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The Importance of Magnesium to Human Nutrition

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Magnesium is an extremely important and valuable mineral, whose value for good health is just being recognized by conventional physicians.

Virtually, all chemical reactions in the body require an enzyme system to help the biochemical reaction take place. An enzyme system generally consists of three parts. They are a specific protein molecule, another smaller organic compound, which is often a vitamin, such as pyridoxine or vitamin B6, and finally a charged mineral, such as zinc, copper, manganese or magnesium. Magnesium is a critical co-factor in more than 300 enzymatic reactions in the human body. Each mineral when dissolved in fluids has a characteristic electrical charge, called its valance. Minerals with a charge of plus 1, or univalent cations, include sodium and potassium. Minerals with a charge of plus 2, or divalent cations, include copper, zinc, manganese and magnesium. Potassium and magnesium are the most abundant cations found within the cells of the body with magnesium being the most abundant divalent cation.

In the USA, magnesium supplementation is dramatically under utilized by conventional physicians and is more important in patient therapy than most physicians realize. There are over 200 published clinical studies documenting the need for magnesium. In fact, at the 1992 American College of Cardiology annual meeting, a limited biography on magnesium was the most often requested item at the National Council on Magnesium and Cardiovascular booth.

Up until recently, conventional medicine's interest in magnesium has been only by obstetricians, who have used injectable magnesium sulfate extensively in the treatment of high blood pressure and pre-eclampsia and eclampsia of pregnancy. But, recently conventional physicians have become interested in treating patients with acute heart attacks, chronic cardiovascular disease, heart arrhythmias, diabetes, asthma, chronic fatigue syndrome and many other disorders.

Symptoms of Magnesium Deficiency?

What are some of the symptoms of magnesium deficiency? They are outlined beautifully in a recent article by Dr. Sidney Baker. Magnesium deficiency can affect virtually every organ system of the body. With regard to skeletal muscle, one may experience twitches, cramps, muscle tension, muscle soreness, including back aches, neck pain, tension headaches and jaw joint (or TMJ) dysfunction. Also, one may experience chest tightness or a peculiar sensation that he can't take a deep breath. Sometimes a person may sigh a lot.

Symptoms involving impaired contraction of smooth muscles include constipation; urinary spasms; menstrual cramps; difficulty swallowing or a lump in the throat-especially provoked by eating sugar; photophobia, especially difficulty adjusting to oncoming bright headlights in the absence of eye disease; and loud noise sensitivity from stapedius muscle tension in the ear.

Other symptoms and signs of magnesium deficiency and discuss laboratory testing for this common condition. Continuing with the symptoms of magnesium deficiency, the central nervous system is markedly affected. Symptoms include insomnia, anxiety, hyperactivity and restlessness with constant movement, panic attacks, agoraphobia, and premenstrual irritability. Magnesium deficiency symptoms involving the peripheral nervous system include numbness, tingling, and other abnormal sensations, such as zips, zaps and vibratory sensations.

Symptoms or signs of the cardiovascular system include palpitations, heart arrhythmias, angina due to spasms of the coronary arteries, high blood pressure and mitral valve prolapse. Be aware that not all of the symptoms need to be present to presume magnesium deficiency; but, many of them often occur together. For example, people with mitral valve prolapse frequently have palpitations, anxiety, panic attacks and premenstrual symptoms. People with magnesium deficiency often seem to be "uptight." Other general symptoms include a salt craving, both carbohydrate craving and carbohydrate intolerance, especially of chocolate, and breast tenderness.

Diagnosing Magnesium Deficiency

Aside from the signs and symptoms of magnesium deficiency, how can a physician diagnose magnesium deficiency? Unfortunately, laboratory testing is of limited value. Since magnesium is found primarily in the cells, the serum magnesium may be normal in spite of a significant magnesium deficiency. The red blood cell magnesium is a little bit better. Probably the best test, although certainly not full proof, is the magnesium loading test. In this test, the patient collects a 24-hour urine sample and the total magnesium is measured. The patient is then given an injection of a specified amount of magnesium and another 24-hour urine specimen is collected. The magnesium is again measured. If the body retains more than a certain amount of magnesium, then it is concluded that the body is magnesium deficient and is holding on to the magnesium that has been injected. Perhaps the best method of diagnosing magnesium

deficiency, however, is the combination of signs and symptoms of magnesium deficiency, which improve with a therapeutic trial of either oral or injected magnesium.

How can one get magnesium from foods? The best way of insuring enough magnesium is to eat a variety of whole foods, including whole grains, nuts, seeds and vegetables, preferably food grown on naturally composted soil. The green color of green vegetables is due to chlorophyll, which is a molecule that contains magnesium. Avoid refined processed foods, especially white sugar and white flour products, as most magnesium is removed from them.

Prevention and Treatment of Magnesium Deficiency Using Oral and Injectable Magnesium
For people who suffer from chronic magnesium deficiency and also to prevent the development of this condition, oral magnesium supplements can be quite useful. Magnesium is available in many forms. The cheapest is probably magnesium oxide, but this form is not absorbed as well as some other forms, which include chelated magnesium, magnesium glycinate and magnesium aspartate. Dr. Baker feels that the prescription form of magnesium chloride, known as Slow-mag, has been most useful for his patients. I have found that magnesium taurate, an unusual form of magnesium in which magnesium is chemically combined with the amino acid derivative taurine, is particularly well utilized and beneficial. This is because some of the same effects that one hopes to get from magnesium, such as the calming effect on the nervous system, and the strengthening effect on heart muscle, is also gotten with taurine. So, the two are synergistic together. I use it in all forms of cardiac and nervous system disorders.

What about dosage? The recommended daily allowance or RDA for magnesium is 350 milligrams of elemental magnesium. An important point here is that when reading the label of a supplement containing magnesium, it is important to distinguish between the number of milligrams per tablet or capsule of the entire magnesium complex versus the number of milligrams of elemental magnesium or pure magnesium. For example, one label of a chelated magnesium states that 4 tablets contain 4,000 mg of the chelated magnesium complex with 500 mg of elemental magnesium. The important number is the one that refers to the elemental magnesium. The other 3,500 mg in this case refers to the amino acid complex that is bound to the magnesium.

Keeping this definition of elemental magnesium in mind, many people do not even get the RDA of 350 mg of magnesium daily. A therapeutic dosage could easily run between 400 mg and 1000 mg daily of elemental magnesium in divided doses. In people with normal kidneys, it is difficult to reach toxic levels of magnesium. However, too much oral magnesium will result in diarrhea. Recall that milk of magnesia is a laxative containing a magnesium salt. Patients suffering from chronic kidney failure must be much more careful because their kidneys have difficulty eliminating magnesium and a toxic buildup may occur. Toxic levels of magnesium

may lead to depression of the entire nervous system and even coma and death. But, this is extraordinarily rare and occurs only in patients with severe kidney function impairment. In general, magnesium doses of 1000 mg per day or less are extremely safe.

Magnesium Supplementation for Various Medical Disorders
Oral magnesium supplementation may be helpful to a wide variety of medical disorders including: high blood pressure, asthma, angina pectoris, coronary artery disease, cardiac arrhythmias, chronic fatigue syndrome, all types of musculoskeletal disorders, epilepsy, mitral valve prolapse, anxiety, panic disorder and many other medical and psychiatric conditions.

For many conditions, such as acute heart attacks, magnesium given by either an intramuscular injection or as an intravenous drip, is the preferred method of treatment. Studies show it reduces the death rate and complications of acute heart attacks. In spite of its low cost or perhaps as a result of its low cost, it is not yet given routinely to heart attack victims. Other patients, such as those suffering from chronic fatigue syndrome also seem to do better with magnesium given by injection. This may be due to the superior absorption of injectable magnesium or because high concentrations in the body are necessary for maximal therapeutic effects. In our office, we use injectable magnesium extensively, as part of our EDTA chelation bottle, and for many of the conditions I've mentioned previously.

Increased use of oral and injectable magnesium, along with a diet rich in magnesium, should greatly improve therapeutic results for many patients.