



# THE CALCIUM WARS: MAGNESIUM DEFICIENCY CAUSES HEART DISEASE

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Many people think that calcium is the only nutrient necessary for strong bones. This is a dangerous myth that needs to be addressed.  
(1)

In fact, it takes 18 different nutrients to make durable bones. However, the most important bone mineral is magnesium because it activates alkaline phosphatase, the enzyme required to ensure optimal bone cell activity, as well as a strong bone matrix.(2)

It is vitally important to understand that calcium and magnesium are in an endless and dynamic dance within our cells.(3) These two key metabolic minerals are actually biological antagonists, and through their opposing actions, activate many of the vital functions we take for granted. But when these minerals get out of balance, due to stress-induced magnesium loss, a whole series of problems and chronic diseases unfold – most notably Heart Disease, our Number 1 killer.

Allopathic medicine is slowly recognizing the following facts about calcium and magnesium:(4)

a. There are dozens of conditions, such as heart disease, arthritis, IBD, IBS, asthma, Alzheimer's triggered by unchecked inflammation. Even cancer is now considered an inflammatory disease.(5)



b. All inflammation is controlled by the sympathetic nervous system, otherwise known as the “fight or flight” response.(6)

c. The sympathetic nervous system is triggered by excess, unregulated calcium.(7) Calcium is pro-inflammatory.

d. Calcium is regulated and controlled by magnesium.(8) Magnesium is anti-inflammatory.

Let's say that again. *Calcium is regulated and controlled by magnesium.* You've probably never heard that before. Most doctors don't even know this foundational aspect of how our bodies actually work. I learned these critical mineral relationships in my 200 hours of biochemistry in medical school. But unfortunately our professors never translated that information into clinical application.

Here's how magnesium carries out its crucial role in calcium metabolism. All three hormones that control the level and location of calcium in our body (PTH, Calcitonin and Hormone-D (which is Vitamin D) are activated by magnesium. Which means, if you don't have enough magnesium, these hormones can't do a proper job.(9)

Medicine is also beginning to see a common basis of magnesium deficiency in heart disease.(10) When all the dust settles on research for high cholesterol, hypertension, cardiomyopathy, congestive heart failure, arrhythmias, Mitral Valve Prolapse (MVP), Post Ventricular Contractions (PVCs), any kind of ischemia, myocardial infarct and sudden cardiac death, what they All have in common is that magnesium deficiency is the precursor to All of these cardiac conditions.(11) EVERY SINGLE ONE OF THEM.

Think of it this way. The heart is NOT an “organ,” but is actually a “muscle.” In fact, it's the hardest working muscle in our body.

FACT: Every 24 hours our hearts beat 103,000+ times and pushes 20,000 pounds of blood around our body.

FACT: The highest concentration of magnesium in our body is in the heart ventricles, which are the muscles that “pump” all that blood.(12)

FACT: Muscles need lots of energy to create sustained movement, and expend more energy relaxing and filling up the ventricles – prior to the “pump!”(13)

FACT: Muscle energy in our body is solely in the form of Mg<sup>2+</sup>-ATP (Magnesium-adenosine triphosphate).(14)

Our heart cells (and every cell in our body) must have magnesium present in plentiful amounts to create and metabolize the ATP necessary to run all of the cell's activities. Any cell unable to create proper levels of energy becomes diseased and dies, and this is especially true of heart muscle cells. The litany of heart diseases noted above is what follows.

So, how does our heart run out of energy?

"Stress!" Pure and simple.(15) "Stress," in all its many forms leads to magnesium use, and if not curtailed, magnesium loss. An accelerated MBR (Magnesium Burn Rate) leads to electrolyte dysfunction, which results in imbalances of our key minerals. The chronic loss of magnesium leads to a relentless increase of sodium and calcium which ultimately becomes the greatest form of cellular "Stress." And how do we know this? Hans Selye, MD, PhD, ScD, who is regarded as the *Father of Stress*, taught the world about the devastating impact of stress on our cellular metabolism, as well as steps we can take to manage it.

In 1958 Selye published a 235-page book called *The Chemical Prevention of Cardiac Necrosis*(16) in which he proved that when electrolyte imbalance becomes great enough, the cell no longer has the ability to produce ATP. We now know ATP is primarily dependent on magnesium. So, cell death – cardiac necrosis is the result of a systemic shortage of magnesium. Selye showed that heart muscle cell death is followed by inflammation in order to clean up the debris from dying cells followed by fibrosis/calcification as the whole area contracts and scars down in order to isolate, repair and minimize the damage.

What Selye found in his research hasn't changed in the intervening 50 years. Cardiac disease still follows these three key steps in cellular breakdown and repair. And these very same three cellular events precede all types of chronic disease, regardless of what organ, what gland or what tissue might be involved.

Chronic stress causes magnesium loss, which then leads to cell death. And what factor accelerates this process? The cellular influx of excess, unregulated calcium(17) Period. If magnesium isn't available, the mineral ion channels in cells are left wide open and calcium floods in.

The preceding overview gives you a new and biologically correct context for the emerging research that excess, unregulated calcium is bad for you.(18)

And how do we create a condition of calcium excess? Human biochemistry strongly favors holding

onto as much calcium as possible. However, magnesium is flushed out through the urine or bowels when the body is under stress or in at times when you have saturated yourself with magnesium.(19) The likely reason is that early mankind lived near oceans with access to fish, seaweeds and thus plenty of magnesium, but with few calcium sources, like dairy and green leafy vegetables. Therefore enhancing calcium absorption and preventing magnesium excess were survival mechanisms that were encoded in our wiring millennia ago.

Research shows that the ratio of calcium to magnesium in the Paleolithic diet was 1:1, compared with a 5:1 to 15:1 ratio in present-day diets.(20) With an average of ten times more calcium than magnesium in our current diet, there is no doubt this will cause an imbalance in the minerals and electrolytes in the body.

A recent Framingham study in the Am J Clin Nutr (Dec, 2012) asked the question. Does increased calcium intake cause coronary artery calcification?(21)The study included only 1,278 people. They found that people in the study who took calcium did not develop coronary artery calcification. Thus they concluded: "Our study does not support the hypothesis that high calcium intake increases coronary artery calcification, which is an important measure of atherosclerosis burden. The evidence is not sufficient to modify current recommendations for calcium intake to protect skeletal health with respect to vascular calcification risk."

We don't agree with this conclusion and would like you to consider the following study flaws:

1. The researchers are assuming that coronary artery calcification is the only cause of heart disease.
2. People with high calcium and low levels of magnesium can suffer sudden death heart attacks due to electrical imbalance without having significant coronary artery calcification.
3. Some might consider the study chose a relatively young population with a mean age of 60 and the range from a low age of 36.
4. This is a very small sample size
5. But most importantly, the study completely ignores the metabolic impact of excess calcium on the mitochondria. Calcium inhibits the production of ATP. How? Calcium bumps out magnesium thus preventing the production of ATP within these critical metabolic factories inside the muscle cells.

A whole line up of studies found the opposite – that calcium supplements increase heart disease. A 2012 study in the journal Heart including almost 24,000 participants concluded that "...risk increased further among those who used only calcium supplements – with this group more than

twice as likely to have a heart attack as those who didn't take any supplements.”(22)

Progressive studies begun in 2008 out of the University of Auckland first showed “Calcium supplementation in healthy postmenopausal women is associated with upward trends in cardiovascular event rates. This potentially detrimental effect should be balanced against the likely benefits of calcium on bone.”(23)

The second study was a 2010 BMJ Meta Analysis on 15 clinical trials where subjects were given calcium supplements showed an increased risk of myocardial infarction of about 30%. The conclusion was “Given the modest benefits of calcium supplements on bone density and fracture prevention, a reassessment of the role of calcium supplements in the management of osteoporosis is warranted.(24)

The third study analyzed data from 16,718 women who were not taking calcium supplements at the start of the trial and found that those who later took combined calcium and vitamin D supplements were at an increased risk of cardiovascular events, especially heart attack.(25)

When the end point of these studies is so extreme – heart attack or death, we forget the daily problems of too much calcium, such as kidney stones, gall stones, heel spurs, breast calcifications and calcifications in fibromyalgic muscles. We also forget about the magnesium deficiency created by high calcium and the dozens of diseases that inevitably occur.

It is time for the “debate” over calcium to shift. For too long, medicine and especially cardiology has been steeped in Newtonian physics with everyone worrying about blockages in the plumbing – the body as a bag of chemicals with deteriorating parts. But in fact, all other branches of science are steeped in Quantum physics with a keen focus on energy creation and transformation.

It is no longer a question of whether calcium causes “calcification” – it does but it's not just the blockage that matters, it's the fact that excess calcium reduces magnesium. What we do know, and what is well established in the literature is that all forms of cardiac disease are a direct reflection of the heart muscle's fundamental inability to satisfy its relentless need for energy. Here's how Cardiologist, Dr. Stephen Sinatra states the problem:

“We in the medical profession have not been trained to look at heart disease in terms of individual cardiac cells lacking the energy to sustain them.” – 2008.

My personal recommendations for calcium and magnesium intake have shifted since the second edition of *The Magnesium Miracle*. First, I found out that the 2:1 ratio of calcium to magnesium is a myth. It originated with the works of a French magnesium researcher, Dr. Jean Durlac who was

concerned about too much calcium and said Never take more than two parts calcium to one part magnesium from food, water and supplements. Something very important got lost in the translation to English and everyone, especially supplement manufacturers, thought they were being directed to use two parts calcium to one part magnesium.

With the current RDA for calcium at 1500 mg and the RDS for magnesium at 350, we're being advised to maintain a 4:1 ratio. People look at the RDA and take that amount in supplement form. And they don't even add up the nutrients they get in their food. Did you know that one ounce of cheese has about 300mg of calcium? And, nobody stops at one ounce! Add supplements to all the calcium in dairy, fortified foods and drinks and in drinking water and many people, women especially, can be taking 3,000 mg of calcium a day.

One hundred years ago we were able to get about 500mg of magnesium in our diet; today we're lucky if we get 250mg. The ratio of 3,000mg of calcium to 250mg of magnesium is 12:1. Yet, few doctors stop to ask what that incredible imbalance is going to do to our metabolism.

I find that people thrive on a 1:1 balance of calcium to magnesium. I support the calcium RDA from the UK (700mg) and the WHO (500-600mg). I personally try to get 700 mg of calcium in my diet, which includes yogurt, green leafy vegetables, and bone broth. To treat my heart palpitations and charley horse muscle cramps, I need at least 700mg a day, which I can't get in my diet. I also get the laxative effect from most magnesium products, so I created a Pico-Ionic Magnesium, called ReMag. But many people can take powdered magnesium citrate or dimagnesium malate or transdermal magnesium oil to meet their need. You can read more about these forms of magnesium under Resources on my website.

The debate about the overuse of calcium in supplements and fortified foods has just begun but you are well ahead of the curve by understanding our argument here. There are many references below and articles on my website, Dr Carolyn Dean and on the Nutritional Magnesium Association website about magnesium and calcium so you can do your own research. You can also follow magnesium expert, Morley Robbins in the following venues: The Magnesium Advocacy Group, Magnesium Man and Nexus Whole Health.

**Authors:** Dr Carolyn Dean and Morley Robbins

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