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Approximately 20 million Americans have asthma, nine million of these are under the age of 18. More than 70% of the people with asthma also suffer from allergies, and the number of asthma patients has been growing. The prevalence of asthma increased by 75% between 1980 and 1994. In 2003, there were 12.7 million physician office visits and 1.2 million outpatient department visits due to asthma, while in 2002 there were 1.9 million asthma-related visits to emergency departments. The number of people with asthma continues to grow. One in 12 people (about 25 million, or 8% of the U.S. population) had asthma in 2009, compared with 1 in 14 (about 20 million, or 7%) in 2001.

Earlier research has shown a relationship between low magnesium and the development of asthma. Also, IV magnesium has been used in emergency situations to stop an asthma attack. Recent research, appearing in the *Journal of Asthma* (2010;47(1):83-92), looked at the

effect magnesium supplementation had on patients with asthma. The subjects of the study were 52 men and women between the ages of 21 and 55, who had been diagnosed with mild to moderate asthma. Subjects were given either a placebo

or 340 mg of magnesium citrate each day for 6 1/2 months.



The group taking the magnesium reported

improved quality of life compared to the placebo group. Additionally, this group had significant improvement in lung function and the ability to move air into and out of the lungs. Both the control group and the group receiving the magnesium had similar levels of CRP (a chemical that is measured to indicate the amount of inflammation), and the amount of magnesium found in the blood cells. Serum magnesium was the same for both the treatment group and the placebo group.

## MAGNESIUM AND HEADACHES

According to the National Institute of Neurological Disorders and Stroke, migraine headaches affect 28 million Americans, 75% of whom are women. Migraine headaches cost an estimated \$13 billion in missed work and reduced productivity each year. Back in 1991, according to the *Journal of the American Medical Association* (January 1, 1991;267(1):64-



69) there were 8.7 million women and 2.6 million men who suffered from moderate to severe migraine headaches, indicating an increase in the number of Americans suffering from migraines in the last 20 years.

There is a fair amount of research that shows that magnesium supplementation may offer some relief for many migraine sufferers. An article appearing in *Clinical Neuroscience* (1998;5:24-27) pointed out that magnesium affects serotonin receptors and the synthesis and release of nitric oxide. One study, appearing in *Cephalgia* (1993;13:94-98) looked at the level of magnesium in the red blood cells of 90 migraine

sufferers (30 with aura and 60 without aura) and compared it to 30 healthy, matched controls. Between headaches, the magnesium levels in migraine patients were lower than they were in the healthy controls. The

patients who had migraines with aura tended to have lower magnesium levels than the patients who did not have an aura. An active headache did

not change the magnesium levels in the migraine patients. Other research appearing in *Cephalgia* (1992;12:21-7) also found lower serum and salivary magnesium levels in headache patients when compared to healthy controls.

Research in the journal *Headache* (2001;41:171-177) looked at the effect intravenous magnesium sulfate had in treating acute migraine attacks. The subjects of the single-blind, placebo-controlled study were 24 women and six men. One gram of intravenous magnesium sulfate was given to 15 of the patients, with the other 15 receiving a placebo. In the group receiving the magnesium, 13 of

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the 15 subject experienced complete relief of pain, with the other two subjects experiencing a reduction in symptoms. In the placebo group, only one patient experienced a reduction in pain.

Research has also shown that magnesium supplementation may help prevent migraine headaches. A study that appeared in *Cephalgia* (1996;16:257-63) looked at 81 migraine patients experiencing a mean attack frequency of 3.6 migraines per month. They were randomly divided into two groups and given either 600 milligrams of magnesium per day or a placebo for 3 months. In the final month of treatment, the frequency of attacks in the group receiving the magnesium was reduced by over 41%, with the placebo group experiencing only a 15.8% reduction in migraine episodes. The patients receiving the magnesium were also able to reduce the amount of medication taken.

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## MAGNESIUM AND GLUCOSE TOLERANCE

If anyone is asked to think of a single nutrient that relates to glucose tolerance, the first thing that comes to mind is chromium. In fact there is a lot of research supporting the idea that chromium is a valuable supplement for people with glucose and insulin issues. People don't always think of magnesium when it comes to this issue, but there is a fair amount of research supporting magnesium supplementation for insulin insensitivity and poor glucose tolerance.

An observational study appearing in the *Journal of the American College of Nutrition* (2006; 25(6): 486-92) found that subjects who consumed more magnesium in their diets had better blood sugar balance. The subjects were 1,223 men and 1,485 women without diabetes. Food frequency questionnaires were given to participants of the Framingham Offspring Study and it was found that subjects in the highest quintile of magnesium consumption were better insulin sensitivity than those in the lowest quintile.

In a double-blind, placebo-controlled study appearing in the *American Journal of Clinical Nutrition* (1992;55:1161-1167), the relationship between glucose tolerance and magnesium status was examined. The subjects were 25 young,

healthy men and 12 elderly men. They were given the equivalent of 360 mg. of magnesium or a placebo over a period of four weeks. In the group receiving the magnesium, red cell magnesium levels and the microviscosity of the red cell membranes improved. Magnesium affects insulin secretion and is necessary for the glucose transport system. It is also involved in energy production and an important cofactor for phosphorylation.

It is estimated that 25% of the diabetic population is magnesium deficient. Lethargy, weakness, irritability, confusion, vertigo, paresthesia, anorexia, nausea, vomiting, and tetany are possible symptoms in magnesium deficiency. Diabetic complications include high blood pressure, cardiac arrhythmias, retinopathy, dyslipidemia, and reduced release of insulin—all of which can be the result of insufficient magnesium.

Of course if insulin insensitivity is a problem, other nutrients may be of value. Chromium, zinc, B vitamins, selenium, antioxidants and omega-3 fatty acids are all important nutrients for those who are insulin insensitive, diabetic or who have syndrome X.

**I saw few die of  
hunger; of  
eating, a  
hundred  
thousand.**

**Benjamin  
Franklin**

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## **MAGNESIUM AND HEART FAILURE**

Research that appeared in the *American Heart Journal* (June 1993;125:1645-1649) looked at the effect IV magnesium sulfate had on patients with congestive heart failure. Magnesium was given intravenously to patients with congestive heart failure, arrhythmia and with serum magnesium levels lower than 2.0 mg/dl. The patients all had at least 10 premature ventricular depolarizations per hour as determined by a six hour ambulatory electrocardiograph reading. There was a significant decrease in premature ventricular depolarizations, correlated to treatment with magnesium. A study that appeared in the *Journal of the American College of Cardiology* (1990;16 (4):827-831) found 19% of a sampling of 199 patients with congestive heart failure had low serum magnesium. Considering that serum magnesium is a poor way to determine deficiency, it would be interesting to see what RBC magnesium levels were in this group of patients.

Patients with congestive heart failure seem to benefit from magnesium supplementation. A double-blind, placebo-controlled study appeared in the *International Journal of Cardiology* (2009; 134(1): 145-7) that involved 79 patients with severe congestive heart failure. The subjects were randomly selected to receive either magnesium orotate or a placebo for one year. The survival rate was higher in the magnesium group (75.7% compared to 51.6% in the placebo group). Also, symptoms improved in 38.5% of the patients receiving magnesium. In 56.3% of the placebo group symptoms became more severe.

Drugs that are used by heart patients may deplete magnesium. Research appearing in *Magnesium Bulletin* (1994;16(3):98-100) demonstrated that treatment with ACE inhibitors deplete magnesium. In this group magnesium supplementation may be especially important.