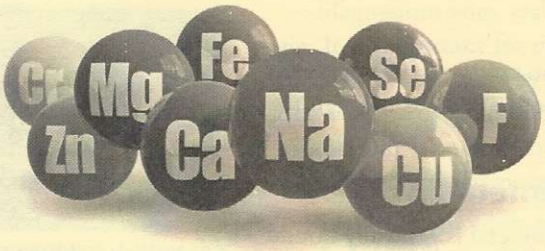
Mineral Deficiencies and Disease



Healing the Body with Calcium, Magnesium, Potassium and other Major Minerals

At one time, people obtained all the nutrients their body needed from the food they ate. That is no longer the case in modern society, particularly when it comes to minerals. Minerals must be present in the soil in order for plants (and the animals which eat them) to obtain them. Plants also need the assistance of fungi and bacteria in the soil to be able to properly absorb minerals. Our bodies can't efficiently extract minerals directly from the soil and must obtain them primarily from foods. If sufficient minerals aren't in the food we eat, we've got a problem.

When it comes to minerals, modern society is in trouble because modern agricultural practices have greatly depleted mineral content and availability. NPK fertilizers that contain nitrogen, phosphorus and potassium are popular because they help make plants grow but they don't replace all the minerals taken from the soil by previous crops. Thus soils have lower mineral content than they did just 100 years ago.

To compound the problem, the use of chemicals like pesticides and herbicides on the land has diminished the healthy microflora in the soil. So, even when minerals are available in the soil, plants may not be able to utilize them. It is a similar problem to what happens when antibiotics destroy the friendly flora in the intestinal tract, reducing the ability to assimilate nutrients.

This depletion of the soil didn't happen overnight. It has been going on for many decades. In 1936, *Senate Document 264* warned that the depletion of trace minerals in our soil would eventually lead to a national crisis and a dramatic increase in mineral deficiency diseases. And in 2001, the *Journal of Complimentary Medicine* pointed out that the U.S. and U.K. government statistics showed a decline in trace minerals of up to 76% in fruit and vegetables from 1940 to 1991.

This decline in soil health is one of the reasons why many people are overfed and undernourished. This is also why mineral supplementation may be essential for most people in modern society to maintain optimal health.

In this issue we'll cover some of the major minerals necessary for human health, which include the four major mineral electrolytes, calcium, magnesium, sodium, and potassium, as well as phosphorus, iron, and silicon. Our next issue will cover other trace minerals.

Understanding Mineral Nutrition

Having an understanding of how minerals are absorbed and utilized will help you know choose how to supplement with them better. The minerals calcium, magnesium, sodium, and potassium are electrolytes. They are all alkaline and combine with acidic minerals like phosphorus, chlorine, and sulfur to form mineral salts. These salts occur naturally in the foods we eat and in our bodies. We're all familiar with one of these salts, sodium chloride or table salt. Another major salt is calcium phosphate, which is the primary mineral salt that makes up bone.

Minerals also occur in protein matrices in living tissue. For instance, there is an iron molecule at the center of a protein called heme, which is part of hemoglobin. The magnesium molecule is found in the protein matrix of chlorophyll, the compound that makes leaves green and photosynthesis, the process of capturing energy from the sun, possible.

During digestion, these proteins are broken apart by the action of hydrochloric acid and enzymes. This releases minerals in an ionic form, that is, a single atom of that mineral. The

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Important Notice

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Managing Editor/Writer: Steven Horne
Editor: David Horne
Associate Editors: Carolyn Hughes, Katie Horne

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ionic minerals typically bond to amino acids or fatty acids for transportation across the intestinal membranes and through the blood.

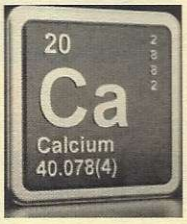
Mineral Supplements

To create a mineral supplement, a mineral is generally bound to a chelating agent, a substance that attaches to the mineral to form a bond like those found in the previously mentioned mineral salts or protein complexes. Some of the common chelating agents include organic acids like citric for fumaric acid, and amino acids like glycine.

Some of these forms are more easily broken down in digestion than others, and some forms appear to be more effective than others. Therefore, it's important to consider the form of the supplement, not just the mineral itself, when picking out supplements.

It's also important to understand that both mineral supplements and the minerals bound in proteins require hydrochloric acid in the stomach to break the bond and release them into an ionic form for absorption. This is especially true for mineral supplements because they are harder to break down and absorb than the minerals found in food.

It's also a good idea to take the mineral supplements with foods, especially ones that are naturally high in that mineral, as this increases absorption and utilization. With that framework, let's look at the individual minerals, what they do, and different ailments where supplementation may be useful.



Calcium

Calcium is the most abundant mineral in the human body because it is the major mineral found in the bones and teeth. Besides being a key component of body structures, calcium plays important roles in muscle contraction, heart action, nerve impulses, and blood clotting.

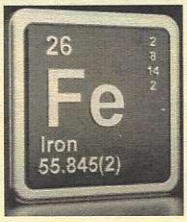
Calcium is also the most widely taken mineral supplement, but calcium, by itself, is not sufficient to ensure healthy bones and teeth. In fact, many of the problems people have with getting enough calcium have little to do with a lack of calcium in their diet. That's because it takes many other vitamins and minerals, including vitamins C, D3, and K2, as well as the minerals zinc, silica, boron, magnesium and vanadium to utilize calcium properly.

Anyone who is suffering from problems with teeth, bones, and/or joints may benefit from calcium supplementation, but this is not the only therapeutic use for this mineral. Calcium is necessary for muscular contractions, nerve function, and many other body processes. Increasing calcium intake may also help nervous system problems, including insomnia, narcolepsy, mental illness, emotional sensitivity, tics, and twitching. It should generally be taken with magnesium for these problems. Calcium supplementation may also be helpful in circulatory problems such as heart fibrillation/palpitations, hypertension, and tachycardia.

The RDA for calcium is 1,000 mg per day for adults 19-50 and 1,300 mg per day for adults over 50. Higher amounts are needed by pregnant women and nursing mothers. However, calcium intake in native cultures and among healthy populations in the world today averages between 1,500 and 2,500 mg daily, which is probably closer to what is needed for optimal health. A good level for supplementation is 400–800 mg daily.

The cheapest form of calcium supplements contain calcium carbonate, which is found in oyster shells, limestone, and Dolomite clay. Unfortunately, this form of calcium neutralizes hydrochloric acid, which can cause indigestion. It is also poorly absorbed, and can also raise levels of free (unbound) calcium in the blood contributing to kidney stones and calcium deposits. Chelated forms of calcium include calcium citrate, malate, lactate, or gluconate. Calcium citrate is one of the more easily assimilable forms.

Pasteurized dairy foods are not the best sources of calcium, since pasteurization makes the calcium in milk harder to assimilate. Raw dairy foods, canned fish with bones, and green-leafy vegetables are good food sources.



Iron

Iron is one of the major minerals the body needs. Iron is used to form hemoglobin, the substance that transports oxygen in red blood cells. A lack of iron causes anemia, but anemia can also be caused by deficiencies of other nutrients needed to utilize iron, particularly vitamin C, folate, and vitamin B12. Absorption of iron also requires adequate levels of hydrochloric acid.

Besides anemia, deficiencies of iron can cause food cravings for inedible items such as ice, paint, starch, clay, or dirt. Deficient iron can also lead to depression or apathy, insomnia or disturbed sleep, decrease in the ability to concentrate, impaired mental skills that can affect memory and job performance, learning disabilities and short attention spans in children, irregular menstrual periods, brittle hair, hair loss, spoon-shaped or ridged nails and the increased risk of lead poisoning in children. Iron is also vital for the synthesis of some neurotransmitters including dopamine, norepinephrine, and serotonin.

The RDA for iron is 10 mg for adult men and 15 mg for adult women during childbearing years. After menopause the RDA for women is only 10 mg. Heme iron, which is found in red meat and liver, is absorbed much more efficiently (about 35%) than chelated iron supplements like ferrous fumarate and ferrous gluconate (about 3%). So, it's better to try and get some iron from food.

Besides red meat, iron can be obtained from black strap molasses and herbs such as alfalfa, nettle leaf, and yellow dock. However, large amounts of the herbs are needed, i.e., twelve capsules of alfalfa or nettle leaf along with 4 capsules of yellow dock daily.

Iron deficiency is more common in women than men because of the monthly loss of blood experienced through the menstrual cycle. This is why Traditional Chinese Medicine (TCM) utilizes blood nourishing tonics for women throughout their child-bearing years. Herbs commonly used to maintain blood health in TCM include dong quai, processed rehmannia root, and peony root. A *Chinese Wood-Increasing Formula*, containing these herbs may be helpful for maintaining iron levels in women during this time of life.

Magnesium

Magnesium deficiencies are extremely common, affecting as high as 70% of the population. Magnesium is necessary to utilize calcium and the ideal ratio of these minerals is 2:1 (two parts calcium to one part magnesium), the ratio found in breast milk. However, since people tend to get more calcium than magnesium in their diets many people need to supplement with a ratio as high as 1:1 calcium and magnesium, and many benefit from supplementing only with magnesium.

Magnesium works with calcium to maintain muscle tone. Calcium ions make muscles contract, while magnesium ions help muscles relax. Thus muscle spasms, tension, colic, and spastic bowel conditions may be signs of deficiency, as can twitching, tics, tremors, or problems like stiff neck, whiplash, or TMJ. Studies have shown that migraine sufferers tend to have lower levels of magnesium.

Magnesium also plays an important role in the nervous system. Deficiencies can cause hypersensitivity, nervousness, and insomnia. If you can't sleep deeply, are disturbed by small noises or minor irritations, feel nervous or exhausted, or suffer from anxiety disorders like obsessive compulsive disorder, you may need more magnesium.

Magnesium is also critical for brain and memory function. If you're having trouble with memory or concentration, magnesium is one of the supplements you should consider. Extra magnesium, along with B-complex vitamins and other nutrients may also be helpful in various mood disorders and mental problems, including depression, autism, schizophrenia, Tourette's syndrome, and PTSD.

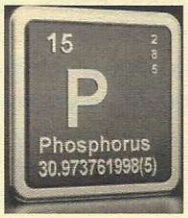
Magnesium helps to lower blood pressure. Along with vitamin K2, it helps prevent calcium deposits in the arteries associated with hardening of the arteries. It can also help prevent heart attacks, ease angina, reduce arrhythmia, tachycardia, heart fibrillation, and palpitations, strengthen the heart, aid recovery from congestive heart failure, and support heart valve function.

Magnesium also affects bowel function. Large doses of magnesium have a laxative action. Colic in infants may be due to magnesium deficiency, either from infant formulas (which usually contain too much calcium and not enough magnesium) or from a magnesium deficiency in the nursing mother.

Magnesium with malic acid has been helpful for fibromyalgia. It is important for energy production in the mitochondria. PMS is often eased by taking magnesium with vitamin B6. Magnesium is even essential for liver detoxification. In total, magnesium is used in over three hundred enzymatic reactions, which is why so many symptoms can occur from deficiencies.

The RDA for adult males is 400 mg per day, while the RDA for females is only 310 mg per day. This is probably way too low for optimal health, since you would need a minimum of 500 mg per day to balance an RDA of 1,000 mg of calcium. If you were getting an optimal intake of calcium, between 1,500 and 2,500 mg you would need 750 to 1,250 mg of magnesium. Supplementation for magnesium for most people should be between 400 and 800 mg per day. If you get lose stool taking magnesium, simply reduce the dose or add some calcium to counterbalance it.

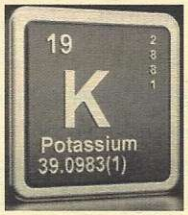
If you crave chocolate, you may be deficient in magnesium, as dark chocolate is one of the richest sources of magnesium. It's also abundant in green vegetables and nuts like almonds, peanuts, and cashews. The best forms for supplementation are magnesium citrate, glycinate, and malate.



Phosphorus

Bones and teeth are composed primarily of calcium phosphate, making phosphorus another major mineral needed for body structure. Phosphorus is also used in energy production as part of ATP (adenosine triphosphate), the molecule used to power cellular functions.

The RDA for phosphorus is 700 mg per day, but people rarely need to supplement with phosphorus as it is typically quite prevalent in most people's diets. Phosphates are plentiful in nuts, seeds, and grains, and are also additives to many sodas. Excess phosphorus from soft drinks and other sources will deplete calcium levels and interfere with the absorption of iron, magnesium, and zinc.



Potassium

Potassium works with sodium to control body fluids. Sodium is plentiful in the blood and extracellular fluid, while potassium is plentiful inside the cell. Potassium is involved in energy production, nerve function, and heart health. It is abundant in fruits and vegetables, and the primary problem with potassium is not getting enough of it in relationship to sodium. People who get a lot of salt in their diet, but don't eat fruits and vegetables, may become deficient. It's also possible to become deficient when taking diuretic drugs, as they deplete potassium. Deficiencies can lead to water retention, confusion, fatigue and muscle twitching, cramps, and spasms.

The RDA for potassium for adults is 4.7 grams per day. The average adult intake is slightly lower than this, about 3.5 grams per day, which means many people could benefit by adding another 1,000 mg of potassium to their diet daily. Supplementation with extra potassium (and possibly magne-

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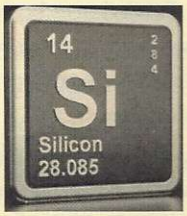
sium) may be advisable if one is having cramps, restless leg syndrome, tics, tremors, twitching (particularly twitching of the eyes), tachycardia, heart palpitations, edema, kidney problems, and tinnitus or Ménière's disease, which cause ringing in the ears.

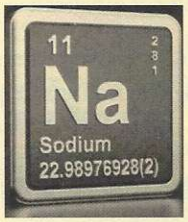


Silicon

Silica or silicon is used in the formation of bones, collagen, cartilage, elastic tissue, the myelin sheath in the nervous system, hair, skin and fingernails. This mineral gives tissues flexible strength. Without it, fingernails are brittle, hair frays more easily, skin lacks luster and bones and joints are more easily damaged. Silica helps the body lay calcium into the bones and can be very helpful in preventing and reversing osteoporosis. Silicon deficiency may also be a factor in joint deterioration in osteoarthritis and in the breakdown of nervous system tissue (especially the myelin sheath) in multiple sclerosis and neurodegenerative disorders.

There is no RDA for silicon, but it is likely that most people aren't getting enough as it is primarily found in the chewy parts of foods, such as peelings and seeds, which are usually discarded in modern diets. Some of the health issues that may involve silicon deficiency include brittle fingernails, getting split ends, dull lusterless skin, and brittle bones. Silicon also helps to detoxify aluminum from the body and may even aid the pineal gland. Supplementation may be wise if you have arthritis, problems with hair, skin, or fingernails, nerve damage, or multiple sclerosis.

The best way to supplement with silicon is to eat more peelings and seeds or use herbs rich in silica such as horsetail and dulse. *Watkin's Hair, Skin, and Nails Formula* contains these herbs and is a good natural silicon supplement.



Sodium

Sodium is an important macro-mineral needed for electrolyte balance, hydration and nerve function. People with hypertension are often advised to reduce salt intake, because higher levels of sodium in the blood are associated with high blood pressure. However, this is often a problem with dehydration, meaning it's wiser to increase water intake rather than reducing the intake of salt. It's also good to supplement with potassium and magnesium, instead of reducing sodium.

It's best to use a natural salt such as Redmond, Celtic, or Himalayan salt. These natural salts will not be white, but have some color to them. This is due to the presence of other minerals naturally found in salt water.

Natural salt has a number of therapeutic uses. First, it helps supply iodine for the thyroid. Second, taking a pinch of salt with water about 15-20 minutes prior to eating may aid digestion by stimulating the production of hydrochloric acid in the stomach.

If you suffer from respiratory allergies, it's also helpful to drink more water with a little bit of salt. This helps flush irritants from mucus membranes, easing allergy symptoms. It's also good to take salt along with plenty of water if you live in a hot climate, as salt is lost via sweat. Finally, salt water can also be used as a gargle for sore throats, or as a sinus wash for sinus infections.

Additional Help and Information

For more information about using major minerals for healing and help determining what minerals you need, contact the person who gave you this newsletter. You can also consult the following resources:

Strategies for Health by Steven Horne
Empty Harvest by Bernard Jensen and Mark Anderson
PDR for Nutritional Supplements by Sheldon Saul Hendler and David Rorvik
Professional Guide to Conditions, Herbs, and Supplements by Integrative Medicine Communications