorus (P)**

Phosphorus is one of the most abundant minerals in the body, second only to calcium.

This essential mineral is required for the healthy formation of bones and teeth, and is necessary for animals to process many of the foods that are eaten. It is also a part of the body's energy storage system, and helps with maintaining healthy blood sugar levels. Phosphorus is also found in substantial amounts in the nervous system. The regular contractions of the heart are dependent upon phosphorus, as are normal cell growth and repair.

Since phosphorus is found in almost all plant and animal food sources, a deficiency of this mineral is rarely seen. Since phosphorus is important in maintaining the animal's energy system and proper blood sugar levels, it should seem logical that not getting enough of this mineral will affect the energy level in the entire body. Indeed, feeling easily fatigued, weak and having a decreased attention span can be symptoms of mild phosphate deficiency.

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

The body must maintain a balance between magnesium phosphorus, and calcium. Excess intake of phosphorus can occur in animals with diets high in processed foods leading to osteoporosis.

### **Potassium (K)**

The element Potassium is an extremely important element in the animal. Bodies are made up of millions of tiny cells, such as brain cells, skin cells, liver cells etc.. These cells make up the different organs in our bodies, such as the brain, skin, or liver. Potassium is extremely important to cells, and without it, life cannot exist.

Cells are the small building blocks of the body. In order to work properly, cells need to let things enter and leave them. Cells have many ways by which they can control what (and how much) enters and leaves. Most of the ways that cells do this requires potassium. In fact, without potassium, cells lose control of what can enter and leave them. As you can imagine, this could be very bad. Imagine a nerve cell in your finger for a moment.

Normally, it doesn't really do very much. But when you touch something, it sends messages down a chain of many nerves to your brain that help you determine what it is that you just touched. When a nerve cell does this, it actually pumps out chemicals, which give the message to the next nerve cell and eventually to the brain. Potassium helps control the release of those chemicals. Without potassium, the nerve cell couldn't send those messages to your brain.

But it is not just nerve cells that depend on potassium.

Most, if not all, of cells depend on it. Every time a muscle is flexed potassium is being used.

### **Selenium (Se)**

Despite selenium's reputation as a toxic heavy metal, this element is actually very important to good 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 immune systems to 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 tissues elastic.

A deficiency of this vital trace element has been linked to the development of leukemia, arthritis, and other diseases. Researchers have also found that the lower 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.

### **Silicon (Si)**

Few of us would consider that silicon is something bodies actually need to be healthy.

Silicon is indeed a very common mineral that is used, along with calcium, to grow and maintain strong bones. It is also important to the formation of connective tissues, like ligaments and tendons. Silicon is also important for the growth of hair, skin and nails.

Unfortunately, despite the fact that silicon is important to the body, there is comparatively little being done to learn more about why and exactly how it is important for good health.

It is possible that silicon is influential in preventing veins and arteries from getting hard and stiff, though there is no clear understanding of how this element affects artery hardening. Also, it is known that silicon reduces the effectiveness of aluminum in the body. It has been suggested that silicon may be able to delay or prevent Alzheimer's disease. But once again, it is unclear how silicon may affect this degenerative disease of the brain. A form of silicon is actually a home remedy for problems with weakening bones, painful joints and aging skin. Obviously it is the water soluble form of Silicon that is accessible to animals.

### **Sodium (Na)**

Sodium is an element that is vital to life. Together with potassium and chlorine, it forms a very important part of blood plasma. Without sodium, cells could not get the nutrients they need to survive. Sodium also allows our bodies to maintain the right blood chemistry and the correct amount of water in our blood. This element also allows muscles to contract normally. Furthermore, our bodies need sodium to digest the food that we eat. Normal functioning of our nervous system also depends on this important element.

Having the proper amount of sodium in blood is so important that animals have special ways to maintain the right levels of this important element.

### **Sulfur (S)**

Sulphur is an important element that is used in small amounts to help construct virtually all parts of the body. Sulphur helps protect the cells from environmental hazards such as air pollution and radiation. Consequently, Sulphur slows down the aging process and extends life span. Also, sulfur helps the liver function properly; helps digest the food eaten and then turn that food into energy. Sulphur is also important for helping blood clot. Additionally, sulfur is an important part of vitamin B1 and insulin. Sulphur is also an important part of a substance that keeps skin supple and elastic.

### **Tin (Sn)**

Tin is possibly an essential element for animals. Scientists suspect that extremely small quantities of tin are necessary for growth and correct development.

### **Titanium (Ti)**

Very little has been written on the biological role of titanium. Titanium has no known biological use although it is known to act as a stimulant. In some plants, titanium is used in chemical energy production.

Titanium is nontoxic even in large doses and does not play any known natural role inside the human body. An estimated 0.8 milligrams of titanium is ingested by humans each day but most passes through without being absorbed. It does, however, have a tendency to Bio-accumulate in tissues that contain silica.

An unknown mechanism in plants may use titanium to stimulate the production of carbohydrates and encourage growth. This may explain why most plants contain about 1 ppm of titanium, food plants have about 2 ppm, and horsetail and nettle contain up to 80 ppm. Interesting to note that in herbal cancer treatments – plants with a high Titanium content plays a significant role.

Titanium was qualitatively detected in leukocytes, using electron probe microanalysis. There are some indications that Titanium levels in the blood may change in a variety of diseased states.

### **Tungsten (W)**

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.

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 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 life.

### **Zinc (Zn)**

Zinc has been recognized as an essential trace element for plants, animals and humans for more than 70 years. Though the average adult body only contains between 2-3 grams of zinc. This element has some very important functions. Zinc is involved in well over one hundred different reactions in the body.

Some of these reactions help with the construction and maintenance of DNA, the molecule that controls how every single part of the body is made and works. Zinc is also needed for the growth and repair of tissues throughout the body. This extremely important element is used to form connective tissue like ligaments and tendons. Teeth, bones, nails, skin and hair could not grow without zinc.

Zinc is widely considered by doctors to be one of the most important elements to a healthy immune system. This unique element is essential for the creation, release and use of hormones in the body. It helps developing fetuses grow correctly and brains to work right.

Additionally, the senses of sight, taste and smell depend on this element.

Not getting enough zinc can have serious effects on health. Some of the symptoms of zinc deficiency include hair loss, mental apathy and damage to reproductive organs. Decreased growth rate and impaired mental capacity are other symptoms. Additionally, you can lose most of your senses of taste and smell, develop mental disorders and men can even become impotent and aggressive without enough zinc.

Many factors affect how well bodies absorb zinc in the food eaten, and at times it can be difficult to get enough zinc - even from a well-balanced diet.

Zinc is necessary for normal bone, muscle and hair growth. Deficiencies exhibit as emaciation, general debilitation, and retarded growth. Occasionally hair quality and texture will be affected

Zinc is known to suppress pathogens and encourage the growth of beneficial organisms.

### **Strontium (Sr)**

Strontium has recently been rediscovered as being an essential substance in helping to prevent osteoporosis and the only one that has the ability to regenerate, preserve, and even

restore bone growth. Research has shown that strontium was vital to a healthy skeletal system.

More significantly, a French researcher went so far as to report that a lack of Strontium in the diet caused defective mineralization of the bones and teeth in his lab animals, suggesting that mammals need the mineral for normal skeletal development and suffer from a deficiency if they do not obtain it in their food – just as they would if their diets lack calcium, magnesium, or zinc. 99% of the mineral is concentrated in the skeletal system.

Scientists then began adding it to the animal's diet and found that the bony "dentine" tissue in their teeth increased. They also noted that healthy teeth contained more strontium than those with cavities. In addition, people living in areas where Strontium was higher in the drinking water had fewer incidents of dental caries – a finding that was subsequently reinforced by eight more studies over the next few decades.

Strontium causes baby osteoblasts to multiply more quickly. There is also a notable increase in the synthesis of DNA in these cells. With all the new osteoblasts on hand, bone tissue cultures exposed to strontium synthesize more bone matrix (the mineral-enriched collagen that forms the foundation of bone tissue). Strontium also appears to draw extra calcium into bones.

Until recently, it has been thought that, because of its chemical similarity to calcium, strontium could replace it somewhat in various body processes, including replacing a small proportion of the calcium in such calcified tissues as bones and teeth. However, this theory is now being ruled out since the amount of calcium appears to have no effect on these parameters or from ranelic acid, the inert acid salt to which strontium has been bound in many of the more recent clinical trials.

Instead, scientists are seeing that there is a receptor in osteoblasts which responds specifically to strontium and is unaffected by calcium, aluminum, or any other metallic element. This would be consistent with the understanding that while calcium is necessary for building new bone, it does not *stimulate* that growth – although an abundance of calcium does help to suppress bone tear down.

### **Lithium (Li)**

Lithium's nutritional importance as a trace element has long been suspected by researchers. Several research studies have confirmed that link between high levels of lithium in tap water and low incidences of suicides, admissions to mental hospitals, murders and rapes i. e. a mood alleviator. In addition, research both in animals and humans showed that lithium influences several functions in the body, including the distribution of sodium and potassium, which regulate impulses along the nerve cells.

Lithium can affect the activity of neurotransmitters and biological systems because it alters the way in which a variety of messages are transmitted after they reach their target

### **Barium (Ba)**

The dietary difference in barium is sustained most strikingly in barium contents of bone, crowns, dentine, and enamel, and it is suggested that this element merits further investigation for a possible role in dental health.

### **Gold (Au)**

Gold compounds have been used for the treatment of rheumatoid arthritis and other auto immune diseases for more than 75 years. Researchers report that special forms of gold, platinum, and other classes of medicinal metals work by stripping bacteria and virus particles from the grasp of a key immune system protein.

The researchers found that gold were just one member of a class of metals, that all render MHC class II proteins inactive.

In subsequent experiments in cell culture, gold compounds were shown to render the immune system antigen presenting cells inactive, further strengthening this connection. These findings now give researchers a mechanism of gold drug action that can be tested and explored directly in diseased tissues.

### **Platinum (Pt)**

Platinum is used to promote normal cell replication. It also helps support a healthy immune system. Platinum is a trace element that helps promote healthy functioning of normal tissue.

Platinum promotes healthy ear functioning by helping the removal of toxins from the body. It also enables tissue metabolism for healthy skin.

Platinum is a trace mineral that has been suggested to help the body in nerve and muscle function. It has also been linked to increased mental alertness and increased energy. Proper platinum reserves encourage mental health and well-being and even sobriety.

Ideal platinum levels can even promote self-preservation and a positive outlook. Researchers found that platinum were just one member of a class of metals, including a special form of gold, that all render MHC class II proteins inactive.

### **Caesium (Cs)**

The chloride salts of caesium (Cs<sup>+</sup>) were evaluated for its ability to influence the growth of Sarcoma I implants in A/J mice. The administration of daily doses reduced the incidence and size of tumor implants. Because of the similarities that existed between caesium and potassium, it was postulated that the effect of caesium was due to alterations in the intracellular composition of the tumor cells. Also, the possible role of cytotoxic agents in potentiating the inhibitory effect of caesium on tumors was discussed.

### **Vanadium (V)**

Vanadium has recently been declared by some scientists to be essential for good health. Vanadium has shown promise in research trials helping the body achieve healthy sugar levels. It may help promote healthy glucose levels in people with a lack of sensitivity to insulin by increasing this sensitivity. Because of this, Vanadium compounds have been termed "insulin-mimetic."

Vanadium containing compounds have also recently been indicated in their ability to help promote healthy cellular replication in the body. This element is also thought to help bones and teeth form properly.

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.

Once absorbed, it is readily transported across membranes and binds to Protein (Transferring and Lactoferrin), and, substituting for phosphate, it can mimic cuclic adenesine

mono-phosphate. As a peroxovanadate, it can reduce free radical generation and mimic insulin.

In research animals, a diet deficient in Vanadium has led to symptoms including growth retardation, bone deformities, and infertility. Shortages of Vanadium also caused reduced intake of food, reduced milk production, bone abnormalities and impaired reproduction, small litter size and high mortality in the kids and does when compared to the control group. Some research has also shown that vanadium may slow growth of tumors and provide protection against the development of breast cancer.

### **Scandium (Sc)**

Recent research has shown that as Scandium levels increase, the risk of acute myocardial infarction decreases.

### **Bismuth (Bi)**

There is empirical and anecdotal data that proves that Bismuth kills *Helicobacter pylori* – the bacterium that causes Peptic ulcers

### **Lead (Pb)**

For all the toxicity touted for lead, and yes it is toxic in larger amounts, plasma lead binds mostly to albumin, blood lead to hemoglobin and some lead binds a low molecular weight protein in erythrocytes. Lead also facilitates iron absorption and/or utilization

### **Silver (Ag)**

Silver deficiency is responsible for the improper functioning of the immune system, and silver does more than just kill disease causing organisms; it also causes major growth stimulation (another criterion of injured tissue). When enough silver was present in a body, human fibroblast cells were able to multiply at a great rate, producing large numbers of primitive, embryonic cells in wounds that are able to differentiate into whatever cell types that are necessary to heal the wound.

### **Rubidium (Rb)**

Rubidium was reported to be necessary for normal reproduction in animals. Shortages cause higher incidences of abortion, lower birth weights and lower weaning weights and increased mortality when compared to the control group.

### **Tantalum (Ta)**

Tantalum is well tolerated by the body and there is evidence that it accelerates bone growth during bone injuries.

### **Uranium (U)**

We are not discussing the radioactive isotopes of Uranium here, but natural Uranium. The kidneys and bones are the principal sites of accumulation. Following uranium administration, 80% is deposited in the urine and faeces, 10% is deposited in the kidneys and the remaining 10% is deposited in the skeleton with negligible concentrations appearing in other tissues.

The skeleton is the major site of long-term storage of uranium. Several studies have reported the amount of uranium in the skeleton of persons with no known occupational exposure to uranium.

### **Zirconium (Zr) and Hafnium (Hf)**

Zirconium is found in all animal tissues. Hafnium is found associated in ALL its terrestrial occurrences in tissue. The two chemicals are more closely identical in their chemical properties than is any other pair in the periodic table. The similarity is so great that no other qualitative differences have yet been found that would permit their separation. The body's need for these elements which are present – remains unexplained for the moment.

### **Antimony (Sb)**

Antimony has been used since antiquity as a medicinal, to induce emesis and to treat other conditions. Antimony tartrates are even used in the treatment of bilharzia (schistosomiasis). Several studies that have monitored the disposition of antimony in experimental animals indicate that antimony mostly concentrates in the skeleton, liver, spleen, lung, fur/pelt, adrenal and thyroid. Again, lethal and therapeutic doses are well known, but the operational mode of these elements in the body is not known.

### **Palladium (Pd)**

Palladium Lipoic Acid acts by modulating cellular energy helping the human body build up the immune system and have an energetic life. It is used as a variant in the nutritional supplement Poly-MVA.

Palladium Lipoic Acid has been found to have a neuroprotective effect, which has been proven in laboratory tests conducted on certain species of animals. Laboratory tests are being conducted on LAPd complexes to check their effectiveness as effective nontoxic anti-neoplastic agents. Hence Poly-MVA that is a variant of Palladium Lipoic Acid (LAPd) acts as an antioxidant supplement and helps us lead a life free from many diseases. In the Palladium Lipoic Acid formulation Palladium serves as a shipping mechanism to facilitate the uptake of Lipoic acid.

Palladium Lipoic Acid (LAPd) complex serves as a powerful treatment to any kind of cancer. Lot of research has been done on the subject and results prove that LAPd complex when taken as a nutritional supplement like Poly-MVA acts as a cancer deterrent.

Palladium is a rare metal which is bonded to alpha Lipoic acid to form a powerful formulation which acts as a deterrent to many diseases such as diabetic neuropathy, retinopathy which causes blindness, helps in increasing metabolism, keeps blood sugar levels under control etc.

### **Iridium (Ir) and Ruthenium (Ru)**

Iridium and Ruthenium - The "May 1995 issue of Scientific American, have been reported to have to be anti-cancerous, the effect of Ruthenium in relation to human DNA, it has been disclosed that Ruthenium atoms placed at each end of a short strand of DNA caused super conductivity that caused defective DNA to correct and repair its self.

### **Rhodium (Rh)**

Affects cellular health by providing one of the components nature intended the body to use in repairing of DNA & the repairing or destruction of damaged cells.

Rhodium is stable as a 5 atom cluster; anything smaller can break down to the ionic or ORME state in the body. Gland associations: rhodium mainly affects the thymus.

### **Gadolinium (Gd)**

Alcohol feeding and SNP increased hepatic and pancreatic injury compared with SNP alone. Gadolinium chloride and glycine improved hepatic micro circulation. In contrast, pancreatic and hepatic morphological damage was reduced by gadolinium chloride but not by glycine. Gadolinium chloride reduces both micro circulatory and morphological damage.

### **Holmium (Ho)**

Holmium's biological role has not been defined fully. It is considered one of the least abundant elements present in human body.

It has been noted that holmium stimulates the metabolism of the body and negatively affects metabolism in certain bacteria, but no one really knows what, exactly, it does.

### **Neodymium (Nd)**

Neodymium is present in the human body in small amounts. Highest concentration is found in the bones suggesting that it plays a role in bone biology.

### **Erbium (Er)**

Recent studies suggest that it might help with metabolism in the human body.

### **Tellurium (Te)**

Recent results imply that Tellurium may serve as anti-inflammatory agent through down-regulation in iNOS and NO as well as in IL-6 production. It possesses protective anti-inflammatory capabilities.

Squalene monooxygenase is a flavin adenine dinucleotide, containing, microsomal enzyme that catalyses the second step in the committed pathway for cholesterol biosynthesis. The present work implicates the involvement of cysteine sulfhydryls in the inhibition of squalene monooxygenase by tellurium compounds.

Sulfhydryls have been implicated as targets for tellurite binding in other enzymes (16, 17), and the organotellurium compound AS101 was shown to selectively inhibit cysteine proteases by reacting with active site thiols – in short, it is utilized by the body to control cholesterol.

### **Lanthanum (La)**

Lanthanum carbonate is used in medicine as a phosphate binder. It is prescribed for the treatment of hypophosphatemia, primarily in patients with chronic kidney disease. It is taken with meals and binds to dietary phosphate, preventing phosphate from being absorbed by the intestine.

### **Indium (In)**

It is a rare trace (or micro-) mineral believed to support several hormonal systems in the body and may elevate immune activity and reduce the severity and duration of a plethora of human conditions. It is believed that indium may provide aid to the hypothalamus and pituitary glands.

These two master hormone producers have the job of maintaining optimal output of hormones for the body.

Once balance is achieved, a great many other hormone-producers become stimulated, causing a domino effect and help retard aging and various health problems. It seems to enhance food and mineral absorption by the body. It even has been found to aid in the utilization of other essential trace elements. It is not found in food or water; in fact, although it is not ordinarily found in the human body at all after approximately 25-30 years of age, those people taking indium experience beneficial results immediately.

Some of the short-term benefits reported by many indium users include: increased energy, an enhanced sense of well-being – the so-called "indium high", and a reduced need for sleep. Long-term benefits of indium include (but are not limited to) a gradual correction of many chronic illnesses such as: ADD, improved blood pressure, stress-related problems, healthier body weight, autism, and a reversal of visible signs of aging.

It is believed that when taking indium one feels rejuvenated and energized because the hormonal system is working better.

### **Rubidium (Rb)**

Helps in the prevention of diabetes: The mineral rubidium plays an essential role in the synthesis of enzymes. One such enzyme that rubidium helps to create is very essential for the proper absorption of glucose in your body.

Maintains hormonal balance: Studies have revealed that rubidium enhances the production of many hormones and various enzymes.

Aids in the regulation and absorption of iron: Rubidium has been shown to help regulate the flow of iron into the bloodstream, which in turn helps in better absorption of iron. When there is enough iron present in your blood, rubidium acts as a block and stops more iron from being let into the blood.

Helps in depression: Initial results of medical studies have shown rubidium to be very useful in the synthesis of serotonin. It also ensures presence of enough serotonin in your body.

### **Praseodymium (Pr)**

Stimulates metabolism.

NO DATA – Although these elements may be found in a healthy body, it plays no known biological role known to medical science.

Nb = Niobium

Hg = Mercury

Th = Thorium

Y = Yttrium

Yb = Ytterbium

Eu = Europium

Lu = Lutetium

Dy = Dysprosium

Be = Beryllium

Sm = Samarium

Tb = Terbium

Tm = Thulium