Appendix III: Both old and new peer-reviewed studies show that CVD risk factors are related to Mg status

Discussed below are a few of the most commonly known CVD risk factors with some of the peer-reviewed science that relates them to Mg status.

See references of *The Magnesium Factor* by Mildred Seelig and Andrea Rosanoff.

See also “The Mg Hypothesis of Cardiovascular Disease: A Bibliography” [http://www.magnesiumeducation.com/the-mg-hypothesis-of-cardiovascular-disease-a-bibliography]

**High Blood Pressure** — Mg normalizes blood pressure, perhaps the most predictive and certainly the oldest cardiovascular risk factor. Mg supplementation also enhances the action of antihypertension medications (Rosanoff, 2010; Houston, 2011). Three meta-analyses on Mg therapy for blood pressure (Dickinson et al., 2006; Jee et al., 2001; Kass et al., 2012) have all reported that Mg supplements do have a small but significant effect on blood pressure, which appears so small as to be clinically insignificant. However, a recent study shows how these meta-analyses failed to include high-responder studies that demonstrate Mg therapy has a highly significant and profound effect on high blood pressure in *some* subjects—that Mg therapy in some hypertensive individuals can consistently lower SBP by 19 mm Hg and DBP by about 8 mm Hg; but other hypertensive subjects as well as normotensive subjects show a much lower or even zero response to Mg therapy. When meta-analyses and studies “average” all these various subjects together, they get the erroneous conclusion that Mg therapy has only a small albeit significant effect on human blood pressure. Not having reliable methods to ascertain Mg status hinders these studies and the interpretation of their results.


Cholesterol — Several studies have shown that adequate Mg or Mg therapy will lower LDL (bad) cholesterol and raise HDL (good) cholesterol (see Seelig & Rosanoff, 2003: 330–42). Mg is an essential cofactor for the rate-limiting enzyme in the cholesterol biosynthesis sequence, HMG-CoA-Reductase, the enzyme targeted by the statins (Rosanoff & Seelig, 2004). High cholesterol in rats was an early aspect of atherosclerotic disease that was tightly tied to Mg status (see appendix I). There is ample evidence to consider a high-LDL and/or low-HDL cholesterol as an aspect of Mg deficit warranting Mg therapy.


The following references are selected from the Mg Hypothesis Bibliography cited above.

Mg can correct Low HDL Cholesterol (Low “good” cholesterol)


Diabetes — More and more medical science is accepting the strong link between Mg status and the onset of type 2 diabetes (Barbagallo et al., 2007). Diabetes is a risk factor for CVD, and the low Mg status of both is part of the Mg Hypothesis of CVD. Type 1 diabetics have long been known to be at high risk for CVD. These people need insulin to keep their blood glucose from becoming too high; a high blood glucose enhances Mg excretion by the kidneys—often leading to a low magnesium status and its risk of CVD.


The following references are from the Mg Hypothesis bibliography cited above.

**Mg and High Fasting Glucose**


**Mg and Impaired Glucose Tolerance**


**Mg and Diabetes**


**Mg and Insulin Resistance**


**Mg and Elevated Plasma Insulin**


**Smoking** — This habit has long been associated with a higher risk of CVD than for nonsmokers. Smoking a tobacco cigarette raises the basal metabolic rate, undoubtedly raising the Mg requirement in smokers. With a higher requirement than the general nonsmoking population, the Mg Hypothesis predicts that smokers will show a higher degree of CVD than nonsmokers, taken as a whole.

**C-Reactive Protein and Inflammation** — A high C-reactive protein in the serum is a newer predictor of CVD (Albert & Ridker, 1999) and is highly inversely related to Mg status (Almoznino-Sarafian et al., 2007). The first symptom of Mg deficiency in mice is biochemical inflammation reactions (Weglicki et al., 2010).


The following references are from the Mg Hypothesis bibliography cited above.

**Ca:Mg and the Metabolic Syndrome**


**Mg and the Metabolic Syndrome**


**Mg and Obesity**


**Mg and Central (Abdominal) Obesity**


**Mg and High Blood Triglycerides**


**Other CVD Risk Factors Linked to Mg status** — depression, microalbuminuria, polycystic ovary syndrome, hemodynamic changes, renal sodium retention, prothrombic factors, fibrinogen and other inflammation markers, C-Reactive Protein, endothelial-dependent vasodilation. References available upon request.