

Special Interest Articles:

- Magnesium and glucose tolerance
- Nutrition in pregnancy
- Magnesium and headaches
- Time for a better paradigm in health care
- Magnesium and Asthma
- Probiotics and irritable bowel
- Magnesium and heart failure

Probiotics and the Common Cold

Research appearing in the journal, *Vaccine* (Volume 24, Issues 44-46, 10 November 2006, Pages 6670-6674) looked at probiotic (bowel flora) supplementation and its effect on upper respiratory tract infections (colds and the flu). The double-blind, placebo-controlled study took place during two winter/spring periods. The subjects were 479 healthy adults who were supplemented with a vitamin/mineral supplement containing probiotics (lactobacilli and bifidobacteria) or a placebo

that contained only the vitamin/mineral supplement.

Taking the probiotic did not reduce the number of upper respiratory infections, but they did significantly shorten the duration of the illness (by nearly two days, compared to the placebo group). Also, the symptoms were less severe in the probiotic group. Taking the probiotics also increased the number of immune cells (cytotoxic T plus T suppressor cell counts and in T helper cell counts).

Omega-3 and Childhood Depression

A small, double-blind, placebo-controlled study, published in the *American Journal of Psychiatry* (2006; 163(6): 1098-1100), looked at supplementation with omega-3 fatty acids and its effect on childhood depression. The subjects of the study were 20 children between the ages of six and 12 suffering with depression. They were randomly assigned to receive either an omega-3 fatty acid supplement or a placebo.

The children were evaluated using the Children's Depression Rating Scale, the Children's Depression Inventory and the Clinical Global Impression. Evaluations were taken at the beginning of the study and at weeks 2, 4, 8, 12 and 16. At the end of the study, 70% of the supplemented children showed at least a 50% reduction in depression scores.

Magnesium and Glucose Tolerance

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.

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.

Nutrition During Pregnancy and Childhood Allergies

A longitudinal cohort study looked at nutrient intake during pregnancy, following the health of the 1,861 children born to the subjects for five years. It was published in the *American Journal of Respiratory and Critical Care Medicine* (Vol 174. pp. 499-507, (2006)). The nutrient status of the mothers was evaluated with a food frequency questionnaire and by measuring blood levels of nutrients. Different groups of the children were evaluated with various tests. FEV1 (forced expiratory volume for

1 second) was tested on 478 of the children. Exhaled nitric oxide was checked on 167 of the children (a way to measure airway inflammation), Allergy testing (performed by skin prick), was performed on 700 of the group. The researchers found that high intake of foods containing vitamin E and zinc during pregnancy reduced the chances of the child developing asthma or allergies.

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.

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 the 15 subjects experienced complete relief of pain, with the other two subjects experiencing a reduction in symptoms.

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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We Need a Better Paradigm for Health Care

Health care costs in the United States exceed \$2 trillion per year, which represents more than 15% of our GDP. Most industrialized nations only spend about 10% of their GDP on health care. The US ranks 15th out of 19 nations with regard to preventable deaths. It is estimated that 115 per 100,000 people die who would have survived if timely and appropriate medical care was administered. France scored highest in this category, with only 75 deaths per 100,000. The US ranks last in infant mortality, with 7 deaths per 1,000 births. The top three countries have 2.7 deaths per 1,000 births—less than half our number. We are at the bottom of the list in life expectancy. American children miss more school for illness than the children from the other industrialized nations. Fewer than half of American adults receive the recommended screening tests appropriate for their age and sex. Preventable hospital admissions for chronically ill patients (e.g.; those with asthma or diabetes) were twice as high compared to the nations at the top of the list. The rate of readmission of Medicare patients ranges from 14-22%.

We spend more on health care and we get much less than other industrialized nations. More utilization of natural health care would reduce this bill. For example, there are a number of studies that demonstrate that asthmatics will have fewer attacks and fewer hospitalizations if they eat a diet that is high in fresh produce and essential fatty acids. Studies have also shown that supplementation with antioxidants, omega-3 fatty acids and magnesium

have all benefited patients with asthma. Such recommendations are not given in medical offices. The reasons given ignoring natural health care include, the studies are too small and inconclusive, a cure has not been proven, and "vitamins don't cure disease".

Treatments for diseases are usually singular: we give Ritalin to children with ADD and ADHD--not essential fatty acids, exercise, or a diet that is free of sugar and additives. We don't even augment the drug therapy with natural approaches that are researched and show promise. Large follow-up studies are usually not performed to "prove" the efficacy of the natural treatments. Even though natural health care treatments are low-risk and high-gain; doctors tend to want them to be proven by large studies.

Doctors generally don't give vitamin C and fish oil to asthmatics--even if it would improve the health of these patients. It is not a "cure", but it does improve symptoms and reduce hospitalizations. They have been taught to use single treatments, usually drugs. CoQ10 can help prevent heart attacks, there are supplements that can speed recovery from surgery and shorten hospital stays, and there are many other natural health approaches that can cut our medical costs. Unfortunately they are largely ignored by the medical community. Supplementation often does not fit in the medical paradigm. But by looking at natural health care as improving the infrastructure of the body, traditional medical doctors could improve the results they get with patients.

Magnesium and Asthma

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.

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Probiotics and Irritable Bowel Syndrome

Research appearing in the *Korean Journal of Gastroenterology* (2006; 47(6): 413-9) looked at 40 subjects with irritable bowel syndrome (IBS) and the effect treatment with probiotics had on the condition. The subjects were randomly divided into two groups. One group was given a probiotic supplement and the second group was given a placebo. Subjects were evaluated at two weeks

and at four weeks. The group receiving the probiotics (which consisted of *Streptococcus faecium* and *Bacillus subtilis*) had fewer episodes of abdominal pain and a reduction in the severity of the pain. The amount of intestinal gas produced remained the same in both groups.

Magnesium and Heart Failure

All who would win joy, must share it; happiness was born a twin.—Lord Byron

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.

