

Magnesium: The Unsung Mineral \*  
by Elizabeth Pavka, PhD, RD, LD/N

A simple, unsung, and vital mineral, magnesium, is involved in a large number of complex and critical body functions. In her book, *The Miracle of Magnesium*, Carolyn Dean, MD, ND, lists the following health conditions in which magnesium has therapeutic value:

1. anxiety and depression
2. migraines and pain
3. strokes, head injury, and brain surgery
4. cholesterol and hypertension
5. heart disease
6. obesity, Metabolic Syndrome [Syndrome X], and diabetes
7. PMS, dysmenorrhea [painful menstrual flow], and polycystic ovarian syndrome
8. infertility, pregnancy, pre-eclampsia, and cerebral palsy
9. osteoporosis and kidney stones
10. chronic fatigue syndrome and fibromyalgia
11. environmental illness [multiple chemical sensitivity]
12. asthma
13. Alzheimers, Parkinson's disease, dementia, aging (1)

How can one mineral affect so many conditions? Here are four reasons.

First, magnesium regulates more than 325 enzymes in the body, the most important of which produce, transport, store, and utilize energy -- what is called adenosine triphosphate or ATP. Every cell requires ATP to accomplish the multitude of tasks essential to the life of a cell second by second. Next Dean writes, “. . . enzymes are protein molecules that stimulate every chemical reaction in the body. Magnesium is required to make hundreds of these enzymes work and assists with thousands of others”(1, p.15).

Third, many aspects of cell metabolism are regulated by magnesium, such as DNA and RNA synthesis, protein formation, cell growth, and cell reproduction. Magnesium is essential to the body's ability to build tissues, including blood, bones, teeth, nerves, and muscle cells. And fourth, “magnesium exists mostly as a positively charged ion with 99% of body stores in intracellular spaces [inside cells]. Approximately 66% is found in bones, and 33% in cardiac muscle, skeletal muscle, and liver”(2). In addition magnesium functions in the electrical transmission of nerve cells and causes skeletal muscles to relax. Magnesium modulates and controls the entry to and release of calcium from the cell. In other words, magnesium is a natural calcium channel blocker.

Most Americans are deficient in magnesium. For a list of 100 health issues that indicate magnesium deficiency, see reference 1, pp. 17-20. The RDA for magnesium ranges between 280-320 milligrams for women and 270-400 milligrams for men, depending on age. Here's a list of magnesium-rich foods in milligrams found in 3½ ounces or 10

tablespoons: kelp-760 mg; wheat bran-490 mg; wheat germ-336 mg; almonds-270 mg; molasses-258 mg; Brazil nuts-225 mg; peanuts-175 mg; pecans-142 mg; collard greens-57 mg; and parsley-41 mg (1, p.230).

Most greens have ample amounts of magnesium because chlorophyll, which is involved in energy production in green plants, is nearly identical in structure to hemoglobin which carries oxygen in the red blood cell. The only difference is that magnesium sits in the center of chlorophyll, while iron sits in the center of hemoglobin. Particularly good sources include cilantro, parsley, chickweed, dandelion leaf (put some in your salad), nettles (lightly steamed) and dulse (1, p.231).

The second way to increase your consumption of magnesium is by taking supplements which come in two basic forms. Inorganic magnesium as oxide or carbonate or dolomite is the cheapest form. In contrast the organic forms of magnesium are chelated (combined) with amino acids such as glycinate, citrate, malate, lysinate, taurate or orotate. These forms cost more, but are more easily absorbed into the body. Like vitamin C, magnesium is a nutrient that will cause loosening of bowel movements when you reach the limit of what the body can absorb. If you choose to supplement with magnesium, choose a chelated form, begin slowly – perhaps 100mg/per day for three days, then increase to 200mg/day for three days and continue that gradually increasing pattern until you notice a loosening of your bowel movements. Then decrease by 100 mg/day. That's how much your body needs at that moment. Take half of the magnesium in the morning with breakfast and half before bed to help you sleep.

Magnesium can also be given by intramuscular or intravenous injection. A new form called magnesium oil – actually a supersaturated solution of magnesium chloride in water – can be sprayed or rubbed on the body and easily absorbed through the skin (1, p.241).

In a recent study researchers investigated the effect of oral Mg(2+) supplementation on 24-hour blood pressure (BP) and intracellular ion status in patients with mild hypertension. Of 48 patients with mild uncomplicated hypertension, 24 subjects were assigned to take 600 mg of pidolate Mg(2+) daily in addition to lifestyle recommendations for a 12-week period and another 24 age- and sex-matched controls were only given lifestyle recommendations. At the beginning and end of this study ambulatory BP monitoring, determination of serum and intracellular ion levels, and 24-hour urinary collections for determination of urinary Mg(2+) were performed in all study subjects.

The results showed that in the Mg(2+) supplementation group, small but significant reductions in mean 24-hour systolic and diastolic BP levels were observed, in contrast to control group. These effects of Mg(2+) supplementation were consistent in both daytime and night-time periods. Serum Mg(2+) levels and urinary Mg(2+) excretion were significantly increased in the intervention group. Intracellular Mg(2+) and K(+) levels were also increased, while intracellular Ca(2+) and Na(+) levels were decreased in the

intervention group. None of the intracellular ions were significantly changed in the control group. The conclusion of this study suggests that oral Mg(2+) supplementation is associated with small but consistent ambulatory BP reduction in patients with mild hypertension (3).

A meta-analysis of clinical trials using magnesium to prevent kidney stones concluded: “Clinical trial evidence does not justify the use of MgO or Mg(OH)<sub>2</sub> as a sole therapy for calcium oxalate kidney stones in a general patient population. However, the addition of magnesium to potassium citrate therapy improves outcomes. Clinical trials should focus on patients who are likely to be Mg deficient”(4).

For lists of other research articles on magnesium and health see *Alternative Medicine Reviews* (2) and Life Extension Foundation (5).

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#### References:

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- 5.. Life Extension Foundation site with more than 100 older studies on magnesium. <[http://www.lef.org/prod\\_hp/abstracts/php-ab236.html](http://www.lef.org/prod_hp/abstracts/php-ab236.html)>



Magnesium is an important mineral for your body and brain. Here are 10 ways that magnesium can improve your health. 1. Magnesium Is Involved in Hundreds of Biochemical Reactions in Your Body. Magnesium is a mineral found in the earth, sea, plants, animals and humans. About 60% of the magnesium in your body is found in bone, while the rest is in muscles, soft tissues and fluids, including blood (1). In fact, every cell in your body contains it and needs it to function. One of magnesium's main roles is acting as a cofactor or helper molecule in the biochemical reactions continuously performed by enzymes. In fact, it's involved in more than 600 reactions in your body, including (2): Energy creation: Helps convert food into energy. How does magnesium work? What are magnesium's functions in the body? Learn why this mineral is so important, so you don't miss out on its benefits. Without magnesium we could not produce energy, our muscles would be in a permanent state of contraction, and we could not adjust the levels of cholesterol produced and released into the blood stream. Magnesium ions regulate over 300 biochemical reactions in the body through their role as enzyme co-factors. They also play a vital role in the reactions that generate and use ATP, the fundamental unit of energy within the body's cells. A List of the Functions of Magnesium. Why does magnesium have such a far-reaching impact on the body? PDF | Magnesium alloys as a class of biodegradable metals have great potential to be used as implant materials, which attract much attention. In this | Find, read and cite all the research you need on ResearchGate. In this review, the mechanical properties of magnesium alloys for medical applications are summarized. The methods to improve the mechanical properties of biodegradable magnesium alloys and the mechanical behaviors of Mg alloys in biomedical application are illustrated. Finally the challenges and future development of biodegradable magnesium alloys are presented. BSE-mode SEM micrograph of surface morphologies of pure Mg (a), Mg-1Zn (b), Mg-5Zn (c) and Mg-7Zn (d) (Cai et al., 2012).