

NEWS UPDATES



MARCH 2011

Hair Mineral Patterns of Patients Suffering From Myocardial Infarct (MI) at Different Stages

This study measured the scalp hair content of arsenic, cadmium, lead and nickel in patients who suffered from their first, second and third MI compared to a control group of similar age and sex. There were 130 patients in the affected group ranging in age from forty-five to sixty years. Thirty-two patients suffered a third MI. Within that group seventy-eight percent expired. Of the group that expired they found an increase in hair arsenic, cadmium, nickel and lead compared to patients who survived a third MI. Arsenic was over 10 percent higher, Cadmium over 19 percent, nickel over 15 percent and lead over 9 percent higher. Heavy metals are being increasingly recognized as mediators or factors in the development and progression of cardiovascular disease and that a deficiency, lack of homeostatic control or excess intake of some metals may lead to cardiovascular mortality. Afridi, Hl., et al. Evaluation of Toxic Elements in Scalp Hair Samples of Myocardial Infarction Patients at Different Stages as Related to Controls. *Biol. Trace Elem. Res.*134, 1, 2010.

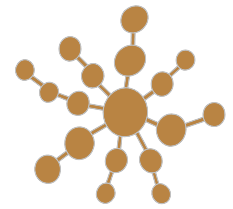
Thyroid Hormone Signaling

Iodothyronine deiodinases is a selenium containing enzyme that is important for the action of thyroid hormones. Most research has focused on the role of this enzyme on maintaining the serum levels of T3. More recently, research has involved studying the effects of the activating and inactivating aspects of deiodinase D2 and D3. They have been found to locally increase or decrease thyroid hormone signaling in tissues independent of serum thyroid hormone levels. A number of factors can affect D2 and D3 including xenobiotics. Gereben, B. et al. Cellular and Molecular Basis of Deiodinase-Regulated Thyroid Hormone Signaling. *Endocrin. Rev.* 29, 7, 2008.

Comment: Practitioners often find patients who are exhibiting hypothyroid symptoms yet their serum T3, TSH, etc. is normal. The above study helps to explain what we have often described as cellular hypothyroidism. Abnormalities in the D2 and D3 relationship may also explain why patients with thyrotoxicosis, or those who show signs of hyperthyroidism have normal serum T3 in particular when they present with a parasympathetic hair mineral pattern. This also illustrates the need for assessing mineral patterns as related to thyroid function such as selenium, zinc, copper etc, as well as heavy metals and their impact upon nutritional minerals. Vitamin requirements are also affected along with mineral imbalances.

Drinking Water and Heart Disease

Environmental factors can affect cardiovascular disease risks and include minerals contained in drinking water. Since major risk factors do not explain the variability and mortality from heart disease, minerals found in drinking water may have an impact.



Many studies have shown a protective effect of hard water on cardiovascular disease mortality. Hard water contains greater amounts of the minerals calcium and magnesium compared to soft water. Epidemiological studies supports a hypothesis that low magnesium intake could increase the risk of dying from heart disease and stroke. Therefore, either not removing magnesium from the drinking water or adding magnesium to drinking water may be helpful and preventive in population groups with low intake of magnesium. Monarco, S. et al. Review of Epidemiological Studies on Drinking Water Hardness and Cardiovascular Disease. *Eur. J. Cardiovas. Prev. Rehab.* 13, 4, 2006.

Comment: The above study along with others cited in the article found that calcium intake was not a significant factor in preventing cardiovascular disease, whereas magnesium intake had a stronger preventative effect. Also high calcium intake could increase risk in the presence of low magnesium intake.

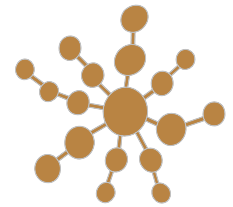
Calcium and Vascular Events in Older Women

A randomized placebo controlled study was performed to determine the effect of calcium supplementation on the incidence of stroke, myocardial infarct (MI) and sudden death in healthy postmenopausal women. This New Zealand study included over seven-hundred women in the control group and approximately the same amount in the treatment group. The study reported more MI's in the calcium group than in controls. Other measurements include stroke and sudden death, which were also reported higher in the calcium supplemented group. The study concluded "Calcium supplementation in healthy postmenopausal women is associated with upward trends in cardiovascular event rates. This potential detrimental effect should be balanced against the likely benefits of calcium on bone." Bolland, MJ., et al. Vascular Events in Healthy Older Women Receiving Calcium Supplementation: Randomised Controlled Trial. *BMJ*, 336, 2008. Reid, IR, et al. Calcium Supplementation and Vascular Disease. *Climacteric.* 11, 4, 2008.

Comment: The negative impact of calcium supplementation can certainly be explained based upon HTMA studies. Since many women have a parasympathetic mineral dominance, excess calcium intake in the face of other mineral deficits could contribute to increased calcium deposition into soft tissues, including arteries, and enhance blood clotting. When a magnesium deficiency is already present along with high calcium supplementation and increased vitamin D intake, this can be considered as "adding fuel to the fire" for the enhanced deposition of calcium into soft tissues.

Magnesium and Type 2 Diabetes

Magnesium is involved in hundreds of enzyme systems that affect energy metabolism, carbohydrate oxidation, glucose transport, insulin secretion, insulin binding and insulin activity. Chronic magnesium deficiency has been found to be associated with insulin resistance and ultimately the development of type 2 diabetes. The authors review points out that an estimated fifty to eighty-five percent of the American population have inadequate magnesium intake. They also state the many factors that can contribute to magnesium deficiency in the U.S. population including; refining of foods which can take out as much as ninety-seven percent of the magnesium content of some foods, food preparation, drinking soft water, alcohol, caffeine, sugar, disease processes and drugs. The authors conclude that disorders associated with magnesium metabolism are common and yet go unrecognized since the importance of testing magnesium status in such a wide range of the population with various disease conditions is not often considered. Chaudhary, DP, et al. Implications of Magnesium Deficiency in Type 2 Diabetes: A Review. *Biol. Trace Elem. Res.* 134, 2, 2010.



Carbohydrates, But Not Saturated Fats contribute To Heart Disease

As reported by Melinda Moyer in Scientific American, the U.S. government has stated over the last thirty years that we should consume less saturated fat in our diet for the prevention of heart disease. However, even though the percentage of daily calories from saturated fats have been reduced by many Americans since 1970, the obesity rate has more than doubled, diabetes has tripled and heart disease is still the biggest killer. She also sites almost two dozen studies that account for this rise and that is the increased consumption of processed carbohydrates. A study in the American Journal of Clinical Nutrition based on over three-hundred thousand individuals followed over a period of five to twenty-three years, reported that no association was found between the amount of saturated fat intake and the risk of heart disease. The past studies reporting the conventional wisdom that saturated fat is bad for the heart is based mostly upon extrapolations with little data to support it. Further "total cholesterol" is not a great predictor of risk. Even though saturated fat may increase levels of LDL, they also increase HDL. Studies have shown that in groups consuming a low-carbohydrate diet and who consumed the most saturated fat compared to low-fat diets had the healthiest ratio of HDL to LDL cholesterol levels. Moyer, MW. Carbs Against Cardio. More data that refined carbohydrates, not fats, threaten the heart. Sci. Amer. May, 2010. Siri-Tarino, PW, et al. Saturated fat, carbohydrate, and cardiovascular disease. Am. J. Clin. Nutr. 91, 3, 2010.

Dietary Sugars Intake and Cardiovascular Health

The American Heart Association (AHA) has published their recommendations for the reduction in the intake of added sugars found in soft drinks and processed foods. They state in the journal Circulation that "High intakes of dietary sugars in the setting of a worldwide pandemic of obesity and cardiovascular disease has heightened concerns about the adverse effects of excessive consumption of sugars". The mean intake for all persons was found to be over 22 teaspoons per day. However, it appears that in the age group between 14 to 18 years, consumption is about 34 teaspoons per day. High-fructose corn syrup used in most sweetened beverages is playing a role in the epidemics of insulin resistance, obesity, dyslipidemia and type 2 diabetes. Johnson, RK, et al. Dietary Sugars Intake and Cardiovascular Health. A scientific statement from the American Heart Association. Circulation. Circ. ahajournals.org. June 2010.

Diabetic Drug Treatment Leads To B12 Deficiency

Metformin is a drug commonly used in the treatment of patients with type 2 diabetes. Common trade names include *Glucophage XR, Riomet, Fortamet, Glumetza, Obimet, Dianben, Diaformin and Diabex*.

The action is primarily through its suppression of hepatic glucose production. This drug is associated with contributing to B12 deficiency. A study of 155 diabetic patients found that B12 deficiency was significantly associated with dose and duration of metformin use. The authors of the study stated their results "underscore the need for monitoring subjects undergoing high-dose and/or prolonged-course metformin therapy." Published in Physician's First Watch October 11, 2006.

Magnesium Infusion Might Improve Outcomes After Subarachnoid Hemorrhage

The incidences of delayed ischemic infarction and vasospasm were significantly reduced in patients treated with magnesium, compared with controls.

Patients who initially survive aneurysmal subarachnoid hemorrhage (SAH) are at risk for death from delayed cerebral ischemia



caused by vasospasm. To determine whether treatment with magnesium sulfate reduces these events, researchers randomized 107 patients with acute SAH who were admitted to a neurosurgical intensive care unit in Germany to receive intravenous magnesium sulfate (bolus of 16 mmol [1920 mg] during 30 minutes followed by continuous infusion of 8 mmol [960 mg] per hour) or placebo. Serum magnesium concentrations were monitored closely and infusions were adjusted to maintain target levels of 2.0–2.5 mmol/L (4–5 mEq/L) for 10 days or until signs of vasospasm resolved. Patients then received tapering oral doses for 12 days.

The incidence of delayed ischemic infarction (assessed by serial computed tomography) was significantly lower in the magnesium group than in the control group (22% vs. 51%). Likewise, the incidence of vasospasm (assessed by transcranial Doppler sonography and digital subtraction angiography) was significantly lower in the magnesium group (67% vs. 85%). One patient in the magnesium group developed hypocalcemic tetany and another developed facial flushing, but no serious adverse effects were noted.

Comment: Magnesium has several effects that might contribute to improved outcomes after subarachnoid hemorrhage, including that it attenuates cerebral hypoxia, physiologically antagonizes calcium — potentially inhibiting vasospasm and ischemic cell death, and improves cerebral perfusion. This relatively inexpensive and safe treatment merits further study in larger trials to confirm a neuroprotective effect, compare it to other adjunct treatments (e.g., nimodipine), and determine how quickly it must be administered to provide benefit. — [Kristi L. Koenig, MD, FACEP](#) Published in [Journal Watch Emergency Medicine](#) April 30, 2010.

Comment: Magnesium deficiency has been implicated in many if not most disease processes. This most critical mineral should be assessed in anyone with health issues, as well as those on medications or anyone having a health screen.