

# **Magnesium For Life**

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*It is highly regrettable that the deficiency of such an inexpensive, low-toxicity nutrient results in diseases that cause incalculable suffering and expense throughout the world.*

*Dr. Steven Johnson*

*Magnesium is nothing short of a miracle mineral in its healing effect on a wide range of diseases as well as in its ability to rejuvenate the aging body. We know that it is essential for many enzyme reactions, especially in regard to cellular energy production, for the health of the brain and nervous system and also for healthy teeth and bones. However, it may come as a surprise that in the form of magnesium chloride it is also an impressive infection fighter.*

*Walter Last*

*The Chinese character for "magnesium" is 'mei', which consists of the root symbol for "metal" and the ideogram for "beautiful." Hence, the "beautiful metal."*

*Daniel Reid*

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## Magnesium in Modern Medicine

Magnesium is nearly miraculous for the depth and scope of its application. It really is not an exaggeration to say that miracles in medicine would be achieved if people's magnesium deficiency were addressed instead of ignored. Certainly many lives would be saved if non-toxic medicines were favored over toxic ones. This is not idle medical banter and the entire medical community will eventually have to reorient itself by putting magnesium, specifically magnesium chloride, at the top of the chart of usable medicines.

*When 1,033 hospitalized patients were studied, over 54% were low in magnesium. What was worse is that 90% of the doctors never even thought of ordering a magnesium test.<sup>1</sup>*

*Journal of the AMA*

Despite the fact that magnesium is almost as important for life as the air we breathe, it seems like the medical industrial complex is not too keen on the public getting enough of this precious mineral. For instance, for the past 15 years evidence has stacked up showing patients with acute coronary thrombosis improve their survival chances by 50 - 82.5% when given intravenous magnesium of 32-66 mmol (1200 milligrams of magnesium equals 50 mmol) in the first 24 hours,<sup>2</sup> and still magnesium chloride or magnesium sulfate are not universally used in hospitals around the world. Rapid intravenous bolus doses of magnesium have been shown to instantaneously and effectively dilate the coronary collateral circulation proving to be a dramatically effective treatment of acute myocardial infarction, angina and congestive heart failure.<sup>3</sup>

*Magnesium is the most important mineral to man and all living organism.<sup>4</sup>*

*Dr. Jerry Aikawa*

The medical authorities, and certainly the pharmaceutical companies, are in a pickle with magnesium chloride. They have a powerful medicine that is non toxic, inexpensive and effective in a wide variety of medical situations. So what do they do? They have a study designed to show the opposite, thus sabotaging medical clarity on the use of a valuable safe medicine. Specifically, when it comes to magnesium, a single negative study showing that magnesium had a worsening effect on survival employed a far higher dose of magnesium (80 mmol) than the studies mentioned above<sup>5</sup>, and another study showing no

benefit with magnesium employed the low dose of 10 mmol in the first 24 hours.

Dr Stephen Davies and Dr Damien Downing, editors of the Journal of Nutritional and Environmental Medicine, criticized the designers of the study for clearly selecting too large a dose of intravenous magnesium, and also for giving magnesium too late and then too quickly. “Although it would appear clear to any first year medical student that magnesium worked well for coronary thrombosis within the optimal dosage level of 30 - 70 mmol; that 10 mmol was shown to be too little, and 80 mmol had been shown to be too much.”

*Over 100 patients suffering from coronary heart disease were treated with intramuscular [injected] magnesium sulphate with only one death, compared to their findings in the previous year when, of 196 cases admitted and treated with routine anticoagulants, 60 died.<sup>6</sup>*

*The British Medical Journal*  
January 23, 1960

Because of these studies many hospitals ceased using magnesium in their treatment of acute coronary thrombosis. The scandalous decision to use this overdose of magnesium in this study is what we would expect of the profit driven pharmaceutical business and medical industrial complex that hurts more people than it helps. Iatrogenic death and disease is rampant and some of that could be avoided if magnesium were more widely used in modern medicine.

Researchers from Northwestern University School of Medicine in Chicago have determined that not having enough magnesium in your diet increases your chances of developing coronary artery disease. In a study of 2,977 men and women, researchers used ultrafast computed tomography (CT scans) of the chest to assess the participants' coronary artery calcium levels. Measurements were taken at the start of the study -- when the participants were 18 to 30 years old -- and again 15 years later. The study concluded that dietary magnesium intake was inversely related to coronary artery calcium levels. Coronary artery calcium is considered an indicator of the blocked-artery disease known as atherosclerosis.

Magnesium is shaping up to become the number one preventative agent for the major plagues of modern man. In two huge long term studies it was also recently concluded that **those who consumed the most magnesium in their diet were least likely to develop type 2 diabetes**, according to a report in the January 2006 issue of the journal Diabetes Care. Until now, very few large studies have directly examined the long-term effects of dietary magnesium on diabetes. Dr. Simin Liu of the Harvard Medical School and School of Public

Health in Boston says, "Our studies provided some direct evidence that greater intake of dietary magnesium may have a long-term protective effect on lowering risk," said Dr. Liu.

Considering some of the basic research already published it is highly frustrating the inertia in medicine about using magnesium as a primary medicine. Dr. Russell Blaylock describes his own experience with this and tells how his own brother fell victim to cancer and how the lack of proper treatment led to a death that could have been prevented. "I asked the doctor in charge of his respiratory care to add vitamins and magnesium to his IV. While he promised he would, he didn't. When I asked his doctor why the magnesium had not been added to his IV, word was sent back to me through the nurse that she had never heard of using magnesium. I sent copies of selected articles showing the immense value of magnesium on pulmonary and cardiovascular function. Still there was no response from the doctor."<sup>7</sup>

**Magnesium deficiency commonly occurs in critical illness and correlates with a higher mortality and worse clinical outcome in intensive care units.** Studies are now underway that have emergency crew personnel authorized to administer IV magnesium immediately in the ambulance. Preliminary trials found "promising" effects of MgSO<sub>4</sub> (magnesium sulfate) on stroke victims if given early enough, before getting to emergency rooms<sup>8</sup>. Magnesium infusion in patients with acute myocardial infarction (four grams of MgSO<sub>4</sub> during the first three days) reduced the incidences of arrhythmias, death and the size of infarction. Another study showed reduction of mortality with infusion of 10 grams of MgSO<sub>4</sub> in 24 hours.<sup>9</sup>

Dr. Sarah Mayhill, a British doctor working for the National Health Service says, "In fact it is partly this effect which is taken advantage of in the treatment of acute myocardial infarction or acute stroke. In both these conditions there is a local obstruction of blood supply. I use I.V. magnesium (2-5mls of 50%) as a bolus to treat both these conditions - often with dramatic effects. With acute myocardial infarctions there is often immediate pain relief, as either the obstruction is relieved or good collateral circulation restored. Furthermore, magnesium is antiarrhythmic. Trials with magnesium have clearly demonstrated benefit and magnesium is used as a front line drug in many hospitals. **In acute stroke, function can be restored within a few minutes** - most satisfying. However, if there is a possibility that the stroke is hemorrhagic (about 15% of cases) then magnesium should not be used."

*Intravenous magnesium is safe and effective in acute severe asthma and is commonly used by emergency medical personnel.*

Magnesium has many known indications in anesthesiology and intensive care, and new studies are beginning to suggest its use in many other areas of medicine as well. For instance two studies have suggested magnesium's role in the treatment of acute migraine. Mauskop *et al*<sup>10</sup> demonstrated relief of headache within 15 minutes of intravenous magnesium in 32 of 40 patients with migraine, cluster headache, or tension headache. "Not all headaches are produced by mineral imbalances, but we now know that 50 to 60 percent of migraines are magnesium-linked. And that's probably why no prescription therapy on the market successfully treats headaches across the board. They're simply not treating the cause," says Dr. Burton M. Altura, professor of physiology and medicine at the State University of New York Health Science Center at Brooklyn. "Of the 17 people we've treated with magnesium, 13 have had complete improvement," says Dr. Herbert C. Mansmann, Jr., professor of pediatrics and associate professor of medicine at Jefferson Medical College in Philadelphia.<sup>11</sup>

When used correctly, magnesium chloride is a weapon against infectious diseases. Between its power to stimulate white blood cells and glutathione production, and its basic role in producing energy we have a heavyweight non-toxic medicine we can use without a prescription. This is going to be very important as antibiotics fail us. For example a new and growing concern - an increasing number of young, otherwise healthy Americans who are being stricken by the bacterial infection known as *Clostridium difficile* -- or *C. diff* -- which appears to be spreading rapidly around the country and causing unusually severe, sometimes fatal illness.

*It's a new phenomenon. It's just emerging. We're very concerned.  
We know it's happening, but we're really not sure  
why it's happening or where this is going.  
Center for Disease Control*

The infection has long been common in hospital patients taking antibiotics for other reasons. As the drugs kill off other bacteria in the digestive system, the *C. diff* microbe can proliferate. Hospitals might be forced to use magnesium chloride or just watch as more and more die from their refusal to step outside their medical boxes and use something that can safely help deal with this and other medical situations.

Magnesium chloride, when concentrated, is a powerful universal medicine that we can turn to in many clinical situations, including common influenza and

the “*dreaded*” bird flu, especially when used in conjunction with vitamin C. This is an exciting medical discovery. The same pure natural substance used in emergency rooms to save people’s lives has a dramatic effect on cell life and is safer to use than aspirin. Effective in a much broader sense than vitamin C, magnesium chloride is a medicine that helps doctors to fulfill their primary mission and purpose.

“Magnesium is necessary for the normal function of over 300 enzyme systems, for muscle relaxation, immune function, cardiac function, clotting, nerve conduction etc. Indeed I cannot think of a bodily department in which magnesium is not essential. **It prevents heart disease, cancer, blood pressure, kidney stones and improves energy, sleep etc.**” reports Dr. Mayhill.

“Like two diverging paths, it appears that the more we learn about the benefits of magnesium the more we uncover about the side effects of prescription drugs,” says Dr. Carolyn Dean, author of *The Miracle of Magnesium*. Magnesium chloride is a versatile medicine we can all put in our medicine cabinets. It boosts almost all aspects of cell physiology and is what you want around if you are having a heart attack or stroke. Magnesium chloride is a basic mineral nutrient supplied by the food industry that can be used orally, intravenously, and transdermally.

Magnesium chloride treatments address systemic nutritional deficiencies, act to improve the function of our cells and immune system, and help protect cells from oxidative damage. It’s a systemic medicine as well as a local one bringing new life and energy to the cells wherever it is applied.

*Hundreds of billions of dollars and millions of lives would be saved if magnesium was supplemented and used widely as a medicine.*



## Magnesium

Magnesium, atomic number twelve, is an element essential for normal function of the nervous and cardiovascular systems. Pure magnesium is a silvery-white metal, which burns with a dazzling brilliance. It is the second most abundant mineral in cells after potassium. The two ounces or so found in the typical human body is present not as metal but as magnesium ions (positively-charged magnesium atoms found either in solution or complexed with other tissues, such as bone). Magnesium is the second most abundant intracellular cation and the fourth most abundant cation in the body. It is an essential transmembrane and intracellular modulator of cellular electrical activity. Its deficiency in the body is nothing short of disastrous for cell life.

Roughly one quarter of this magnesium is found in muscle tissue and three-fifths in bone; but less than 1% of it is found in blood serum, although that is used as the commonest indicator of magnesium status. This blood serum magnesium can be further subdivided into free ionic, complex-bound and protein-bound portions, but it's the ionic portion that's considered most important in measuring magnesium status, because it is physiologically active. The body works very hard to keep blood levels of magnesium constant. Magnesium is the single most important mineral for maintaining proper electrical balance and facilitating smooth metabolism in the cells. One of the major properties of magnesium is that of stabilizing membranes. Magnesium has a stabilizing effect not only for the cell membrane but also for various subcellular organelles.

Unfortunately, magnesium deficiency is one of the most common nutritional problems in the industrialized world today. This deficiency is the result of agricultural practices, food preparation techniques, and dietary trends. The health implications are nothing short of catastrophic.

*Magnesium is necessary for the metabolism of carbohydrates, fats and amino acids. It is essential for the functions of muscles and nerves and for the formation of bones and teeth. Generally it counteracts and regulates the influence of calcium.*

There are basically two classes of minerals: micronutrients, which are only needed in trace amounts and macronutrients, of which we need fairly significant

amounts. Magnesium is a mineral we need fairly large quantities of but sadly the conventional medical paradigm has not realized its strategic importance. Magnesium supplementation is dramatically under utilized by conventional physicians. Though magnesium deficiency is common, it is usually not looked for, and therefore, not found or corrected. In most industrialized countries, magnesium intake has decreased over time and is now marginal in the entire population.<sup>12</sup>

*Magnesium deficiency can affect virtually every system of the body. Unfortunately, Mg absorption and elimination depend on a very large number of variables, at least one of which often goes awry, leading to a Mg deficiency that can present itself with many signs and symptoms.*

Magnesium is very important in health and medicine. It is extremely important for the metabolism of Ca, K, P, Zn, Cu, Fe, Na, Pb, Cd, HCl, acetylcholine, and nitric oxide (NO), for many enzymes, for the intracellular homeostasis and for activation of thiamine and therefore, for a very wide gamut of critical body functions. Magnesium is a particularly crucial element for mediating the vital functions of the nervous and endocrine systems; it helps maintain normal muscle and nerve functions, keeps heart rhythm steady, supports a healthy immune system, and keeps bones strong. Magnesium also helps regulate blood sugar levels, promotes normal blood pressure, and is known to be involved in energy metabolism and protein synthesis. In the nucleus more than half the magnesium is closely associated with nucleic acids and mononucleotides. Magnesium is necessary for the physical integrity of the double helix of DNA, which carries genetic information and the code for specific proteins.

*Enzymes are protein molecules that stimulate every chemical reaction in the body. Magnesium is required to make hundreds of these enzymes work.*

*Dr. Carolyn Dean*

According to Dr. Carolyn Dean, “Of the **325 magnesium-dependent enzymes**<sup>13</sup>, the most important enzyme reaction involves the creation of energy by activating adenosine triphosphate (ATP), the fundamental energy storage molecule of the body. ATP may be what the Chinese refer to as qi, or life force. Magnesium is required for the body to produce and store energy. Without magnesium there is no energy, no movement, no life.” *Magnesium is necessary for the synthesis of various compounds that have energy-rich bonds of any type.*<sup>14</sup> The formation of energy-rich bonds that require Mg<sup>2+</sup> constitutes the

necessary basis for all cellular activities. This alone establishes the critical biologic importance of magnesium. Thus fatigue is often reduced with magnesium supplementation for the many enzyme systems that require magnesium help restore normal energy levels.

*The toxic effect of fluoride ions plays a key role in acute Mg deficiency. Fluoride ion clearly interferes with the biological activity of magnesium ions. In general, fluoride-magnesium interactions decrease enzymatic activity.*<sup>15</sup>

Dr. Dean and many other doctors and researchers are clear that “magnesium deficiency is a significant factor -- often the major factor -- in many severe illnesses including heart attacks and other forms of heart disease, asthma, anxiety and panic attacks, depression, fatigue, diabetes, migraines and other headaches, osteoporosis, insomnia, and most cases of muscular problems.” Dr. Steven Johnson agrees adding, “The range of pathologies associated with Mg deficiency is staggering: hypertension (cardiovascular disease, kidney and liver damage, etc.), peroxynitrite damage (migraine, multiple sclerosis, glaucoma, Alzheimer's disease, etc.), recurrent bacterial infection due to low levels of nitric oxide in the cavities (sinuses, vagina, middle ear, lungs, throat, etc.), fungal infections due to a depressed immune system, thiamine deactivation (low gastric acid, behavioral disorders, etc.), premenstrual syndrome, Ca deficiency (osteoporosis, mood swings, etc.), tooth cavities, hearing loss, diabetes type II, cramps, muscle weakness, impotence, aggression, fibromas, K deficiency (arrhythmia, hypertension, some forms of cancer), Fe accumulation, etc.”

Magnesium is essential in regulating central nervous system excitability thus magnesium-deficiency may cause aggressive behavior,<sup>16</sup> depression, or suicide.<sup>17</sup> Magnesium calms the brain and people do not need to become severely deficient in magnesium for the brain to become hyperactive. One study<sup>18</sup> confirmed earlier reports that a marginal magnesium intake overexcites the brain's neurons and results in less coherence--creating cacophony rather than symphony--according to electroencephalogram (EEG) measurements.<sup>19</sup> During half of the six-month study, 13 women consumed 115 milligrams of magnesium daily--or about 40 percent of the Recommended Dietary Allowance (RDA). During the other half, they got 315 mg daily--a little more than the 280 mg recommended for women. After only six weeks on the marginal intake, EEG readings showed significant differences in brain function.

*Magnesium exists in the body either as active ions or as inactive complexes bound to proteins or other substances.*

Minerals in general rule over other nutrients because vitamins, enzymes and amino acids, as well as fats and carbohydrates, require them for activity. There are 17 minerals that are considered essential in human nutrition and if there is a shortage of just one the balance of the entire system can be upset. A deficiency of a single mineral can negatively impact the entire chain of life, rendering other nutrients ineffective and useless.

## Dietary Magnesium Deficiencies

*Studies show that as many as half of all Americans do not consume enough magnesium. Magnesium deficits have been tied to allergies, asthma, attention deficit disorder, anxiety, heart disease, muscle cramps and other conditions.*<sup>20</sup>

*Massachusetts Institute of Technology*

The latest government study shows a staggering 68% of Americans do not consume the recommended daily intake of magnesium. Even more frightening are data from this study showing that 19% of Americans do not consume even half of the government's recommended daily intake of magnesium.<sup>21</sup>

One of the great challenges in medicine today is to understand the complexity of causes that leads to the breakdown of health and the formation of serious disease. There are so many factors that simultaneously impinge on our physical systems that it is truly a daunting task to ascertain what is causing what. During this past century the physical environment that surrounds us has gotten incredibly toxic and even **the food most people eat acts to destroy rather than nourish**. There are people and organizations that hide behind this complexity of causes thus making it impossible to prove anymore what is harming our children and us, what is causing autism, why certain kids fall down dead after being vaccinated and other not.

*Let thy food be thy medicine,  
and thy medicine be thy food.*

*Hippocrates, 400 B.C.*

A few years ago I wrote a *Tale of Two Hammers* about the situation in Africa where populations were being decimated because mass vaccine programs were being administered to malnourished populations whose immune systems were already compromised. Little did I dream then of a similar situation in the west with the majority of the population being malnourished in magnesium.

Food contamination is a growing problem and now an acknowledged risk to young children and adults alike. It does not take much to see that human well being has been breached by the air we breathe, the water we drink, by the

medicines and vaccines administered to us, by mercury put in our mouths, and clearly by the cocktails of chemicals in food.

*At least 2,800 substances have been recognized as food additives by the U.S. Food and Drug Administration. These are used to make foods more attractive, to make foods tastier, and to increase the grocery shelf life.*

The Pesticide Action Network's (UK) analysis reveals a diverse cocktail of chemicals in food. "Mostly, but not always, below legal limit, 65 per cent of them are recognized hazards to health: 35 per cent are suspected cancer-causing chemicals, 12 per cent are hormone-disrupting chemicals, and 41 per cent are acutely toxic." Because magnesium is so important for the removal of toxic substances from the body its lack makes us even more vulnerable to food contamination. According to Dr. Carolyn Dean if you have a magnesium deficiency and regularly use aspartame, the toxicity is magnified and can result in headaches and migraines.

More and more people are becoming aware of the chemical rape of our children but what few are conscious of is the decreasing value of vitamins, minerals and proteins in the food we all eat. On one side we are being poisoned and on the other we are being deprived of the very nutrition necessary to resist all the different toxicities we are being confronted with. Then, on top of everything else, our systems have to navigate through further deficiencies brought on by allopathic drugs like antibiotics that are used too often. When we use chelators (drugs used to remove heavy metals) we have to deal with the fact that important minerals are reduced even further.

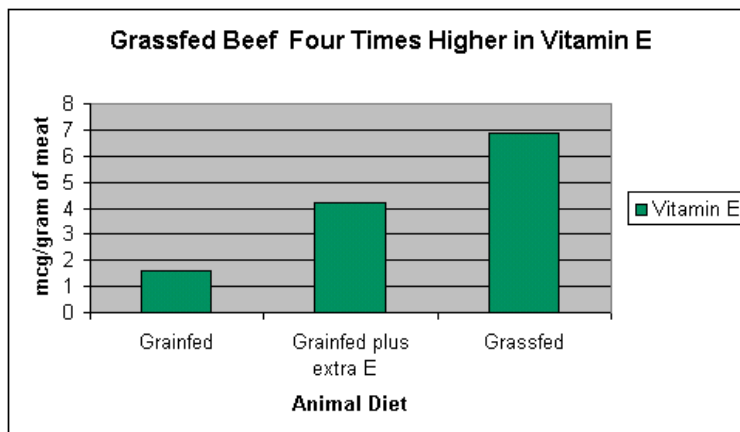
Drug/Substance	Nutrients Depleted
Antibiotics	Vitamin A, B-12, C, E, K, Biotin, Calcium, Iron, <b>Magnesium</b> , Potassium
Chelators	Copper, Iron, <b>Magnesium</b> , Zinc
Anticonvulsants	Vitamin B-2, B-12, C, F, K, Folic Acid, Calcium, <b>Magnesium</b>

Antidiabetics (Oral)	Vitamin B-2, B-12, C, D, Folic Acid
Antihistamines	Vitamin C
Aspirin	Calcium, Folic Acid, Iron, Potassium, C, B Complex

Dr. Matthias Rath says that, “Almost all the prescription drugs currently taken by millions of people lead to a gradual depletion of vitamins and other essential cellular nutrients in the body. Drugs are generally synthetic, non-natural substances that we absorb in our bodies. Our bodies recognize these synthetic drugs as “toxic,” just like any other non-natural substance. Thus, all synthetic drugs have to be “detoxified” by the liver in order to eliminate them from our bodies. This detoxification process requires magnesium and vitamin C and other cellular nutrients as cofactors. Many of these essential nutrients are used up in biological (enzymatic) reactions during this detoxification process. One of the most common ways for eliminating drugs from our bodies is called hydroxylation.” The strongest “hydroxylating agent” in our bodies is vitamin C, which is literally destroyed during this detoxification process. Thus, long-term use of many synthetic prescription drugs leads to chronic vitamin depletion in the body, a form of early scurvy and the onset of cardiovascular disease.”

*Micronutrient content of the average diet  
in industrialized countries is declining.*

Cheryl Long and Lynn Keiley writing for Mother Earth News<sup>22</sup> tell us that “American agrobusiness is producing more food than ever before, but the evidence is building that the vitamins and minerals in that food are declining. For example, eggs from free-range hens contain up to 30 percent more vitamin E, 50 percent more folic acid and 30 percent more vitamin B-12 than factory eggs. Most of our food now comes from large-scale producers who rely on chemical fertilizers, pesticides and animal drugs, and inhumane confinement animal production. In agribusiness, the main emphasis is on getting the highest possible yields and profits; nutrient content (and flavor) are, at best, second thoughts. This shift in production methods is clearly giving us less nutritious eggs and meat. Beef from cattle raised in feedlots on growth hormones and high-grain diets has lower levels of vitamins E, A, D and beta carotene, and twice as much fat, as grass-fed beef.” Health writer Jo Robinson has done groundbreaking work on this subject<sup>23</sup> making us critically aware of the importance of the conditions in which our crops, meat and dairy are raised.



Data from: Smith, G.C. "Dietary supplementation of vitamin E to cattle to improve shelf life and case life of beef for domestic and international markets." Colorado State University, Fort Collins, Colorado

**We humans are not getting the minerals we need** because modern agricultural methods, including widespread use of N P K fertilizer, over farming, loss of protective ground cover and trees, and lack of humus have made soils vulnerable to erosion. The result is a reduced nutrient content of crops. N P K fertilizer is highly acidic. It disrupts the pH (acid/alkaline) balance of the soil, as does acid rain. Acid conditions destroy soil microorganisms. It is the job of these microorganisms to transmute soil minerals into a form that is usable by plants. In the absence of these microbes, these minerals become locked up, unavailable to the plant. Stimulated by the N P K fertilizer, the plant grows, but it is deficient in vital trace minerals. In the absence of trace minerals, plants take up heavy metals (such as aluminum, mercury and lead) from the soil. Between 1950 and 1975, the calcium content in one cup of rice dropped 21 percent, and iron fell by 28.6 percent.

*When trace minerals are scarce in plant  
bodies they become scarce in human bodies.*

Dr. Scott Whitaker, in his book MediSin, tells us how unfortunate it is that the modern day farmer has been persuaded to use monoculture, artificial fertilization, pesticides, and herbicides. "The end result of our domestic food production has been 'quantity' rather than 'quality'. The human body can thrive on fruits and vegetables that are grown on vital rich soil but not on soil that is artificially pumped up with chemicals." Thus today hardly anyone can eat enough fruits and vegetables to supply his or her body with the mineral salts required for good health. .

*It is crucial that doctors and parents recognize*



*that from poor soil comes poor food,  
deficient in minerals and vitamins*

Dr. Nan Kathryn Fuchs, author of **The Nutrition Detective**, says that, “Our diets today are very different from those of our ancestors though our bodies remain similar. **Thousands of years ago, our ancestors ate foods high in magnesium and low in calcium.** Because calcium supplies were scarce and the need for this vital mineral was great, it was effectively stored by the body. Magnesium, on the other hand, was abundant and readily available, in the form of nuts, seeds, grains, and vegetables, and did not need to be stored internally. Our bodies still retain calcium and not magnesium although we tend to eat much more calcium (in the form of dairy products) than our ancestors. In addition, our sugar and alcohol consumption is higher than theirs, and both sugar and alcohol increase magnesium excretion through the urine. Our grains, originally high in magnesium, have been refined, which means that magnesium is lost in the refining process. The quality of our soil has deteriorated as well, due to the use of fertilizers that contain large amounts of potassium a magnesium antagonist. This results in foods lower in magnesium than ever before.”

*We need an average of 200 milligrams more  
magnesium than we get from the average diet.*

*Dr. Mildred Seelig*

President of the American College of Nutrition

Imbedded into allopathic medicine are starvation nutritional protocols. The United Nation’s Codex Alimentarius commission actually is staffed by people in the medical community whose main goal is to block our access to vitamins and minerals within the therapeutic range, as well as to all the most innovative dietary supplements, especially food based products, and even to organic food. If they have their way we will only be able to buy at highly inflated prices, with a doctor’s prescription, low levels of vitamins and minerals.

Allopathic philosophy ignores the idea or concept of deficiency. There is no general awareness when a person’s disease is caused by a deficiency in a vital mineral like magnesium. Certainly the western medical establishment missed the boat completely when it came to the declining values of magnesium in food. Some huge eye went blind to what modern farming and food processing did to the nutritional values of food meaning that no attention has been paid to the slowly developing levels of malnutrition in populations. In the first world we

now find the majority of obese people are actually malnourished in essential minerals and vitamins. (See chapter on magnesium deficiency.)

**The food supply has been steadily becoming magnesium-poor since 1909:<sup>24</sup>**

1909 intake	408 mg/day
1949 intake	368 mg/day
1980 intake	349 mg/day
1985 intake	323 mg/day (men)
1985 intake	228 mg/day (women)

There has been a steep decline of dietary magnesium in the United States, from a high of almost 500 mg/day at the turn of the last century to barely 175-225 mg/day today.<sup>25</sup> The National Academy of Sciences also has determined that most Americans are magnesium deficient. Their calculations are that men obtain only about 80 percent of their daily needs with women fairing even worse obtaining about 70 percent of their needs.<sup>26</sup>

The magnesium content of refined foods is usually very low. Magnesium is a fairly soluble mineral, which is why boiling vegetables can result in significant losses; in cereals and grains, it tends to be concentrated in the germ and bran, which explains why white refined grains contain relatively little magnesium by comparison with their unrefined counterparts. Whole-wheat bread, for example, has twice as much magnesium as white bread because the magnesium-rich germ and bran are removed when white flour is processed. Magnesium deficiency is more likely in those who eat a processed-food diet; in people who cook or boil all foods, especially vegetables, and in people who eat food grown in magnesium-deficient soil, where synthetic fertilizers containing no magnesium are often used.

Deficiency is also more common when magnesium absorption is decreased, such as after burns, serious injuries, or surgery and in patients with diabetes, liver disease, or intestinal mal-absorption problems. Also deficiencies develop when magnesium elimination is increased, which it is in people who use alcohol, caffeine, or excess sugar, or who take diuretics or birth control pills. We can add to this list vaccines because they offer a traumatic insult to the

body that have to be defended against and that defense gobbles up both magnesium and vitamin C.

Other drugs that cause loss of body magnesium:

- Cocaine
- Beta-adrenergic agonists (for asthma)
- Corticosteroids (CS) (for asthma)
- Theophylline (for asthma)
- Diuretics
- Thiazide
- Phosphates (found in cola drinks)
- Nicotine
- Insulin

*The nutrient content of foods can no longer be relied upon.  
The effects of stress, intense physical activity, or the use  
of certain medications cause magnesium deficiency.*

Because magnesium in certain forms is not easily absorbed and because no classical symptoms exist that point to magnesium's causal role in disease, the problem of its deficiency is readily masked. Many are the conditions that reduce total body magnesium and increase magnesium requirements. With nutritional values declining quickly and chemical toxicity in our bodies rising rapidly we and our children are caught between a rock and a hard place.

*Data indicate that subsets of the population may be unusually  
susceptible to the toxic effects of fluoride and its compounds.  
These populations include the elderly, people with magnesium  
deficiency, and people with cardiovascular and kidney problems.<sup>27</sup>*

**Several studies have reported that increasing calcium in the diet significantly reduces the absorption of magnesium.** In addition, diarrhea, extreme athletic physical training, sodas (especially cola type sodas, both diet and regular), sodium (high salt intake), stress (physical and mental—anything that activates a person's fight or flight reaction), and intense sweating all diminish magnesium levels.

Magnesium deficiency at a cellular level where it counts is not easy to diagnose, as serum magnesium levels do not correlate to muscle or cellular magnesium levels. Instead of trying difficult tissue magnesium analysis to find out if your health problems may be due to low magnesium levels, it is much easier and more effective just to take more magnesium and see what happens. Caution is necessary only in cases of renal failure.

Table 1: the magnesium content of common foods

<b>Food</b>	<b>MAGNESIUM Content (milligrams per 100g)</b>
Pumpkin seeds (roasted)	532
Almonds	300
Brazil nuts	225
Sesame seeds	200
Peanuts (roasted, salted)	183
Walnuts	158
Rice (whole grain brown)	110
Wholemeal bread	85
Spinach	80
Cooked beans	40
Broccoli	30
Banana	29
Potato (baked)	25
White bread	20
Yoghurt (plain, low fat)	17
Milk	10
Rice (white)	6
Cornflakes	6 ('Frosties' or 'Honeynut')
Apple	4
Honey	0.6

Source; *USDA Nutrient Database*

Green vegetables such as spinach are good sources of magnesium because the center of the chlorophyll molecule (which gives these vegetables their color) contains magnesium. Since 1981, Life Extension<sup>28</sup> has recommended high-potency magnesium supplements, because magnesium is the most deficient mineral in the American diet. In the early 1980s, the Life Extension

Foundation was criticized by mainstream doctors for recommending high doses of magnesium relative to calcium. They even had their magnesium supplements seized by the FDA because they presented evidence that this mineral could help prevent heart attack.

*An excess of a toxic metal and/or a relative deficiency of a nutritional element can be found as significant contributors to every disease.*

*Dr. Garry Gordon*

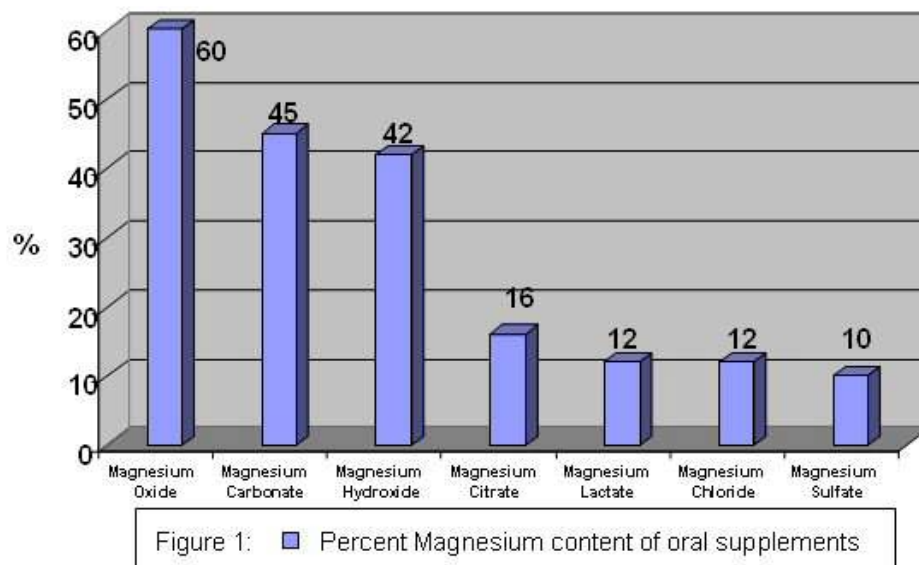
William Faloon from Life Extension says, “With all the research linking low magnesium intake with high cardiovascular risks, this low-cost mineral would appear to be a simple way to counter today’s heart attack and stroke epidemic. Unfortunately, magnesium is so cheap that virtually no one is promoting it as a lifesaving mineral.”

*There is no substitute for magnesium; it’s as close as a metal comes to being as necessary as air.*

## Intravenous, Transdermal, and Oral Magnesium Mineral Therapy

“Magnesium is poorly absorbed orally. That is why I start off with injections. By injecting magnesium I can guarantee 100% to bring the levels up. I cannot guarantee to do this with oral magnesium,” says Dr. Sarah Mayhill who continues with, “Treating magnesium deficiency is the most difficult deficiency to correct. In evolutionary terms, magnesium was abundant in the diet and therefore no good mechanisms to conserve magnesium evolved. It appears to be poorly absorbed and easily excreted even by normal people.”

The problem with oral magnesium is that all magnesium compounds are potentially laxative. And there is good evidence that magnesium absorption depends upon the mineral remaining in the intestine at least 12 hours. If intestinal transit time is less than 12 hours, magnesium absorption is impaired, and this is the case when high doses of oral magnesium are administered. Thus it is very difficult to administer what would be considered medicinal doses orally.



There are many forms of oral magnesium<sup>29</sup> and perhaps one is more easily utilized than the other. Oral magnesium chloride is well tolerated and gets absorbed very quickly and is inexpensive. Magnesium chloride hexahydrate can be purchased chemically pure from most chemical supply houses without a prescription. One of the disadvantages of oral magnesium compositions that are currently available is that they do not control the release of magnesium. One of the reasons they are inefficient is because they release magnesium in the upper gastrointestinal tract where it reacts with other substances such as calcium. These reactions reduce the absorption of magnesium.

Many things affect magnesium absorption from the gut.<sup>30</sup> Most drugs will adversely affect how magnesium taken orally is absorbed or how quickly it will be excreted. When we think about the drugs used for children on the autism spectrum, we should be concerned about antipsychotics used for behavior control. Zyprexa, Risperdal, and others can cause hyperglycemia, which in turn causes increased excretion of magnesium taken orally. Many drugs bind with magnesium diminishing its availability in the body. Two cans of soda per day (all of which contain phosphates) also bind up a lot of magnesium by preventing absorption of magnesium ions in the GI tract. Magnesium also binds with aspartame so drinking diet sodas is not a good idea for any reason.

Magnesium supplementation is actually crucial for everyone today but we have to pay especial attention to the method of supplementation because this is critical in terms of effective body utilization. Magnesium is absorbed primarily in the distal small intestines or colon. Active uptake is required involving various transport systems such as the vitamin D-sensitive transport system. Since magnesium is not passively absorbed it demonstrates saturable absorption resulting in variable bioavailability averaging 35-40% of administered dose even under the best conditions of intestinal health. Magnesium levels in the body, presence of calcium, phosphate, phytate and protein can affect rate of absorption. These and other conditions make oral magnesium supplements intake chancy and inefficient compared to the new transdermal magnesium chloride mineral therapy that this book introduces.

**The health status of the digestive system and the kidneys significantly influence magnesium status.** Magnesium is absorbed in the intestines and then transported through the blood to cells and tissues. Approximately one-third to one-half of dietary magnesium is absorbed into the body.<sup>31</sup> Gastrointestinal disorders that impair absorption such as Crohn's disease can limit the body's ability to absorb magnesium.

“When people are ill, faced with magnesium deficiency and poor digestion, what do you think the odds are of fixing that problem with oral magnesium supplementation and digestive enzymes alone?” asks Dr. Ronald Hoffman. In his clinic Dr. Hoffman carefully measures magnesium and found that many patients with low magnesium who take just oral supplements do not normalize. Dr. Mildred Seelig, renowned researcher of magnesium, predicts it would take 6 months to normalize magnesium levels in a woman who is magnesium deficient with oral supplementation. The bottom line is that transdermal magnesium therapy speeds up the process of nutrient repletion in much the same way as intravenous methods.

*For children with neurological disorders or asthma  
transdermal magnesium is like an oxygen mask.*

Dr. Mayhill tells us, “One injection of 2mls of 50% magnesium sulphate (1gm MgSO<sub>4</sub>, or 100mgs elemental Mg or 4 millimols) will usually keep levels up for two weeks (however, some people need them more often). By the third week, levels will usually have fallen again. For some people this is the only method that has worked, but it is tedious to have to keep injecting. **But the injection is painful because one is injecting a concentrated solution.** It is best given at room temperature or blood heat, intramuscularly, either into triceps or deltoid, slowly over one to two minutes. I usually use an orange needle, at least 1” long to get deep into the muscle. Magnesium is a powerful vasodilator. Even if one takes care to check the tip of the needle is not in a vein, sometimes there is such a powerful local vasodilatation that the vessels open up and an I.V. injection is inadvertently given. This does not matter much, except that the patient develops a generalised vasodilatation, feels hot and alarmed, goes red and may faint (if upright).”

### **Intravenous Magnesium**

According to Dr. Norman Shealy the most rapid restoration of intracellular magnesium is accomplished with intravenous replacement. For most patients 10 shots, given over a two-week period, are adequate. Depending upon the patient’s weight and general status, Dr. Shealy gives either 1 or 2 grams of magnesium chloride IV over a 30 to 60 minute period:

#### Magnesium I

- 250 cc of 0.9% Sodium Chloride

#### Magnesium II

- 250 cc of 0.9% Sodium Chloride



- |                                  |                                  |
|----------------------------------|----------------------------------|
| • 1 gram Magnesium Chloride      | • 2 grams Magnesium Chloride     |
| • 500 mg Calcium Chloride        | • 1 gram Calcium Chloride        |
| • 100 mg. Pyridoxine (B-6)       | • 100 mg. Pyridoxine (B-6)       |
| • 1 gram DexPanthenol (B-5)      | • 1 gram DexPanthenol (B-5)      |
| • 1000 mcg Cyanocobalamin (B-12) | • 1000 mcg Cyanocobalamin (B-12) |
| • 6 grams Vitamin C              | • 6 grams Vitamin C              |

Therapy with magnesium is rapid acting, has a safe toxic-therapeutic ratio, is easy to administer and titrate.<sup>32</sup> Magnesium has minimal side effects in usual therapeutic doses and has a large therapeutic index. Meaning it is so useful that it is just negligent to not use it. In reality there is no medicine like magnesium chloride when it comes to the effect it has on the life of cells.

Though giving magnesium by injection is the quickest way of restoring normal blood and tissue levels of magnesium, the injections, while giving benefit, are just too painful to be considered for children and for long term use in adults. They are also relatively expensive because they have to be administered by a doctor.

Transdermal magnesium chloride therapy is inexpensive, safe, a do-it-yourself at home technique that can easily replace uncomfortable injections in anything other than emergency room situations. By using what is called “Magnesium Oil,” either topically or in a soak, massive amounts of magnesium can be absorbed by our bodies. Body pains can be eliminated quickly in a strong soak or through direct application to the skin. Magnesium Oil is made up of approximately 31 to 35% magnesium chloride, derived from natural sources and is both moisturizing and hydrating.

Transdermal application of magnesium is superior to oral supplements in many ways and is the best practical way magnesium can be used as a medicine besides by direct injection. **Used transdermally or intravenously we have a potent natural substance that penetrates the cells with stunning result on cell biochemistry.** Healing, overall energy production (ATP), skin integrity,

cardiac health, diabetes prevention, pain management, calming effect on the nervous system, sleep improvement, lowering of blood pressure are among the general uses magnesium chloride can be put to. The studies coming out every day provide more evidence of the need to supply adequate magnesium to people of all ages, and in a form that will be easily absorbed.

*What a few can do with intravenous magnesium injections everyone can do with transdermal magnesium.*

Dr. Norman Shealy has done studies on transdermal magnesium chloride mineral therapy where individuals sprayed a solution of magnesium chloride over the entire body once daily for a month and did a 20 minute foot soak in magnesium chloride also once daily. Dr. Shealy recruited 16 individuals with low intracellular magnesium levels; subjects had a baseline Intracellular Magnesium Test documenting their deficiency and another post-Intracellular Magnesium Test after 1 month of daily soaks and spraying were analyzed. The results: Twelve of sixteen patients, 75%, had significant improvements in intracellular magnesium levels after only four weeks of foot soaking and skin spraying.

### **Typical Results:**

Test results before and after 4 weeks of foot soaks:

Electrolyte Name	Foot Soaking		Reference Range
	Before Soaking	After Soaking	
	(mEq/l)	(mEq/l)	
Magnesium	31.4	41.2	33.9 - 41.9
Calcium	7.5	4.8	3.2 - 5.0
Potassium	132.2	124.5	80.0 - 240.0
Sodium	3.4	4.1	3.8 - 5.8
Chloride	3.2	3.4	3.4 - 6.0
Phosphorus	22.2	17.6	14.2 - 17.0
Phosphorus/Calcium	3.0	3.7	3.5 - 4.3
Magnesium/Calcium	4.2	8.6	7.8 - 10.9
Magnesium/Phosphorus	1.4	2.3	1.8 - 3.0
Potassium/Calcium	17.6	26.1	25.8 - 52.4
Potassium/Magnesium	4.2	3.0	2.4 - 4.6
Potassium/Sodium	39.1	30.5	21.5 - 44.6

Intravenous as well as transdermal administration of magnesium bypass processing by the liver. Both transdermal and intravenous therapy create "tissue saturation", the ability to get the nutrients where we want them, directly in the circulation, where they can reach body tissues at high doses, without loss.

Transdermal magnesium lotions deliver high levels of magnesium directly through the skin to the cellular level, bypassing common intestinal and kidney symptoms associated with oral use. Magnesium chloride has a major advantage over magnesium sulfate because it is hygroscopic and will attract water to it, thus keeping it wet on the skin and vastly more likely to be absorbed, while magnesium sulfate simply "dries" and becomes "powdery". Magnesium Oil feels "oily" on the skin. **The biggest benefit of topical/transdermal magnesium chloride administration is that the intestines are not adversely impacted by large doses of oral magnesium.**

The correction of magnesium deficit is a top priority for clinicians. **When magnesium chloride is understood properly (as the basic medicine it is) it will be prescribed to all patients as a foundation and support for all other therapeutic and pharmaceutical interventions.** The same medicine that can be used as a treatment to limit myocardial damage in myocardial infarction<sup>33</sup> can be used safely for a broad range of problems healthcare practitioners see everyday.

Dr. Walt Stoll says, "Magnesium deficiency inhibits the body's ability to absorb magnesium. This is an idiosyncrasy of magnesium. Once the intracellular level gets low enough to cause symptoms, in some people, the intestinal lining loses its ability to absorb magnesium efficiently. The magnesium IVs are to get the body over that hump so that it can be absorbed orally again." The same could be said about magnesium applied through transdermal/topical means.

In summary, magnesium is a safe and simple intervention and should be the first thing doctors recommend to their patients. Transdermal mineral therapy with magnesium chloride is the most powerful, relatively safe medical intervention we have to care for many of our patients needs. With the simple application of an oily solution on the skin or used in baths we can easily have our patients take up their magnesium to healthier levels. With patients who are deficient in magnesium (the great majority of patients are magnesium deficient) expect dramatic improvements in a broad range of conditions.

## Magnesium Treatments

Magnesium chloride is so safe and effective we have to wonder why it has been ignored by allopathic medicine. One explanation was offered as early as 1943 by Dr. A Neveu, “Official Medicine saw in Magnesium Chloride Therapy a threat to its new and growing business: vaccinations.” In the 1940’s Dr. Neveu used the magnesium chloride solution in a case of diphtheria to reduce the risks of anaphylactic reaction due to the anti-diphtheria serum that he was ready to administer. To his great surprise, when the next day the laboratory results confirmed the diagnosis of diphtheria, the little girl was completely cured, before he could use the serum. Now what would be safer to administer to a child, a vaccine for diphtheria or a form of magnesium that comes from the sea? According to Dr. Delbet, magnesium chloride has a cytophilactic activity that no other magnesium salt has.<sup>34</sup>

It is little known, for instance, that magnesium increases the efficiency of white blood cells.<sup>35</sup> “Think what it could mean if we could induce the white cells in our blood to double their protective activity without any increase in numbers.<sup>36</sup> It would reduce sharply the possibility that invaders of the bloodstream could get by these defenders and do consequent damage to our systems. It would mean that the need for drugs to fight bacterial invasions would be just about eliminated. It would mean bringing the protective ability of everybody's blood up to the level that is now possessed by the superbly healthy individual,” wrote J. I. Rodale in his book “Magnesium, The Nutrient that could change your life”.

*Dr. Pierre Delbet used to give IV magnesium chloride solution routinely to his patients with infections and for several days before any planned surgery and was surprised by many of these patients experiencing euphoria and bursts of energy.*

This is not a fantasy but the celebrated work of Dr. Pierre Delbet<sup>37</sup>, called *Politique Préventif du Cancer*. Dr Raul Vergini, in Italy, says that epidemiological studies confirmed Delbet’s views and demonstrated that the regions with soil more rich in magnesium had less cancer incidence. He also says that in experimental studies the magnesium chloride solution was able to slow down the course of cancer in laboratory animals. Dr. Delbet demonstrated many years ago that magnesium chloride solution was a good therapy for a long list of diseases because it had an effect on the whole organism. He obtained good results in: colitis (oral magnesium is contraindicated in severe intestinal

disorders) angiocholitis and cholecystitis in the digestive apparatus; Parkinson's Disease, senile tremors and muscular cramps in the nervous system; acne, eczema, psoriasis, warts, itch of various origins and chilblains in the skin. There was a strengthening of hair and nails, a good effect on diseases typical of the aged (impotency, prostatic hypertrophy, cerebral and circulatory troubles) and on diseases of allergic origin (hay-fever, asthma, urticaria and anaphylactic reactions).

*The clinical facts have, for the most part, been observed by chance. My followers take much magnesium chloride. They are enthusiasts propagandizing for it. Others adopt it, partly, perhaps, because it often produces systemic excitation. Among those who take it for its tonic action, several are afflicted with various ailments which disappear, and they report from time to time successes I did not expect.*

*Dr. Pierre Delbet*

Magnesium chloride, when used correctly, is the best weapon we have to defend the body, not only from infectious diseases of both viral and bacterial origin, but also from the chemical deluge of toxic chemicals that are invading our bodies everyday. Between its power to stimulate white blood cells and glutathione we have a heavyweight non toxic medicine we can use without a prescription.

Table 2: Recommended Dietary Allowances for magnesium for children and adults.<sup>38</sup> (National Institute of Health)

<b>Age (years)</b>	<b>Male (mg/day)</b>	<b>Female (mg/day)</b>	<b>Pregnancy (mg/day)</b>	<b>Lactation (mg/day)</b>
1-3	80	80	N/A	N/A
4-8	130	130	N/A	N/A
9-13	240	240	N/A	N/A
14-18	410	360	400	360
19-30	400	310	350	310

31+	420	320	360	320

There is insufficient information on magnesium to establish a RDA for infants. For infants 0 to 12 months, the DRI is in the form of an Adequate Intake (AI), which is the mean intake of magnesium in healthy, breastfed infants. Table 3 lists the AIs for infants in milligrams (mg).

Table 3: Recommended Adequate Intake for magnesium for infants (National Institute of Health)

<b>Age (months)</b>	<b>Males and Females (mg/day)</b>
0 to 6	30
7 to 12	75

Try taking the magnesium questionnaire in the reference section to see whether you are magnesium deficient or not.<sup>39</sup> The time scale of mineral loss is long, it can be many months or even years before lack of exposure to certain elements is noted with respect to a person's state of health. Improving your mineral status by eating a whole food diet used to ensure that you get the right minerals in the correct quantities and proportions. But today **supplementing is necessary** because of increased chemical body burdens and the decreased mineral food values. Re-mineralization can improve the levels of long-term imbalances with truly life-changing results, and very quickly if administered in highly bioavailable forms.

*Magnesium rapidly distributes throughout the body following absorption. Normal plasma levels of magnesium range from about 1.6 to 2.1 nM.*

In spite of its low cost or perhaps as a result of its low cost, magnesium is not given routinely to heart attack victims.<sup>40</sup> The "Myers' cocktail," which was used effectively for acute asthma attacks, migraines, fatigue (including chronic fatigue syndrome), fibromyalgia, acute muscle spasm, upper respiratory tract infections, chronic sinusitis, seasonal allergic rhinitis, cardiovascular disease, and other disorders consisted of magnesium, calcium, B vitamins, and vitamin C. This treatment was made famous by Dr. Linus Pauling and many doctors around the world practice Orthomolecular Medicine with good clinical results.

Dr. Pauling was well ahead of his time but today we need safer methods that are more practical and universal and easily administered to children.

Transdermal treatments are applicable and effective for almost all medical conditions and situations and can be as quick acting as and IV drip.

## Magnesium and Calcium

*Calcium and magnesium are opposites in their effects on our body structure. As a general rule, the more rigid and inflexible our body structure is, the less calcium and the more magnesium we need.*

Dr. Garry Gordon wrote, “If you have compromised cell membranes or low ATP production for any reason, then the cell has trouble maintaining the normal gradient. This is because the usual gradient is 10,000 times more calcium outside of cells than inside; when this is compromised you will have increased intracellular calcium, which seems to always happen at the time of death. Whenever intracellular calcium is elevated, you have a relative deficiency of magnesium, so whenever anyone is seriously ill, acute or chronic, part of your plan must be to restore magnesium.”

*The ratio of calcium to magnesium is vital for cell membranes and the Blood Brain Barrier.*

Countries with the highest calcium to magnesium ratios (high calcium and low magnesium levels) in soil and water have the highest incidence of cardiovascular disease. At the top of the list is Australia. In contrast, in Japan with its low cardiac death rate, the daily magnesium intake was cited as high as 560 milligrams. The human populations that consume the most calcium tend to have the highest mortality rates in the world. The Scandinavian countries, the USA and New Zealand are the dairy consuming countries and mortality rates soar in these countries. In Japan where the consumption of calcium from dairy products is the lowest on the planet so are the mortality rates. “There is a lot of calcium in most diets, and even a relatively small amount of calcium supplementation, taken on a regular basis, can result in undesirable, rocklike, nonbiologic deposits of calcium in the tissues,” says Dr. Thomas E. Levy.

*The widespread shortage of magnesium, not calcium, in the western diet is attributed to the high rates of sudden-death heart attack.*

Adequate levels of magnesium are essential for the heart muscle. Those who die from heart attacks have very low magnesium but high calcium levels in their heart muscles. Patients with coronary heart disease who have been treated



with large amounts of magnesium survived better than those with other drug treatments. Magnesium dilates the arteries of the heart and lowers cholesterol and fat levels.

*Magnesium taken in proper dosages can solve the problem of calcium deficiency.*

*Dr. Nan Kathryn Fuchs*  
Author of The Nutrition Detective

It is magnesium that controls the fate of potassium and calcium in the body. If magnesium is insufficient potassium and calcium will be lost in the urine and calcium will be deposited in the soft tissues (kidneys, arteries, joints, brain, etc.). Magnesium and calcium have competing effects on many of the body's chemical pathways.

*Calcium causes muscles to contract, while magnesium helps them relax.*

Magnesium and calcium are paired minerals. Several studies have reported that increasing calcium in the diet significantly **reduces** the absorption of magnesium. Calcium intakes above 2.6 grams per day may reduce the uptake and utilization of magnesium by the body thus increasing magnesium requirements. So much stress is placed on the importance of calcium by the dairy industry that we may, in fact, be harming magnesium absorption.

*Up to 30% of the energy of cells is used to pump calcium out of the cells.*

A healthy cell has high magnesium and low calcium levels. The higher the calcium level and the lower the magnesium level in the extra-cellular fluid, the harder is it for cells to pump the calcium out. The result is that with low magnesium levels the mitochondria gradually calcify and energy production decreases. Our biochemical age could theoretically be determined by the ratio of magnesium to calcium within our cells.

*Magnesium is the mineral of rejuvenation and prevents the calcification of our organs and tissues that is characteristic of the old-age related degeneration of our body.*

Without sufficient magnesium, calcium can collect in the soft tissues and cause arthritis. Not only does calcium collect in the soft tissues of arthritics, it is

poorly, if at all, absorbed into their blood and bones. Some researchers estimate that the American ratio of calcium to magnesium is actually approaching 6:1, while the recommendation for healthy living is actually 2:1. But even 2 parts of calcium to 1 part of magnesium is probably too high, since current research on the Paleolithic or caveman diets show that the ratio they used to eat was 1:1.<sup>41</sup>

*A diet high in dairy and low in whole grains can lead to excess calcium in the tissues and a magnesium deficiency.*<sup>42</sup>

*Dr. Nan Kathryn Fuch*

According to Dr P Kaye, Emergency Department, Bristol Royal Infirmary, UK, “Magnesium acts as a smooth muscle relaxant by altering extracellular calcium influx and intracellular phosphorylation reactions. It may also attenuate the neutrophilic burst associated with inflammatory bronchoconstriction by attenuating mast cell degranulation. The principal trigger for this degranulation is a rise in intracellular calcium, which is antagonised by magnesium. It has been shown experimentally to augment the bronchodilatory effect of salbutamol and to inhibit histamine induced bronchospasm. Magnesium should be used as a safe, easy to administer and effective second line agent in acute severe asthma.”<sup>43</sup>

*Calcium can accumulate in heart valves (mitral valve), and can become a concretion in the kidneys and become a stone, a condition that affects 1 in 12 Americans.*

Medical authorities claim that the widespread incidence of osteoporosis and tooth decay in western countries can be prevented with a high calcium intake. However Asian and African populations with a low intake (about 300 mg) of calcium daily have very little osteoporosis. Bantu women with an intake of 200 to 300 mg of calcium daily have the lowest incidence of osteoporosis in the world.<sup>44</sup> In western countries with a high intake of dairy products the average calcium intake is about 1000 mg. With a low magnesium intake, calcium moves out of the bones to increase tissue levels, while a high magnesium intake causes calcium to move from the tissues into the bones. Thus high magnesium levels leads to bone mineralization.

Dr. Karen Kubena, associate professor of nutrition at Texas A & M University indicates that even if you monitor your magnesium level like a maniac, you're still at risk for migraines if your calcium level is out of whack. It seems that higher than normal blood levels of calcium cause the body to excrete

the excess calcium, which in turn triggers a loss of magnesium. "Let's say you have just enough magnesium and too much calcium in your blood. If calcium is excreted, the magnesium goes with it. All of a sudden, you could be low in magnesium," says Dr. Kubena.<sup>45</sup>

If calcium is not taken with enough magnesium it will cause more harm than good. The unabsorbed calcium can lodge anywhere in the body and provoke practically any disease. For instances, if it lodges in your bones and joints, it leads to some forms of arthritis; if it lodges in your heart, it leads to arterial lesions; it provokes respiratory problems if it lodges in your lungs, etc.

Despite the crucial relationship between calcium and magnesium a recently published study announced that most U.S. children don't get enough calcium in their diets, and pediatricians should intervene to help remedy the problem. These guidelines were issued in Feb. 2006 by the American Academy of Pediatrics.<sup>46</sup> The proportion of children who receive the recommended amounts of calcium declines dramatically after the second year of life, reaching a nadir during adolescence, said Dr. Nancy F. Krebs, of the University of Colorado in Denver, who headed the academy committee that wrote the guidelines.

Adolescent girls are faring the worst, Dr. Krebs and colleagues reported. Only about 10% of girls ages 12 to 19 are getting the recommended amount of calcium. For boys, the figure is about 30%. Not a word is mentioned about magnesium as the committee goes on to recommend increasing calcium intake through the use of fortified foods and calcium supplements. Is a medical crime being committed when these pediatricians fail to address the crucial relationship between magnesium and calcium? Our affirmative answer is sustained when reviewing the materials presented below.

Experts say excessive calcium intake may be unwise in light of recent studies showing that high amounts of the mineral may increase risk of prostate cancer. "There is reasonable evidence to suggest that calcium may play an important role in the development of prostate cancer," says Dr. Carmen Rodriguez, senior epidemiologist in the epidemiology and surveillance research department of the American Cancer Society (ACS). Rodriguez says that a 1998 Harvard School of Public Health study of 47,781 men found **those consuming between 1,500 and 1,999 mg of calcium per day had about double the risk of being diagnosed with metastatic (cancer that has spread to other parts of the body) prostate cancer as those getting 500 mg per day or less.** And

those taking in 2,000 mg or more had over four times the risk of developing metastatic prostate cancer as those taking in less than 500 mg.

*The recommended daily allowance (RDA) of calcium is 1,000 mg per day for men, and 1,500 mg for women.*

Later in 1998, Harvard researchers published a study of dairy product intake among 526 men diagnosed with prostate cancer and 536 similar men not diagnosed with the disease. That study found a 50% increase in prostate cancer risk and a near doubling of risk of metastatic prostate cancer among men consuming high amounts of dairy products, likely due, say the researchers, to the high total amount of calcium in such a diet. The most recent Harvard study on the topic, published in October 2001, looked at dairy product intake among 20,885 men and found men consuming the most dairy products had about 32% higher risk of developing prostate cancer than those consuming the least.

According to the University of Florida Shands Cancer Center a high level of calcium in the blood, called hypercalcemia,<sup>47</sup> may become a medical emergency. This disorder is most commonly caused by cancer or parathyroid disease but underneath the primary etiology is probably magnesium deficiency. Hypercalcemia is commonly attributed to either the cancer treatment or the cancer itself and may make it difficult for doctors to detect hypercalcemia when it first occurs. This disorder can be severe and difficult to manage especially because doctors have not a clue about the underlying relationship between excess calcium and low levels of magnesium. Severe hypercalcemia is a medical emergency that can be avoided if magnesium levels are brought up to normal.

*Calcium competes with zinc, manganese, magnesium, copper and iron for absorption in the intestine and a high intake of one can reduce absorption of the others.*

Because of the totally distorted way medical science relates to magnesium the medical profession makes mistakes with calcium. It's still common to hear the assumption about calcium's ability to help prevent osteoporosis (weakening of the bones usually associated with aging). The fact is that it's the increasing of magnesium intake that improves bones density<sup>48</sup> in the elderly and reduces the risk of osteoporosis. "Higher Magnesium intake through diet and supplements was positively associated with total-body bone mineral density (BMD) in older white men and women. For every 100 mg per day increase in

Mg, there was an approximate 2 per cent increase in whole-body BMD,"<sup>49</sup> said Dr. Kathryn Ryder.

*Magnesium is essential for proper calcium absorption and is an important mineral in the bone matrix.*

"Bones average about 1 % phosphate of magnesium and teeth about 1% per cent phosphate of magnesium. Elephant tusks contain 2 % of phosphate of magnesium and billiard balls made from these are almost indestructible. The teeth of carnivorous animals contain nearly 5 % phosphate of magnesium and thus they are able to crush and grind the bones of their prey without difficulty," wrote Otto Carque (1933) in Vital Facts About Foods.

Some people, like a spokesperson for the UK-based charity, the National Osteoporosis Society, continue to think that "magnesium deficiency is, in fact, very rare in humans." So they cannot get it through their neural circuits that magnesium deficiency, not calcium deficiency plays a key role in osteoporosis. Thus it is no surprise when we find more studies suggesting that high Ca intake had no preventive effect on alteration of bone metabolism in magnesium deficient rats<sup>50</sup> and that not only severe but also moderate dietary restriction of magnesium results in qualitative changes in bones in rats.<sup>51</sup> The results from some of these studies may be surprising to some. While we have no reason to question the importance of calcium in bone strength, we have plenty of reason to doubt the value of consuming large amounts of calcium that are currently being recommended for adults and young people alike.<sup>52</sup>

*One of the most important aspects of the disease osteoporosis has been almost totally overlooked. That aspect is the role played by magnesium.*

*Dr. Lewis B. Barnett*

While most sources understand that calcium is important in the growth and development of children, little attention is paid to the role of magnesium or magnesium deficiency or the need to maintain the intricate balances of each (and other nutrients as well). Back in the 1950's Dr. Barnett examined the bone content of healthy people and compared it with the content of people suffering from severe osteoporosis. He found there was little difference among the calcium, phosphorus, and fluoride content of the bones of the individuals. The magnesium content in the bones of the healthy people, however, was 1.26 %. That of the osteoporosis victims was .62 %. Many years ago Dr. Barnett conducted tests on 5,000 people and found about 60 % of them deficient in magnesium. Today we find MIT placing that number officially at 68 %. How is

it that so many in the medical profession can ignore this clinical reality and go on pretending that magnesium deficiency in the general population is rare?

*Magnesium status is important for regulation of calcium balance through parathyroid hormone-mediated reactions.*<sup>53</sup>

The current focus on increased need for calcium in a magnesium deficient population can easily push those already receiving adequate amounts of calcium in their daily diets over the edge to reaching too high levels, thus causing depletion of magnesium and other problems. The American Diabetes Association in their 2006 guidelines for diabetes and pre diabetes, when making treatment and nutritional recommendations, join the Pediatricians and do not recommend magnesium be addressed in any significant way despite the increasing evidence over the years that magnesium is even more deficient in diabetics and dietary recommendations are not combating the issue. This medical review is important exactly because large segments of the medical establishment are choosing ignorance in relationship to magnesium and calcium thus misleading the public and leading them to the altar of iatrogenic disease, a place where billions of dollars are made.

Despite the fact that serum levels of magnesium are not the best indicator of adequate magnesium levels some studies have shown that when magnesium deficiency was induced in humans, the earliest sign was decreased serum magnesium levels (hypomagnesemia). **Over time serum calcium levels also began to decrease (hypocalcemia) despite adequate dietary calcium.** Hypocalcemia persisted despite increased parathyroid hormone (PTH) secretion. Usually, increased PTH secretion quickly results in the mobilization of calcium from bone and normalization of blood calcium levels. As the magnesium depletion progressed, PTH secretion diminished to low levels. Along with hypomagnesemia, signs of severe magnesium deficiency included hypocalcemia, low serum potassium levels (hypokalemia), retention of sodium, low circulating levels of PTH, neurological and muscular symptoms (tremor, muscle spasms, tetany), loss of appetite, nausea, vomiting, and personality changes.<sup>54</sup> Hypercalcemia can cause magnesium deficiency and wasting.<sup>55</sup>

It is medical wisdom that tells us that magnesium is actually the key to the body's proper assimilation and use of calcium, as well as other important nutrients. If we consume too much calcium, without sufficient magnesium, the excess calcium is not utilized correctly and may actually become toxic, causing painful conditions in the body. Hypocalcemia is a prominent manifestation of magnesium deficiency in humans (Rude et al., 1976). Even mild degrees of magnesium depletion significantly decreases the serum calcium concentration (Fatemi et al., 1991).

The adverse effects of excessive calcium intake may include high blood calcium levels, kidney stone formation and kidney complications.<sup>56</sup> Elevated calcium levels are also associated with arthritic/joint and vascular degeneration, calcification of soft tissue, hypertension and stroke, and increase in VLDL triglycerides, gastrointestinal disturbances, mood and depressive disorders, chronic fatigue, and general mineral imbalances including magnesium, zinc, iron and phosphorus. High calcium levels interfere with Vitamin D and subsequently inhibit the vitamin's cancer protective effect unless extra amounts of Vitamin D are supplemented.<sup>57</sup>

William R. Quesnell, author of 'Minerals: The Essential Link to Health, said, "Most people have come to believe nutrition is divisible, and that a single substance will maintain vibrant health. The touting of calcium for the degenerative disease osteoporosis provides an excellent example. Every day the media, acting as proxy for the milk lobby, sells calcium as a magic bullet. Has it worked? Definitely for sales of milk, but for American health it has been a disaster. When you load up your system with excess calcium, you shut down magnesium's ability to activate thyrocalcitonin, a hormone that under normal circumstances would send calcium to your bones."

## Magnesium and Disease

Many people find it tempting to oversimplify disease. Dr. Hulda Clark, for example, wrote the following in the beginning of her book, **The Cure for All Diseases**:

“No matter how long and confusing is the list of symptoms a person has, from chronic fatigue to infertility to mental problems, I am sure to find only two things wrong: they have in them **pollutants** and/or **parasites**. I never find lack of exercise, vitamin deficiencies, hormone levels or anything else to be a primary causative factor. So the solution to good health is obvious:

<u><b>Problem</b></u>	<u><b>Simplest Cure</b></u>
Parasites	Electronic and herbal treatment
Pollution	Avoidance

I personally can appreciate this kind of oversimplification because there was a time when my wife and I used to laugh at my own oversimplification: standing on one foot and a closed heart. I wrote my book HeartHealth about the situation with our hearts (that medicine pays no attention to) and on my Biogenic Medicine site I have a section with pictures about the structural damage of defying gravity with the common posture of shifting our body weight to one side. Next time you go into a bank just watch everyone and see for yourself. Few today stand evenly on two feet and chiropractors do a booming business for this and of course other reasons.

Magnesium certainly qualifies as a principal cause of disease when it is lacking and no matter what we do with our hearts, postures, medical treatments, there is simply nothing we can do to remove the stone weight and disease causing factor when magnesium supplies are not adequate in our bodies. The art and science of helping people (medicine) is truly a daunting task involving knowledge, experience and understanding to encompass a whole range of factors.



*The health status of the digestive system and the kidneys significantly influence magnesium status.*

Without adequate levels of magnesium, our hearts definitely suffer. Magnesium coordinates the activity of the heart muscle as well as the functioning of the nerves that initiate the heartbeat. It also helps keep coronary arteries from spasming, an action that can cause the intense chest pain known as angina. The most alarming trend in the past century has been the sharp increase in sudden deaths from ischemic heart disease (IHD), particularly in middle-aged men, and the increasing number of younger men who suddenly develop myocardial infarctions, cardiac arrhythmias, or arrests.

Dr. Mildred Seelig, of New York University Medical Center, wrote twenty-five years ago in her book, **Magnesium Deficiency in the Pathogenesis of Disease**, that magnesium deficiency was probably the common etiologic factor in the increased incidence of sudden infant deaths, infantile myocardial infarction and arteriosclerosis, and the same diseases that becomes manifest later in life. It is also suggested that magnesium deficiency might cause or predispose to some skeletal and renal diseases, all of which can coexist.

It has been said that many sudden deaths following vaccination can be prevented by sufficient vitamin C and vitamin A reserves (or supplementation) but we should probably take a good look at magnesium as a crucial factor in sudden death. In adults it has been seen how high levels of mercury in the heart becomes dangerous. Since deficient magnesium and high levels of mercury are related, childhood vaccines containing thimerosal would be especially dangerous to administer in children deficient in magnesium.

According to Dr. Seelig, "In Finland, which has a very high death rate from heart disease there is a clear relationship with heart disease and the amount of magnesium in the soil (Karppanen and Neuvonen, 1973). In eastern and in northern Finland, where the soil content is about a third of that found in southwestern Finland (Karppanen *et al.*, 1978) the mortality from ischemic heart disease is twice as high as is that in the southwest. Finland, which has the highest cardiovascular death rate in Europe, has experienced a huge decrease in magnesium intake and today stands at less than a third of what it was in 1911 (H. Katz, 1973).

## Magnesium and Preventive Medicine

Typically, if you are a mainstream allopathic physician, preventive medicine is limited to elective stress testing, mammography, screening for prostate-specific antigen, periodic lipid profiling and giving some kind of lip service to life-style changes and diet. This kind of medicine offers only a shadow of what preventive medicine needs to be. According to the New York Times, “New evidence keeps emerging that the medical profession has sold its soul in exchange for what can only be described as bribes from the manufacturers of drugs and medical devices.”<sup>58</sup> A soulless medicine’s first crime is its failure to seriously embrace preventive medicine and avoid disease in the first place. None of the pharmaceutical companies are interested in preventive medicine for they make all their money off the sick and dying.

Preventive medicine is as important as any other type of medicine. In ancient China the oriental medical doctors were paid for keeping people well thus patients stopped paying when they fell sick. Allopathic medicine, through its major misunderstanding, denial and neglect of preventive medicine, is directly contributing to modern man becoming the most diseased population in the history of the world. Doctors and health officials really have no idea that the vast majority of diseases can be prevented and even cured without drugs or surgery. Their idea of preventive medicine starts and ends with vaccines, which contain toxic chemicals like mercury that may be contributing greatly to the swift rise in chronic diseases.

Allopathic medicine could do much to redeem its soul if it would face all the evidence that has been building up all of which suggests that we have to add adequate intake of magnesium—the “forgotten electrolyte”—to our list of preventive health measures. Ensuring adequate magnesium intake, through a combination of dietary sources, oral supplementation, and importantly the use of transdermal methods of application, constitutes a crucial step toward health that is justified by scientific and clinical data.

We need no further information to conclude that the American public consumes less magnesium than necessary for good health and that magnesium supplementation is indicated for almost everyone. Magnesium supplementation is the single greatest thing we can do to help people avoid serious diseases or

recover from the ones they already have. It certainly is not the only thing but there is no other single element that can compare.

The use of magnesium as a preventive, clinical and emergency medicine would spell disaster for the 1.6 trillion dollar medical industry in the United States. Single-handedly it could wipe out the need for hundreds of billions of dollars of medical expenses and diminish a mountain of pain, misery and death. When combined with some other medical essentials like Vitamin C, proven antioxidants and minerals like selenium, zinc, organic foods and full hydration with pure water the reduction in medical expenses would be staggering to the industry.

There is a mountain of evidence that sustain these statements. For instance, Dr. Frank D. Gilliland, professor of preventive medicine at the Keck School of Medicine, and his colleagues monitored more than 2,500 pre-teens and teenagers in a dozen Southern California communities, tracking what kids eat and measuring lung function (how well their lungs work). The team has found that children who eat lots of antioxidant-rich fruit and juices-as well as those who get an abundance of magnesium and potassium-perform better on lung function tests than children who eat less of the nutrients.<sup>59</sup> Vitamin C plays a big role in lung development, Gilliland says, while vitamins E and A also appear helpful, especially in children with asthma. This information is especially important for children who live in cities and other areas where air pollution is a problem.

According to Dr. Ronald Elin and Dr. Robert Rude, “Refining and processing of grains and other foodstuffs typically results in loss of 70% or more of the magnesium content (as well as other nutrients). The conversion of wheat into flour results in a loss of 82% of magnesium. Refining rice into polished rice sacrifices 83% of the magnesium. Milling corn into corn starch loses 98% of the magnesium. When soy beans are cooked, they lose 69% of their magnesium. Quick-cooking oatmeal provides only about 15% of the magnesium obtained from the slow-cooking cereal. As the nation’s eating habits have gone from freshly prepared items made in the home to prepared, processed meals and "fast foods" taken on the run, the magnesium content of the food has plummeted.”<sup>60</sup>

*Our bodies simply cannot extract adequate nutrition from today’s “fast” and processed foods.*

Dr. David Thomas, who researched government records, found that the levels of magnesium in the average rump steak have dropped 7%. Milk appears to

have lost 2% of its calcium and 21% of its magnesium.<sup>61</sup> According to the analysis, cheddar provides 9% less calcium today, 38% less magnesium and 47% less iron, while parmesan shows the steepest drop in nutrients, with magnesium levels down by 70% and iron all gone compared with content in the years up to 1940. Though some of this information is being contested,<sup>62</sup> academics in the US and Denmark have also reported significant changes in the nutritional profile of modern foods.

Studies show that people who eat at least three servings of whole grains a day have a lower risk of heart disease, diabetes and cancer and seem to maintain a healthy weight more easily. Since refined grains, such as white flour, have their innermost and outermost layers (their germ and bran) removed, they are stripped of a great portion of their minerals. Whole grains are not only higher in fiber but contain four times the magnesium and zinc and twice the selenium.<sup>63</sup>

*Only about 15 to 25 percent of children eat the recommended amount of magnesium.*

Even in individuals who are unwilling to make prudent changes in their diets and sedentary habits, the administration of certain nutrients and/or drugs may help to prevent or postpone the onset of type 2 diabetes. The evident ability of fiber-rich cereal products to decrease diabetes risk, as documented in prospective epidemiological studies, is most likely mediated by the superior magnesium content of such foods. High-magnesium diets have preventive (though not curative) activity in certain rodent models of diabetes; conversely, magnesium depletion provokes insulin resistance.<sup>64</sup>

*A non-drug abortive approach to migraine attacks has been the use of 1g magnesium sulfate through a slow intravenous push during an acute migraine with 85% effectiveness.<sup>65</sup>*

Deficiencies in magnesium affect all people leaving them vulnerable to developing acute and chronic conditions. We humans are genetically strong and designed to be well, not ill. Mistakes of living and nutrition break down our natural strengths. It is thought that each person is especially susceptible to certain diseases when compared to other people, but each person is also more resistant to certain diseases when compared to others. In this sense, each person could be thought to have particular genetic weaknesses and strengths but nobody is strong enough to live without air, water, or magnesium for very long. Though in the long run food can be considered one of the best medicines, it is difficult to recover fully from magnesium deficiencies through changes in diet

only. Even the use of oral magnesium supplementation is slow and needs to be augmented with quick acting transdermal methods of application and by intramuscular and intravenous magnesium in emergency situations.

A magnesium deficiency is closely associated with cardiovascular disease.<sup>66</sup> Lower magnesium concentrations have been found in heart attack patients<sup>67</sup> and administration of magnesium<sup>68</sup> has proven beneficial in treating ventricular arrhythmias.<sup>69, 70, 71, 72</sup> Fatal heart attacks are more common in areas where the water supply is deficient in magnesium and the average intake through the diet is often significantly less than the 200-400 milligrams required daily.<sup>73</sup>

Magnesium is proving to be very important in the maintenance of heart health and in the treatment of heart disease. Magnesium, calcium, and potassium are all effective in lowering blood pressure.<sup>74, 75, 76, 77</sup> Magnesium is useful in preventing death from heart attack and protects against further heart attacks.<sup>78, 79</sup> It also reduces the frequency and severity of ventricular arrhythmias and helps prevent complications after bypass surgery.

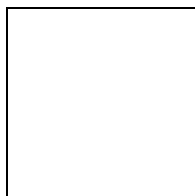
**Using magnesium as a preventive medicine starts in pregnancy** for there are significant benefits of magnesium for preeclampsia and eclampsia. Eclampsia and preeclampsia are the leading causes of death for pregnant women and their fetuses, particularly in developing countries. Physicians believe the high blood pressure, swelling, and protein in the urine associated with preeclampsia lead to the convulsions and coma of eclampsia. Magnesium is a most effective drug at preventing eclamptic seizures. Now magnesium sulfate is being used increasingly to treat preeclampsia as well, with the hope it will prevent eclampsia. A study published in the June 1, 2002, issue of The Lancet confirms this hope.<sup>80</sup>

*Women receiving magnesium sulfate had a 27% lower risk of premature detachment of the placenta.*

Dr. Elin and Rude sum up the universal need for all health care practitioners to become more aware of the crucial role of magnesium and the need to start practicing preventive medicine with magnesium. “The common denominator between magnesium intake and these diseases (see below list), as well as diabetes mellitus, migraine, and premenstrual syndrome is chronic latent magnesium deficiency. **It is reasonable to suspect chronic latent magnesium deficiency in any patient with cardiovascular disease, diabetes mellitus,**

**migraine, osteoporosis, or premenstrual syndrome, or risk factors for any of these conditions.”<sup>81</sup>**

It is reasonable as well to suspect chronic magnesium deficiency in anyone eating white bread and white rice and other heavily processed foods.



Harvard University

People who regularly eat whole grains develop cancer less often than those who don't. A 1998 overview of 40 studies that looked at 20 types of cancer linked consumption of whole grains with reduced risks of stomach, colon, mouth, gallbladder, and ovarian cancers.<sup>82</sup>

A close study of all the literature yields a long list of clinical situations associated with magnesium deficiency. Magnesium intake decreases significantly in persons age 70 and older — precisely those at highest risk for many of the diseases associated with chronic latent magnesium deficiency. Suboptimal intake of magnesium has been associated with the following prevalent and potentially serious conditions.

- ADD/ADHD
- Alzheimer's
- Angina
- Anxiety disorders
- Arrhythmia
- Arthritis- Rheumatoid and Osteoarthritis
- Asthma
- Autism
- Auto immune disorders- all types
- Cavities
- Cerebral Palsy- in children from magnesium deficient mothers
- Chronic Fatigue Syndrome
- Congestive Heart Disease
- Constipation

Crooked teeth- narrow jaw- in children from magnesium deficient mothers  
 Depression  
 Diabetes- Type I and II  
 Eating disorders- Bulimia, Anorexia  
 Fibromyalgia  
 Gut disorders- including peptic ulcer, Crohn's disease, colitis, food allergy  
 Heart Disease- Arteriosclerosis, high cholesterol, high triglycerides  
 Heart Disease- in infants born to magnesium deficient mothers  
 High Blood Pressure  
 Hypoglycemia  
 Impaired athletic performance  
 Infantile Seizure- in children from magnesium deficient mothers  
 Insomnia  
 Kidney Stones  
 Lou Gehrig's Disease  
 Migraines- including cluster type  
 Mitral Valve Prolapse  
 Multiple Sclerosis  
 Muscle cramps  
 Muscle weakness, fatigue  
 Myopia- in children from magnesium deficient mothers  
 Obesity- especially obesity associated with high carbohydrate diets  
 Osteoporosis- just adding magnesium reversed bone loss  
 Parkinson's Disease  
 PMS- including menstrual pain and irregularities  
 PPH- Primary Pulmonary Hypertension  
 Raynaud's  
 SIDS- Sudden Infant Death Syndrome  
 Stroke  
 Syndrome X- insulin resistance  
 Thyroid disorders- low, high and auto-immune; low magnesium reduces T4

Instead of ordering large batteries of tests, doctors' first reflex action should be to put their patients immediately on magnesium. If they had done that earlier as a preventive action the chances are much greater they would not have their patients sitting in their offices with so many complaints. It should become clear that as breathing is vital to life magnesium is fundamental to medicine. The

chances of it not being exceedingly helpful is very low, not only because of the massive deficiencies evident in all segments of the population today, but because it is exceptionally supportive of all aspects of cell physiology in an extremely safe way.

Because the allopathic medical industrial complex is going to drag its feet on using magnesium as a universal medicine the entire alternative medical sector has a chance to make even bigger inroads in the health field. Americans' dissatisfaction with traditional health care is seen in the more than \$27 billion they spend annually on alternative and complementary medicine. The numbers continue to grow for reasons that have to do with increasing distrust of mainstream medicine and how it is betraying medical logic and sound scientific principles. Alternative practitioners can steal the thunder of their allopathic brethren by cementing magnesium into the foundations of their medical and healthcare practices.

Eventually mainstream doctors will get the idea or like the dinosaurs they will pass into oblivion – relics of an age of medical ignorance and arrogance. Men and woman who have sold their souls to the pharmaceutical companies have an exceedingly difficult time listening to anything that challenges the basic practice and philosophy of allopathic medicine.

Though this might feel like war talk we must remember that millions of people around the world are dying of iatrogenic death each year and uncounted millions suffer from iatrogenic diseases. In a medically sane world it should be our hope that this division between allopathic and alternative medicine would not be so great or that they would meld together with mutual respect and knowledge. Yet it is a war and people are getting killed at a rate not equaled in any war in history. In the future we must add to the already astronomically high iatrogenic statistics a huge group that would not be sick and dying in the first place if it were not for the fact that doctors are neglecting their magnesium needs.

On February 5, 2006 the New York Times suggested we declare war on diabetes and the first battle should be fought at the Federal Drug Administration (FDA). The FDA is the headquarters of all that is wrong and hurtful in medicine and it has been quite successful at censoring every claim that dietary ingredients treat disease, regardless of the proof in support of the claim.<sup>83</sup> The FDA only allows drug companies to make claims of treatment. It protects a monopoly for those companies at the expense of the lives of people.



Magnesium walks a fine line between a dietary ingredient and a medicine because it is a powerful medicine already used in emergency rooms.

*White blood cells and other immune components are sensitive to malnutrition, especially when it comes to magnesium.*

In medicine arrogance translates into the massive death and suffering of others. It is not a time to be nice but to cut our words on the diamond hardness of medical truth. The truth is that the need for preventive magnesium medicine has never been greater and the cost of doctors' resistance to coming around to this point of view is outrageous.

*Magnesium affects lung function and indirectly influence respiratory symptoms.*

Magnesium is at the center of many processes important to the body-energy metabolism, immune function, muscle and nerve function. It is the perfect preventive medicine for the 21<sup>st</sup> century. There are a lot of unknowns when it comes to staying healthy and there is little, if any, evidence that many of the therapies people use today work. When it comes to magnesium this is not the case at all. The evidence is ironclad and according to the US Department of Agriculture 1994 Continuing Survey of Food intakes by Individuals, the mean magnesium intake by males age 9 and older was 323 mg/d— far below today's RDA of 420 mg/d. Similarly, for women older than 9, the mean intake was 228 mg/d—again, significantly below the RDA of 320 mg/d. The proportion of individuals consuming their RDA of magnesium is very low thus it is essential that magnesium be supplemented and used as a primary medical intervention.

## Magnesium, Selenium and Zinc in Cancer Prevention

*Since ending one's life with cancer is not pleasant  
it behooves all of us to be concerned with its prevention.*

It certainly is time to get serious about cancer prevention, with the disease predicted to surge in the next 15 years. The Association for International Cancer Research (AICR) said that if current trends continue, the number of people developing cancer was set to rise at an "alarming" rate. The World Health Organization predicts that cases of cancer will increase by up to 50% worldwide by 2020.

The weight of evidence based on the findings of wildlife biologists, toxicologists, and epidemiologists clearly indicates that the world's populations are being exposed to a host of chemical contaminants that have recently passed over an invisible barrier and is now more dangerous and threatening than any combination of viruses. Chronic disease is the number one killer in the United States, accounting for about four out of five deaths in America each year. According to the Physicians for Social Responsibility (PSR) about 100 million Americans, more than one-third of the population, suffer from some form of chronic disease like asthma, diabetes, cancer, heart and kidney disease or arthritis.

Cancer is the second leading cause of death, exceeded only by heart disease. **Among children ages 1 to 14, cancer is now the leading cause of death by disease.** At current rates, invasive cancer will be diagnosed in **half of all men** and in **one in three** women in their lifetime. More than 1.3 million new cases of invasive cancer will be diagnosed in 2006 meaning that approximately 1,500 Americans will die of the disease everyday. "Whether it is cancer or autism that is affecting our families and showing up in our examination rooms, the growing rates of chronic disease compel us to search for clues and answers to determine the true causes of these increasingly prevalent illnesses," says the PSR.

*Almost 100 percent of these people  
are suffering from chemical poisoning.*

“With rates of cancer incidence rising, mortality rates not falling, and an ever increasing armamentarium of high-tech scanners, radiotherapy equipment, and chemotherapeutic drugs being directed in what sometimes appears as a losing battle, there is no more emotive nor scientifically charged issue than cancer,” writes Dr. Sandra Goodman. Along with the rest of the allopathic medical establishment the last thing oncologists want to admit is that the population is suffering from poisoning from hundreds of carcinogenic compounds and that this, in large part, is a great part of what is driving the escalating epidemic in cancer.

In March of 2004, the federal government issued an unusually detailed alert to the nation’s 5.5 million health care workers: **The powerful drugs used in chemotherapy can themselves cause cancer** and pose a risk to nurses, pharmacists and others who handle them. Four years in the making, the alert was issued by the National Institute for Occupational Safety and Health (NIOSH). Chemotherapy — the use of potent drugs to kill cancerous cells — is more than 60 years old. The first such drugs were nitrogen mustards, originally developed as chemical warfare agents. Modern chemotherapy drugs are so strong that they can **cause secondary cancers in patients**; to a healthy person, they’re poison. Most health care workers are clueless about how toxic these agents really are. **Oncologists use treatments that cause cancer to treat cancer when they use radiation and chemotherapy treatments.** (See upcoming IMVA essay for more information)

*A Harvard thesis has shown a connection between water fluoridation and a 700% increase in osteosarcoma in young men if they are exposed to fluoridated water during their 6<sup>th</sup> to 8<sup>th</sup> years.<sup>84</sup>*

*Dr. Paul Connett*

The prevailing medical paradigm surrounding cancer today is in total disavowal of nutrition as crucial in cancer prevention and treatment and this clearly puts the cancer industry and health officials in clear opposition to many distinguished research scientists. Though the data speaks for itself in thousands of studies the majority of cancer specialists are patronizing to patients who wish to use nutritional methods in their cancer treatment protocol. Oncologist’s vociferous and over-zealous protestations of the inherent worthlessness and supposed quackery of nutrition in cancer treatment is embarrassing to the institution of medicine. It exposes many of these doctors as little more than human leaches, extracting money and profits on the backs of cancer patients.<sup>85</sup>

Most main stream physicians are unaware of the extensive depth of evidence about nutrients preventing and alleviating many deadly diseases. This is a

disgrace since we can save countless lives and reduce needless suffering if we apply the power of minerals and vitamins in the prevention and treatment of cancer.

**According to the National Foundation for Cancer Research the value of minerals as part of an anticancer diet is frequently overlooked.** However, minerals can play a vital role in fighting cancer. A prime example is the mineral selenium, which has powerful antioxidant properties. Selenium (Se) is an essential micronutrient with important biological and biochemical functions in organisms because of its unique antioxidant properties and its ability to regulate thyroid gland metabolism. It is well known that Se is an antagonist that moderates the toxic effects of many heavy metals such as arsenic, cadmium, mercury, and lead in organisms.

Data suggests that a diet rich in selenium protects against cancers of the stomach, breast, esophagus, lung, prostate, colon, and rectum. According to Dr. Harold Foster **death rates in the USA for cancer are lower when blood selenium levels are high.** One important study found that high blood levels of selenium is associated with a four- to fivefold decrease in the risk of prostate cancer. Scientists at Stanford University studied 52 men who had prostate cancer and compared them to 96 men who didn't.<sup>86</sup> One surprising finding was that blood levels of selenium generally decreased with age. It is well known that the risk of prostate cancer increases dramatically as one ages.

Those who have studied geographical differences have seen that in low-selenium regions, higher death rates occurred from malignant lymphomas and cancers of the tongue, esophagus, stomach, colon, rectum, liver, pancreas, larynx, lung, kidneys and bladder. In addition, cancer patients with low selenium levels tend to have a wider spread of the disease, more recurrences and die sooner.<sup>87</sup>

In China, where the selenium levels in the soils varies much more dramatically than in the United States and the population is less mobile, an ecological study in 1985 showed dramatic results in linking cancer with selenium deficiencies. Dr. Shu-Yu Yu measured the selenium content of blood stored in blood banks in 30 different regions in China, and classified the regions as high selenium, medium selenium, and low selenium. They then compared death rates from cancer to the selenium rates and found there was an exact correlation. **In the low selenium classification, three times as many people died from cancer as in the high selenium classification.**

The West African country of Senegal is dominated by high concentrations of selenium in the soil and thus in their foods, and as expected, we find that Senegalese males had the world's lowest rates for cancer of the trachea, bronchus and lung; stomach and colon; the fourth lowest for prostate cancer and sixth lowest for esophageal cancer. Senegalese women had the lowest incidence of cancers of the trachea, bronchus, lung, esophagus, stomach and colon and second lowest for breast cancer and fifth lowest for cancer of the uterus.

There is no doubt that selenium is essential for human health and that these elements may protect against cancer and other diseases. For this reason people in regions which are naturally rich in selenium tend to live longer. Selenium, especially when used in conjunction with vitamin C, vitamin E and beta-carotene, works to block chemical reactions that create free radicals in the body (which can damage DNA and cause degenerative change in cells, leading to cancer). Selenium also binds strongly with mercury protecting us from its damaging effects.

Selenium helps stop damaged DNA molecules from reproducing, meaning it acts to prevent tumors from developing. "It contributes towards the death of cancerous and pre-cancer cells. Their death appears to occur before they replicate, thus helping stop cancer before it gets started," says Dr. James Howenstine in *A Physician's Guide to Natural Health Products That Work*.

A 1996 study by Dr. Larry Clark of the University of Arizona showed just how effective selenium can be in protecting against cancer. In the study of 1,300 older people, the occurrence of cancer among those who took 200 micrograms of selenium daily for about seven years was reduced by 42 percent compared to those given a placebo. Cancer deaths for those taking the selenium were cut almost in half, according to the study that was published in the *Journal of the American Medical Association* on December 25, 1996. In addition, the people who had taken selenium had 63 percent fewer prostate cancers, 58 percent fewer colorectal cancers, 46 percent fewer lung cancers and overall 37% fewer cancers. Selenium was found to reduce the risk of lung cancer to a greater degree than stopping smoking.<sup>88</sup>

## Magnesium

*It is generally accepted that a higher magnesium intake in the drinking water is associated with reduced cancer incidence and reduced frequency of cardiac infarction.*

Information is scarce about the relationship between cancer and magnesium but researchers from the School of Public Health at the University of Minnesota have just concluded that diets rich in magnesium reduced the occurrence of colon cancer.<sup>89</sup> A previous study from Sweden<sup>90</sup> reported that women with the highest magnesium intake had a 40 per cent lower risk of developing the cancer than those with the lowest intake of the mineral.

*Preliminary data also suggests a relationship between low intake of magnesium and kidney cancer.*

Several studies have shown an increased cancer rate in regions with low magnesium levels in soil and drinking water as well. In Egypt the cancer rate was only about 10% of that in Europe and America. In the rural fellah it was practically non-existent. **The main difference was an extremely high magnesium intake of 2.5 to 3 g in these cancer-free populations, ten times more than in most western countries.**<sup>91</sup>

Dr Seeger and Dr Budwig in Germany have shown that cancer is mainly the result of a faulty energy metabolism in the powerhouses of the cells, the mitochondria. ATP and most of the enzymes involved in the production of energy require magnesium. A healthy cell has high magnesium and low calcium levels. The problem that comes with low magnesium (Mg) levels is the calcium builds up inside the cells while energy production decreases as the mitochondria gradually calcify.

“Mg<sup>2+</sup> is critical for all of the energetics of the cells because it is absolutely required that Mg<sup>2+</sup> be bound (chelated) by ATP (adenosine triphosphate), the central high energy compound of the body. ATP without Mg<sup>2+</sup> bound cannot create the energy normally used by specific enzymes of the body to make protein, DNA, RNA, transport sodium or potassium or calcium in and out of cells, nor to phosphorylate proteins in response to hormone signals, etc. In fact, ATP without enough Mg<sup>2+</sup> is non-functional and leads to cell death. Bound Mg<sup>2+</sup> holds the triphosphate in the correct stereochemical position so that it can interact with ATP using enzymes and the Mg<sup>2+</sup> also polarizes the

phosphate backbone so that the 'backside of the phosphorous' is more positive and susceptible to attack by nucleophilic agents such as hydroxide ion or other negatively charged compounds. Bottom line, Mg<sup>2+</sup> at critical concentrations is essential to life,” says Dr. Boyd Haley who asserts strongly that, “All detoxification mechanisms have as the bases of the energy required to remove a toxicant the need for Mg-ATP to drive the process. There is nothing done in the body that does not use energy and without Mg<sup>2+</sup> this energy can neither be made nor used.” Detoxification of carcinogenic chemical poisons is essential for people want to avoid the ravages of cancer. The importance of magnesium in cancer prevention should not be underestimated.

*The School of Public Health at the Kaohsiung Medical College in, Taiwan, found that magnesium also exerts a protective effect against gastric cancer, but only for the group with the highest levels.<sup>92</sup>*

Among other effects, magnesium improves the internal production of defensive substances, such as antibodies and considerably improves the operational activity of white, granulocytic blood cells (shown by Delbet with magnesium chloride), and contributes to many other functions that insure the integrity of cellular metabolism.

A Dr. Hans A. Nieper, back in 1961, introduced cardiac therapy based on magnesium aspartate. He was surprised to observe that hardly any new cancer occurrences appear in the group of patients so treated. The rate of new cancerous diseases with long-term magnesium therapy was reported to be less than 20% of the frequency otherwise expected. In an uncontrolled trial, researchers in the UK found that intravenous magnesium relieves neuropathy pain in patients with cancer.<sup>93</sup> Magnesium acts as a noncompetitive antagonist of the N-methyl-D-aspartate receptor, which has been implicated in the transmission of pain, according to Dr. Vincent Crosby and colleagues at Nottingham City Hospital.

It is known that carcinogenesis induces magnesium distribution disturbances, which cause magnesium mobilization through blood cells and magnesium depletion in non-neoplastic tissues. **Magnesium deficiency seems to be carcinogenic, and in cases of solid tumors, high levels of magnesium inhibits carcinogenesis.**<sup>94</sup> Both carcinogenesis and magnesium deficiency increase the plasma membrane permeability and fluidity.

## Zinc

*No modern chemotherapy includes zinc adjuvant even though zinc serum levels are usually low in leukemic children.*

Epidemiologic studies suggest that zinc deficiency may be associated with increased risk of cancer.<sup>95</sup> Zinc supplementation is associated with decreased oxidative stress and improved immune function, which may be among the possible mechanisms for its cancer preventive activity.

**Zinc is essential for health.** It's needed for the enzymes that regulate cell division, growth, wound healing, and proper functioning of the immune system. Zinc is an essential co-factor in a variety of cellular processes including DNA synthesis, behavioral responses, reproduction, bone formation, growth and wound healing. Zinc is a component of insulin and it plays a major role in the efficiency of most of the functions of the body. Zinc is necessary for the free-radical quenching activity of superoxide dismutase (SOD), a powerful antioxidant enzyme which breaks down the free-radical superoxide to form hydrogen peroxide. Zinc is required for the proper function of T-lymphocytes. The mineral also plays a role in acuity of taste and smell. And zinc is required for proper functioning of genetics, immunity, formation of red blood cells, organ, muscle and bone function, cell membrane stability, cell growth, division, differentiation and genetics. Importantly, zinc is vital for the metabolism of Vitamin A.

A paper by Dr. Mei and colleagues at the Anhui Medical University, Hefei, China, suggests that some aspects of immune function can be enhanced by treatment with zinc. The authors state that it would be “reasonable to expect that zinc is instrumental in restoring failing immunocompetence of cancer patients. Mei studied the influence of zinc and selenium-zinc upon the immune function (T-cells, granulocytes and NK cells) of cancer patients. The results showed that immune response was strengthened.<sup>96</sup>

Leukemic cells contain much less zinc than normal lymphocytes, suggesting an error in zinc metabolism, which appears correctable with zinc treatment. Zinc also is known to have some beneficial interactions with chemotherapy drugs. In one recent case, upon noting low blood levels of zinc in a 3-year-old 11.3 kg girl, zinc at the rate of 3.18 mg/kg body weight/day was administered from the start of chemotherapy through the full 3 years of maintenance therapy. Dosage was split with 18 mg given at breakfast and 18 mg zinc with supper.



The result was a bone marrow remission from 95+% blast cells to an observed zero blast cell count in both hips within the first 14 days of treatment which never relapsed.<sup>97</sup>

Dr. Mathais Rath wrote that “500 years ago, the Roman church was making billions of Thaler (early dollars) by selling indulgences, an imaginary “key to heaven” for its believers. Then the fraud scheme collapsed and with it much of the power of the church. Today, the pharma business uses the same fraud scheme. It tries to sell the “key to health” to millions of people and takes away billions of dollars in return for an illusion: the deception that the pharmaceutical industry is interested in your health.”<sup>98</sup>

The cancer industry is among the most aggressive areas in the medical arena and the FDA will swoop in with automatic weapons into doctors’ offices if they step out of line with acknowledged oncology protocols. Medical fascism is perhaps at its worst in the cancer area with oncologists insisting that poisoning patients with chemicals and radiation is the only and best way to go.

Minerals are essential for life and health and provide the keys for the prevention of cancer. Minerals (in the form of cesium chloride)<sup>99</sup> also provide a reasonably safe way to treat advanced stage four cancer without resorting to the slash and burn tactics of radiation and chemotherapy.

It’s a frightening world when it comes to cancer and that fright is made much worse by the medical authorities who insist their way is the only way. Not only do they let the ball drop by not informing us about how to avoid cancer, but if we get it, they will use therapies that are as dangerous to live healthy cells as they are to the cancer cells. Cesium chloride on the other hand aggressively kills cancer cells by turning their internal chemistry alkaline.

## Magnesium – Antioxidant Status – Glutathione

The involvement of free radicals in tissue injury induced by magnesium deficiency<sup>100</sup> causes an accumulation of oxidative products in the heart, liver, kidney, skeletal muscle tissues and in red blood cells.<sup>101</sup> Magnesium is a crucial factor in the natural self-cleansing and detoxification responses of the body. It stimulates the sodium potassium pump on the cell wall and this initiates the cleansing process in part because the sodium-potassium-ATPase pump regulates intracellular and extracellular potassium levels. Cell membranes contain a sodium/potassium ATPase, a protein that uses the energy of ATP to pump sodium ions out of the cell, and potassium ions into the cell. The pump works all of the time, like a bilge pump in a leaky boat, pumping K<sup>+</sup> and Na<sup>+</sup> in and out, respectively.

“ATP production is essential for every cell to have an ample supply to deal with the challenges of metal overload, as it is required to even permit the cell to keep on pumping out calcium. Lack of ATP then is the underlying cause of abnormal calcification of tissues,” wried Dr. Garry Gordon

Potassium regulation is of course crucial because potassium acts as a counter flow for sodium's role in nerve transmission. The body must put a high priority on regulating the potassium of the blood serum and this becomes difficult when magnesium levels become deficient.<sup>102</sup> Because of these crucial relationships, when magnesium levels become dramatically deficient we see symptoms such as convulsions, gross muscular tremor, atheloid movements, muscular weakness, virtigo, auditory hyperacusis, aggressiveness, excessive irritability, hallucinations, confusion, and semicomma. Magnesium deficiency causes the body to lose potassium. Magnesium and potassium inside the cell assist oxidation, and sodium and calcium outside the cell wall help transmit the energy produced. **The healthy cell wall favors intake of nutrients and elimination of waste products.**

Magnesium protects cells from aluminum, mercury, lead, cadmium, beryllium and nickel, which explains why re-mineralization is so essential for heavy metal detoxification and chelation. Magnesium protects the cell against oxyradical damage and assists in the absorption and metabolism of B vitamins, vitamin C and E, which are anti-oxidants important in cell protection. Recent evidence suggests that vitamin E enhances glutathione levels and may play a protective role in magnesium deficiency-induced cardiac lesions.<sup>103</sup> Magnesium

in general is essential for the survival of our cells but takes on further importance in the age of toxicity where our bodies are being bombarded on a daily basis with heavy metals. Magnesium especially is needed to protect the brain from toxic effects of chemicals. It is highly likely that low total body magnesium contributes to heavy metal toxicity in children and is a strong participant in the etiology of learning disorders and autism.

Without sufficient magnesium, the body accumulates toxins and acid residues thus it degenerates more rapidly and ages prematurely. Recent research has pointed to low glutathione levels being responsible for children's vulnerability to mercury poisoning from vaccines.<sup>104</sup> It seems reasonable to assume that low levels of magnesium would also render a child vulnerable. And in fact glutathione requires magnesium for its synthesis.<sup>105</sup> **Glutathione synthetase requires  $\gamma$ -glutamyl cysteine, glycine, ATP, and magnesium ions to form glutathione.**<sup>106</sup>

In magnesium deficiency, the enzyme  $\gamma$ -glutamyl transpeptidase is lowered.<sup>107</sup> Data demonstrates a direct action of glutathione both in vivo and in vitro to enhance intracellular magnesium and a clinical linkage between cellular magnesium, GSH/GSSG ratios, and tissue glucose metabolism.<sup>108</sup> Magnesium deficiency causes glutathione loss, which is not affordable because glutathione helps to defend the body against damage from cigarette smoking, exposure to radiation, cancer chemotherapy, and toxins such as alcohol and just about everything else.

According to Dr. Russell Blaylock, low magnesium is associated with dramatic increases in free radical generation as well as glutathione depletion and this is vital since glutathione is one of the few antioxidant molecules known to neutralize mercury.<sup>109</sup> Thus, sadly, children receiving thimerosal containing vaccines are sitting ducks to mercury when both magnesium and glutathione levels are low. Also under the shadow of magnesium deficiency too much Nitric Oxide (NO) is produced which in turn may react with superoxide to form a very damaging compound peroxynitrite. Low magnesium levels can induce such excessive NO production that even the glutathione in the red blood cells is damaged. This provides some one explanation for why magnesium protects the arteries.<sup>110</sup>

“For every molecule of pesticide that your body' detoxifies, you throw away or use up forever, a molecule of glutathione, magnesium and more,” says Dr. Sherry Rogers who goes on to say that, “Your body uses nutrients to make this

glutathione and it uses up energy as well. Every time we detoxify a chemical, we use up, lose, throw away forever, a certain amount of nutrients.”

*Magnesium permits calcium to enter a nerve cell to allow electrical transmission along the nerves to and from the brain. Even our thoughts, via brain neurons, are dependent on magnesium.*

*Dr. Carolyn Dean*

When dealing with autism spectrum and other neurological disorders in children it is important to know the signs of deficient magnesium: restlessness, can't keep still, body rocking, grinding teeth, hiccups, noise sensitive, poor attention span, poor concentration, irritable, aggressive, ready to explode, easily stressed. When it comes to autistic children today we need to assume significant magnesium deficiency for multiple reasons.

1) The foods they are eating are stripped of magnesium because of soil deficiencies in vital minerals.

2) The foods many children eat are highly processed junk foods that do not provide real nutrition to the body.

3) Children on the autistic spectrum are not absorbing the minerals they need even when present in the gut. Magnesium absorption is dependent on intestinal health, which is compromised in leaky gut syndromes.

4) The oral supplements doctors rely on are not easily absorbed.

Magnesium and copper are important modulators of NMDA-receptor activity. Recent data indicate that disturbances of glutamatergic transmission (especially via NMDA-receptor) are involved in pathogenesis of mood disorders. Magnesium deficiency is related to a variety of psychological symptoms especially depression. There are many reports indicating significant changes in blood levels of magnesium or copper during a depressive episode. Moreover magnesium exhibits antidepressant-like and anxiolytic-like effects in animal models of depression, in rodents.<sup>111</sup>

Evidence is mounting that low levels of magnesium contribute to the heavy metal deposition in the brain that precedes Parkinson's, multiple sclerosis and Alzheimer's. Many of the symptoms of Parkinson's disease can be overcome with high magnesium supplementation. In a trial with 30 epileptics 450 mg of

magnesium supplied daily successfully controlled seizures. Another study found that the lower the magnesium blood levels the more severe was the epilepsy.

*Magnesium works best in combination with vitamin B6 and zinc.*

Because of its nerve and muscle support, magnesium is helpful for nervousness, anxiety, insomnia, depression, and muscle cramps. Thus magnesium is also given as part of a treatment for autism or hyperactivity in kids. Dr. Bernard Rimland, of the Autism Research Institute, did extensive research on vitamin B6 and magnesium many years ago and found, through double-blind placebo-controlled crossover experiments with 16 autistic children, statistically significant results. Children and adults tend to sleep better when taking magnesium before bed.

## Magnesium Facilitates Safer Detoxification and Chelation

How many doctors relate the increased accumulation of mercury in the body to deficiencies in magnesium? The cause and cure of many physical illnesses can be as simple as correcting a magnesium deficiency and many of the problems with mercury chelation can be reduced when a person is given sufficient magnesium. Everyone knows that chelation wastes minerals yet few have investigated sufficiently the key mineral whose loss cannot be tolerated without unacceptable risk.

Magnesium is very important for phase one detoxification and it, along with other minerals like zinc, **displaces toxic heavy metals from the body.** Magnesium is a crucial factor in the natural self-cleansing and detoxification responses of the body. Thus it is reasonable to assume that low levels of magnesium would render a child vulnerable to mercury mobilization during chelation.

Human exposure to heavy metals has risen dramatically in the last 50 years as a result of an exponential increase in the use of heavy metals in industrial processes and products. The need for detoxification and chelation is increasing considerably yet the exaggerated healing crises or detox side effects could arise and be caused by magnesium and other mineral deficiencies. According to Dr. Sherry Rogers, There is as much as a 500-fold difference in the ability of individuals to detoxify the same chemical. One of the key markers of this difference is each individual's magnesium level.

There are over 200 published clinical studies<sup>112</sup> documenting the need for magnesium and many examples of miraculous "cures" from the use of this common mineral. Yet DAN (Defeat Autism Now) doctors underestimate autistic children's needs recommending only 50 mgs twice a day in oral form even though children with gut problems can absorb only small percentages through their intestines. The entire autism community needs to be acutely aware that its present dependency on oral magnesium supplementation is responsible for the less than excellent results from chelation. A changeover to transdermal/topical approaches to magnesium supplementation would be helpful.

**Dr** Leslie Fisher has treated over of 35,000 patients where mineral therapy was prescribed as the sole form of medication with good results. He has conducted research in the Department of Psychiatry at Austin Hospital, Melbourne. Mineral therapy is the foundation that chelation treatments and protocols should to be built on. An over reliance on synthetic chelators is dangerous without appropriate mineral support therapies. In the case of autism spectrum disorders oral magnesium supplement plans cannot be expected to alleviate magnesium deficiencies.

Sufficient magnesium levels not only leads to safer detoxification and Chelation, it makes chelation possible, as Dr. Boyd Haley points out in the next section. The autism community has been told by Dr. Andrew Cutler Hall that **it is "mineral transport" defects that are the biggest problem with heavy metal toxicity.** The discovery that an important mineral like magnesium can be supplied through the transdermal route is significant for the autism community and everyone else. The last thing any parent or doctors treating autistic children want to do is to miss the boat on effective magnesium supplementation.

## Magnesium and ATP

“Mg<sup>2+</sup> is critical for all of the energetics of the cells because it is absolutely required that Mg<sup>2+</sup> be bound (chelated) by ATP (adenosine triphosphate), the central high energy compound of the body. ATP without Mg<sup>2+</sup> bound cannot create the energy normally used by specific enzymes of the body to make protein, DNA, RNA, transport sodium or potassium or calcium in and out of cells, nor to phosphorylate proteins in response to hormone signals, etc. In fact, ATP without enough Mg<sup>2+</sup> is non-functional and leads to cell death. Bound Mg<sup>2+</sup> holds the triphosphate in the correct stereochemical position so that it can interact with ATP using enzymes and the Mg<sup>2+</sup> also polarizes the phosphate backbone so that the 'backside of the phosphorous' is more positive and susceptible to attack by nucleophilic agents such as hydroxide ion or other negatively charged compounds. **Bottom line, Mg<sup>2+</sup> at critical concentrations is essential to life,**” says Dr. Boyd Haley who asserts strongly that, **“All detoxification mechanisms have as the bases of the energy required to remove a toxicant the need for Mg-ATP to drive the process. There is nothing done in the body that does not use energy and without Mg<sup>2+</sup> this energy can neither be made nor used.”**

PMS? Sinus problem? Arthritis? Chronic Fatigue? Fibromyalgia ? Lupus? Psoriasis? Painful and enlarged breasts? What do all these disorders have in common? They are all chronic conditions fully or partially due to a backup of the body's lymph system. These conditions were created over a long period of time as the body's immune system had been gradually weakened. The cause of this weakening is a slowdown of the metabolism which is often caused by magnesium deficiency. A slow metabolism causes an overabundance of waste products within the tissues. In a healthy body, the lymph fluid carries waste away. An interference of this process is often the beginning of chronic conditions such as mentioned above.

Mercury drastically increases the excretion of magnesium and calcium from the kidneys.<sup>113</sup> Both mercury itself and the drugs used to chelate mercury have a strong impact on mineral levels. Between the dramatically diminishing mineral content in foods and the highly toxic world we live in the need for magnesium has never been greater.



A magnesium ion is an atom that is missing two electrons, which makes it search to attach to something that will replace its missing electrons so it is actively and directly involved in diminishing heavy metal toxicity. Magnesium appears to be a competitive inhibitor of lead and cadmium.<sup>114</sup> An increased level of magnesium has been shown to eliminate lead and cadmium through the urine<sup>115</sup> and has also been reported to reduce the toxic effects of aluminum as well.<sup>116</sup>

Magnesium ions constitute the physiologically active magnesium in the body; they are not attached to other substances and are free to join in biochemical body processes.<sup>117</sup> This is one basic reason magnesium helps to detoxify toxic chemicals and helps eliminate heavy metals from the body. Another reason would be the part it plays in glutathione production but undoubtedly, as Dr. Haley indicates, the Mg-ATP provides the crucial energy to remove each toxicant. Thus Dr. Dean is certainly justified in saying, “Symptoms of chemical toxicity can be completely or partially produced by magnesium deficiency.”

Transdermal magnesium chloride therapy (the only way one can dependably increase magnesium levels besides intravenous application) is crucial in any kind of detoxification or chelation program. Deficiencies of magnesium result in a deficiency in B6 because it is involved in vitamin metabolism and if you don't get enough magnesium, your body cannot make or utilize protein. Few appreciate that magnesium deficiency can create such problems like protein deficiencies. Magnesium also activates vitamins C and E. Therefore, if you don't get enough magnesium, the vitamin C and E that you eat cannot be used. If you don't have enough magnesium DMPS and DMSA, the most commonly used synthetic chelators, will hurt more than they will help.

## Magnesium and Diabetes

Magnesium for diabetics is critical. A Gallup survey in 1995 of 500 adults with diabetes reported that 83 percent of those with diabetes are consuming insufficient magnesium from food, with many by significant margins.<sup>118</sup> At least twenty five percent of diabetics have hypomagnesemia<sup>119</sup> and this is likely an underestimate. One group has recently suggested that the effects of reduced glutathione on glucose metabolism may be mediated, at least in part, by intracellular magnesium levels.<sup>120</sup>

Dr. Carolyn Dean indicates that magnesium deficiency may be an independent predictor of diabetes and that diabetics both need more magnesium and lose more magnesium than most people. Magnesium is necessary for the production, function & transport of insulin. Magnesium deficiency is associated with insulin resistance and increased platelet reactivity. According to Dr. Jerry L. Nadler, “The link between diabetes mellitus and magnesium deficiency is well known. A growing body of evidence suggests that magnesium plays a pivotal role in reducing cardiovascular risks and may be involved in the pathogenesis of diabetes itself. While the benefits of oral magnesium supplementation on glycemic control have yet to be demonstrated in patients, magnesium supplementation has been shown to improve insulin sensitivity. Based on current knowledge, clinicians have good reason to believe that magnesium repletion may play a role in delaying type 2 diabetes onset and potentially in warding off its devastating complications -- cardiovascular disease, retinopathy, and nephropathy.”

The mechanism of hypomagnesemia in diabetic patients still remains unsolved but there is enough evidence to suggest that Mg levels drop in the course of recovery from ketoacidosis, during insulin therapy<sup>121</sup> or with severe retinopathy<sup>122</sup> or proteinuria.<sup>123</sup> Diabetic patients, especially those with poor glucose control, can also develop hypomagnesemia from a glucose-induced osmotic diuresis.

Insulin resistance and magnesium depletion may result in a vicious cycle of worsening insulin resistance and decrease in intracellular Mg(2+) which may limit the role of magnesium in vital cellular processes. Diabetic ketoacidosis (DKA)<sup>124</sup> is a state of inadequate insulin levels resulting in high blood sugar

and accumulation of organic acids and ketones in the blood. Increased blood acids (ketoacidosis) can be an acute complication of diabetes. It occurs when your muscle cells become so starved for energy that your body takes emergency measures and breaks down fat, a process that forms acids known as ketones.<sup>125</sup>

Hyperglycemia initially causes the movement of water out of cells, with subsequent intracellular dehydration, extracellular fluid expansion and hyponatremia (sodium loss). It also leads to a diuresis in which water losses exceed sodium chloride losses. It is believed that magnesium is also lost by osmotic action. Urinary losses then lead to progressive dehydration and volume depletion, which causes diminished urine flow and greater retention of glucose in plasma. The net result of these alterations is hyperglycemia with metabolic acidosis.<sup>126</sup>

Proteinuria is protein in the urine, caused by damaged kidneys and a declining ability of the kidneys to protect the body from protein loss. This is frequently seen in longstanding diabetes, hypertension, as well as other chronic renal conditions. In the United States, diabetes is the leading cause of end-stage renal disease (ESRD), the result of chronic kidney disease. In both type 1 and type 2 diabetes, the first sign of deteriorating kidney function is the presence of small amounts of albumin in the urine, a condition called microalbuminuria. As kidney function declines, the amount of albumin in the urine increases, and microalbuminuria becomes full-fledged proteinuria. **Lower serum magnesium levels are associated with more rapid decline of renal function.** During insulin treatment, neither magnesium nor potassium can be metabolized properly, so these essential minerals must be replaced.

Severe symptomatic hypermagnesemia is relatively rare. But high levels of magnesium can develop in people, most commonly those with renal insufficiency or renal failure.<sup>127</sup> Kidney disease, rather than diet, is the usual cause of magnesium overload, **because the kidneys lose the ability to remove excess magnesium.**

## Diabetic Children and Magnesium

On Monday, November 7, 2005, The Associated Press said that “About 2 million U.S. children ages 12 to 19 have a pre-diabetic condition linked to obesity and inactivity that puts them at risk for full-blown diabetes and cardiovascular problems, government data suggest.” One in 14 boys and girls in a nationally representative sample had the condition. Among the overweight adolescents, it was one in six. The study in question appears in November's *Pediatrics*. It is based on data involving 915 youngsters who participated in a 1999-2000 national health survey.<sup>128</sup>

The autism disaster is happening at a rate of one child in approximately 166, though if one counts all the severe learning disabilities it is one in six. What is happening to the nation's children? The CDC does not know because it has its head stuck in the bird flu sand. And the FDA does not know because it has been too busy allowing the pharmaceutical companies to poison children.

Dr. Teresa A. Hillier has reported, “Diabetes increased the risk of heart attack and stroke in both age groups, but the increased risk was much larger in younger people. People who had been diagnosed before age 45 were 14 times more likely to have a heart attack and 30 times more likely to have a stroke than their non-diabetic peers. In contrast, older people with diabetes were four times more likely than their peers to have a heart attack and three times more likely to have a stroke.” Hillier and a colleague, Kathryn L. Pedula, based their findings on a study of nearly 8,000 people who were newly diagnosed with type 2 diabetes.<sup>129</sup>

*While type 2 diabetes used to be primarily a problem of middle and old age, new cases of the illness among people 30 to 39 have risen 70 percent in the last decade.*

What is happening to our children is a disaster and no words can express the pain and agony that millions of parents are facing in the United States alone. Some day the medical authorities will be held responsible for their failure to address these issues. In the area of autism spectrum disorders the government just does not want to admit that hundreds of thousands of children have been damaged by vaccines laden with mercury. Poisoned is the word but no one at the FDA or CDC knows anything about the dangers of low level toxicity because knowledge in those areas brings guilt and criminal prosecution.

*Diabetes has risen by over 14 percent in the last two years.  
The CDC estimates that 20.8 million Americans -- 7 percent of  
the U.S. population -- have diabetes, up from 18.2 million in 2003.*<sup>130[iii]</sup>  
*Centers for Disease Control*

Is a lack of magnesium related to type 2 Diabetes in Obese Children? Dr. Huerta and colleagues say yes in their study titled *Magnesium deficiency is associated with insulin resistance in obese children*.<sup>131</sup> Insulin resistance occurs when the body does not use insulin, a protein made by the pancreas, to turn glucose into energy. Children who are obese (seriously overweight) are more likely to have insulin resistance. This might be because they have low magnesium levels in their blood. This study was done to see if obese children get enough magnesium in their diets and if a lack of magnesium can cause insulin resistance and eventually type 2 diabetes. This is the first study linking low magnesium levels to insulin resistance in obese children. **Researchers found that 55% of obese children did not get enough magnesium from the foods they ate, compared with only 27% of lean children.** Obese children had much lower magnesium levels in their blood than lean children. Children with lower magnesium levels had a higher insulin resistance.

The results of the diet survey showed that obese children got 14.4% less magnesium from the foods they ate than lean children, even though obese and lean children ate about the same number of calories per day. Obese children eat more calories from fatty foods than lean children. In addition to not eating enough foods rich in magnesium, obese children seem to have problems using magnesium from the foods they eat. Extra body fat can prevent the body's cells from using magnesium to break down carbohydrates.

When it comes to diabetes there is no lack of information pointing to magnesium deficiency and chemical poisoning converging on the young but medical authorities find it too difficult to address magnesium deficiencies and warn parents of the chemical dangers. The United States government seems to be involved in a huge cover up of medical and pharmaceutical wrong doings and will just keep on letting things slide as hundreds of thousands of kids each year get sick.

## Magnesium and Diabetic Neuropathy

Diabetes is commonly thought to have no cure. It is progressive and often fatal, and while the patient lives, the mass of medical complications it sets off can attack every major organ. Though public health officials acknowledge that their ability to slow the disease is limited, and though doctors fear a huge wave of new cases will overwhelm public health systems, “Public health authorities around the country have all but ignored chronic illnesses like diabetes, focusing instead on communicable diseases, which kill far fewer people,” according to the New York Times. Hospitals around New York City are full of diabetic patients and on any given day, nearly half the patients are there for some trouble precipitated by the disease.<sup>132</sup>

*Type two diabetes is being declared  
an epidemic in New York City.*

With one in three children born in the United States five years ago expected to become diabetic in their lifetimes, a close look at its surge in New York City offers a disturbing glimpse of where the city and the rest of the world is headed. Diabetes has swept through families, entire neighborhoods in the Bronx and broad slices of Brooklyn. While the ranks of American diabetics have exploded by an extremely painful 80 percent in the last decade, New York has seen a devastating explosion of 140 percent.

*Type 2 Diabetes is sweeping so rapidly through  
America we need not waste time giving  
children bicycles. Just roll them a wheelchair.  
Boston Globe<sup>133</sup>*

These chapters on diabetic neuropathy introduces a much needed medical intervention for the prevention and treatment of diabetes and the many complications that come from it, but as the New York Times admits, “In the Treatment of Diabetes, Success Often Does Not Pay.” “It’s almost as though the system encourages people to get sick and then people get paid to treat them,” said Dr. Matthew E. Fink, a former president of Beth Israel Medical Center in Manhattan. The Times bemoans, “a medical system so focused on acute illnesses that it is struggling to respond to diabetes, a chronic disease that looms as the largest health crisis facing the city.”<sup>134</sup> Something is wrong with the way

the medical establishment is dealing with diabetes and that starts with its refusal to look honestly at what is causing the disease.

*Commercials tell children that junk food is good food  
- the latest message from an industry that spends  
\$10 billion a year marketing to children.  
New York Times*

Medical science has discovered how sensitive the insulin receptor sites are to chemical poisoning. Metals such as cadmium,<sup>135</sup> mercury,<sup>136</sup> arsenic, lead, fluoride<sup>137</sup> and possibly aluminum may play a role in the actual destruction of beta cells through stimulating an auto-immune reaction to them after they have bonded to these cells in the pancreas. **Food is not considered junk just because of high fat or sugar content, there is a long list of poisonous chemicals used by the food industry that are striking down people.** And there are many serious nutritional deficiencies in today's food that diminish the bodies capacity to deal safely with these chemicals and heavy metals - with magnesium and selenium deficiencies at the top of the list.

For instance, according to Dr. Ellen Silbergeld, a researcher from the Johns Hopkins School of Public Health, the poultry industry's practice of using arsenic compounds in its feed is something that has not been studied: "It's an issue everybody is trying to pretend doesn't exist."<sup>138</sup> Arsenic exposure is a risk factor<sup>139</sup> for diabetes mellitus.<sup>140</sup> Inorganic arsenic is considered one of the prominent environmental causes of cancer mortality in the world. Chicken consumption may contribute significant amounts of arsenic to total arsenic exposure of the U.S. population according to the Journal Environmental Health Perspectives.<sup>141</sup>

"Arsenic acts as a growth stimulant in chickens—develops the meat faster—and since then, the poultry industry has gone wild using this ingredient," says Donald Herman, a Mississippi agricultural consultant and former Environmental Protection Agency researcher who has studied this use of arsenic for a decade. Doctors also are on notice that many drugs have toxic effects that can participate as well in destroying insulin creation and cell receptivity to it.

*Wistar rats were made diabetic  
with a single injection of Alloxan.<sup>142</sup>*

Another example is Alloxan. Studies show that Alloxan, the chemical that makes white flour look "clean and beautiful" destroys the beta cells of the pancreas.<sup>143</sup> Scientists have known of the alloxan-diabetes connection for years yet there seems to be a conspiracy that defends the integrity of the FDA, which allows dangerous chemicals that can cause diabetes to be used in drugs and food. "A growing body of research shows that pesticides and other contaminants are more prevalent in the foods we eat, in our bodies, and in the environment than we thought,"<sup>144</sup> all confirming the chemical nightmare in progress.

And we are just beginning to hear that a massive mistake has been made with genetically modified foods, which can only fan those diabetic winds.<sup>145</sup> Dr. Alpad Pusztai, for instance, has already shown that genetically-manipulated foods can, when fed to animals in reasonable amounts, cause very gradual **organ and immune system damage**.<sup>146</sup> Another study, carried out by Dr Irina Ermakova at the Institute of Higher Nervous Activity and Neurophysiology, at the Russian Academy of Sciences, found that more than half of the offspring of **rats fed on modified soya died** in the first three weeks of life, six times as many as those born to mothers with normal diets.<sup>147</sup> Dr. Manuela Malatesta and colleagues in the Universities of Pavia and Urbino in Italy, showed that mice fed on GM soya experienced **a slowdown in cellular metabolism and modifications to liver and pancreas**.<sup>148</sup> Researchers are reviving fears that GM food damages human health and certainly would not be indicated for children or people with diabetes.

## **Diabetic Neuropathy**

Diabetic neuropathy, a complication of both type one and type two diabetes, is probably the most common complication of the disease.<sup>149</sup> Studies suggest that up to 50% of people with diabetes are affected to some degree. Diabetic neuropathy is a nerve disorder caused by diabetes. The two main classifications of neuropathy are peripheral neuropathy, affecting the extremities, arms, legs, hands and feet, and autonomic neuropathy, affecting the organ systems, mainly affecting the nerves of the digestive, cardiovascular systems, urinary tract and sexual organs.

Symptoms of peripheral nerve damage (neuropathy) are basically weakness, usually in the arms and hands or legs and feet, often with pain burning, tingling,



or other abnormal sensations. Numbness or decreased sensation, difficulty walking and difficulty using the arms and hands or legs and feet are all common. Peripheral sensory neuropathy can initiate physiologic events that lead to distal extremity ulceration and eventual amputation.

Nerve damage caused by diabetes can also lead to problems with internal organs such as the digestive tract, heart, and sexual organs, causing indigestion, diarrhea or constipation, dizziness, bladder infections, and impotence.<sup>150</sup> Diabetic neuropathy is a major cause of impotence in diabetic men.<sup>151</sup> Autonomic neuropathies are believed to be implicated in “silent heart attacks” of diabetes, where the full symptoms of myocardial infarction are not felt by the person.

In some cases, neuropathy can flare up suddenly, causing weakness and weight loss. Neuropathy may cause both pain and insensitivity to pain in the same person. Often, symptoms are slight at first, and since most nerve damage occurs over a period of years, mild cases may go unnoticed for a long time. In some people, mainly those afflicted by focal neuropathy, the onset of pain may be sudden and severe.

*A major risk factor of this condition is the level and duration of elevated blood glucose.*

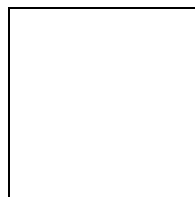
Scientists do not know ‘exactly’ what causes diabetic neuropathy, but several factors are likely to contribute to the disorder. High blood glucose, a condition associated with diabetes, causes chemical changes in nerves. These changes impair the nerve’s ability to transmit signals. High blood glucose also damages blood vessels that carry oxygen and nutrients to the nerves. Keeping blood sugar levels as close to the normal range as possible slows the onset and progression of nerve disease caused by diabetes.<sup>152</sup> An increase in oxidative stress also may result in neuropathy. Hyperglycemia can increase intracellular sorbitol and fructose levels within neuronal tissue, which may lead to the production of harmful free radicals and an alteration of neuronal function.

*It is possible to reduce amputation rates by between 49% and 85%.<sup>153</sup>*

Recently, researchers have focused on the effects of excessive glucose metabolism on the amount of nitric oxide in nerves. Nitric oxide dilates blood vessels. In a person with diabetes, low levels of nitric oxide may lead to constriction of blood vessels supplying the nerve, contributing to nerve damage. Scientists also know that high glucose levels affect many metabolic pathways in the nerves.

While the medical and the research industry is focused on the fact that hyperglycemia is the primary cause of peripheral neuropathy, little attention is paid to the effects of hypoglycemia,<sup>154</sup> or low blood sugars. This seems to be a far too ignored piece of the puzzle of diabetes, worsening as diabetics are pushed to achieve lower and lower blood sugars, and with faster acting synthetic insulin. Research shows us that too rapid lowering of blood sugars from a longstanding hyperglycemic state,<sup>155</sup> and that episodes of sustained hypoglycemia can and do cause neuropathy.<sup>156</sup>

From 1993 to 1995, about 67,000 amputations were performed each year among people with diabetes. In 2002, about 82,000 non-traumatic lower-limb amputations were performed in people with diabetes.<sup>157</sup> The direct cost of an amputation associated with diabetes is estimated to be between US\$30,000 and US\$60,000. The estimated cost for three years of subsequent care ranges from US\$43,000 to US\$63,000 – mainly due to the increased need for home care and social services.



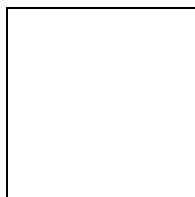
*It has been forced upon me that diabetic  
gangrene is not heaven sent, but earth born.  
E.P. Joslin, 1934*

Early in the last century, soon after the discovery of insulin, Joslin made the important observation noted above: he stated that it was not inevitable that a certain proportion of the diabetic population would develop foot ulceration or gangrene. He concluded that it was something to do with the way that we as health care professionals look after our patients, or the way that patients look after themselves, which results in conditions collectively referred to as ‘the diabetic foot.’<sup>158</sup>

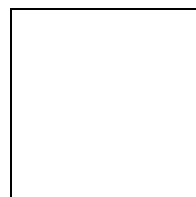
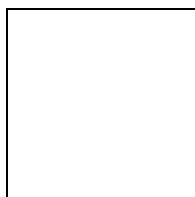
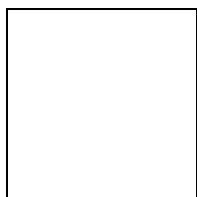


The medical establishment likes to think that great steps have been taken in diabetes management<sup>159</sup> but in the area of the diabetic foot little impact has been made in the depressing statistics for rates of amputations and foot ulcers. Foot ulcers develop in approximately 15 percent of patients with diabetes, and foot disorders are a leading cause of hospitalization among such patients. Eighty-five

percent of lower-limb amputations in patients with diabetes are preceded by foot ulceration, suggesting that prevention and appropriate management of foot lesions are of paramount importance.<sup>160</sup>



Diabetic foot ulcer. Ulceration is caused by several factors acting together, but particularly by neuropathy.



*Every 30 seconds a leg is still lost because of diabetes somewhere in the world.<sup>161</sup>*

It is very painful to look at these pictures and imagine ourselves or a loved one with foot ulcers, gangrene, and eventual foot amputation. One can get indignant knowing that just a little bit of applied medical intelligence could avoid much of this. A recent analysis showed that people with higher dietary intakes of magnesium (through consumption of whole grains, nuts, and green leafy vegetables) had a decreased risk of type 2 diabetes.<sup>162</sup> Magnesium has potentially beneficial effects at several key steps of glucose and insulin metabolism. In animal studies, dietary magnesium supplementation can prevent fructose-induced insulin resistance and elevations of blood pressure in rats.<sup>163</sup>

## **Magnesium and Diabetic Neuropathy**

Magnesium is known to be necessary for nerve conduction; deficiency is known to cause peripheral neuropathy symptoms and studies suggest that a deficiency in magnesium may worsen blood glucose control in type 2 diabetes. Scientists believe that a deficiency of magnesium interrupts insulin secretion in the pancreas and increases insulin resistance in the body's tissues.

An abstract from Disorders of Magnesium Metabolism<sup>164</sup> concludes, “Magnesium depletion is more common than previously thought. It seems to be especially prevalent in patients with *diabetes mellitus*. It is usually caused by losses from the kidney or gastrointestinal tract. A patient with magnesium depletion may present with neuromuscular symptoms, hypokalemia, hypocalcemia, or cardiovascular complication. Physicians should maintain a high index of suspicion for magnesium depletion in patients at high risk and should implement therapy early.”

**Diabetic neuropathy and other complications are most likely to be worse as a result of concurrent Magnesium deficiency.** Magnesium is known to be deficient in over 68% of the US population, and more so in diabetics who waste magnesium more than others when blood sugars are out of control. Up to 80% of type 2 diabetics have a magnesium deficiency.<sup>165</sup> Children labeled "pre diabetic" (now 41 million) are in great need of magnesium, which has been linked to preventing the development of type 2 diabetes.<sup>166</sup> In a series of papers, Dr. L. M. Resnick has shown in the test tube that an increase in glucose in the fluid leads to the release and/or displacement, of Magnesium from the red blood cells, thus in the body hyperglycemia, high blood sugar, will cause a total body Magnesium deficiency.<sup>167</sup>

A more recent study shows us that “Serum magnesium depletion is present and shows a strong relationship with foot ulcers in subjects with type 2 diabetes and foot ulcers, a relationship not previously reported.” Hypomagnesemia is associated with the development of neuropathy and abnormal platelet activity, both of which are risk factors for the progression of ulcers of the feet.<sup>168</sup>

Thus we can expect to find that magnesium can be used to prevent and treat both diabetes and the complications that come from it including severe peripheral neuropathy. Dr. S. E. Browne makes a strong case for intravenous magnesium treatment of arterial disease and has used magnesium sulphate in

his general practice for over three decades. “Magnesium sulphate (MgSO<sub>4</sub>) in a 50% solution was injected initially intramuscularly and later intravenously into patients with peripheral vascular disease (including gangrene, claudication, leg ulcers and thrombophlebitis), angina, acute myocardial infarction (AMI), non-haemorrhagic cerebral vascular disease and congestive cardiac failure. A powerful vasodilator effect with marked flushing was noted after intravenous (IV) injection of 4-12 mmol of magnesium (Mg) and excellent therapeutic results were noted in all forms of arterial disease.”<sup>169</sup>

Dr. Herbert Mansmann Jr., Director of the Magnesium Research Lab,<sup>170</sup> who is a diabetic with congenital magnesium deficiency and severe peripheral neuropathy, shares that **he was able to reverse the neuropathy and nerve degeneration with a year of using oral magnesium preparations at very high doses.** “For example it took me 6 tabs of each of the following every 4 hours, Maginex, MgOxide, Mag-Tab SR and Magonate to get in positive Mg balance. I tell people this not to scare them, but to illustrate how much I needed to saturate myself. Most will only need 10% of this amount. I was doing an experiment on myself to see if it helped my diabetic neuropathy. It worked so I did it for one year, and I have had **significant nerve regeneration.** I could never have been able to do this with MgSO<sub>4</sub> baths (Epsom Salt), since I could not get into and out of a bath tub”<sup>171</sup>

“I was saturated at about 3 grams of elemental Mg per day, but went to 20 grams for over a year. I now take 5 grams, and stools are semi-formed, and the surrounding water is clear, 3-4 per day.” “Mg is very safe, since the gut absorption is regulated by serum Mg levels, and then the Mg stays in the gut and results in varying degrees of diarrhea. Then the dose is too high. Want soft semi-formed stools. Mine, while on high dosages of magnesium were liquid every 2-4 hours for 2 years, the electrolytes every month were normal, but for low potassium, part of my urinary Mg wasting, both.”

Dr. Mansmann concludes, “I have had diabetic neuropathy (DN) for over 10 years. The most significant symptom is my neuropathic pain of burning feet, called erythromelalgia (EM). With the aid of Mg I can completely suppress the symptom, but if my blood glucose level is acutely elevated, because of a dietary indiscretion, the pain flares in spite of an apparent adequate dose of Mg. It goes away with extra Mg gluconate (Magonate) in an hour or so in either case. Without the Mg it will last for six plus hours, even though the blood glucose level is normal in about two hours.” **“It is my belief that every one with diabetes should be taking Mg supplementation to the point of one’s Maximum Tolerated Dose, which is until one has soft-semi, formed stools.**

In addition, anyone with neuropathy, without a known cause, must be adequately evaluated for diabetes and especially those with poorly, slowly, healing foot sores of any kind. Since the use of Mg is safe I see no reason that this should not be **“the standard of care”**.<sup>172</sup>

## Conclusion

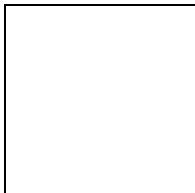
*Prolonged use of Magnesium will prevent chronic complications from diabetes.*<sup>173</sup>

“The current “party line” on this subject is not universally accepted, but many of us believe the establishment is too conservative and will some day change. While admitting its importance, for some unknown reason they remain reluctant to recommend magnesium supplements. They just do not know how poor the American diet is in Mg and the frequency of magnesium deficiency” says Dr. Mansmann.<sup>174</sup>

*Poorly controlled diabetes increases loss of magnesium in urine.*

It would be prudent for physicians who treat diabetic patients to consider magnesium deficiency as a contributing factor in many diabetic complications and as a main factor in exacerbation of the disease itself. **Repletion of the deficiency with transdermal magnesium chloride mineral therapy<sup>175</sup> is the ideal way of administering magnesium in medically therapeutic doses.** Such treatments will, in all likelihood, help avoid or ameliorate such complications as diabetic peripheral neuropathy, arrhythmias, hypertension, and sudden cardiac death and will even improve the course of the diabetic condition in general.<sup>176</sup>

Once doctors, primary healthcare providers and the public are made aware of the role of magnesium in diabetes there will be no excuse to not increase public magnesium consumption, which can even be added to water supplies<sup>177</sup> instead of poisonous fluoride<sup>178</sup> and dangerous statins<sup>179, 180, 181</sup> which are also known to cause peripheral neuropathy with long term use. During a stroke or heart attack it would be cruel, medically incompetent and life threatening to not use magnesium chloride or magnesium sulfate immediately. The same kind of treatment that saves lives in dramatic life threatening situations is urgently needed in the treatment of diabetes and diabetic neuropathy.



Incredible as it seems, researchers at Washington University School of Medicine in Missouri are currently evaluating BOTOX® injections to help treat foot ulcers.<sup>182</sup> Botox injections are a diluted form of botulism that will paralyze the specified muscle area. Botulinum toxin is made by the bacteria *Clostridium botulinum*. The bacteria themselves (and their spores) are harmless, but the toxin is considered one of the most lethal known poisons, one that has been a principle agent in biological warfare.<sup>183</sup> It binds to nerve endings where they join muscles, leading to weakness or paralysis. Recovery from botulism occurs when the nerves grow new endings, which can take months, according to the FDA.<sup>184</sup> Choosing highly toxic options has no medical merit when there are infinitely safer treatments like magnesium chloride that is so safe that it helps prevent the development of foot ulcers and diabetic neuropathy in the first place.

*Rapid increase of magnesium stores are necessary in some cases and may be lifesaving for diabetics as they are for other patients in emergency rooms.*

Preventative effects of magnesium may go a long way to protecting the children of the future from early onset of both diabetes and the complications that come from it. The safety profile of magnesium chloride is extraordinary compared to today's pharmaceutical drugs. It is only with severe renal insufficiency that problems have been observed with magnesium treatments. The elderly are at risk of magnesium toxicity only because of possible decreased renal function so caution is necessary.

**Special Note:** While Dr. Mansmann makes a strong case for hi doses of magnesium, it cannot be ignored that GLA has also been recognized for it's ability to stop and/or reverse peripheral neuropathy and is endorsed by Dr. Atkins, of the famous Atkins diet, which many diabetics follow. Dr. Atkins says, "Science has established rather conclusively that GLA halts the otherwise inevitable advance of nerve damage caused by diabetes. GLA helps the nerves to heal. As one study of 111 patients showed, people with either form of diabetes, Type I or Type II, can benefit, using a dose as small as 480 mg of GLA per day.<sup>185</sup> Other research suggests that the fatty acid may even prevent the nerve deterioration from starting up.<sup>186</sup> Some kind of abnormality in fatty

acid metabolism is very likely involved in the development of diabetic complications and maybe even the development of diabetes itself. People who have the disease seem unable to make GLA from dietary fats and therefore may suffer from an insufficiency of PGE<sub>1</sub>, (Prostaglandin E<sub>1</sub>, a beneficial hormone-like compound). Coincidentally enough, this substance can potentiate the work of insulin and exerts insulin like actions of its own. Therefore diabetics need all the PGE<sub>1</sub> that GLA can help them make.”



## Magnesium and Strokes

Stroke is the third leading cause of death in the United States and the most common cause of adult disability. An ischemic stroke occurs when a cerebral vessel occludes, obstructing blood flow to a portion of the brain. Each year, 700,000 Americans suffer a stroke. If they do not die on the spot, nearly 25% of them will die in a year from lack of appropriate treatment. Those 1.2 million Americans who have survived strokes now report serious disabilities that affect daily living. How we treat strokes is very important because the list of disabilities of patients age 65 or over, six months after they'd suffered their stroke is appalling.<sup>187</sup>

- 50% suffer paralysis on one side of their body.
- 35% have symptoms of depression
- 30% can't walk without assistance
- 26% need help with daily activities
- 26% are living in nursing homes
- 19% have speech or language problems

The cost to care for stroke victims in America, this year, alone, is \$54 billion dollars. Most think that taking aspirin every day will prevent platelet aggregation (clot formation) and help prevent stroke. However, the truth is that aspirin may prevent stroke in only 3 of 100 women and does not seem to prevent stroke in men at all.<sup>188</sup> Aspirin is not the correct preventive treatment for stroke and that point is driven home when we consider that aspirin causes gastrointestinal bleeding in 8 out of 1,000 people and is sometimes fatal.

*Ischemia leads to excessive activation of excitatory amino acid receptors, accumulation of intracellular calcium, and release of other toxic products that cause cellular injury.*

Dr. James Howenstine writes, "The use of aspirin has become widely accepted in the United States as an important measure to prevent heart attacks and strokes. Estimates suggest that 20,000,000 persons are taking aspirin daily for prevention of vascular accidents. The evidence upon which this decision to recommend aspirin was made is not very solid. Millions of patients with heart attacks, strokes, angina pectoris, diabetes and risk factors for vascular disease

have been encouraged by their physicians to take aspirin to prevent heart attacks and strokes. Four early studies using aspirin to prevent heart attacks had shown no benefit.<sup>189-190</sup>

Then along came a study on U.S. physicians, which used Bufferin (aspirin and magnesium). This study showed no reduction in fatal heart attacks and no improvement in survival rate but there was a 40 % decrease in the number of non fatal heart attacks. The magnesium was ignored and there was a prompt extensive institution of aspirin for prevention of heart attacks. The benefits of magnesium in treating heart disease include the well known decrease in ischemic heart disease and sudden death found in communities drinking hard water (magnesium containing), powerful prevention of platelet clumping (clot prevention) known to be caused by magnesium, strong blood vessel dilating properties of magnesium, and effective action to block dangerous heart rhythms in persons taking magnesium. **The decrease in number of heart attacks probably resulted from the magnesium in Bufferin.**<sup>191</sup>

*Magnesium deficiency can cause metabolic changes  
that may contribute to heart attacks and strokes.*<sup>192</sup>

*National Institute of Health*

Once you get a stroke you have limited treatment options, one of which is taking more aspirin. If the dose is too high though you run the risk of GI bleeding, ringing in the ears, and hearing loss. There are other medications called antiplatelet aggregators that may reduce risk for further stroke, death, or heart attack to the tune of 9% but the side effects escalate to diarrhea, skin rash, and agranulocytosis (a condition that wipes out your white blood cells). Most of the non-aspirin antiplatelet drugs cost three to four dollars per day or \$1,000 to \$1,500 a year for the rest of your life.

*High blood pressure (hypertension) is one of the  
major vascular disorders that magnesium can help.*<sup>193</sup>

*Dr. Jay Cohen*

Statin drugs are also prescribed to stroke patients for a potential 25-30% reduction of future stroke. The cost of these pills also ranges from three to four dollars a day. Another group of drugs given to stroke patients is antihypertensives. Often the stress of a stroke will elevate blood pressure, or it may even be one of the primary causes. Taking these drugs along with an antiplatelet drug may reduce the relative risk of stroke, death, and MI by 32%.

The price for many of the antihypertensives is also about three dollars a day or \$1000 per year.

Also we have the blood thinners called thrombin inhibitors. The main one is Warfarin, which is the main ingredient in rat poison—it acts by causing fatal hemorrhage in rats. In humans the dosage has to be adjusted very carefully by taking regular blood tests. This drug is often necessary immediately after a stroke to prevent clot formation in the heart and to diminish the incidence of heart arrhythmias. Bleeding and bruising are the main side effects of blood thinners. This is a non-patented drug and a year's supply may only be about \$200. However, the weekly doctor's appointments and blood tests make blood thinning a highly lucrative therapy for modern medicine.

The most commonly studied neuroprotective agents for acute stroke block the N-methyl-D-aspartate (NMDA) receptor. Dextropropofol, a noncompetitive NMDA antagonist and metabolite of cough suppressant, was the first NMDA antagonist studied in human stroke patients. Unfortunately, dextropropofol caused hallucinations and agitation; it also produced hypotension, which limited use. **Magnesium is an agent with actions on the NMDA receptor and a low incidence of side effects.** It may reduce ischemic injury by increasing regional blood flow, antagonizing voltage-sensitive calcium channels, and blocking the NMDA receptor.

Using various mechanisms, neuroprotective agents attempt to save ischemic neurons in the brain from irreversible injury. Studies in animals indicate a period of at least 4 hours after onset of complete ischemia in which many potentially viable neurons exist in the ischemic penumbra.<sup>194</sup> With magnesium treatments the trend toward a better functional outcome at 30 days in patients is seen when treatments are started within 24 hours from onset vs controls.<sup>195</sup> Intravenous magnesium sulfate administration during the hyperacute phase of stroke was shown to be safe in a small, open-label pilot trial, in which more than 70% of patients were treated less than 2 hours from symptoms onset. Dramatic early recovery was achieved in 42% of patients, and good functional outcome (modified Rankin scale  $\leq 2$ ) at 90 days post treatment was achieved by 69% of all patients and in 75% treated within 2 hours.<sup>196</sup>

Dr. Carolyn Dean says, “Magnesium is important in lowering blood pressure, keeping the heart muscle from going into spasm, and lowering cholesterol (by the same mechanism as statin drugs) but it can help heal the damage in the brain caused by a stroke.” Magnesium, an important cofactor in

metabolism and protein synthesis, joins into a complex with adenosine triphosphate. Magnesium acts as a noncompetitive NMDA receptor blocker; it inhibits the release of excitatory neurotransmitters at the presynaptic level and blocks voltage-gated calcium channels. Moreover, it has been shown to suppress anoxic depolarization and cortical spreading depression -- both potential targets for neuroprotective treatment. Magnesium also exerts vascular effects, such as boosting vasodilatation, increasing the cardiac output, and prolonging bleeding time.

*In my practice the use of magnesium in the  
early stages of a stroke has rendered the best results  
for my patients who have the greatest deficits.*

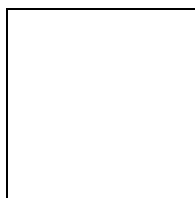
*Dr. Al Pinto*

Intravenous magnesium sulphate protects ischemic neurons in vitro and in vivo in standard animal experimental stroke models, including global 4-vessel forebrain ischaemia (Tsuda et al 1991), permanent middle cerebral artery occlusion (Izumi 1991) and direct NMDA injection (McDonald et al 1990). Neuroprotection may be due to a number of properties of magnesium: vasodilatation by magnesium sulphate increases blood flow to the ischemic cortex (Chi et al 1990) whilst increasing cardiac output; it prevents cerebral vasospasm (Kemp et al 1993); it is the endogenous non-competitive blocker of NMDA receptors (Nowak et al 1984, Harrison and Symmonds 1985), a property which may be responsible for its efficacy as an anticonvulsant (The Eclampsia Trial Collaborative Group 1995); and it antagonizes calcium entry to cells via multiple channels (Iseri and French 1984).<sup>197</sup>

Magnesium chloride has several advantages over other neuroprotective agents currently available or in development. A gallon and a half of magnesium chloride a year, at a maximum cost of 180 dollars, would do more to prevent strokes safely, (heart attacks, and probably cancer if combined with selenium) without side effects, than any other single medicine. And a gallon, used transdermally after a stroke, over a two or three month period, will reduce disability; and when combined with acupuncture and other nutritional and herbal interventions presents us with the treatment of choice of the International Medical Veritas Association.

## Magnesium, Violence and Depression

In February of 2006 the New York Times reported that, “While violent crime has been at historic lows nationwide and in cities like New York, Miami and Los Angeles, it is rising sharply in many other places across the country. And while such crime in the recent past was characterized by battles over gangs and drug turf, the police say the current rise in homicides has been set off by something more bewildering: petty disputes that hardly seem the stuff of fistfights, much less gunfire or stabbings. Suspects tell the police they killed someone who "disrespected" them or a family member, or someone who was "mean mugging" them, which the police loosely translate as giving a dirty look.”<sup>198</sup>



“Police Chief Nannette H. Hegerty of Milwaukee calls it "the rage thing," the Times reported, "We're seeing a very angry population, and they don't go to fists anymore, they go right to guns," she said. "When we ask, 'Why did you shoot this guy?' it's, 'He bumped into me,' 'He looked at my girl the wrong way,' "said Police Commissioner Sylvester M. Johnson of Philadelphia. “It's not like they're riding around doing drive-by shootings. It's arguments — stupid arguments over stupid things." While arguments have always made up a large number of homicides, the police say the **trigger point now comes faster**. In robberies, Milwaukee's Chief Hegerty said, "Even after the person gives up, the guy with the gun shoots him anyway. We didn't have as much of that before."

What could be driving such a surge in violence? We can easily suspect that with a reported magnesium deficiency of almost 70 percent of the American population, we are witnessing the extreme end of the most severe deficiencies in the population. The two most basic requirements for the normal operation of our brain are a sufficient energy supply and an optimal presence of biochemicals involved in transmitting messages. Magnesium is crucial in both the production of energy and neurotransmitters, not to mention the integrity of

the blood brain barrier. It is bedrock science that connects magnesium to neurological disorders.<sup>199</sup>

*Magnesium deficiency causes serotonin-deficiency  
with possible resultant aberrant behaviors,  
including depression suicide or irrational violence.*

*Paul Mason*

Magnesium of course is not the only nutrient whose deficiency is leading to broad problems of mind and emotion. Zinc is also an important mineral and is involved with psychiatric disorders. Over 90 metallo-enzymes require zinc and the functioning of the brain is dependent on adequate levels of zinc. Deficiency can cause amnesia, apathy, depression, irritability, lethargy, mental retardation and paranoia. As it is for magnesium and zinc it is for a host of basic nutrients though it is the mineral deficiencies that are the most important.

*Numerous studies conducted in juvenile correctional institutions  
have reported that violence and serious antisocial behavior have  
been cut almost in half after implementing nutrient-dense diets.*

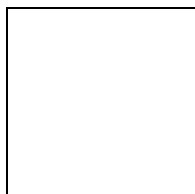
But health officials and the pharmaceutical companies want to know nothing about using simple minerals to help depression or violence. Since the arrival of selective serotonin reuptake inhibitors antidepressants (SSRIs), and atypical antipsychotics on the market, countless studies have shown the so-called "new generation" of psychiatric drugs to be **ineffective and dangerous**. Worldwide, sales of anti-psychotics went from \$263 million in 1986 to \$8.6 billion in 2004 and antidepressant sales went from \$240 million in 1986, to \$11.2 billion in 2004, For these two classes of drugs combined, sales went from \$500 million in 1986 to nearly \$20 billion in 2004, a 40-fold increase, according to Robert Whitaker, best-selling author of *Mad in America*.<sup>200</sup>

*Despite a dramatic increase in treatment of psychiatric disorders  
during the past 10 years, there has been no decrease in the rate of  
suicidal thoughts and behavior among adults, according to a federal  
study primarily funded by the National Institute of Mental Health.*

*The Washington Post  
June, 2005*

Though it is a complex matrix of causes that cuts across physical, emotional, mental and spiritual levels of being - it's arguable that a significant portion of the blame for violence and depression can be laid on nutritional causes which

are the easiest causes to correct. It is clear, for example, that magnesium deficiency or imbalance plays a crucial role in the symptoms of mood disorders. Observational and experimental studies have shown an association between magnesium and aggression<sup>201 202 203 204 205</sup>, anxiety<sup>206 207 208</sup>, ADHD<sup>209 210 211 212</sup>, bipolar disorder<sup>213 214</sup>, depression<sup>215 216 217 218</sup>, and schizophrenia<sup>219 220 221 222</sup>.



*Patients who had made suicide attempts (by using either violent or nonviolent means) had significantly lower mean CSF magnesium level irrespective of the diagnosis.<sup>223</sup>*

The Department of Family Medicine, Pomeranian Medical Academy, states that dietetic factors can play a significant role in the origin of ADHD and that magnesium deficiency can result in disruptive behaviors.<sup>224</sup> Even a mild deficiency of magnesium can cause sensitiveness to noise, nervousness, irritability, mental depression, confusion, twitching, trembling, apprehension, and insomnia.

Yet as Evelyn Pringle, investigative reporter, lets us know, “Pharma will stop at nothing when it comes to making money off children. On April 25, 2005, the Ohio Columbus Dispatch reported an investigation of state Medicaid records that found 18 newborn to 3 years-old babies in Ohio had been prescribed antipsychotic drugs in July 2004.” It is a horrible crime and terrible sadness what is being done to the children by pediatricians and psychiatrists who live by the increasingly popular creed to drug the kids with toxic substances.”

*When the body of a 19-year-old student, Traci Johnson, was found hanging from a shower rod in the laboratories of pharmaceuticals giant Eli Lilly, US officials were quick to announce that the death could not be linked to a new anti-depressant drug she was helping to test.<sup>225</sup>*

Magnesium ions have nutritional and pharmacologic actions that safely protects against the neurotoxicity of many agents up to and including stress from environmental noise and physical trauma. Magnesium deficiency, even



when mild, increases susceptibility to various types of neurological and psychological stressors in both animals and healthy human subjects. "Mg deficiency increases susceptibility to the physiologic damage produced by stress. The adrenergic effects of psychological stress induce a shift of Mg from the intracellular to the extracellular space, increasing urinary excretion and eventually depleting body stores," reports Dr. Leo Galland.<sup>226</sup>

Linus Pauling was one of the first who "highlighted the supremacy of nutrition in correcting abnormalities in the chemical environment of the brain." Nutrients like ascorbic acid, thiamin, niacinamide (vitamin B3), pyridoxine, vitamin B12, folic acid, magnesium, glutamic acid, and tryptophane were presented by Dr. Pauling as intimately linked to brain function and mental illness. In addition to strong bodies good nutrition helps us keep our mental health and emotional stability. With the proper diet containing the right nutrients in correct amounts, symptoms of mental illness can be rolled back and treated. Deficiencies in certain necessary nutrients lead to psychotic symptoms and depression while supplementation of other nutrients help attenuate and improve the symptoms of mental illness.

"In 1970 I read about Dr. Abram Hoffer's work and at that time was approached by a friend who had just been stopped from suiciding in a gas oven by her husband. She had her head in there and the gas on. She had also just begun a new drug, for bipolar (manic depression it was named then). She used to be admitted to the local Mental Hospital regularly every year at Spring Time. I began her on hi-dose B3, magnesium, Vit C and zinc. Today she is 90 and as bright as a button, very keen mind. In the subsequent 33 years she has only been in Mental wards once, and that was when she thought she was cured and didn't have to take her vitamin/mineral formula anymore. At that time we were also approached by a young man who had attempted suicide on same drug. The same result we obtained for him. And this was only a small Western cattle and sheep town of 16,000 people. Since, the same results have been obtained in all who have come to me for depression, bipolar, schizophrenia."

-- Michael Sichel, D.O., N.D.  
Chittaway Bay, New South Wales, Australia

In 2000, the National Institute of Health (NIH) listed depression as a sign of magnesium deficiency. NIH defined magnesium deficiency symptoms as having three categories:

**Early symptoms include** (one or more) irritability, anxiety (including Obsessive Compulsion Disorder and Tourette syndrome), anorexia,



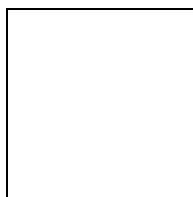
fatigue, insomnia, and muscle twitching. Other symptoms include apathy, confusion, poor memory, poor attention and the reduced ability to learn.

**Moderate deficiency symptoms** can consist of the above and possibly rapid heartbeat, irregular heartbeat and other cardiovascular changes (some being lethal).

**Severe deficiency symptoms** can include one or more of the above symptoms and more severe symptoms including full body tingling, numbness, a sustained contraction of the muscles along with hallucinations and delirium, (including depression) and finally dementia (Alzheimer's Disease).

Mild magnesium deficiency appears to be common among patients with disorders considered functional or neurotic and appears to contribute to a symptom complex that includes asthenia, sleep disorders, irritability, hyperarousal, spasm of striated and smooth muscle and hyperventilation.

Normally joy, sadness and grief are parts of everyday life. While a short period of depression in our response to daily problems is normal, a long period of depression and sadness is abnormal. Most depressive episodes are triggered by a stressful personal event such as loss of a loved one or change of circumstances, and depression over a short period is a normal coping mechanism. Long-term stress-induced depression often results when magnesium falls to dangerously low levels in the body. **One of the reasons it does this is because the stress itself depletes already meager cellular magnesium stores.**



Repletion of deficiency typically reverses any increased stress sensitivity, and pharmacologic loading of magnesium salts orally, parenterally or transdermally induces resistance to neuropsychologic stressors. If the NIH knows this, why don't doctors use magnesium to treat depression and other

mental (and physical) disorders asks George Eby, the developer of coldcure.com, who successfully treated himself with magnesium for depression.

### **George Eby's Testimonial**

I remain truly amazed at the tremendous benefits of magnesium in treating and preventing depression. In particular, I see magnesium as an important research topic for survival considering its limited availability from our Western diets and due to its ability to inexpensively cure and prevent many expensive diseases, life threatening or not.

I know how bad depression can be, because I spent September of 1999 through April of 2000 in a clinical depression that worsened from the beginning. By Christmas the depression suddenly became much worse, nearly suicidal in intensity, and remained that way for four more months. Never did I think that things could go so wrong with my biochemistry that it would cause me to have suicidal thoughts and tendencies. How wrong I was. I had been taking Zoloft (an antidepressant) since 1987 which seemed to take care of my depression. I lived on Zoloft, but by September of 1999, it stopped working - and I knew that something was really wrong.

My depression was preceded by many years of major stress from over-work, anxiety, hypomania, fibromyalgia, infrequent panic attacks, anger, stress, poor diet, overwhelming emotional feelings, night time muscle spasms, paranoia, asthma, prickly sensations in hands, arms, chest and lips. I wanted to sleep all day and had trouble getting up in mornings. Occasionally my lips felt that they were going to vibrate or tingle off my face. About 10 years ago, I had a very painful bout with calcium oxalate kidney stones, a recognized sign of magnesium deficiency. A few weeks before I was hospitalized in January of 2000, I had very low energy, mental foginess, depression with strange suicidal thoughts and I was under enormous stress.

Now, I can recognize these "mental" symptoms as symptoms of magnesium deficiency and/or calcium toxicity. I was put on nearly every antidepressant drug known and had severe side effects to all of them and felt sicker and sicker. None worked. I lost a lot of weight, and I was extremely constipated. I also had a cardiac arrhythmia.

On April 12, 2000, I looked like I was dying to several people important in my life. My psychiatrist agreed and took me off all antidepressant medications and put me on a tiny amount of lithium carbonate (150 mg twice a day). Shortly later, I picked up a 1975 copy of Nutrition Almanac, McGraw-Hill Book Company, New York, and happened to open it to the magnesium section. I was interested to find that magnesium was low in the serum of people who were suicidal and depressed. The article indicated that magnesium dietary supplements had been effective in treating depression. Also, a person with a magnesium deficiency is apt to be uncooperative, withdrawn, apathetic, and nervous, have tremors, essentially lots of neurological symptoms associated with depression.

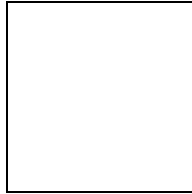
Just a few months previous to the onset of my depression, I had been hospitalized for chest pain, cardiac dysrhythmia and an inability to take in more than about 1/5 my normal breath. The hospital found no cardiac problems, and the internist gave me an IV drip of magnesium sulfate solution. **A few hours later all of those symptoms vanished as rapidly as they had come. What I was beginning to see was that nearly all illnesses in my adult life were magnesium deficit related.**

So finally I made the decision to start taking magnesium at a level 3 times the 400 mg/day RDA for magnesium, with 400 mg in the morning, 400 mg mid afternoon and 400 mg at bedtime. I used Carlson's chelated magnesium glycinate (200 mg magnesium elemental) product. Within a few days to a short week, I felt remarkably better, my depression lifted noticeably, but I was getting a bit of diarrhea.

Within a week to 10 days of starting magnesium, I felt close to being well. I looked so well, that my psychiatrist thought I looked better than he had ever seen me. As I improved, I lowered my dosage of magnesium to find the best dosage for me. I lowered it too much and symptoms rapidly came back. Eventually, I stabilized the dosage at four 200-mg elemental magnesium (as magnesium glycinate) tablets a day. My depression is completely, totally, absolutely gone. I am active and can function mentally, emotionally, and physically at my best again. My vision and bowels also returned to normal.

For all the talk about protecting children in America, too many of our little ones are threatened by psychiatrists and psychologists who have betrayed the

young. Millions of children are now taking psychotropic drugs, which are causing catastrophic problems that are going unreported. For a tragic trip into the violent hell these drugs are causing please read Evelyn Pringle's *FDA Forgot A Few ADHD Drug Related Deaths and Injuries at <http://usa.mediamonitors.net/content/view/full/27099>*)



#### After High School shootings

The medical and educational establishments are conducting a skyrocketing campaign to get kids and their parents to “just say yes” to brain-altering pharmaceuticals, with the drug of choice being Ritalin, even though some report that Ritalin is a drug that has a more potent effect on the brain than cocaine.<sup>227</sup> By far, the overwhelming majority of psychotropic prescriptions for children are given for attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD). In some instances, taking medicine is a prerequisite for attending school, with refusal to comply considered grounds for dismissal, or worse, removal of the child from the home by the state.

On top of everything else the Children's Hospital of Philadelphia has reported that 19% of newly diagnosed Type 2 diabetic children **also have neurological diseases**. Many of these children are being treated with psychiatric medications Zyprexa, Risperdal, Geodon, Seroquel, Clozaril, and Abilify. All of these drugs carry black box warnings to alert MD's about the dangers of diabetes. All these drugs would in all likelihood push down magnesium serum levels.

*Do not, and I scream, do not trust psychologists, psychiatrists  
and the current drug-pushing culture of education.*

*Dr. Julian Whitaker*

There is an international explosion of legal child drugging as parents, educators and politicians in mass have been thoroughly duped into believing that only by continuous heavy drugging from a very early age can the “afflicted” child possibly make it through life’s worst. Teen suicides have tripled since 1960 in the United States. Today suicide is the leading cause of death (after car accidents) for 15- to 24-year-olds. Since the early 1990’s

millions of children around the world have taken antidepressants that health authorities are just now branding as suicidal agents. This is the other side of the magnesium deficiency, the nightmare of these drugs which only compounds and worsens the loss of magnesium from the body.

The scene has been long in the making for the patterned onslaught of psychiatry on the young. Psychiatry has only in the last two decades unleashed its devastating attack on children using lucrative chemical weapons on our youth – addictive psychotropic drugs posing as medication. Psychiatrists have created a generation of drug addicts and to a great extent they are making the crisis in children today worse when they should be helping to make things better for them.

*Child psychiatrists are one of the most dangerous enemies  
not only of children but also of adults. They must be abolished.*

*Dr. Thomas Szasz*  
Professor of Psychiatry

According to Dr. Sydney Walker, author of *The Hyperactivity Hoax*, “Thousands of children put on psychiatric drugs are simply smart. These students are bored to tears, and people who are bored fidget, wiggle, scratch, stretch, and (especially if they are boys) start looking for ways to get into trouble.” What this chapter adds to that is the underlying complication these children face when their magnesium levels are too low and the devastation that rains down on them in the form of **psychiatric medications**.

If we look at the whole picture what do we see? Children are born under medical stress with unnatural procedures and drugs, they are then vaccinated, ie., bombarded with terrible chemicals, dosed out with antibiotics, eat terrible food, watch inordinate amounts of television, suffer through educational curriculums from the stone age, undergo exposure to thousands of chemical poisons in the environment and home, get more vaccines, suffer from malnutrition while stuffing their face to the point of obesity, only to have to suffer through being drugged by psychiatrists further for becoming the mess they have become.

Psychologists and psychiatrists should know better because of their training in mind and emotion so it is a terrible betrayal of humanity to see them turn into drug dealers. The pharmaceuticals that the drug companies produce for these mental health care workers are as dangerous as any of the drugs dealers on the streets sell. **Magnesium should be substituted for these drugs not only because it**

is very effective in relieving neurological disorders but because it is vastly safer than any pharmaceutical.

*I practiced neurology and psychiatry for 30 years, but found to my chagrin that it was largely a huge fraud, despite the fact that most of the doctors I met had the best intentions. They were simply brain-washed.*

*Dr. Alan Greenberg*

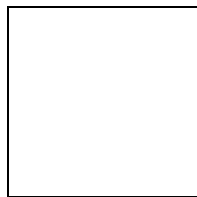
## Magnesium Chloride

*In addition to its immune-stimulating properties, both magnesium as well as chloride has other important functions in keeping us young and healthy. Chloride, of course, is required to produce a large quantity of gastric acid each day and is also needed to stimulate starch-digesting enzymes.*

There are many compounds that have ionic bonds. They are called ionic compounds, and they are formed when metals react with nonmetals. The formation of magnesium chloride can be thought of as a result from a reaction involving magnesium metal (Mg) and chlorine gas, Cl<sub>2</sub>. The reaction involves the following simultaneous processes:

1. The Oxidation of Magnesium Metal

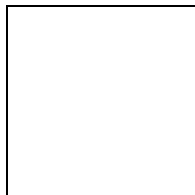
A magnesium atom loses its 2 outer-shell electron to become a magnesium ion, (i.e. cation). The magnesium metal is said to be oxidized.



2. The Reduction of Chlorine Gas

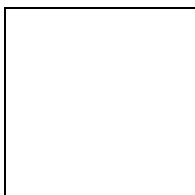
The covalently bonded Cl<sub>2</sub> molecule gains two electrons to become two chloride ions, (i.e. anions). Chlorine is said to be reduced.

3.



4.

Combining the above oxidation and reduction processes, the overall effect is the transfer of TWO electrons from magnesium to chlorine.



The opposite charges of the magnesium and chloride ions attract each other forming ionic bonds. In the solid state, each cation is surrounded by anions, and each anion is surrounded by cations. The ratio of  $Mg^{+2}Cl^{-}$  is 1:2. The formula for this ionic compound is  $MgCl_2$ .

The “Magnesium Oil” ( $MgCl_2$ ) (different from  $6H_2O-MgCl_2$  which is the form of crystal or powdered magnesium chloride) is made of one atom of magnesium (atomic weight 24.3) and two atoms of chloride (atomic weight of each is 35.4), which means if a solution contains 35 percent  $MgCl_2$ , the percentage of actual magnesium metal ions would be 7.7 percent. This is about double what you would get as far as magnesium concentration if you use powder or crystal form of magnesium chloride.

Magnesium Chloride is a naturally occurring element and is extracted from salt water solutions such as those found in sea water, Great Salt Lake, Dead Sea and many other locations. To extract the magnesium chloride brine, water is removed from the salt water by solar evaporation. Magnesium chloride has many uses and touches most of us in one way or another every day. In its various forms and concentrations, clean, high quality magnesium chloride has found its way into the food and health business, medical field, industrial uses, agriculture and water operations just to name a few. Magnesium chloride is environmentally safe, and is used around vegetation and in agriculture for dust control.

*Magnesium chloride solution is not only harmless for tissues, but it had also a great effect over leucocytic activity and phagocytosis; so it was perfect for external wounds treatment.*

Chloride is required to produce a large quantity of gastric acid each day and is also needed to stimulate starch-digesting enzymes. **Using other magnesium salts is less advantageous because these have to be converted into chlorides in the body anyway. We may use magnesium as oxide or carbonate but then we need to produce additional hydrochloric acid to absorb them.**



Many aging individuals, especially with chronic diseases who desperately need more magnesium cannot produce sufficient hydrochloric acid and then cannot absorb the oxide or carbonate.

## General Uses for Magnesium Chloride

**For the Skin:** Sprayed on sun damaged skin regularly will begin to rejuvenate from the inside out and after a few months will be significantly restored. Helps with wrinkles as well as hair health and growth.

**Dental:** As a mouthwash sprayed into the mouth it is excellent for the gums creating a highly alkaline oral environment. Strengthens teeth and is excellent for gingivitis. It is magnesium, not calcium, which helps form hard tooth enamel resistant to decay.

**Mucus Membranes:** People have used low concentrations for nose and eye washes and even for application in the vagina. (Beware of stimulative effect).

**General Tonic:** Magnesium Chloride is a strong tonic boosting all aspects of cell physiology and energy production. Magnesium is essential for life as it participates in over 325 enzyme reactions. Expect more energy, strength and endurance and even increased sexual energy.

**Sports:** Magnesium is perhaps the single most important mineral to sports nutrition. This is true especially of athletes. During vigorous exercise, people lose through their sweat critical minerals, the most important being magnesium. Adequate magnesium level will help your body against fatigue, heat exhaustion, blood sugar control and metabolism.

**Pain Relief.** Transdermal magnesium chloride treatments are essential in the treatment of sport injuries and the aches and pains of sore muscles and joints.

**Natural Immune System Booster:** Dr. A. Neveu observed that magnesium chloride has no direct effect on bacteria (i.e. it is not an antibiotic). Thus he thought that its action was a specific, immune-enhancing, so it could be useful against viral diseases.

**Memory and Cognitive Function:** Magnesium deficit may lead to decreased memory and learning ability, while an abundance of magnesium may improve cognitive function in children and the elderly.

## Blood Brain Barriers

Several studies show that magnesium does cross the blood–brain barrier, in both animals and in humans.<sup>228</sup> Brain magnesium concentrations are regulated by active blood–brain barrier transport.<sup>229</sup> Cerebrospinal fluid magnesium concentration increases by 20% to 25% in response to doubling of the serum concentration, and peaks around 4 hours after parenteral administration.<sup>230</sup>

The concept of a barrier between the blood and brain interface is about a hundred years old. The brain barriers, namely blood-brain barrier (BBB) and blood-cerebrospinal fluid barrier, usually referred to as the choroid plexus maintains the chemical stability of the central nervous system (CNS). Less known are the functions of the BBB in brain development, neuroendocrine regulation, drug efflux and metabolism, as well as aging processes. The choroid plexus embraces the cerebrospinal fluid (CSF) compartment, the interstitial fluid (ISF) or extracellular fluid compartment, and the intracellular compartment playing a pivotal role in maintaining the homeostasis of essential metal ions<sup>231</sup> in the CNS.

The composition of the cerebrospinal fluid with a specific gravity (1.004 - 1.007 g/cm<sup>3</sup>) is much like blood plasma; it is a clear, colorless fluid that contains glucose, proteins, lactic acid, urea, salts, and some white blood cells. The cerebrospinal fluid picks up metabolic wastes as it circulates past the nervous tissue of the brain and spinal cord. These metabolic wastes then move into the bloodstream in the intracranial vascular sinuses as the CSF is absorbed. The blood carries these wastes away to be eliminated from the body by the lungs and kidneys.<sup>232</sup> Changes in the composition (increased protein) or in the appearance (cloudiness) of the CSF would suggest some neurologic disease.<sup>233</sup>

*Systemic Zinc deficiency can also affect the permeability of brain barriers. Zinc deficiency significantly increases the permeability of the blood–brain barrier.*

*Noseworthy and Bray (2000)*

The choroid plexus separates the CSF compartment from the systemic blood compartment and possesses numerous transporters for metals, metal–amino acid conjugates, and metal–protein complexes. There are many hundreds of different transporter types, each specialized for different substances. The integrity and function of the BBB is mission critical for overall brain function. Changes in permeability often reflect alterations in BBB transport systems. Toxicological causes of generalized changes in BBB permeability include

organic solvents, enzymes, and heavy metals. Some agents like mercury induce selective changes in BBB transport at very low doses.

*Brain barrier integrity is  
compromised by free radicals.*

Magnesium has been seen to attenuate increased blood-brain barrier permeability during insulin-induced hypoglycemia in animal studies. Magnesium has its important role at the BBB and researchers think that this metal probably protects brain tissue against the effects of cerebral ischemia, brain injury and stroke through its actions as a calcium antagonist and inhibitor of excitatory amino acids.

*Children are most susceptible to brain damage because  
the blood/brain barrier has not had time to develop enough to filter  
out poisonous substances like lead and mercury and the other heavy  
metals, drugs and chemicals that are assaulting their systems.*

As amino acids and their associated linkage are highly susceptible to enzymatic degradation, the nature and concentration of specific enzymes at the BBB can greatly impact the efficacy of detoxification and nutrient supply. Magnesium is crucial in preventing enzyme degradation and thus crucial for BBB integrity. Specific transporters exist at the BBB that permit nutrients to enter the brain and toxicants / waste products to exit. Independent transport systems for glucose, neutral amino acids, basic amino acids, and monocarboxylic acids have been identified in the BBB.

Especially relevant is the transport of methyl mercury into the brain. In vivo studies in rats have demonstrated that methyl mercury, bonded to the amino acid cysteine, is transported across the blood-brain barrier.<sup>234</sup> Lead transport at the blood-brain barrier is dependent on the ATP calcium pump and this pump is dependent on magnesium. For the lead to get out of the brain, the pump must be working properly.

Excitotoxicity, a mechanism by which excess glutamate accumulates outside the neuron, thereby leading to death of the cell by an excitation process, has been linked to mercury neurotoxicity. Recent studies have confirmed that mercury, even in concentrations below that known to cause cell injury, paralyzes the glutamate removal mechanism, leading to significant damage to synapses, dendrites and neurons themselves. Glutamate and its biochemical

"cousin," aspartic acid or aspartate, are the two most plentiful amino acids in the brain.

*Wheat gluten is 43% glutamate, the milk protein casein is 23% glutamate.*

This glutamate removal mechanism is critical to brain protection. Additionally, mercury in very low concentrations increases glutamate release, primarily by stimulating the brain's immune cell, the microglia. Chronic microglial activation, as seen with mercury exposure, has been linked to neurodegenerative diseases. Mercury, among all the metals tested, was the only one shown to block the removal of excess glutamate from the nervous system. By paralyzing the glutamate removal system, mercury triggers chronic excitotoxicity - that is chronic destruction of the nervous system.

*Excess glutamate can also produce the same neurofibrillary tangles seen with mercury exposure.*

Glutamate transport at the BBB is crucial and mercury, if not neutralized, plays havoc at the barrier. **Two of the principle conditions that allow glutamate to shift from neurotransmitter to excitotoxin are:**

- 1) Inadequate neuronal ATP levels (whatever the cause)
- 2) **Inadequate neuronal levels of magnesium.**

One of the most common food additives, MSG (monosodium glutamate), has expanded greatly in use, doubling every decade since 1948. Aspartic acid is one half of the now ubiquitous sweetener aspartame (NutraSweet®), which is the basis of diet desserts, low-calorie drinks, chewing gum, etc. Both of these food additives spell danger for our children.

Glutamate and aspartate are neurotransmitters. Neurotransmitters are the chemicals that allow neurons to communicate with and influence each other. Neurotransmitters serve either to excite neurons into action, or to inhibit them. Glutamate receptors are excitatory - they literally excite the neurons containing them into electrical and cellular activity. When glutamate or aspartate attaches to the NMDA (N-methyl-D-aspartate) receptor, it triggers a flow of sodium (Na) and calcium (Ca) ions into the neuron, and an outflow of potassium (K). When the PCP is occupied, the opening of the ion channel is blocked, even

when glutamate occupies its receptor site. Magnesium can occupy and block the NMDA channel, which means that as long as the neuron is able to maintain its normal resting electrical potential of -90 millivolts, the magnesium blocks the ion channel even with glutamate in its receptor.

## Safety



The longer the bar in the above graph the safer the substance.

Many of the best magnesium chloride products are made from condensed seawater. In Japan ion exchange filters are used that have extremely fine pores 1/100th of a millimeter (001 microns) small, which allows magnesium, calcium and potassium to pass through but not large molecules such as PCBs (dioxins) or heavy metals (mercury, arsenic, etc.). The resulting salt water is processed to form salt crystals in a vacuum style vaporization canister.

The Magnesium Oil from Global Light, which is endorsed by The International Medical Veritas Organization, is a low technology product. Using seawater and long evaporation process (two years) it offers one of the least processed product on the market. Dr. Boyd Haley, the former chairman of the chemistry department of Kentucky University, and the world's leading expert on mercury toxicity, ran tests and said, "The Magnesium Oil is safe. There is a small amount of mercury in it but there is a several fold excess of selenium also. The selenium would react with the mercury forming HgSe which is one of the most stable and least toxic of all mercury compounds." Dr. Haley found 30 times more selenium than mercury, "which would bind the mercury and render it much, much less toxic."

The IMC Research Laboratory in Cyprus in the Mediteranian tested the Magnesium Oil using an ICP-OES with detection limits in the parts per billion and found no detectable mercury. Dr. Haley was using instruments sensitive to parts per trillion so the actual level is just around the four part per billion mark. Dr. Haley reported, "Our instrument can measure 0.01 nanograms of mercury (that is  $10^{-9}$  grams). We found the level of mercury in the Magnesium Oil to be in the range of 4,000 nanograms per liter or 4 micrograms per liter or 0.004 milligrams per liter. A liter of water is one million milligrams so the 0.004 milligrams is about 0.004 ppm or 4 ppb. Now, the amount is very low and sea water is known to also have about 0.12 to 0.15 mg per liter of selenium, which

is in excess of the Hg by about 3 to 4 fold by weight. Therefore, it is very unlikely that any free Hg is available to cause toxic problems as it would be tied up in the non-reactive HgSe form.”

The total heavy metal profile of Global Light’s magnesium product added up to only 416 parts per billion or .0000416%. Most magnesium chloride food grade powder products claim higher heavy metal toxicities (Heavy Metals: 0.001% max) making the Magnesium Oil one of the safest magnesium chloride products found to date.

## **MAGNESIUM OIL ANALYSIS**



<b>Element</b>	<b>Result (ppb)</b>
<b>Aluminum</b>	<b>248.5</b>
<b>Antimony</b>	<b>&lt;dl</b>
<b>Arsenic</b>	<b>74.05</b>
<b>Beryllium</b>	<b>&lt;dl</b>
<b>Cadmium</b>	<b>11.73</b>
<b>Cobalt</b>	<b>&lt;dl</b>
<b>Lead</b>	<b>82.64</b>
<b>Molybdenum</b>	<b>&lt;dl</b>
<b>Mercury</b>	<b>&lt;dl</b>
<b>Nickel</b>	<b>&lt;dl</b>
<b>Calcium</b>	<b>&lt;dl</b>
<b>Chromium</b>	<b>&lt;dl</b>
<b>Copper</b>	<b>26.31</b>
<b>Iron</b>	<b>163.1</b>
<b>Magnesium</b>	<b>Saturated</b>
<b>Manganese</b>	<b>62.16</b>
<b>Selenium</b>	<b>22.26</b>
<b>Strontium</b>	<b>12.42</b>
<b>Zinc</b>	<b>&lt;dl</b>

## Dosage

Before one begins transdermal magnesium chloride it is highly advised that you read the chapter on warnings and contraindications if you are suffering from any chronic illness, severe disease or deficiency, or are taking any pharmaceutical medications. Also if one is suffering from any kind of disease it is always recommended to have your treatments supervised by a primary health care practitioner. That could be a nurse, chiropractor, naturopathic doctor, acupuncturist, or allopathic medical doctor. Unfortunately few know anything about transdermal magnesium mineral therapy because it is so new. The most pertinent question about magnesium chloride dosing is: how effectively is it absorbed transdermally?

Magnesium chloride is without doubt a versatile mineral medicine, though as with all forms of magnesium supplementation, it is not easy to calculate the exact dosage. Absorption rates vary considerably from one person to another and from one form of use to another, even with magnesium chloride, which probably delivers more useable magnesium to the cells than any other form. **It is wise, especially if one is seriously ill, to start out with low dosages and build slowly up to higher doses over a period of a week or two.**

In general, to individualize the appropriate magnesium dosage for oral intake, the rule of thumb is approximately 6-8 mg/kg (3-4 mg per pound) of body weight per day. That translates into a total dietary magnesium intake of 600 to 900 mg per day for a 200-lb man. With children some researchers indicate that 10 mg/kg/day are appropriate because of their low body weight and increased requirements for growth. Athletes also need more depending on their stress and training levels<sup>235</sup> and we can always adjust upwards when under great emotional stress or when seriously ill.<sup>236 237</sup>

The normal accepted recommended daily dietary amount of magnesium is only 300-400 mg. Many professionals feel this to be the bare minimum. Some would say that 1,000 mg is probably more in the range of what most people need due to stress (measured by cortisol levels) causing magnesium to be dumped into the sweat in increasing quantities. Most people are numb to the amount of stress experienced every day. But cortisol can be measured by saliva

tests, if one really wants to know, and if found to be high, magnesium dosages can be adjusted up accordingly.

Dr. Norm Shealy, who has tested the transdermal/topical method against oral and intravenous applications, asserts that only through the transdermal form are DHEA levels raised. According to Shealy the best absorbed oral preparation is magnesium taurate, but in his experience, **it takes up to one year of oral supplementation to restore intracellular levels to normal.** Until a few years ago, Dr. Shealy gave most of his patients' ten doses of magnesium chloride intravenously over a period of two weeks. This helped to restore the intracellular levels to normal and usually allowed them then to maintain normal levels with oral supplementation. However, one can use transdermal magnesium mineral therapy to achieve the same result in only a slightly longer time frame. In four weeks, use of magnesium oil can accomplish as much as having the ten doses intravenously according to Shealy who says, "It is a lot simpler and easier, and you can do it on your own. There is no known risk to using magnesium unless you have kidney failure."

As with anything when just starting, caution should be taken in the beginning until one gets a feel for the appropriate dosages for adult and especially with children. Each person has to adjust the dosage to their own needs, size and body weight. The actual amount used is also dependent on the method of use or the combinations of methods used. Magnesium chloride may be taken orally, applied directly to the skin (used in a massage or simply rubbed on), used in foot baths, full body baths, and sprayed into mucus membranes.

Our cells are best served when they are brimming with magnesium reserves and we need to absorb a sufficient amount each and every day. A magnesium saturated body will have a tougher immune system that will fight more easily against infections and influenza. This does not mean that we should all put ourselves into hypermagnesaemia without concern and ignore the needed balance with other minerals. What we really have to do is make sure we have adequate magnesium, for all the cellular systems to work to their optimal level.

The requirements for a very ill person are going to be higher than for a healthy person. In general, for a large adult, spraying one ounce of magnesium oil a day all over the body is recommended with that adjusted downward for children depending on their age and size. If applied in a full body bath two ounces or more could be used. Some people enjoy a very concentrated magnesium chloride bath applying as many as eight ounces at a time. For sport

injuries more concentrated baths would definitely be indicated. Footbaths use much less water so two ounces will yield a very concentrated footbath.

**The magnesium oil can and should be diluted when applying directly to the skin (especially with children) if redness or “stingy” feelings result in uncomfortable feelings or sensations.** If one is suffering from long term illness of any kind, dosages, whether orally or topically administered, should be started at lower levels and brought up gradually. Magnesium chloride and Vitamin C have similar toxicity profiles with overdose from both resulting at worst usually in diarrhea unless the kidneys are seriously compromised.

Soak the whole body or just the feet in bath water for 20-30 minutes, at a temperature of about 108 degrees The most effective protocol for this therapy is to begin with a daily body or foot bath every day for the first 7 days, (starting at lighter concentrations and building up) then continue with a maintenance program of 2-3 times a week for 6-8 weeks or longer. Sensitive care must be taken especially with children as to dose levels, water temperature and magnesium concentrations. Muscle spasms might occur on rare occasions if one forgets to get out of the tub so it is necessary to supervise children and the length of time they remain soaking in magnesium chloride. All strong reactions like redness in local areas to diarrhea or even muscle spasms are indications to reduce concentration.

Fick’s Law of Membrane Permeability says that the amount of any solute (magnesium) that will be absorbed is directly dependent upon the area of contact, the concentration of the solution and the time that the solute is in contact with the membrane.<sup>238</sup> Thus one has to feel one’s way to appropriate dosage both in initial self-treatment phases and for long term maintenance dosage levels. A particularly strong sensation is realized when one uses magnesium chloride in the mucous membranes and it is especially useful as a mouthwash to strengthen teeth and revitalize the gums. Applying three or four sprays full or half strength twice a day is appropriate.

There are no numbers available for how many milligrams are absorbed through the skin but it is generally acknowledged by those who have been involved with transdermal application of magnesium chloride that it is an important way to supplement magnesium.

Magnesium Oil from the sea weighs 12 pounds per gallon. Distilled water weighs only 8 pounds.<sup>239</sup> Thus we can calculate in a straightaway manner how

much elemental magnesium is in each gallon and ounce. **Each spray of Magnesium Oil contains approximately 18 milligrams of elemental magnesium.** An ounce would contain just over 3,300 mg. Five sprays in a glass of water would be almost 100 milligrams and one could probably count on the majority of that being absorbed. If two ounces are put into a bath we might have over six thousand milligrams floating around in the water but only a fraction of that will be absorbed. But absorbed it will be for almost everyone experiences the effect of deep relaxation. Spraying it on the body will yield a higher magnesium concentration on the skin so an ounce used that way will result in more magnesium absorbed than two ounces used in a bath.

It should be understood that we need more research into studies on absorbability and bioavailability through the skin. Possibly what is best is a combination approach - alternating between baths, direct spraying on the body, and oral intake while increasing the intake of foods high in magnesium. When one uses all avenues together it is easier to bring ones magnesium levels up and then to maintain one's intake.

#### **Food Sources of Magnesium**

Spirulina, 1 oz 110 mg  
 Tofu, firm, 1/2 cup 118mg  
 Chili with beans, 1 cup 115mg  
 Wheat germ, toasted, 1/4 cup 90mg  
 Halibut, baked, 3 ounces 78mg  
 Swiss Chard, cooked, 1 cup 75mg  
 Peanut, roasted, 1/4 cup 67mg  
 Baked potato with skin, 1 medium 55mg  
 Spinach, fresh, 1 cup 44mg

— Source: USDA: Composition of Foods. USDA Handbook No. 8 Series. Washington, D.C., ARS, USDA, 1976-1986.

There is no specific information about oral magnesium chloride in liquid form but it is reasonably safe to assume it would be more absorbable than magnesium taurate because liquid minerals are in general more absorbable than tablets.

*3-5 sprays of magnesium chloride in a glass of pure water is an excellent way to take magnesium internally. It assists digestion, counteracts excess acidity in the stomach, and delivers magnesium swiftly into the bloodstream for distribution to all the cells of the body.*

*Daniel Reid*  
Tao of Detox

The taste of the solution is not very good (it has a bitter-saltish flavor) so a little fruit juice (grapefruit, orange, lemon) can be added to the solution. Individuals with very sensitive taste buds may start using it in small amounts and increase doses very gradually. Alternatively, drink it in one gulp dissolved in water while pinching your nose and quickly drink something afterwards.

Hydrated magnesium chloride (powder or crystal) contains about 120 mg of magnesium per gram or 600 mg per rounded teaspoon. It has a mildly laxative effect. As a good maintenance intake to remain healthy you may take about 400 mg or a level teaspoon daily in divided doses with meals. With raised blood pressure and symptoms of magnesium deficiency you may temporarily increase this to 2 teaspoons daily in divided doses under the supervision of your healthcare practitioner. This may already cause 'loose stools' in some. However, commonly with these conditions a rounded teaspoon daily or 600 mg may be just right.

Dr. Raul Vergin offers the following guidelines for oral intake of a 2.5% Magnesium Chloride hexahydrate ( $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ ) solution (i.e.: 25 grams or approximately one ounce of pure food grade powder in a liter of water). **The quantity of elemental magnesium contained in a 125 cc dose of the 2.5% solution is around 500 mg.**

Dosages are as follows:

Adults and children over 5 years old 125 cc  
4 year old children 100 cc  
3 year old children 80 cc  
1-2 year old children 60 cc  
Over 6 months old children 30 cc  
Under 6 months old children 15 cc

125 milliliter = 4.2267528 ounce [US, liquid]  
cc and ml are equivalent

Dr. Vergin indicates that “In acute diseases the dose is administered every 6 hours (every 3 hours the first two doses if the case is serious); then space every 8 hours and then 12 hours as improvement goes on. After recovery it's better going on with a dose every 12 hours for some days. As a preventive measure,

and as a magnesium supplement, one dose a day can be taken indefinitely. Magnesium Chloride, even if it's an inorganic salt, is very well absorbed and it's a very good supplemental magnesium source.”

Daniel Reid says, “Using magnesium oil is the quickest and most convenient way to transmit magnesium chloride into the cells and tissues through the skin. 2-3 sprays under each armpit function as a highly effective deodorant, while at the same time transporting magnesium swiftly through the thin skin into the glands, lymph channels, and bloodstream, for distribution throughout the body. Spray it onto the back of the hand or the top of the feet any time of day or night for continuous magnesium absorption. Regardless of where you apply the spray on the body, once it penetrates the surface of the skin, the body transports it to whichever tissues need magnesium most.”

Typical recommendations for magnesium oil made from  $MgCl_2 \cdot 6H_2O$  suggest using 6-8 oz in each bath. With the magnesium oil from Global Light the recommended amount per bath is only 2 oz. The magnesium oil from Global Light Network is 30–35 percent magnesium chloride as opposed to approximately 25 percent for the magnesium oils one makes from powder or crystal magnesium chloride hexahydrate. Cost analysis between the products need to reflect the large difference in dosage required.

All massage therapists should be using magnesium oil for it is always a good idea to combine a massage with a magnesium treatment. If we really appreciated how important it is to make sure our magnesium levels are satisfactory we would be spraying our underarms with it everyday, spraying it on to different parts of our body and would never leave it out of our baths.

## Magnesium Chloride Vs Magnesium Sulfate

According to Daniel Reid, author of *The Tao of Detox*, magnesium sulfate, commonly known as Epsom salts, is rapidly excreted through the kidneys and therefore difficult to assimilate. This would explain in part why the effects from Epsom salt baths do not last long and why you need more magnesium sulfate in a bath than magnesium chloride to get similar results. Magnesium chloride is easily assimilated and metabolized in the human body.<sup>240</sup> Epsom salts are used by parents of children with autism because of the sulfate, which they are sometimes deficient in; sulfate is also crucial to the body and is wasted in the urine of autistic children.

Dr. Jean Durlach et al, at the Université P. et M. Curie, Paris, wrote a paper about the relative toxicities between magnesium sulfate and magnesium chloride. They write, “The reason of the toxicity of pharmacological doses of magnesium using the sulfate anion rather than the chloride anion may perhaps arise from the respective chemical structures of both the two magnesium salts. Chemically, both  $MgSO_4$  and  $MgCl_2$  are hexa-aqueous complexes. However  $MgCl_2$  crystals consist of dianions with magnesium coordinated to the six water molecules as a complex,  $[Mg(H_2O)_6]^{2+}$  and two independent chloride anions,  $Cl^-$ . In  $MgSO_4$ , a seventh water molecule is associated with the sulphate anion,  $[Mg(H_2O)_6]^{2+} + [SO_4 \cdot H_2O]$ . Consequently, the more hydrated  $MgSO_4$  molecule may have chemical interactions with paracellular components, rather than with cellular components, presumably potentiating toxic manifestations while reducing therapeutic effect.”

*MgSO<sub>4</sub> is not always the appropriate salt in clinical therapeutics.*

*MgCl<sub>2</sub> seems the better anion-cation association to be used in many clinical and pharmacological indications.<sup>241</sup>*

*Dr. Jean Durlach et al*

These researches also studied ionic fluxes in the two directions between the mother and the fetus. They found that there was a greater positive effect when  $MgCl_2$  was used and that  $MgSO_4$  could not guarantee the fetal needs in sodium and potassium exchange like  $MgCl_2$  could. Dr. Durlach summarized saying, “ $MgCl_2$  interacts with all exchangers while the interaction of  $MgSO_4$  is limited to paracellular exchangers, and  $MgCl_2$  increases the flux ratio between mother to fetus while  $MgSO_4$  decreases it.”



Dropping levels of magnesium during pregnancy leads to premature contraction and this has been treated by allopathic medicine mostly with magnesium sulfate. But high-dosage, tocolytic magnesium sulfate administered to pregnant women during preterm labor can be toxic, and sometimes lethal, for their newborns.<sup>242</sup> A Medline's search found  $\text{MgSO}_4$  had 53 reports of its use in prematures,<sup>243</sup> whereas  $\text{MgCl}_2$  had only 4 papers of its use. The paper cited just above showed the results of severe overdose of the mothers, 50 grams or more of  $\text{MgSO}_4$ . Clearly too much is toxic, but other studies show safety and efficacy at lower doses. Magnesium sulfate given to women immediately before very preterm birth may improve important pediatric outcomes. No serious harmful effects have been seen at lower dosage levels.

Chloride is required to produce a large quantity of gastric acid each day and is also needed to stimulate starch-digesting enzymes. We may use magnesium as oxide or carbonate but then we need to produce additional hydrochloric acid to absorb them. Many aging individuals, especially with chronic diseases who desperately need more magnesium cannot produce sufficient hydrochloric acid and then cannot absorb the oxide or carbonate.

Sulfate is also important and has an influence over almost every cellular function. Sulfate attaches to phenols and makes them less harmful, and sets them up for being excreted from your kidneys. A lot of these potentially toxic molecules are in food. Sulfate is also used to regulate the performance of many other molecules. Many systems in the body will not function well in a low-sulfate environment. Sulfur is so critical to life that the body will apparently borrow protein from the muscles to keep from running too low.

Though magnesium sulfate will save your life in emergency situations as quickly and easily as magnesium chloride, magnesium chloride fits the bill as a universal medicine, magnesium sulfate does not. Magnesium sulfate is a close cousin whose effect, form and toxicity demands it be used in special applications when the sulfur is needed.

## Magnesium, Memory and Cognitive Function

*Magnesium may reverse middle-age memory loss.*<sup>244</sup>

*Massachusetts Institute of Technology*

Associate Professor Guosong Liu and postdoctoral associate Inna Slutsky at MIT's Picower Center for Learning and Memory found that magnesium helps regulate a key brain receptor important for learning and memory. Their work provides evidence that **a magnesium deficit may lead to decreased memory and learning ability, while an abundance of magnesium may improve cognitive function.**

"Our study shows...maintaining proper magnesium in the cerebrospinal fluid is essential for maintaining the plasticity of synapses," the authors wrote. "Since it is estimated that the majority of American adults consume less than the estimated average requirement of magnesium, it is possible that such a deficit may have detrimental effects...resulting in potential declines in memory function."

Plasticity, or the ability to change, is the key to the brain's ability to learn and remember. Synapses, the connections among brain cells, undergo physical changes in response to brain activity. While the mechanisms underlying these changes remain elusive, it is known that synapses are less plastic in the aging or diseased brain. Loss of plasticity in the hippocampus, where short-term memories are stored, causes the forgetfulness common in older people.

Armed with this new understanding, the researchers then identified magnesium's importance in synaptic function. Magnesium is the gatekeeper for the NMDA receptor, which receives signals from an important excitatory neurotransmitter involved in synaptic plasticity. Magnesium helps the receptor open up for meaningful input and shut down to background noise. "As predicted by our theory, increasing the concentration of magnesium and reducing the background level of noise led to the largest increases of plasticity ever reported in scientific literature," Liu said.

The researchers have identified and are now studying several families of drugs that may restore learning and memory in animals. Most important, Liu said, "This new theory may help create strategies to prevent aging-induced loss of synaptic plasticity."

## Magnesium Deficiency & Periodontal Disease

*It is magnesium, not calcium, that helps  
form hard tooth enamel, resistant to decay.*

Many chronically ill patients have periodontal problems. An association between magnesium and periodontitis has been suggested. In a study, conducted by the International and American Associations for Dental Research, subjects aged 40 yrs and older, increased serum Mg/Ca was significantly associated with reduced probing depth ( $p < 0.001$ ), less attachment loss ( $p = 0.006$ ), and a higher number of remaining teeth ( $p = 0.005$ ). Subjects taking magnesium showed less attachment loss ( $p < 0.01$ ) and more remaining teeth than did their matched counterparts.<sup>245</sup> These results suggest that increased magnesium supplementation will improve periodontal health.

I use magnesium chloride as a mouthwash for my gum problems and felt a change in my oral environment after only one application. I had periodontal disease when I was seventeen and severe bone loss through many years. My mouth was also loaded up with mercury amalgam starting at age five. It is very difficult to keep up the discipline of maintaining my mouth perfectly. A fine dentist told me six years ago that I had to brush and floss after every meal and never eat between meals to preserve my teeth.

I have had a hard time following those directions and the results are as expected. I now use salt water instead of fluoride toothpaste and that has helped out a lot. Spraying in three pumps of the magnesium chloride though has had a dramatic healing and alkalizing effect. My whole mouth feels stronger and my oral environment stays with a healthier feeling for hours more if I do not clean my teeth.

## Natural Influenza Protocol with Magnesium and Vitamin C

The New York Times writes, "As concern about a flu pandemic sweeps official Washington, Congress and the Bush administration are considering spending billions to buy the influenza drug Tamiflu. But after months of delay, the United States will now have to wait in line to get the pills." It's that time of year when the CDC puts the plug back in the wall with the intention of lighting up signs all over the country whipping the public into its yearly flu frenzy.

Not only do we have to worry about the regular flu and its misery but now we have the bird flu. On October 5, 2005 the New York Times reported that the deadly 1918 influenza pandemic was linked to the avian flu. Two teams of federal and university scientists announced that they had resurrected the 1918 influenza virus and found that it was actually a bird flu that jumped directly to humans.

Democrats on Capitol Hill are complaining that the delay has put Americans in jeopardy. Tamiflu, introduced in 1999, has recently become the drug of choice of the medical establishment worried about pandemic flu because it is one of the only medicines claimed to reduce the duration and severity of the potentially deadly disease if taken within 48 hours of infection. Tamiflu is 'supposed' to speed recovery from the flu. When started during the first 2 days of the illness, it is said to hasten improvement by at least "a day." Tamiflu is one of a new class of antiviral drugs called neuraminidase inhibitors. No studies have been conducted to compare Tamiflu with mother's chicken soup, which is also reported to diminish intensity, discomfort and duration of the flu.

Medical officials are lining up to scare the wits out of the public but offer only impotent medical strategies. "This is a nation-busting event!" warned Dr. Tara O'Toole of the University of Pittsburgh Medical Center's Center for Biosecurity. Speculating that 40 million Americans could die -- that's about one in eight -- she warned: "We must act now." For the Avian flu medical authorities are rushing to develop new unproven vaccines. There are also concerns that a resistance to Tamiflu's effects is growing so other drugs like Relenza is beginning to be recommended for stockpiling.<sup>246</sup>

"We and the entire world remain unprepared for what could arguably be the most horrific disaster in modern history," said Dr. Gregory A. Poland of the Mayo Clinic speaking about the avian flu. "The key to our survival, in my

opinion, and to the continuity of government is vaccination.” And “we do not have a licensed or approved vaccine,” continued Dr. Poland. Dr. J. Anthony Morris, former Chief Vaccine Control Officer FDA said, “There is no evidence that any influenza vaccine thus far developed is effective in preventing or mitigating any attack of influenza. The producers of these vaccines know that they are worthless, but they go on selling them, anyway.”

*A review in The Lancet suggests that  
influenza vaccination of infants is useless.*

*Dr. F. Edward Yazbak*

Each and every year at this time medical officials come out to remind us of our mortal danger yet advocate medical procedures that do little to nothing to protect us but cost billions. Dr. Eleanor McBean was an on-the-spot observer of the 1918 Influenza epidemic and said, “As far as I could find out, the flu hit only the vaccinated. Those who had refused the shots escaped the flu. My family had refused all the vaccinations so we remained well all the time. We (who didn't take any vaccines) seemed to be the only family which didn't get the flu. It has been said that the 1918 flu epidemic killed 20,000,000 people throughout the world. But, actually, the doctors killed them with their crude and deadly treatments and drugs. This is a harsh accusation but it is nevertheless true.”

*The Vaccine Injury Compensation Program created a federal, court-like process through which victims of vaccination could seek financial compensation. Created in 1986, the program has settled 1,200 vaccine claims worth \$1.2 billion as of 2004. This represents compensation to only a fraction of the children and families devastated by vaccines.*

**Most problems noted during tests of Tamiflu were indistinguishable from the symptoms of flu.** That's a tricky way of saying Tamiflu can as easily cause the flu as deminish it. Tamiflu should not in fact be the drug of choice because of its large side effect profile that leaves one wondering if their flu symptoms are from a virus or Tamiflu. Below is the list of side-effects that Tamiflu can cause. These are all the reasons Tamiflu should be avoided:

- Aches and pains
- Allergic reactions sometimes leading to shock
- Asthma - aggravation of pre-existing asthma

- Bronchitis
- Chest infection
- Conjunctivitis
- Dermatitis
- Diarrhoea
- Difficulty sleeping
- Dizziness
- Ear infection
- Ear problems
- Erythema multiforme
- Headache
- Hepatitis
- Indigestion
- Liver problems
- Lymphadenopathy
- Nausea
- Nose bleed
- Rash or rashes
- Runny nose
- Sinusitis
- Stevens Johnson syndrome
- Symptoms of a cold
- Tiredness
- Tummy pain

- Urticaria
- Vomiting

Ingredients: Black iron oxide (E172), Croscarmellose Sodium, FD and C Blue 2 (indigo carmine, E132), Gelatin, Oseltamivir, Povidone, Pregelatinised maize starch, Red iron oxide (E172), Shellac, Sodium Stearyl Fumarate, Talc, Titanium dioxide (E171,) Yellow iron oxide (E172). The oral suspension has: **Oseltamivir**, Saccharin sodium (E954), Sodium benzoate (E211), Sodium dihydrogen citrate (E331 (a)), Sorbitol (E420), Titanium dioxide (E171), Tutti Frutti flavour, Maltodextrins (maize), Propylene glycol, Arabic gum (E414), Xanthan gum (E415).

Various U.S. and U.N. agencies are spreading the word that the Avian Influenza, if it breaks out this fall or winter, could be as severe as the worldwide Spanish Influenza epidemic of 1918, and they are predicting hundreds of millions of deaths worldwide. Of course this is what they do each and every year and it does sell a lot of vaccines to an easily frightened public.

According to health consultant Jonathan Campbell, “The influenza, currently isolated in China, is a hemorrhagic illness. It kills many of its victims by rapidly depleting ascorbate (vitamin C) stores in the body, inducing scurvy and collapse of the arterial blood supply, causing internal hemorrhaging of the lungs and sinus cavities. Most people today have barely enough vitamin C in their bodies (typically 60 mg per day) to prevent scurvy under normal living conditions, and are not prepared for this kind of illness.”<sup>247</sup>

*Some physicians would stand by and see their patient die  
rather than use ascorbic acid (Vitamin C) because  
in their finite minds it exists only as a vitamin.*

*Dr. Frederick R. Klenner*

The International Medical Veritas Association’s recommendation for flu prevention and treatment is simple and carries no side effects: transdermal/topical application of Magnesium Chloride, zinc lozenges, Vitamin C and a properly hydrated body. Instead of weakening the body with the toxic substances found in Tamiflu, other drugs and vaccines, we strengthen the cells from their roots up. A great part of people’s vulnerability to influenza is a combination of nutritional deficiencies and enormous toxic buildup from environmental poisons, toxic containing foods and noxious drugs.

The first physician to aggressively use Vitamin C to cure diseases was Frederick R. Klenner, M.D.<sup>248</sup> beginning back in the early 1940's. Dr. Klenner consistently cured chicken pox, measles, mumps, tetanus and polio<sup>249</sup> with huge

doses of the vitamin. Certainly if it is effective for these diseases it will help tremendously with the flu. From 1943 through 1947 Dr. Klenner reported successful treatment of 41 more cases of viral pneumonia using massive doses of vitamin C.

Dr. Anthony S. Fauci, director of the National Institute of Allergy and Infectious Diseases, said, "You must prepare for the worst-case scenario. To do anything less would be irresponsible." Fauci is correct here, it pays to prepare but not with toxic vaccines or other drugs like Tamiflu. It makes sense medically to use the least toxic substances, for toxins only increase the chance we will get the flu. The flu like side effects of Tamiflu bears this line of reasoning out. The caution on pregnant women, or those considering becoming pregnant, should serve to turn away a good deal of the population thinking of using Tamiflu. If it is too toxic for mother and fetus it is too toxic for you.

"Are we prepared today? Clearly no," said Dr. Hayden of the University of Virginia Health Science Center. From personal medicine cabinets to the White House, the focus recently is on a killer flu epidemic that is going to hit like a huge asteroid. If we trust our medical officials (I do not) we will prepare and if we do not trust these people we still need to prepare because of the possibility that what they are warning us against is simply a long planned bio-chemical attack.<sup>250, 251</sup> Many believe that at heart the pharmaceutical companies have, for almost a century, used vaccines as a carrier of poisonous substances to earn profits over dead people's bodies. If we look at FluMist, another new nasal vaccine, we see a pharmaceutical company deliberately spilling into the environment contagious influenza viruses. The FluMist vaccine is a live virus vaccine that is given as a nasal spray. The virus can be shed from the nasal passages of a vaccinated individual for up to 21 days after vaccination. The package insert for the FluMist vaccine clearly states "Due to the possible transmission of vaccine virus, FluMist recipients should avoid being in close (for example, within the same household) contact with immune-compromised individuals for 3 weeks following vaccination."

Many might have missed seeing the congressional hearing on TV<sup>252</sup>, talking about bioterrorism and hearing the blatant statement made that new vaccines, even if not yet proven safe, would be put out for use in the general population, as the risk of disease is seen to be stronger than any risk the use of these unproven vaccines might cause. These vaccines will be unleashed on us, and we will be at great risk of harm. The last thing the medical industrial complex is



interested in is safe and natural methods of protection against viruses and the deficiencies that make us vulnerable.

**Magnesium depleted cells are in trouble and introducing another toxic drug will not build their defenses or strength.** The average severe flu lasts approximately 10 days so we must question whether spending billions to stockpile Tamiflu to reduce that average by a day is really going to save anyone's life. The pharmaceutical industry, the CDC and the FDA of course see no problem with adding more toxic chemicals into the populations' blood streams.

Yes it pays to be prepared for the flu so stock up your medicine cabinets with effective substances that will help, not hurt your family. It would also be worthwhile to detoxify our families during the warmer months so hidden toxicities like mercury, which is known to increase the dangers of influenza, would be less present in our children's bodies. Truly doctors can be blamed when their patients die of influenza for it is not the virus that is deadly but the deficiencies of vitamin C and magnesium combined with the drugs and vaccines doctors use that bring old and young alike down to their graves.

Why is the United States government so anxious to invest billions in Tamiflu and flu vaccines laced with mercury? The Boston Globe reported this month that alarmed infectious disease specialists have indicated that excessive use of Tamiflu and other antiviral drugs could lead to the emergence of flu strains that do not respond to antivirals, making both avian and regular flu strains even more of a health threat. Yet another reason for using a natural protocol is raised and as usual ignored by medical authorities. Dr. Klenner is right though, medical authorities would standby and watch millions die rather than entertain the thought that it all could be stopped using Vitamin C and magnesium chloride.

There should be no doubt that key government officials are in bed with the pharmaceutical companies. Defense Secretary Donald Rumsfeld, for example, seems likely to profit greatly from government purchase of Tamiflu, the drug developed by Gilead Sciences when Rumsfeld was president of the company. He is reported to hold major portions of stock in Gilead.<sup>253</sup> Tamiflu was actually developed by Gilead, which then gave Roche the exclusive rights to market and sell this drug.<sup>254</sup> Trust in our government's medical officials is in short supply.



## Magnesium, Sexuality, Life and Aging

*Magnesium is important for us from before  
we are born until our last breath in life.*

Life, health, longevity and happiness are related concepts and somehow our sexualities thread in the middle of that. Sex is part of our basic nature because we were created in sex from the union of male and female cells. Whenever sex is fulfilling, the chances of love and a joyful life become greater. There is no denying that sex is one of the most pleasurable activities available to human beings and that it is important and central to life itself. It provides an universally recognized enjoyment in all societies but for some very deep reasons there lies darkness across the world of sexuality.

Sex in particular has become a major source of anxiety and stress for many of us and this is not all our fault. Sometimes things beyond our control affect our sexuality, and thus our life itself is affected. Biologically all humans, male and female, have various levels of sex hormones. Males have more male hormones but still have some low or very low levels of female hormones. Females have more female hormones but still have some low or very low levels of male hormones. Testosterone is primarily a male sex hormone, and is thought to be **the primary hormone responsible for the driving force of libido.**

Emotional satisfaction during sex and coronary health are related. A healthy sexuality is potentially the best anti-stress medicine we have and when we embrace its full power and potentiality for healing we discover one of the greatest gifts God has given to us, an eternal fountain of youth and passion giver. With it we can bring a new life to earth and with it we can ever bring new life and love to our soul.

*Sex can be both the fountain of youth  
and the fountain in which we replenish our love  
over and over again to the great joy of our beings.*

Many scientists believe that hormone-driven mechanisms in the central nervous system should dominate analysis of mammalian behaviors especially sexuality because sexuality is primarily hormone driven. **Magnesium is**

**necessary for normal sexual functioning** yet is glossed over as important in nervous and endocrine function necessary for good sexual performance.

**In all likelihood pregnancy cannot be normal unless magnesium levels are adequate.** The concentration of Mg in the placental and fetal tissues increases during pregnancy. The requirements for this element in a pregnant woman's organism generally exceed its supply; hence, pregnancy should be considered a condition of 'physiological hypomagnesemia'.<sup>255</sup>

*At the time that life is waning, as we age  
magnesium diminishes while calcium rises.*

The fact that magnesium diminishes with age and illness should give us a clue to magnesium's vital place in life, health, sexuality and happiness. In this chapter we are going to attempt to unify the role magnesium has on basic human sexuality as well as aging and general health. When we related magnesium in importance to the air we breathe perhaps we can begin to understand how important our daily magnesium input is. Five minutes without air spells doom. Deficient daily magnesium intake means serious trouble and speaks of disease when uncorrected. It means premature aging, declining sexual potency and ability to conceive new life.

*Magnesium is found in higher levels in semen than serum.  
Orhan Deger from the Ataturk University in Turkey found  
infertile men had about half the semen magnesium as fertile men.*<sup>256</sup>

The role of magnesium in our lives continues its importance when we are in the womb. When pregnant, magnesium helps build and repair body tissue in both mother and fetus. A severe deficiency during pregnancy may lead to preeclampsia<sup>257</sup>, birth defects and infant mortality. Magnesium relaxes muscles and research suggests that proper levels of magnesium during pregnancy can help keep the uterus from contracting until week 35. Dropping magnesium levels at this point may start labor contractions. This has been treated by allopathic medicine with magnesium sulfate but this has led to problems we discussed in the chapter that compares magnesium sulfate to magnesium chloride.

In animal studies it has been shown that magnesium plays a role in ovule maturation, sperm viability and fecundation. In rats pregnancy cannot be normal unless the food contains an adequate supply of magnesium. Severe or

mild deficiencies affect the site of fetal implantation and, if they are prolonged, lead to abortion in the first instance and pathological disorders in the latter.<sup>258</sup>

Some 43 percent of women suffer with sexual dysfunction, compared to 31 percent of men, according to University of Chicago researcher Dr. Edward Laumann<sup>259</sup>. And some \$2 to \$3 billion will be spent within the next ten years on products aimed at improving the sex lives of these women. Female sexual dysfunction is characterized by a lack of desire, arousal and orgasm. Lack of desire is the chief complaint among women, affecting about one-third of them at some point in their lives, says Cindy Meston, assistant professor of clinical psychology at the University of Texas at Austin<sup>260</sup>. How much of this dysfunction is related to magnesium deficiency is anyone's guess but when upward of 70 percent of all people are deficient in this precious metal of life it is not too hard to make the connection.

## Magnesium and DHEA

*DHEA -S levels were significantly lower  
in the men with sexual dysfunction.*<sup>261</sup>

For normal sexual function, we need both healthy organs and a balanced, working endocrine system, producing the necessary hormones. **Cholesterol cannot be synthesized without magnesium and cholesterol is a vital component of many hormones.** Aldosterone is one such hormone, and helps to control the balance of magnesium and other minerals in the body. Interestingly aldosterone needs magnesium to be produced and it also regulates magnesium's balance.<sup>262</sup> Cholesterol, that most maligned compound, is actually crucial for health and is the mother of hormones from the adrenal cortex, including cortisone, hydrocortisone, aldosterone, and DHEA.

*DHEA-S is a natural substance that has been shown  
to improve sexual desire and overall quality of life.*

Flaunted as a “fountain of youth,” DHEA is a natural hormone produced by the adrenal glands. This hormone rises at puberty, is at its apex till the age of thirty and drops down drastically afterwards. At the last stage of life i.e. between 70 and 80 the quantity of the hormone produced is only 5% of the amount churned out at the age of 30. Another factor that contributes significantly in DHEA loss is chronic stress. The hormone helps aging men and

women increase muscle strength and lean body mass, regain youthful vitality, and just feel better.

**Also known as "mother of all steroid hormones" DHEA is converted in the body into several different hormones, including estrogen and testosterone.** But according to some medical scientists replacement of diminishing DHEA with synthetic DHEA can lead to health hazards including cancer, heart disease, diabetes, Alzheimer's, Parkinson's, and lupus.<sup>263</sup>

Much of the popular and scientific interest in DHEA stems from our culture's emphasis on youth. If levels of this hormone decline with age, the thinking goes, we could avoid the health problems that accompany aging -- or even extend our lifespan -- by keeping DHEA levels high.<sup>264</sup> Many people are already taking DHEA just in case this turns out to be true. That wouldn't be a problem if this substance were as safe as vitamin C. But as a potent steroid hormone, DHEA has the potential for far-reaching side effects throughout the body.

Dehydroepiandrosterone (DHEA) is a steroid hormone produced by the adrenal gland and ovaries and converted to testosterone and estrogen. DHEA can be purchased over the counter in supplement form. In one small study published in the *New England Journal of Medicine* (Sept. 30, 1999), women who took 50 mg of DHEA daily noticed a significant increase in sexual interest. However, most DHEA products lining the store shelves recommend taking only 25 mg per day. Because of its potential for heart attacks and breast cancer and masculating side-effects such as facial hair, synthetic DHEA is dangerous thus it would serve us if a natural way of increasing DHEA levels were to be found.

**Magnesium chloride, especially when applied transdermally, is reported by Dr. Norman Shealy to gradually increase DHEA in a natural way.**<sup>265</sup> Dr. Shealy has determined that when the body is presented with adequate levels of magnesium at the cellular level, the body will begin to naturally produce DHEA and also DHEA-S. Because of the problems with supplementing directly with DHEA, transdermal magnesium chloride mineral therapy holds great promise for DHEA hormonal supplementation because taking magnesium could counteract the heart attack and stroke hazards of synthetic DHEA hormone replacement therapy.

**The DHEA Adverse Effects (Via Synthetic Supplementation)**

- In women, excess DHEA can produce unwanted side effects like flare-ups of acne.

- Higher levels of DHEAS appear to be linked to an increased risk for ovarian cancer (in both pre- and postmenopausal women) as well as breast cancer (in postmenopausal women).
- In addition, because DHEA is converted to testosterone, there is concern that long-term use of DHEA supplements may raise the risk for prostate cancer or, in those who have the disease, hasten its progression.

*It appeared that for old men with a deficit of testosterone, Mg(2+) supplementation during treatment with DHEA can increased the free testosterone concentration and its biological effect.<sup>266</sup>*

In men, too little testosterone may cause difficulty obtaining or maintaining erections, but it is not clear whether testosterone deficiencies interfere with female sexual functioning apart from reducing desire. Magnesium's ability to increase DHEA levels, thus testosterone levels in both men and women, demonstrates the pathway between transdermal magnesium chloride and sexual function and libido.

**Testosterone plays a vital role in many functions throughout the body:**

- Muscle mass maintenance
- Blood sugar regulation
- Bone density maintenance
- Oxygen uptake by cells throughout the body
- Immune surveillance
- Healthy red blood cell production
- Cholesterol regulation
- Heart muscle maintenance
- Sexual desire and performance
- Neurological activity

*Women need and respond to much lower levels of testosterone increases than men do with significant increases in libido.*

For the first few years of life, the adrenals make very little DHEA. Around age six or seven, they begin churning it out. Production peaks in the mid-20s, when DHEA is the most abundant hormone in circulation. At all ages, men tend to have higher DHEA levels than women.

*Serum magnesium falls with the cyclic increase in estrogen secretion.<sup>267</sup>*

After being secreted by the adrenal glands, it circulates in the bloodstream as DHEA-sulfate (DHEAS) and is converted as needed into other hormones. DHEA also modulates immunity. A group of elderly men with low DHEA levels who were given 50 mg of DHEA per day for 20 weeks experienced a significant activation of immune function. Postmenopausal women have also shown increased immune functioning in just three weeks when given DHEA in double-blind research.

*DHEA appears to protect every part  
of the body against the ravages of aging.*

Published studies link low levels of DHEA to aging and diseased states.

Specifically, a deficiency of DHEA has been found to correlate with:

- Chronic inflammation
- Immune dysfunction
- Depression
- Rheumatoid arthritis
- Type-II diabetic complications
- Greater risk for certain cancers
- Excess body fat
- Cognitive decline
- Heart disease in men
- Osteoporosis

In 1981, the Life Extension Foundation introduced DHEA in an article that described the multiple anti-aging effects this hormone might produce. DHEA did not establish scientific credibility until 1996, when the New York Academy of Sciences published a book entitled **DHEA and Aging** and summarized the concept of DHEA replacement in their journal *Aging*.

The role that magnesium plays in the transmission of hormones (such as insulin, thyroid, estrogen, testosterone, DHEA, etc.), neurotransmitters (such as dopamine, catecholamines, serotonin, GABA, etc.), and mineral electrolytes is a strong one. Research concludes that it is **magnesium status that controls cell**



**membrane potential** and through this means controls uptake and release of many hormones, nutrients and neurotransmitters.

It has been found that DHEA levels may be raised in human beings through transdermal absorption of magnesium without the application of exogenous supplements of DHEA, DHEA-S, or their corresponding salts. Treatments consisting of applying a composition comprising a therapeutically effective amount of magnesium chloride.<sup>268</sup>

Since DHEA is one of the primary bio-markers for aging, the long range effect of large doses of magnesium in a usable form is to significantly raise DHEA levels and thus produce true age reversal results. But if you are an obese postmenopausal woman or a male with prostate cancer, then you certainly would not want to supplement DHEA directly. DHEA as the master hormone, (actually it can be considered more as a prohormone, a precursor, which is true for magnesium as well), when produced at sufficient levels, will induce the production of other hormones whose depletion can be associated with many symptoms of aging. Through the use of Magnesium Oil, women have reported complete abatement of menopausal symptoms and some have even returned to their menstrual cycle and the possible explanation for this is that rising magnesium levels brings up DHEA levels.

### **Local Effects**

Magnesium is essential for life as it participates in over 325 enzyme reactions and thus when we treat the deficiency we can expect more energy, strength and stamina and even increases in sexual energy. Magnesium chloride often produces systemic excitation. It also has a strong local effect, which is easily experienced when applied to sore muscles. Even more pronounced is the effect when we apply magnesium chloride to the mucus membranes.

“Spray the magnesium oil into and around the vaginal area, give it a try, see what happens. Amazing for me when I did this by accident, within an hour or so and now within minutes, I can hardly stand not to have sex.”

Dr. Robert Ornstein and Dr. David Sobel, regional director for preventive medicine for Kaiser Permanente, the world’s largest health maintenance organization, say that the physiology of sexual excitement in both men and women depends on the ability of blood to flow into the genital glands and into

the supporting tissues and muscles of the pelvis. They also say that “it is the full engorgement of blood in the muscles and tissues of the pelvis that eventually triggers orgasm. One reason that women in general may be slower to orgasm than men is because they have a far more complex system of arteries, veins, and capillaries in the pelvic area than men do that must be fully engorged for orgasm to occur.” And in fact pharmaceutical companies, in searching for a female equivalent of Viagra, are focused on developing a drug that increases blood flow to the female genitals, resulting in vaginal lubrication and relaxing vaginal muscles.

“A person who feels uncomfortable with his or her sexuality will unconsciously tense the muscles in the genitals, thighs, anus, and buttocks, preventing the free flow of blood into the area and thereby limiting the possibility for complete arousal. But a person who can relax and allow energy in the form of blood to flow into the pelvic area and genitals will enjoy the sensations of building excitement,” wrote Drs. Ornstein and Sobel.

In men, decreased levels of magnesium gives rise to vasoconstriction from increased thromboxane level, increased endothelial intracellular  $Ca^{2+}$ , and decreased nitric oxide. This may lead to premature emission and ejaculation processes. Magnesium is also probably involved in semen transport.<sup>269</sup>

Magnesium chloride delivers a relaxing and opening effect to general body physiology. Magnesium acts peripherally to produce vasodilation. With low doses only flushing and sweating occur, but larger doses actually will cause a lowering of blood pressure. It is known that magnesium causes nitric oxide independent coronary artery vasodilation in humans.<sup>270</sup> Magnesium is thought to behave like a calcium channel blocker at the cellular level thus helps to maintain the elasticity of our arteries. Magnesium prevents the deposition of calcium along the arterial wall at points of micro-injury, which is the crucial role it plays in the prevention of both atherosclerosis and arteriosclerosis. Magnesium-ions appear to reduce vascular resistance. Magnesium also is important in the maintenance of healthy muscles. The heart muscle itself benefits from an adequate supply of available magnesium. For these reasons, magnesium is critical to the maintenance of a healthy heart. We would expect the same in all the muscles including those in the pelvic and genital areas.

*We should not be surprised that magnesium chloride, a strong cell tonic, one that releases energy production by boosting ATP levels as well as hundreds of enzyme reactions, would have this effect.*

Low pituitary function may lead to decreased development of the sexual organs, early menopause in women, and impotence in men. Weak adrenals may reduce the desire and strength for sex and increase sensitivity to stress. Low thyroid may cause a lack of desire or capacity for sex. In men, low testicular function decreases sex drive and sperm production. In women, low estrogen slows sexual maturity, decreases breast size, and retards egg maturation. Estrogen-progesterone imbalance can create many menstrual cycle variations and symptoms. According to Dr. Mildred Seelig, “The high magnesium content in the spinal fluid is that the mineral is necessary for balancing the stimulant effect of body hormones. The purpose of thyroid, gonadal, adrenal and other hormones is to charge up or excite the body. Magnesium and some other substances tend to slow down and relax the system, thus regulating the hormones and achieving a happy medium.”<sup>271</sup>

Thyroid hormone is intimately associated with regulation of energy production and mitochondrial function. Indeed, mitochondria possess thyroid hormone receptors. According to Biotics Research Corporation enzyme utilization of ATP generated by mitochondria requires complex formation with magnesium, generally in a 1:1 ratio. Magnesium is essential for protein synthesis, cell replication and activation of the sodium-potassium pump, as well as regulation of calcitonin and parathyroid hormone.<sup>272</sup>

## Conclusion

In Taoist health & longevity systems, there has always been a strong link between sexual potency, immune response, cerebral function, and longevity. Magnesium is the most needed nutrient mineral for all of these factors. **There should be no doubt in anyone’s mind that we will live healthier, happier and longer lives if we make sure we satisfy completely our body’s need for magnesium.** Not only do our cells need to be brimming with magnesium we need to absorb a sufficient amount each and every day.

## Transdermal Magnesium Mineral Therapy in Sports Medicine

*Magnesium nutrition is an area that no serious athlete can afford to overlook.*

Despite magnesium's pivotal role in energy production, many coaches and athletes remain unaware of its critical importance in maintaining health and performance. Research suggests that even small shortfalls in magnesium intake can seriously impair athletic performance.<sup>273</sup> Magnesium deficiency reduces metabolic efficiency, increases oxygen consumption and heart rate required to perform work, all things that would take the edge off of athletic performance. The last thing any trainer or sports doctor wants to see is their athletes lose their competitive edge. Not performing to full capacity because of the lack of a mineral like magnesium is simply not an option for winners. Athletic endurance and strength performance increases significantly when a large amount of magnesium is supplemented transdermally/topically and orally.

*A magnesium shortfall can cause a partial uncoupling of the respiratory chain, increasing the amount of oxygen required to maintain ATP production.*

Athletes, who might be expected to take greater care with their diets, are not immune from magnesium deficiency. For example, studies carried out in 1986/87 revealed that gymnasts, footballers and basketball players were consuming only around 70% of the RDA,<sup>274</sup> while female runners fared even worse, with reported intakes as low as 59% of the RDA.<sup>275</sup> There is ample evidence that a magnesium shortfall boosts the energy cost, and hence oxygen use, of exercise during an activity like cycling.<sup>276</sup> One study of male athletes supplemented with 390mg of magnesium per day for 25 days resulted in an increased peak oxygen uptake and total work output during work capacity tests.<sup>277</sup>

*Sub-optimum dietary magnesium intakes impairs athletic performance.*

The regular advice given athletes is to make a conscious effort to increase the proportion of magnesium-rich foods in his or her diet. Even a simple change

like eating more whole grain products and boosting your intake of vegetables, nuts and seeds can make an impact. But that is not enough, not for an athlete who loses magnesium much faster than the average person. It is not even enough today for a regular person.

If an athlete is not eating a heavy diet of Pumpkin seeds (roasted), Spirulina, Almonds, Brazil nuts, Sesame seeds, Peanuts, Walnuts or Rice (whole grain brown), the only common foods with over 100 milligrams of magnesium content for every 100 grams, it is not really in the realm of possibility that sufficient magnesium would be consumed. Add white bread and other junk food and it can safely be assumed that it is exceedingly impractical for athletes to consume enough magnesium through dietary sources alone.

It is commonly thought that magnesium intakes above the RDA are unlikely to boost performance, but this is absurd advice that no athlete or coach should pay attention to. First, RDAs are almost universally understated even for the general population. For athletes they are sure guides to failure for they do not take into account all the extra demands and needs of an athlete's body. **When it comes to magnesium we should be thinking many times the RDA if we are thinking of maximizing athletic performance.**

Studies have shown that supplementing with 30mg of Zinc and 450mg of magnesium per day can elevate testosterone levels up to 30%. Dr. Lorrie Brilla, at Western Washington University, recently reported that magnesium and zinc, when supplemented orally, significantly increase free testosterone levels and muscle strength in NCAA football players.<sup>278</sup> In another study, young athletes supplemented with 8mg of magnesium per kilo of body weight per day **experienced significant increases in endurance performance and decreased oxygen consumption** during standardized, sub-maximal exercise.<sup>279</sup>

Dr. Brilla reported that during an eight-week spring training program athletes had 2.5 times greater muscle strength gains than a placebo group.<sup>280</sup> **Any athlete looking to gain strength, increase athletic performance, and muscle mass should consider greatly increasing their magnesium intake, as well as zinc.**

*Muscle endurance and total work capacity,  
declines rapidly with nutritional deficiency in the  
area of key minerals like zinc and magnesium.*

“Magnesium is essential to a diet for people are under a lot of stress or want to experience the ultimate rush,” says Dr. James Thor, National Director of Extreme Sports Medicine. “Several reasons, one is if you are working out in a gym, or continual stress excessive amounts of lactic acid in the muscle have been linked to higher levels of anxiety,” Dr. Thor adds. Large amounts of magnesium are lost when a person is under stress.

The combination of heat and magnesium chloride increases circulation and waste removal and this principle can be applied during breaks in competition as well as after the game in deeply relaxing baths similar to Epsom salt baths, but much stronger. A magnesium chloride bath helps draw inflammation out of the muscles and joints. Dr. Mark Steckel recommends a hot bath with Epsom salts (magnesium sulfate) after a long run when the muscles are just aching. He also recommends soaking once a week “as a treat to your legs, just to keep them happy!” Switching to magnesium chloride takes the experience to an entirely new level of therapeutics.

*Transdermal magnesium chloride mineral therapy  
enhances recovery from athletic activity or injuries.*

A whole new world of sports medicine is going to explode onto the scene when athletes and coaches find out that magnesium chloride from natural sources is available for topical use. In this new and exciting breakthrough in sports medicine coaches can now treat injuries, prevent them, and increase athletic performance all at the same time. Magnesium chloride, when applied directly to the skin is transdermally absorbed. Transdermal magnesium chloride mineral therapy is ideal for athletes who need high levels of magnesium. Oral magnesium is much less effective than transdermal magnesium in the treatment of injuries and tired worn out muscles.

Until now it was thought that the best forms of supplemental magnesium were the ones chelated to an amino acid (magnesium glycinate, magnesium taurate) or a krebs cycle intermediate (magnesium malate, magnesium citrate, magnesium fumarate). These forms seem to be better utilized, absorbed, and assimilated. Some have correctly advised to stay away from oral intake of inorganic forms of magnesium like magnesium chloride (taken orally) or magnesium carbonate because they may not be absorbed as well and may cause gastric disturbances. But now we have a magnesium chloride lotion/bath salt that can be applied directly to the skin so dosage levels can be brought up safely to high levels without diarrhea and problems with absorption.

*Maximal contraction of the quadriceps is positively correlated to serum magnesium status.<sup>281</sup>*

Dr. Jeff Schutt insists that hamstring injuries can at least partially be avoided through nutritional support because contraction and relaxation is dependant on adequate cellular levels of magnesium. A shortened hamstring is a result of lack of available magnesium he says. Liquid magnesium chloride can be simply sprayed and rubbed into a sore Achilles tendon to decrease swelling. And soaking the feet in a magnesium chloride foot bath is the single best thing - apart from stretching - that you can do for yourself to protect from or recover from hamstring and other injuries. The only thing better is a full body bath or to have a massage therapist use it to rub it in as they work deeply on the muscles.

*The heavy use of magnesium for athletic performance will be enough to make a difference between winning and losing on a regular basis.*

Magnesium is the single most important mineral to sports nutrition. Adequate magnesium level will help your body against fatigue, heat exhaustion, blood sugar control, and metabolism. It also offers part of the secret why athletes die young -- magnesium levels in tissue analysis are usually very low, and often mercury very high in athletes who have heart attacks. Congestive heart failure patients have recently been reported to have 22,000 times more mercury and 14,000 times more antimony in their hearts.<sup>282</sup>

Zinc, chromium and selenium in addition to magnesium are lost in the sweat<sup>283-284</sup> or in the actual accelerated metabolism of strenuous exercise and are difficult to replenish.<sup>285</sup> When we sweat, we lose more than just water. Other components of sweat include electrolytes, principally sodium and magnesium. Loss of magnesium by sweating takes place at an accelerated pace when there is a failure in sweat homeostasis, a situation which arises when exercise is made in conditions of damp atmosphere and high temperature.<sup>286</sup> **Increased energy expenditure causes an increase in magnesium requirements.** Selenium is important in that it neutralizes the toxic effects of mercury and this is especially important for athletes who have a mouth full of mercury containing dental amalgam.<sup>287</sup> Beware the sports people who say that the amount of magnesium lost through sweat is negligible, making magnesium supplementation unnecessary.<sup>288</sup> Dr. Sarah Mayhill says, "Heavy exercise also makes you lose magnesium in the urine and explain why long distance runners may suddenly drop dead with heart arrhythmias." Magnesium intake is most

often marginal at best and heavy exercise is a factor that is particularly likely to expose athletes to magnesium deficit through metabolic depletion linked to exercise.

*Magnesium depletion and deficiency play a role  
in the pathophysiology of physical exercise.<sup>289</sup>*

Many in sports medicine think that supplements should only be taken when there is proof that the diet cannot provide the quantities of nutrients needed and that supplements require a proper medical diagnosis and should only be prescribed by the sports physician and dietician in writing. Some go as far as insisting that fitness coaches and conditioning staff should not prescribe any supplements. But trainers need to be aware of anything that would enhance or help reduce the amount of time for rehabilitation due to an injury. The job of trainers and coaches is to prevent injuries or to get the players well as fast as possible.

Everyone involved in athletics need to be acutely aware that the medical industrial complex is not going to act in the best interests of athletes. Many are becoming more conscious about how good ideas and sound natural medicine are being professionally suppressed by intricate campaigns of discreditation, spun by the vested interests of corporate science and backed by the pharmaceutical industry and even the government which is in bed with the drug companies. The last thing they do want athletes or the general public to know is that it is now virtually impossible to receive needed and necessary nutrition from foods grown from modern agricultural methods. Nutritional values of foods have been dropping precipitously over the last fifty years and the increasing toxic exposures put additional demands on an athlete's nutritional status. This is especially true with magnesium. There is virtually no one that cannot benefit greatly from increasing daily magnesium intake. In terms of health and longevity magnesium is essential. For the professional athlete it means the difference between winning and losing.



## Testimonials

I am an older woman who has been diagnosed with a terminal Heart Condition, Diabetes, High Blood Pressure, and Neuropathy. Over a year ago, I had a major heart attack, which killed the entire back of my heart, leaving only a damaged front of my heart to carry the load.

My Dr. told me I would die shortly and to get my papers in order. His response when I disagreed with his prognosis was to offer more drugs to help me deal with my “denial”. In essence taking away any hope I had to survive.

At that point, I decided to look for a Cardiologist who would be open to alternative methods of healing, allow me to be involved, and would most importantly allow me to have hope. After months of unsuccessful appointments with closed-minded Dr’s, I decided to take my healing into my own hands, and began my quest for a form of natural healing on my own.

I stopped taking all prescription drugs and began experimenting with various alternative methods, techniques, and products, in hope of finding a “Miracle Cure”. I felt no effect from some of things I tried, with others I felt a little improvement, but nothing made any real difference in my pain level or my incredible weakness. No matter what I did, I could not regain my strength or alleviate my continuous pain.

Then a friend of mine (Bless his heart) sent me some Essence of Life magnesium oil. The first day I sprayed a little below my ears, on some glands that had been swollen for 20 years. Now I am serious, for 20 years, every single day, these glands had been swollen and sensitive to touch. When I got up the next morning, I decided to spray a little more on the glands, but when I began to rub the oil in, I noticed there was NO swelling. The swelling wasn’t reduced after 20 years - it was suddenly gone!

That was the beginning of my love affair with Magnesium Oil. After 2 weeks of spraying it on my body 3-5 times a day, I now have periods each day where I am pain free, and I am discovering more strength each day! It is incredible! This is the first product I have found that has given me such immediate and powerful results.

I absolutely love this product and believe it has saved my life. I do not type these words casually; I was a dying woman and could feel my life force ebbing away each day. I now feel my strength and life force building in me, and know that I will heal. I cannot thank the makers and distributors of Essence of Life Magnesium oil enough.

I believe this magic oil knows no limits in healing, and I wish the Blessing of Magnesium oil on anyone who is sick or in need of healing.

When we first started talking about the magnesium I was dying. I knew it inside. I am no longer dying. I feel life in me. I am so happy.

J. Jones  
Washington State

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Interestingly, right when the magnesium oil came I was having a strong cramp in my neck and shoulder, which I sometimes get from the computer. When I get it, it usually comes on for a day, until it is excruciating, and nothing makes it go away except the passage of a couple days' time. Well, I thought, I'll see if this magnesium stuff works like they say, and I rubbed one small squirt into my left neck and shoulder. Within 5 minutes the pain was gone, and I did not get several days of excruciating pain, like I usually do. Since that time I've used it on a couple other muscle aches with success, a couple of skin scratches that weren't healing very fast, and they were healed in a couple of days. I've tried it on a nagging joint pain in my left shoulder, which it hasn't helped so far. I did use it last night on a sore throat I felt coming on, and it was gone before I went to bed. I think you may be onto something with this!

Skip J.

We have just started using the Mg products. The bath is especially relaxing. Elaine and I sleep the night through after an evening 20-minute soak in 2 Oz Mg bath salts in hot bath. Elaine usually gets up often in the night. I am also spraying Mg oil onto my toothbrush with toothpaste, as well as in mouthwash. I also use it in my niddy pod, a little tea-pot looking container filled with water and some sea salt, the pours through one nostril and exits the other. Elaine is

using the gel on her feet to relieve the peripheral neuropathy pain and hopefully rebuild the nerve cells.  
Ken Norton

I've just started using the magnesium oil on my 7yr old ASD son. He's always tested very low in magnesium and I don't believe oral supplementation is doing that much. I put a few tablespoons of the oil in his bath water, and I also spray it onto my hands & rub it into his skin (tops of his feet & elbows). The reason I chose his elbows was because he's had this rash (large, bumpy, flesh colored) for quite some time. The magnesium stung at first when I rubbed it on, but after just a few nights, the rash is gone from one elbow and fading from the other!  
Rose Langford

## Eyes

The Oblique muscle actually loops around the eye through a loop of tissue under the forehead. Its purpose is obviously not to orient the eye as in training on an object, but to actually squeeze the eye like a belt around a water balloon. This gentle squeezing produces a tiny, less than a millimeter change in the length of the eye and actually lengthens it for near focusing. A nearsighted person has chronic partial spasms in this muscle so it never completely releases. Therefore the eye is always configured for near vision. Nearsighted people often have pain above the eye under the eyebrow due to this tension and stress. Conversely, a farsighted person sometimes experiences pain in the temples where some of the Oblique muscles underlie. Hypertonic Oblique muscles reflexively inhibit the Oblique muscle and the eye is always predisposed to distant vision and eventually due to lack of innervations, the Oblique muscle becomes more and more useless.

After reading about unwinding spasms with Magnesium Oil, I diluted a little in an eyedropper bottle until the salinity was neutral to my tears and comfortably dropped it into my eyes. The effect is subtle, but I experienced some of my best distant vision (my challenge is nearsightedness) a day after using the drops for two days.

Sam Patterson

## Parkinson's Disease

I have completed my first day of magnesium oil therapy on William who has had Parkinson's for over 20 years. I am hoping for a revival of functionality but not with high expectations because of the severity and duration of his symptoms.

His condition before starting the magnesium oil was: He couldn't talk at all. Could not articulate what-so-ever! He was barely functional and did nothing voluntarily. No exercise and no attempt to stop drooling. The drooling was getting so bad and so constant that I was beginning to isolate him to his bedroom in his big recliner because the carpets are new here and the enzymes of the saliva stain permanently. And it appeared to be getting worse by the week. That's how he was. He also had started getting violent with me. If I pushed him too hard he would fly into a rage and hit me with whatever he could lay his hands on.

I applied the magnesium oil twice yesterday and he woke this morning and washed his own face, cleaned his teeth and put on his robe by himself - without being told to do these things. This is unheard of and hasn't happened for 2 years. What is more, he is not drooling. The drooling has been massive and absolutely uncontrollable for about a year. His swallowing reflex is simply going. He has had his nutritional drink, his coffee, his brain formula, fresh veggies, and scrambled eggs and hasn't drooled once. So, my hope is high. This is the best I've seen for a very long time.

After only three days interestingly his speech has been much better over all. I am applying it faithfully 3 times a day all over him. I will just keep up the application and let time do the explaining. I am very encouraged by the improvement in speech. I honestly did not expect to see any results. His eyes are brighter, the concentration is longer and better and the speech is much improved. By no means has he become a "toastmaster" but at least he can string 2 or 3 words together now and does not freeze up completely.

Most recently he has been quite violent. For example he thrashed me over the head with a plastic ladle one day so quickly that he got in 6 or 7 good thwacks before I could snatch it away from him. But since starting the magnesium oil, his demeanor has improved immensely. No more surly ugly looks, no more stubborn refusals to swallow or do something that I ask him to do. Great improvement and best of all he is now able to communicate so he can tell me what he wants and needs.

I am glad that I ordered a gallon of the magnesium oil. I figure that it may take a gallon to see any meaningful results. After 3 + weeks his speech is still much improved. It seems to be stable now. He couldn't give any lectures at Harvard, but he can make himself understood as to what he needs or wants. As I said prior to the magnesium treatment he couldn't speak well enough to communicate anything.

Nancy English Vinal

## **ADHD**

I wanted to first thank you from the bottom of my heart and soul for the magnesium oil. I do see a change in my son Dane when we use it. The best change that I have seen is when Dane soaks in a tub before bed time he sleeps about 75% better. That is a good thing because he has always had a problem with sleep. He is medicated to help him sleep but even then, he does not rest well, talking in his sleep, flipping and flopping all night long, but after a soak that is reduced greatly.

I'm not saying that he is normal and completely calm, but any difference is good. He is a very high energy child, way too much energy for one kid. He tells me that he loves his magnesium. He insists that he feels calmer inside. I think you are on to something with this transdermal magnesium chloride lotion.

Think about all of the kids out there with ADHD and their parents who are willing to try anything to help calm their child. The only thing is that it needs to be used ever day consistently. It just doesn't work as well if you are not consistent. I guess his body can't hold on to the magnesium very long. In fact if he uses it before bed time he is good all night and by morning he is not as calm. But then I have been spraying him when he gets home from school.

Beth

## Autism & Varicose Veins

I've decided to sign up as a distributor for the magnesium chloride products because I've used them extensively in my healing practice and have had outstanding results. Previously I'd used and recommended Epsom salts, as they were cheap and easy for my clients to access. However, I found that epsom salts were drying on people's skin, especially at the high concentrations that I've found to be most useful for healing and detoxification. We also tried a number of sea salts, such as Dead Sea salts, but there's something subtly different about your magnesium that makes it work better.

I also use it extensively with my son. He had a lot of impulse control, focus, etc. issues, so we had him tested at the local university. Among other things, he was diagnosed with Asperger's Syndrome, which is a high functioning form of autism. During the evaluation, he was tested for a number of potential organic causes for his symptoms. His urine provocation test came back very high in several heavy metals. Apparently this is common in kids with autism spectrum disorders, one theory being that they are not as efficient at purging these toxins from their systems as "normal" kids. We've been successfully using biomedical approaches to treat him, including far infrared sauna sessions and supplements. One of the more helpful treatments has been consistent magnesium baths. DAN protocol suggests using epsom salts (if I understand correctly it's because it is magnesium sulfate and these kids need the sulfates as well as the magnesium). But the frequent epsom salt baths were very drying on the poor kid's skin. I switched over to your magnesium chloride for his baths, along with the Master's Miracle soap/neutrizer combo. My son loves those baths! He doesn't have to rinse after the baths, even though we're using quite strong concentrations of magnesium. And his skin is now soft and moist despite having several baths each week. The combination of the FIR sauna's and the magnesium baths have been very helpful in detoxifying his system, and have really calmed his behavior. His teachers, neighbors and other family members have all commented on how much better he can focus and track now. I recently started to periodically mix some epsom salts into the baths as well, just to make sure he's getting the benefits of the sulphates as well. Yet we mainly rely on the magnesiumchloride.

Also, my father passed away recently, and my Mom (who's in her 80's) has moved in with me. She'd gotten some very unsightly and uncomfortable varicose veins. She's not felt well enough to be able to get in and out of the bathtub, but I've been able to give her foot soaks in the Master's Miracle

soap/neutralizer/magnesium flakes almost every day. I've been spraying the magnesium oil on her feet and lower legs after the foot baths and rubbing it in as well. We were both pleasantly surprised to see her varicosities have shrunk considerably after a couple of weeks of this treatment. L.H.

### **More Testimonials**

I will tell you all the ways I have been using the mag oil, and I seem to be adding to them all the time. I have been 'curing' a couple of things and have lots of things to use it on. In fact it seems every week now, I am using it for more things.

I have been using the mag oil successfully on the pain and inflammation of arthritis in my knees. I have been rubbing lots of the mag oil on and around and under my knees, a couple of times a day. Also to get rid of both sinus headaches and also what I call "ME" headaches or headaches caused by Myalgic Encephalomyelitis.

I have been rubbing it under my eyebrows, on my temples, on my forehead and behind my ears and the edge of my skull around the sides and back for the sinus headaches and congestion (being careful not to get it into the eyes though) plus the top of my spine and into the back of my head for the ME headaches.

Also I broke out in boils a few weeks ago and have been rubbing it on them. The boils have been very painful the first few days as the tops come off and they seem to have what look like large pores all over them; but it does work.

Those baths are terrific! I am sleeping better, in spite of the boils, than I have in 10 years. By better, I mean I seem to sleep deeper and feel more rested, plus don't wake up as often at night and fall asleep easier.

My sinuses don't get nearly as congested at night now - they tried everything to stop my almost continuous sinus infections but nothing worked. I have been using a homeopathic mixture which does work; but I have to use it every night and after 4 months realized that it was costing me a lot of money and while I was sleeping better, it wasn't curing anything.

I rub it onto my gums - I have gingivitis. My gums don't bleed anymore. I get a lousy taste in my mouth sometimes, but spray it 3 or 4 times in my mouth and it goes away.

I also get swollen and painful glands in my neck -- didn't know I had so many glands until I got sick. Anyway, within 24 to 36 hours they will all clear up, after spraying the mag oil in the sides of my mouth and on my back molars, 3 times a day. I have gone for so long in the past with swollen glands that I have forgotten what my face really looks like. I also squirt it onto the back of my throat when I get a sore throat now too - it goes away. I was surprised - I tend to be skeptical. In my experience, things that work for one person don't necessarily work for others -- but this magnesium chloride seems to be different.

Frequently the glands under my arms and behind my knees also get sore and swollen. I have been rubbing it on these glands and it has been causing the pain and swelling to go away. That keeps coming back but it comes back less and less and goes away quicker. I tried just rubbing the glands without the mag just to see if I could get the same results - but it didn't work.

When I first started using it on my face and neck it 'burned' or stung a lot so diluted it with filtered water by 50%; after a week or so, then started using the mag gel; now doesn't sting anymore even with the undiluted mag oil. And my skin is much better; it does take away the wrinkles to a point. It sort of makes the skin smoother and makes the pores smaller. I have never found anything that truly does make the pores smaller before - those cosmetic face clay masks work for a few hours but my pores now seem to be permanently smaller.

It also exfoliates the skin. I know there are products out there in the cosmetic world that with much help from the consumer are supposed to do this -just never found one that worked nearly as well nor easily as the mag chloride oil. Can't remember when I last had such soft feet".

Shan Russell



## **Diabetic Testimonial**

I have been using magnesium oil now for about three months, and find it keeps my elevated blood pressure much lower without all the pills the doctor wanted me to be taking. It acts as a natural calcium channel blocker as research is showing. I am a diabetic and find this very encouraging to prevent complications.

I spray all over the body every day, and take a full bath 3 times a week with magnesium oil added. I can tell the baths are strong, and when I get upset, it helps to calm me even more than baths did without the oil...when daily stresses get to me, I run for a relaxing bath with magnesium oil now.

My husband has a blockage of an artery in his leg, and often had trouble with pain and soreness. He is on his feet all day long, and he can feel the muscles in his leg cramping. He used to come home from work limping. He sprays the oil on his leg, and sometimes we massage his leg with this oil....but even without the massage, he feels the difference within about 5 minutes of spraying the oil on. He says the oil itches at first, then the pain and cramping disappears. He has started to use the magnesium oil with a heat treatment, too, and lately he is not coming home limping anymore!

Research is also showing that magnesium has effects like statin drugs in lowering cholesterol. My husband's cholesterol used to be very high, and now it has also dropped significantly..... yes, he has improved his diet , but I can't help but wonder if magnesium oil is not also working it's wonders for this! He refused the advice on using a prescription drug from his MD, and tried magnesium instead with a lowering of bad cholesterol by almost 250 points, and is now back to very near acceptable levels, a truly gratifying surprise and benefit of increasing magnesium levels. We are both thrilled beyond words.

Claudia French RN, LPHA

## Warnings and Contraindications

Toxic symptoms from increased magnesium intake are not common because the body eliminates excess amounts unless there are serious problems with kidney function. Magnesium excess sometimes occurs when magnesium is supplemented as a medication (intravenously) because adding magnesium in very large doses, in isolation from other nutrients, can cause harmful effects on the body. In reality problems with magnesium supplementation usually occurs when the magnesium in the IV is given too rapidly and in too high of a dose or both.

There is the balance of calcium to magnesium to be kept in the range of 1:1 to 2:1. If more magnesium than calcium is taken then you are going to upset your calcium balance. This is not an issue though for people whose dairy intake is high. Most people today are getting too much calcium and not enough magnesium.

The ratio of minerals and vitamins to each other is important. Scientists from the University of Helsinki said, “The present average sodium intakes, approximately 3000-4500 mg/day in various industrialised populations, are very high, that is, 2-3-fold in comparison with the current Dietary Reference Intake (DRI) of 1500 mg. The sodium intakes markedly exceed even the level of 2500 mg, which has been recently given as the maximum level of daily intake that is likely to pose no risk of adverse effects on blood pressure or otherwise. By contrast, the present average potassium, calcium, and magnesium intakes are remarkably lower than the recommended intake levels (DRI). In USA, for example, the average intake of these mineral nutrients is only 35-50% of the recommended intakes. There is convincing evidence, which indicates that this imbalance, that is, the high intake of sodium on one hand and the low intakes of potassium, calcium, and magnesium on the other hand, produce and maintain elevated blood pressure in a big proportion of the population. Decreased intakes of sodium alone, and increased intakes of potassium, calcium, and magnesium each alone decrease elevated blood pressure. A combination of all these factors, that is, decrease of sodium, and increase of potassium, calcium, and magnesium intakes, which are characteristic of the so-called Dietary Approaches to Stop Hypertension diets, has an excellent blood pressure lowering effect.”<sup>290</sup>

In isolation and in too high a quantity anything can become a problem. There is a balance needed between minerals, trace elements and large amounts of magnesium used to treat disorders. Spirulina is offered as the ideal compliment to transdermal magnesium chloride therapy for it is a potent medicine in its own right and is another gift from the Waters of Life. Spirulina, which is high in chlorophyll, is probably the most potent food on planet earth and provides a complete list of all the minerals and trace elements as well as amino acids and fatty acids we need to sustain life. Anything that has chlorophyll has magnesium since it is the center of the chlorophyll molecule.

Some people and especially children might develop a rash from using the Magnesium Oil when applied directly to the skin. Many children, if the magnesium oil is used at full strength, will feel a burning or stinging and this can be painful and if this happens the oil should be washed off quickly. In such cases you need to dilute the magnesium oil 50/50 with distilled or mineral water and when the body acclimates to the magnesium one can then build up to the full concentration. A rule of thumb about dosage: It is always a good idea to start with low dose and work ones way gradually to higher doses. Whenever any kind of uncomfortable reaction occurs this is a sign to lower the dosage or concentration.

Magnesium is regulated and excreted primarily by the kidneys where various ATPase enzymes are responsible for maintaining homeostasis.<sup>291</sup> However hypermagnesemia can also occur in people with hypothyroidism, those using magnesium containing medications such as antacids, laxatives, cathartics, and in those with certain types of gastrointestinal disorders, such as colitis, gastroenteritis and gastric dilation, which may cause an increased absorption of magnesium.

Risk of magnesium toxicity is usually related to severe renal insufficiency, when the kidney loses the ability to remove excess magnesium. Individuals with impaired kidney function are at higher risk for adverse effects from magnesium supplementation and people with severe renal insufficiency should avoid magnesium supplementation or approach very carefully starting with very low dosages. Everyone needs magnesium and its deficiency itself can lead to problems in any part of the body including the kidneys. Magnesium is essential for life, as is air, and in no situation can the body live without it. Magnesium supplementation in children with dehydration or renal failure is also contraindicated so before beginning any kind of magnesium treatment any dehydration needs to be addressed.

Signs of excess magnesium symptoms can be very subtle and can occur with long term use of magnesium supplements and laxatives. The symptoms can be similar to magnesium deficiency and include: changes in mental status, nausea, diarrhea, appetite loss, muscle weakness, difficulty breathing, extremely low blood pressure, and irregular heartbeat. Though extremely rare severe magnesium intoxication is manifested by a sharp drop in blood pressure and respiratory paralysis. Disappearance of the patellar reflex is a useful clinical sign to detect the onset of magnesium intoxication. In the event of overdosage, artificial ventilation must be provided until a calcium salt can be injected i.v. to antagonize the effects of magnesium.

The most common cause of hypermagnesemia is renal failure. Other causes include the following:

- Excessive intake
- Lithium therapy
- Hypothyroidism
- Addison disease
- Familial hypocalciuric hypercalcemia
- Milk alkali syndrome
- Depression

Most adverse effects of parenterally administered magnesium (intravenous) are usually the result of magnesium intoxication. These include flushing, sweating, hypotension, depressed reflexes, flaccid paralysis, hypothermia, circulatory collapse, cardiac and CNS depression proceeding to respiratory paralysis. Hypocalcemia, with signs of tetany secondary to magnesium sulfate therapy for eclampsia, has been reported.

Intravenous administration of magnesium could accentuate muscle relaxation and collapse the respiratory muscles if given too rapidly or in too high a dosage. Patients with excessively slow heart rates should also be careful because slow hearts can be made even slower, as magnesium relaxes the heart. And when there is an obstruction in the bowel additional caution is required because the main route of elimination of oral magnesium is through the bowel.

Magnesium supplementation is known to interact with many different pharmaceutical drugs and it is wise to know what these are when treating our

patients. Certain drugs will increase the loss of magnesium in urine. Thus, taking these medications for long periods of time may contribute to magnesium depletion. On the other hand many antacids and laxatives contain magnesium. When frequently taken in large doses, these drugs can inadvertently lead to excessive magnesium consumption and hypermagnesemia, which refers to elevated levels of magnesium in blood.

Some recommendations on dosing related to medications when used with magnesium are:

#### **Doxycycline**

Magnesium may make doxycycline less effective. Take magnesium supplements 1 to 3 hours before or after ingesting doxycycline.

#### **Minocycline**

Magnesium may make minocycline less effective. Take magnesium supplements 1 to 3 hours before or after ingesting minocycline.

#### **Tetracycline Hydrochloride**

Magnesium may make tetracycline less effective. Take magnesium supplements 1 to 3 hours before or after ingesting tetracycline.

#### **The following diabetes medicines:**

Glipizide (Glucotrol®) and Glyburide (Micronase, Glynase, Diabeta). Taking magnesium and either Glipizide or Glyburide together may further lower blood sugar leading to blurred vision, tremor (shaking), hunger, sweating, headache, skipped heart beats, confusion, nervousness and extreme tiredness. Magnesium (also commonly found in antacids), may increase the absorption of glipizide and glyburide, medications used to control blood sugar levels. Ultimately, this may prove to allow for reduction in the dosage of those medications.<sup>292</sup>

The Magnesium Research Institute says that the drug Neurontin binds Mg in the GI tract and results in a malabsorption of both oral Mg and Neurontin (PDR says 24%). Interaction with Neurontin is important to note, because it is an antiseizure medication, and also used off label, frequently, as a mood stabilizer and behavioral drug, in addition to being used for Migraine Headaches. Some children with ASD may be on this medication. It is also used in Bipolar disorder, as an alternative to Lithium.

Taking magnesium and Mefenamic Acid (Ponstel) together may increase the amount of Mefenamic Acid absorbed, possibly leading to an increase in side-effects. Mefenamic Acid is a NSAID used for pain and PMS.

## Magnesium Chloride Therapy

Raul Vergini, MD - Italy<sup>293</sup>

A French doctor, A. Neveu, observed that Magnesium Chloride has no direct effect on bacteria (i.e. it is not an antibiotic). Thus he thought that its action was a specific, immune-enhancing, so it could be useful, in the same manner, also against viral diseases. So he began to treat some cases of poliomyelitis, and had good results. And then found the same good results in: pharyngitis, tonsillitis, hoarseness, common cold, influenza, asthma, bronchitis, broncho-pneumonia, pulmonary emphysema, "children diseases" (whooping-cough, measles, rubella, mumps, scarlet fever...), alimentary and professional poisonings, gastroenteritis, boils, abscesses, erysipelas, whitlow, septic pricks (wounds), puerperal fever and osteomyelitis.

But the indications for Magnesium Chloride therapy don't end here. In more recent years other physicians (and I among these) have verified many of Delbet's and Neveu's applications and have tried the therapy in other pathologies: asthmatic acute attack, shock, tetanus (for these the solution is administered by intravenous injection); herpes zoster, acute and chronic conjunctivitis, optic neuritis, rheumatic diseases, many allergic diseases, spring-asthenia and Chronic Fatigue Syndrome (even in cancer it can be an useful adjuvant).

The preceding lists of ailments are by no means exhaustive; maybe other illnesses can be treated with this therapy but, as this is a relatively "young" treatment, we are pioneers, and we need the help of all physicians of good will to definitely establish all the true possibilities of this wonderful therapy. From a practical standpoint, please remember that only Magnesium CHLORIDE has this "cytophilactic" activity, and no other magnesium salt; probably it's a molecular, and not a merely ionic, matter.

The solution to be used is a 2.5% Magnesium Chloride hexahydrate ( $MgCl_2 \cdot 6H_2O$ ) solution (i.e.: 25 grams / 1 liter of water). Dosages are as follows:

Adults and children over 5 years old 125 cc  
 4 year old children 100 cc  
 3 year old children 80 cc  
 1-2 year old children 60 cc

Over 6 months old children 30 cc  
Under 6 months old children 15 cc

These doses must be administered BY MOUTH. The only contraindication to Magnesium Chloride Therapy is a severe renal insufficiency. As the magnesium chloride has a mild laxative effect, diarrhea sometimes appears on the first days of therapy, especially when high dosages (i.e. three doses a day) are taken; but this is not a reason to stop the therapy. The taste of the solution is not very good (it has a bitter-saltish flavor) so a little of fruit juice (grapefruit, orange, lemon) can be added to the solution, or it can be even used in the place of water to make the solution itself.

For CHRONIC diseases the standard treatment is one dose morning and evening for a long period (several months at least, but it can be continued for years). In ACUTE diseases the dose is administered every 6 hours (every 3 hours the first two doses if the case is serious); then space every 8 hours and then 12 hours as improvement goes on. After recovery it's better going on with a dose every 12 hours for some days.

As a PREVENTIVE measure, and as a magnesium supplement, one dose a day can be taken indefinitely. Magnesium Chloride, even if it's an inorganic salt, is very well absorbed and it's a very good supplemental magnesium source.

For INTRAVENOUS injection, the formula is: Magnesium Chloride hexahydrate 25 grams Distilled Water 100 cc. Make injections of 10-20cc (very slowly, over 10-20 minutes) once or twice a day. Of course the solution must be sterilized. This therapy gives very good results also in Veterinary Medicine, at the appropriate dosages depending upon the size and kind of animals.



## The Role of Magnesium in Fibromyalgia

By Mark London

Magnesium is important for people with fibromyalgia. Not only is our daily intake low, but we eat a diet which increases the demand for magnesium. And unfortunately, urinary magnesium loss can be increased by many factors, both physical and emotional. Magnesium loss increases in the presence of certain hormones. Stress can greatly increase magnesium loss. Thus the chances are almost 100 percent that a person with fibromyalgia has a magnesium deficiency since people with fibromyalgia often have high levels of stress and a disrupted hormonal system. Magnesium utilization is also increased by the presence of estrogen, and this might explain why many women are diagnosed with fibromyalgia after menopause, when estrogen levels would decrease.

Additionally, the sleep disruption which occurs in fibromyalgia might also affect magnesium utilization, as sleep deprivation has been shown to cause lower magnesium levels.<sup>294</sup> The reason lack of sleep causes a magnesium deficiency is probably due to the lower amounts of growth hormone secretion which occurs due to a sleep disturbance, especially the type that is found in people with fibromyalgia.

Low levels of ATP have commonly been found in people with fibromyalgia, and it is believed that this plays an important role in many of the fibromyalgia symptoms. Thus, a magnesium deficiency would definitely be a factor in worsening those symptoms. Magnesium is extremely necessary for proper ATP synthesis, because ATP is stored in the body as a combination of magnesium and ATP, which is known as MgATP. ATP requires magnesium in order to be stable. Without magnesium, ATP would easily break down into other components, ADP and inorganic phosphate. The brain heavily relies ATP for many functions. In fact, 20% of total body ATP is located in the brain. Thus, low levels of ATP can diminish brain cognitive functions, a common problem in people with fibromyalgia.

Adequate magnesium is necessary for proper muscle functioning. Magnesium deficiency promotes excessive muscle tension, leading to muscle spasms, tics, restlessness, and twitches. This is due to an imbalance of the ratio of calcium to magnesium, as calcium controls contraction, while magnesium

controls relaxation. Plus, in fibromyalgia, changes are seen in the muscles, such as "significantly lower than normal phosphocreatine and ATP levels" and "values for phosphorylation potential ... also were significantly reduced." All of these same changes are found also in magnesium deficiencies.<sup>295</sup>

It's because of magnesium's ability to regulate nerve functions that other fibromyalgia symptoms occur. Migraine headaches, mitral valve prolapse, and Raynaud's phenomenon, all problems commonly found in people with fibromyalgia, are also problems that have been associated with a magnesium deficiency. Without enough magnesium nerves fire too easily, even from minor stimuli. Noises will sound excessively loud, lights will seem too bright, emotional reactions will be exaggerated, and the brain will be too stimulated to sleep, all symptoms commonly found in fibromyalgia. And if the oversensitivity to light and noise reminds you of someone suffering from a hangover, they are one and the same problem, as alcohol is known for decreasing magnesium levels, and magnesium supplementation has been found to relieve hangover symptoms.

Magnesium is thus involved in many functions in the body, and so it's no wonder that the chemical brain imbalances in fibromyalgia somehow seem connected to processes involving magnesium. **It's because magnesium is involved in so many processes in the body, that a deficiency has a spiralling effect.** Low magnesium levels cause metabolic functions to decrease, causing further stress on the body, reducing the body's ability to absorb and retain magnesium. A marginal deficiency could easily be transformed into a more significant problem. Any stressful event could trigger magnesium loss, so one could postulate that stressful events which trigger fibromyalgia are doing so by creating a high loss of magnesium. Perhaps people in a fibromyalgia flare could be helped by additional magnesium.

Unfortunately, magnesium deficiency is not easily detected, as serum levels do not reflect the levels of magnesium in tissues. This is the reason why it is so overlooked and ignored, both by doctors and by studies. And unfortunately, **oral magnesium supplementation can be difficult because of absorption problems.** Digestion and diet play a key role in absorption. People with fibromyalgia often have conditions like Irritable Bowel Syndrome, gluten intolerance, or other problems that might limit absorption. Excess amounts of certain substances, such as fructose, may interfere with magnesium absorption. Phosphate can bind to magnesium in the gut, creating magnesium phosphate, an insoluble salt that can't be utilized. Many forms of oral magnesium supplements are hard to assimilate. The most common, magnesium oxide and

citrate, happen to be the worst to assimilate, which is why both have a strong laxative effect. If you suffer from diarrhea from taking oral magnesium, it is often not because you are taking too much, but because you are not assimilating it well.

While most symptoms which are directly due to magnesium are reversible, magnesium indirectly causes problems that may not be reversible. Combined aluminum intoxication with calcium-magnesium deficiencies is not reversible through oral magnesium supplementation. Chronic magnesium deficiency can produce irreversible lesions in the brain.

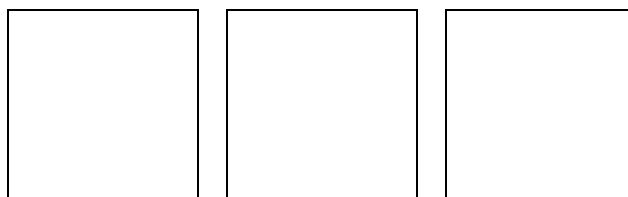
I personally started taking magnesium for spasms and facial tics, only doing so on my own after neurologists simply told me to either get better sleep or take a prescription drug. The magnesium helped almost immediately, and I then slowly increased the dose to about 225% the RDA (balanced with 100% calcium RDA) At that point, all spasms and tics stopped completely, and they have not returned since starting that dose several years ago. I doubt any traditional doctor would have been willing to prescribe that much magnesium. The RDA is 400mg, but many people believe this is too low. Traditionally, it's been recommended to take calcium and magnesium in a ratio of 2/1, because that is the ratio that these minerals are found in bone. But magnesium is less easily absorbed than calcium, so this ratio may not be valid for a lot of people, and in fact many cal-mag combinations found in health food stores often have additional magnesium.

Magnesium is just one of many helpful remedies and/or supplements for that might be helpful for fibromyalgia. It's not a cure, but it may be helpful in relieving some of the symptoms.

## Product Information

This book introduces a new magnesium product, a magnesium chloride taken from the ocean. It is very different from the crystal or powdered magnesium chloride created industrially with hydrochloric acid. The Magnesium Oil is considerably less toxic in terms of heavy metals than industrial fabricated magnesium chloride and is considerably more concentrated. There is approximately twice as much elemental magnesium as in magnesium oils that are created from magnesium chloride powder or crystal. The Magnesium Oil from Global Light is between 31 to 35 percent magnesium chloride by weight.

<http://wellness.globallight.biz/>



I product that I have used personally that combines high dosage oral magnesium with natural detoxification and chelation is Chelorex. Chelorex™ is safe and effective approach to heavy (toxic) metal chelation. When building a mega-magnesium protocol using Chelorex for oral magnesium and general detoxification is a good idea. Chlorex is an excellent source of magnesium, selenium and zinc, plus ascorbic acid, Vitamin E and a whole list of natural agents and amino acids that facilitate detoxification of the body. We are all exposed to toxic metals from a polluted environment everyday, from the air we breathe, the water we drink and other possible sources depending on where we live or work. For more information please visit:

<http://magnesiumforlife.com/wellness/mercury.shtml>

If you needed that extra nudge to start feeding your kids organic food, here it is: In a recent U.S. EPA-funded study, 23 Seattle-area youngsters were switched to an all-organic diet, and the levels of pesticides in their bodies

declined to essentially zero after only five days. When the kids started eating conventionally grown food again, their pesticide levels shot back up. The study, published in Environmental Health Perspectives clearly shows that pesticide-free food leads to pesticide-free kids. United Press International, Christine Dell'Amore, 22 Feb 2006

I was lucky enough to be found by <http://www.Bulknuts4you.com> and <http://wellnesshealth.wholefoodfarmacy.com/2005/> who are a good source of foods high in magnesium. I seriously recommend the purchase of Brazil Nuts and Toasted Sesame Seeds (very high in magnesium and calcium) and in general use organic whole grain foods, all of which you will find at this site. For everyone who has not heard of nutritional yeast I highly recommend it as a source of B vitamins and many other wonderful nutritional things. It is up there with spirulina in my eyes. It is exceptionally good tasting and can be used in or on almost everything.

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- <sup>4</sup> - Aikawa LK, Magnesium: Its Biological Significance, CRC Press, Boca Raton, FL, 1981
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[http://www.mercola.com/2004/nov/24/modern\\_medicine.htm](http://www.mercola.com/2004/nov/24/modern_medicine.htm)
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- <sup>11</sup> - <http://www.mgwater.com/prev1801.shtml>
- <sup>12</sup> Galan, P., Preziosi, P., Durlach, V., Valeix, P., Ribas, L., Bouzid, D., Favier, A. & Hercberg, S. (1997) Dietary magnesium intake in a French adult population. *Magnes. Res.* 10:321-328. [Medline]
- <sup>13</sup> **Enzymes of carbohydrate metabolism** glucokinase, hexokinase, galactokinase, phosphorylase phosphatase, phosphorylase kinase, phosphoglucomutase, 6-phosphofructokinase aldolase, triokinase, fructose-1,6-bisphosphatase, glucose-6-phosphatase, glucose-6-phosphate dehydrogenase, transketolase, phosphoglycerate kinase, phosphoryl glycerylmutase, enolase, pyruvate kinase, thiamine-pyrophosphate kinase, pyruvate decarboxylase, glycerokinase, glycerophosphatase, various pentoside kinases that activate B vitamins. **Enzymes of nucleic acid and protein metabolism:** RNA polymerase which allows the synthesis of RNA and especially that of messenger RNA which, associated with post-ribosomal factors of initiation and elongation and with polyamines, codes for amino acids to produce specific proteins; DNA polymerase which allows the reconstitution and recombination of DNA, ornithine carbamyl transferase, glutamine synthetase, carbamate kinase, argininosuccinate synthetase, creatine kinase, insulinase, leucine aminopeptidase which appears to be similar to hypertensinase. **Enzymes of lipid metabolism** acetylcoenzyme A synthetase, acylco A synthetase, beta-ketothiolase, diglyceride kinase, phosphatidate phosphatase, mevalonate kinase, phosphomevalonate kinase, lecithin-cholesterol-acyl transferase (LCAT).
- <sup>14</sup> The phosphoric anhydride bond that is found mainly in ATP or adenosine triphosphate, "the main fuel of life" (13), but also in GTP (guanosine triphosphate) as well as in other nucleoside triphosphates such as UTP (uridine triphosphate), CTP (cytosine triphosphate) and ITP (inosine

triphosphate). It is also found in the phosphoamide bond of phosphocreatine, the phosphoenol bond of phosphoenolpyruvic acid, the mixed anhydride bond of 1,3-diphosphoglyceric acid and in the bond between an acid and a thiol group as in acyl coenzyme A or succinyl coenzyme A.

<sup>15</sup> A Machoy-Mokrzynska. Fluoride\_Magnesium Interaction. Fluoride (J. of the International Society for Fluoride Research), Vol. 28 No. 4; November, 1995, pp 175-177

<http://www.mgwater.com/fl2.shtml> Institute of Pharmacology and Toxicology, Pomeranian Medical Academy, Szczecin, Poland.

<sup>16</sup> Bernard Rimland. While no patient has been cured with the vitamin B6 and magnesium treatment, there have been many instances where remarkable improvement has been achieved. In one such case an 18-year-old autistic patient was about to be evicted from the third mental hospital in his city. Even massive amounts of drugs had no effect on him, and he was considered too violent and assaultative to be kept in the hospital. The psychiatrist tried the B6/magnesium approach as a last resort. The young man calmed down very quickly. The psychiatrist reported at a meeting that she had recently visited the family and had found the young man to now be a pleasant and easy-going young autistic person who sang and played his guitar for her. <http://www.autism.org/vitb6.html>

<sup>17</sup> C. M. Banki, M. Arato and C. D. Kilts. Aminergic studies and cerebrospinal fluid cations in suicide. Annals of the New York Academy of Sciences, Vol 487, Issue 1 221-230, Copyright © 1986 by New York Academy of Sciences

<sup>18</sup> This is the first experimental study in which magnesium intakes were tightly controlled and EEG measurements were analyzed by computer so they could be statistically compared.

<sup>19</sup> <http://www.ars.usda.gov/is/np/fnr/fnr1095.htm#calm>

<sup>20</sup> <http://www.sciencedaily.com/releases/2004/12/041219164941.htm>

<sup>21</sup> King D, Mainous A 3rd, Geesey M, Woolson R. Dietary magnesium and C-reactive protein levels. J Am Coll Nutr. 2005 Jun 24(3):166-71.

<sup>22</sup> Is Agrobusiness Making Food Less Nutritious?

[http://www.motherearthnews.com/library/2004\\_June\\_July/Is\\_Agribusiness\\_Making\\_Food\\_Less\\_Nutritious\\_](http://www.motherearthnews.com/library/2004_June_July/Is_Agribusiness_Making_Food_Less_Nutritious_)

<sup>23</sup> [www.eatwild.com](http://www.eatwild.com)

<sup>24</sup> Paul Mason. Violence Prevention through Magnesium-Rich Water. Healthy Water Association. <http://www.mgwater.com/cyalettr.shtml>

<sup>25</sup> Altura BM, Introduction: importance of Mg in physiology and medicine and the need for ion selective electrodes. Scand J Clin Lab Invest Suppl, vol. 217, pp. 5-9, 1994

<sup>26</sup> Institute of Medicine, Dietary Reference Intake for Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride, National Academy Press, Washington DC, 1997

<sup>27</sup> U.S. Dept. of Health, Agency for Toxic Substances and Disease Registry, Division of Toxicology, December 16, 1991. <http://www.mgwater.com/fluoride.shtml>

<sup>28</sup> <http://www.lef.org/>

<sup>29</sup> Oral Magnesium Chloride, Magnesium Citrate Magnesium Gluceptate, Magnesium Gluconate, Magnesium Hydroxide, Magnesium Lactate, Magnesium Oxide, Magnesium Pidolate, Magnesium Sulfate.

<sup>30</sup> There are a number of factors that can prevent the uptake of minerals, even when they are available in our food. The glandular system that regulates the messages sent to the intestinal mucosa require plentiful fat-soluble vitamins in the diet to work properly. Likewise, the intestinal mucosa requires fat-soluble vitamins and adequate dietary cholesterol to maintain proper integrity so that it passes only those nutrients the body needs, while at the same time keeping out toxins and large, undigested proteins that can cause allergic reactions. Minerals



may "compete" for receptor sites. Excess calcium may impede the absorption of manganese, for example. Lack of hydrochloric acid in the stomach, an over-alkaline environment in the upper intestine or deficiencies in certain enzymes, vitamin C and other nutrients may prevent chelates from releasing their minerals. Finally, strong chelating substances, such as phytic acid in grains, oxalic acid in green leafy vegetables and tannins in tea may bind with ionized minerals in the digestive tract and prevent them from being absorbed

<sup>31</sup> <http://ods.od.nih.gov/factsheets/magnesium.asp#en9#en9>

<sup>32</sup> Crippa G, Sverzellati E, Giorgi-Pierfranceschi M, et al. Magnesium and cardiovascular drugs: interactions and therapeutic role. *Ann Ital Med Int.* 1999 Jan; 14(1):40-5.

<sup>33</sup> Experimentally Magnesium has been shown to have a role in myocardial salvage, possibly by inhibiting calcium influx to ischaemic myocytes and/or by reducing coronary tone. It has also been shown to increase the threshold for depolarisation of cardiac myocytes, theoretically reducing the risk of malignant arrhythmia. In healthy humans it can reduce peripheral vascular resistance and increase cardiac output with no effect on cardiac work.

<sup>34</sup> He credited the immuno-stimulant activity to the solution for this result, and he tested it in some other diphtheric patients. All the patients were cured in a very short time (24-48 hours), with no after-effects. As Magnesium Chloride has no direct effect on bacteria (i.e. it is not an antibiotic), Neveu thought that its action was aspecific, immuno-enhancing, so it could be useful, in the same manner, also against viral diseases. So he began to treat some cases of poliomyelitis, and had the same wonderful results. He was very excited and tried to divulge the therapy, but he ran into a wall of hostility and obstructionism from "Official Medicine". Neither Neveu or Delbet (who was a member of the Academy of Medicine) was able to diffuse Neveu's extraordinary results. The opposition was total: Professors of Medicine, Medical Peer-Reviews, the Academy itself, all were against the two doctors.

<sup>35</sup> J. I. Rodale in his book *Magnesium, The Nutrient that could change your life*. "There is, on the average, only one of these cells for each 150 of the red blood cells. These white corpuscles have a unique power. When the bloodstream is invaded by harmful bacteria or any other foreign matter, these white cells are somehow attracted to the source of the invasion, such as a wound, and go to work actually swallowing, and digesting the foreign matter and thus rendering it harmless. They do the same with any foreign bodies that infiltrate the bloodstream. They are the body's first and most important defense against all types of infection. But to increase the number of such cells circulating in the bloodstream would be a very dangerous thing. Leukemia, cancer of the blood, is marked by precisely such an increase. The destructive capacity of these cells is so great that their numbers must be kept at normal proportions for fear of the damage they might do our own systems if they got out of hand. Dr. Pierre Delbet claims that magnesium can do exactly this, strengthen the white cells without increasing their number. In a paper submitted in collaboration with Dr. Karalanopoulo to the French Academy of Science, September 6, 1915, titled *Cytophylaxis*, which means work done by the white cells or phagocytes in destroying invaders of the bloodstream. Delbet says, "A solution of magnesium chloride at 12.1 parts per 1,000 gave extraordinary results. It increased the proportion of phagocytosis [killing microbes] by 75 per cent as compared with the solution of sodium chloride at 8 parts per 1,000 which itself gave 63 per cent more than the Locke-Ringer's solution. The increase is based on the number of polynucleates [white cells] as well as the phagocytic [germ-destroying] power of each of them. "These experiments prove that a solution of desiccated chloride of magnesium at 12.1 parts per 1,000 has a special effect on the white corpuscles, which is not the case with either physiological serum [a solution of chloride of sodium at seven parts per 1,000] or seawater, or the solution of Locke-Ringer which was



considered best for maintaining the activity of cells. "Consequently, a solution of chloride of magnesium was better than all the solutions previously used in the washing and dressing of wounds."

<sup>36</sup> In another communication to the French Academy of Medicine (September 7, 1915), Dr. Delbet describes researches that proved the effectiveness of magnesium within the body. He injected 150 cc. of a solution of magnesium chloride into the vein of a dog, taking a blood sample before the injection and a second one 35 minutes afterward. Then the white corpuscles were presented with microbes from the same culture to see their effect on or power to destroy them. Five hundred white cells in the first sample destroyed 245 microbes. Five hundred white cells from the second destroyed 681. This increase in microbe-killing under the influence of magnesium chloride was 180 percent over the other solutions. More experiments were performed; in one there was an increase to 129 percent, in another, 333 percent.

<sup>37</sup> Back in 1915, a French surgeon, Prof. Pierre Delbet, MD, was looking for a solution to cleanse wounds, because he had found out that the traditional antiseptic solutions actually mortified tissues and facilitated the infection instead of preventing it. He tested several mineral solutions and discovered that a Magnesium Chloride solution was not only harmless for tissues, but it had also a great effect over leucocytic activity and phagocytosis; so it was perfect for external wounds treatment. Prof. Delbet wrote two books, "Politique Preventive du Cancer" (1944) and "L'Agriculture et la Santé" (1945), in which he stated his ideas about cancer prevention and a better living. The first is a well documented report of all his studies on Magnesium Chloride.

<sup>38</sup> <http://ods.od.nih.gov/factsheets/magnesium.asp#en4#en4>

<sup>39</sup> **MAGNESIUM DEFICIENCY QUESTIONNAIRE**

Circle each yes answer which is given a numerical value.

When you finish, total your score.

--With 30-50, you likely have low magnesium.

--Over 50 & you most certainly have low magnesium.

YES	QUESTION...
2	Under excessive emotional stress
3	Irritable, or easily provoked to anger
2	Restless, or hyperactive
4	Easily startled by sounds or lights
2	Difficulty sleeping
3	Chronic headaches or migraines
2	Convulsions
3	Fine tremor or shakiness in your hands
3	Fine, barely noticeable muscle twitching around your eyes, facial muscles, or other muscles of your body
3	Muscle cramps
3	Muscle spasms in hands or feet
4	Gag or choke from spasms in your esophagus(food tube)
3	Have asthma or wheezing
2	Suffer from emphysema, chronic bronchitis, or shortness breath

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5	Have osteoporosis
3	Have you ever had a kidney stone
2	Suffer from chronic kidney disease
4	Have diabetes
3	Have an overactive thyroid, or parathyroid gland
3	Have high blood pressure
4	Have mitral valve prolapse (“floppy heart valve”)
3	Have very fast heart beats, irregular heart beats, or arrhythmia
3	Take Digitalis (Digoxin)
5	Take any kind of diuretic
5	Recent radiation therapy or exposure
4	Have more than 7 alcohol drinks weekly
3	Have you ever had a drinking problem?
2	Have more than 3 servings of caffeine daily
2	Eat sugar containing food daily
2	Crave carbohydrates &/or chocolate
2	Crave salt
2	Eat a high processed food/ junk food diet
2	Eat a diet low in green, leafy vegetables, seeds, & fresh fruit
2	Eat a low protein diet
2	Pass undigested food or fat in your stools
3	Suffer from chronic intestinal disease, ulcerative colitis, Crohn’s, irritable bowel syndrome
3	Frequent diarrhea or constipation
3	Suffer from PMS or menstrual cramps
2	Pregnant or recently pregnant
4	In previous pregnancy had high blood pressure or pre-eclampsia
2	Chronic fatigue
2	Muscle weakness
2	Cold hands &/or feet
2	Numbness in face, hands, or feet
2	Persistent tingling in body
2	Chronic lack of interest, indifference, or apathy
2	Poor memory
2	Loss of concentration
3	Anxiety

- 
- 2 Chronic depression for no apparent reason
  - 2 Feelings of disorientation as to time or place
  - 2 Feel your personality is stiff or mechanical
  - 2 Hallucinations
  - 2 Feel that people are trying to harm or persecute you
  - 2 Face pale, puffy, or lacking in color
  - 2 Loss of considerable sexual energy or vitality
  - 2 Been told by your Dr that your blood calcium is low
  - 3 Been told by your Dr that your blood potassium is low
  - 2 Take Calcium supplements regularly without magnesium
  - 2 Take iron or zinc supplements regularly without magnesium
  - 2 Know chronic exposure to fluorides
  - 3 Frequently use antibiotics, steroids, oral contraceptives, Indomethacin, Cisplatin, Amphotericin B, Cholestyramine, synthetic estrogens
- <--- TOTAL ...  
 Subtract 15 from your score if you daily supplement at least 600 mg of magnesium

<sup>40</sup> According to Dr. Seelig, “In Finland, which has a very high death rate from IHD, there is a clear relationship with heart disease and the amount of magnesium in the soil (Karppanen and Neuvonen, 1973). In eastern and in northern Finland, where the soil content is about a third of that found in southwestern Finland (Karppanen *et al.*, 1978) the mortality from ischemic heart disease is twice as high as is that in the southwest. Ho and Khun (1976/1980) surveyed factors that might be contributory both to the rising incidence of cardiovascular disease in Europe, and the falling levels of magnesium both in the soil and in the food supply. They commented that in Finland, which has the highest cardiovascular death rate in Europe, the dietary supply of magnesium had decreased by 1963 to a third of the intake common in 1911 (H. Katz, 1973). In contrast, in Japan with its low cardiac death rate, the daily magnesium intake was cited as 560 mg (Holtmeier, 1969a, 1973).” Recent evidence suggests that vitamin E enhances glutathione levels and may play a protective role in magnesium deficiency-induced cardiac lesions.

<sup>41</sup> Eades M, Eades A, *The Protein Power Lifeplan*, Warner Books, New York, 1999

<sup>42</sup> The source of menstrual cramps may come from eating too much cheese, yogurt, ice cream or milk, combined with insufficient whole grains and beans. Or it could come from taking too much calcium without enough magnesium. Modifying diet and increasing magnesium supplementation may allow menstrual cramps to disappear.

<sup>43</sup> Kaye, P. O'Sullivan, I. The role of magnesium in the emergency department. *Emergency Department, Bristol Royal Infirmary, Bristol, UK Emerg Med J* 2002; 19:288-291

<sup>44</sup> <http://list.weim.net/pipermail/holisticweim/2001-July/001023.html>

<sup>45</sup> <http://www.mgwater.com/prev1801.shtml>

<sup>46</sup> Pediatricians Say That Most US Kids Don't Get Enough Calcium  
<http://www.medpagetoday.com/Pediatrics/GeneralPediatrics/dh/2624>

<sup>47</sup> Signs and symptoms of hypercalcemia may include:

• Nausea	• Fatigue
• Vomiting	• Lethargy
• Stomach Pain	• Moodiness
• Constipation	• Irritability
• Anorexia	• Confusion
• Excessive thirst	• Extreme muscle weakness
• Dry mouth or throat	• Irregular heart beat
• Frequent Urination	• Coma

<sup>48</sup> Stendig-Lindberg G. Tepper R. Leichter I. Trabecular bone density in a two year controlled trial of peroral magnesium in osteoporosis. Department of Physiology and Pharmacology, Sackler Faculty of Medicine, Tel Aviv University, Israel. *Manges Res.* 1993 Jun;6(2):155-63.

<sup>49</sup> *Journal of the American Geriatric Society* (November, Vol 53, No 11, pp 1875-1880).

<sup>50</sup> We examined the effects of high calcium (Ca) intake on bone metabolism in magnesium (Mg)-deficient rats. Male Wistar rats were divided into three groups, with each group having a similar mean body weight, and fed a control diet (control group), a Mg-deficient diet (Mg-deficient group) or a Mg-deficient Ca-supplemented diet (Mg-deficient Ca-supplemented group) for 14 d. Femoral Ca content was significantly lower in the Mg-deficient Ca-supplemented group than in the control group and Mg-deficient group. Femoral Mg content was significantly lower in the Mg-deficient group and Mg-deficient Ca-supplemented group than in the control group. Furthermore, femoral Mg content was significantly lower in the Mg-deficient Ca-supplemented group than in the Mg-deficient group. Serum osteocalcin levels (a biochemical marker of bone formation) were significantly lower in the two Mg-deficient groups than in the control group. As a biochemical marker of bone resorption, urinary deoxypyridinoline excretion was significantly higher in the Mg-deficient Ca-supplemented group than in the control group and Mg-deficient group. The results in the present study suggest that high Ca intake had no preventive effect on alteration of bone metabolism in Mg-deficient rats. *Effects of high calcium intake on bone metabolism in magnesium-deficient rats.* *Magnes Res.* 2005 Jun;18(2):97-102.

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=16100847&itool=iconabstr&query\\_hl=10&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=16100847&itool=iconabstr&query_hl=10&itool=pubmed_docsum)

<sup>51</sup> *Br J Nutr.* The effect of moderately and severely restricted dietary magnesium intakes on bone composition and bone metabolism in the rat. 1999 Jul;82(1):63-71.

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=10655958&query\\_hl=12&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10655958&query_hl=12&itool=pubmed_docsum)

<sup>52</sup> In particular, these studies suggest that high calcium intake doesn't actually appear to lower a person's risk for osteoporosis. For example, in the large Harvard studies of male health professionals and female nurses, individuals who drank one glass of milk (or less) per week were at no greater risk of breaking a hip or forearm than were those who drank two or more

glasses per week. Other studies have found similar results. Additional evidence also supports the idea that American adults may not need as much calcium as is currently recommended. For example, in countries such as India, Japan, and Peru where average daily calcium intake is as low as 300 mg/day (less than a third of the US recommendation for adults, ages 19-50), the incidence of bone fractures is quite low. Of course, these countries differ in other important bone-health factors as well - such as level of physical activity and amount of sunlight - which could account for their low fracture rates. Calcium in Milk, Harvard School of Public Health; <http://www.hsph.harvard.edu/nutritionsource/calcium.html>

<sup>53</sup> North Western University; Nutrition Fact Sheet:  
<http://www.feinberg.northwestern.edu/nutrition/factsheets/magnesium.html>

<sup>54</sup> Shils ME. Magnesium. In: Shils M, Olson JA, Shike M, Ross AC, eds. Nutrition in Health and Disease. 9th ed. Baltimore: Williams & Wilkins; 1999:169-192.

<sup>55</sup> Other causes of renal magnesium wasting include aldosterone excess, most likely through chronic volume expansion, causing increased magnesium excretion; hypercalcemia due to increased competition for reabsorption with magnesium; Hypercalcemia inhibits magnesium reabsorption, probably through competition for passive transport through the renal system. Hypomagnesemia; Mahendra Agraharkar, MD,FACP **Updated:** June 20, 2002  
<http://www.emedicine.com/med/topic3382.htm>

<sup>56</sup> New York State Department of Health;  
<http://www.health.state.ny.us/diseases/conditions/osteoporosis/qanda.htm>

<sup>57</sup> Accu-Cell Nutrition; Calcium and Magnesium <http://www.acu-cell.com/acn.html>

<sup>58</sup> New York Times February 2, 2006

<sup>59</sup> Dietary Magnesium, Potassium, Sodium, and Children's Lung Function. Gilliland et al. Am. J. Epidemiol..2002; 155: 125-131.

<sup>60</sup> <http://www.mgwater.com/wellness.shtml>

<sup>61</sup> <http://www.foodnavigator.com/news/ng.asp?n=65593-enzyme-nutritional-obese>

<sup>62</sup> Addressing the assertion that changes in the methods of measuring the composition of food cannot account for the huge fall in nutrient content, Dr Tim Lobstein said, "Minerals are easy to detect and measure and have been since the 19th century. It is almost impossible that methods have changed so much that it would explain the huge difference between these figures. One of the key arguments is that today's agriculture does not allow the soil to enrich itself, but depends on chemical fertilizers that don't replace the wide variety of nutrients plants and humans need."

<sup>63</sup> <http://www.mgwater.com/wellness.shtml>

<sup>64</sup> Toward practical prevention of type 2 diabetes. McCarty MF. Med Hypotheses 2000;54:786-793.

<sup>65</sup> Migraine Awareness Group: a National Understanding for Migraineurs  
[http://www.migraines.org/about\\_media/ijim.htm](http://www.migraines.org/about_media/ijim.htm)

<sup>66</sup> Harrison, Tinsley R. Principles of Internal Medicine. 1994, 13th edition, McGraw-Hill, pp. 1106-15 and pp. 2434-35

<sup>67</sup> Shechter, Michael, et al. The rationale of magnesium supplementation in acute myocardial infarction: a review of the literature. Archives of Internal Medicine, Vol. 152, November 1992, pp. 2189-96

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<sup>68</sup> Ott, Peter and Fenster, Paul. Should magnesium be part of the routine therapy for acute myocardial infarction? *American Heart Journal*, Vol. 124, No. 4, October 1992, pp. 1113-18

<sup>69</sup> Dubey, Anjani and Solomon, Richard. Magnesium, myocardial ischaemia and arrhythmias: the role of magnesium in myocardial infarction. *Drugs*, Vol. 37, 1989, pp. 1-7

<sup>70</sup> England, Michael R., et al. Magnesium administration and dysrhythmias after cardiac surgery. *Journal of the American Medical Association*, Vol. 268, No. 17, November 4, 1992, pp. 2395-2402

<sup>71</sup> Yusuf, Salim, et al. Intravenous magnesium in acute myocardial infarction. *Circulation*, Vol. 87, No. 6, June 1993, pp. 2043-46

<sup>72</sup> Woods, Kent L. and Fletcher, Susan. Long-term outcome after intravenous magnesium sulphate in suspected acute myocardial infarction: the second Leicester Intravenous Magnesium Intervention Trial (LIMIT-2). *The Lancet*, Vol. 343, April 2, 1994, pp. 816-19

<sup>73</sup> Eisenberg, Mark J. Magnesium deficiency and sudden death. *American Heart Journal*, Vol. 124, No. 2, August 1992, pp. 544-49

<sup>74</sup> Supplemental dietary potassium reduced the need for antihypertensive drug therapy. *Nutrition Reviews*, Vol. 50, No. 5, May 1992, pp. 144-45

<sup>75</sup> Ascherio, Alberto, et al. A prospective study of nutritional factors and hypertension among US men. *Circulation*, Vol. 86, No. 5, November 1992, pp. 1475-84

<sup>76</sup> Witteman, Jacqueline C.M., et al. Reduction of blood pressure with oral magnesium supplementation in women with mild to moderate hypertension. *American Journal of Clinical Nutrition*, Vol. 60, July 1994, pp. 129-35

<sup>77</sup> Geleijnse, J.M., et al. Reduction in blood pressure with a low sodium, high potassium, high magnesium salt in older subjects with mild to moderate hypertension. *British Medical Journal*, Vol. 309, August 13, 1994, pp. 436-40

<sup>78</sup> Manz, M., et al. Behandlung von herzhrythmusstorungen mit magnesium. *Deutsche Medi Wochenschrifte*, Vol. 115, No. 10, March 9, 1990, pp. 386-90

<sup>79</sup> Iseri, Lloyd T., et al. Magnesium therapy of cardiac arrhythmias in critical-care medicine. *Magnesium*, Vol. 8, 1989, pp. 299-306

<sup>80</sup> The study, dubbed the Magpie Trial, was a large international effort aimed at discovering the effects of magnesium sulfate on women with preeclampsia and their children. Close to 10,000 women with preeclampsia from 33 developed and developing countries were involved. Roughly half of the women were randomly assigned to receive magnesium sulfate while the other half received a placebo. Use of magnesium sulfate resulted in a 58% decrease in risk of eclampsia compared to use of the placebo. This translates to 11 fewer women in 1,000 suffering from eclampsia. The preventive effect of magnesium was consistent regardless of the severity of the preeclampsia, the stage of pregnancy, whether an anticonvulsant had been given prior to the trial, and whether the woman had delivered before entry into the trial. Women receiving magnesium sulfate also had a 45% lower risk of death than women receiving the placebo. There appeared to be no difference in the risk of fetal or infant death related to the use of either the drug or the placebo.

<sup>81</sup> <http://www.mgwater.com/wellness.shtml>

<sup>82</sup> Harvard Heart Letter. November 2002

<sup>83</sup> Between 1992 and 1996, FDA prohibited companies that sell folic acid from telling women of childbearing age that .4 mg of folic acid daily before pregnancy could reduce the incidence of neural tube defects (including spina bifida and encephaly) by 40%. FDA's censorship contributed to a preventable 10,000 neural tube defect births.

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Between 1994 to 2000, FDA prohibited companies that sell omega-3 fatty acids from telling Americans that those fatty acids found in fish oil could reduce the risk of coronary heart disease by as much as 50%. FDA's censorship contributed to a preventable 1.8 million sudden death heart attacks.

Between 2000 and the present, FDA prohibits companies that sell saw palmetto extract (the fruit of the dwarf American palm tree) from telling Americans that saw palmetto reduces enlarged prostates and relieves related symptoms. Approximately 50% of all men age 50 and older suffer from enlarged prostates and are denied access to this information.

Between 2000 and the present, FDA prohibits companies that sell glucosamine and chondroitin sulfate from telling Americans that those dietary ingredients treat osteoarthritis and relieve osteoarthritic pain and stiffness. Approximately 20 million Americans suffer needlessly from osteoarthritis.

<sup>84</sup> Dr. Paul Connett posted on 20 July 2005 at 4:55 am. I am really surprised that Medical News Today published the puff piece from the American Dental Association about their celebration of 60 years of fluoridation, but missed the real news from last week. This was the revelation carried by the Washington Post and the Associated Press (July 13, 2005) that a Harvard thesis has shown a connection between water fluoridation and a 700% increase in osteosarcoma in young men if they are exposed to fluoridated water during their 6th to 8<sup>th</sup> years. Particularly disturbing is the information that the thesis adviser, Professor Cheser Douglass, who is also a consultant to Colgate, has covered up these results in talks to the public and in a report to his funding agency. Both the NIEHS and Harvard University are investigating his conduct.

<sup>85</sup> Some doctors just take it too far. Dr. Michael A. Rosin, for instance, was accused of falsely diagnosing patients with skin cancer and operating on them unnecessarily. He was recently ordered by federal authorities to refer all patients with confirmed or suspected skin cancer to other doctors instead of treating them himself. The order says Rosin, 54, poses "an immediate and serious danger to the health, safety and welfare of the public." He was found guilty by jury trial.

<sup>86</sup> The Journal of Urology {2001;166:2034-8}. December issue.

<sup>87</sup> Foster HD. "Landscapes of Longevity: The Calcium-Selenium-Mercury Connection in Cancer and Heart Disease," *Medical Hypothesis*, Vol. 48, pp 361-366, 1997.

<sup>88</sup> Clark LC. The epidemiology of selenium and cancer. *Fed Proc* 1985; 44:2584-2590.

<sup>89</sup> *American Journal of Epidemiology* (Vol. 163, pp. 232-235)

<sup>90</sup> *Journal of the American Medical Association*, Vol. 293, pp. 86-89

<sup>91</sup> MAY 19, 1931, Dr. P. Schrumpf-Pierron presented a paper entitled "On the Cause Of the Rarity of Cancer in Egypt," which was printed in the *Bulletin of the Academy of Medicine*, and the *Bulletin of the French Association for the Study of Cancer* in July, 1931. <http://www.mgwater.com/rod02.shtml>

<sup>92</sup> Yang CY et al. *Jpn J Cancer Res.*1998 Feb;89 (2):124-30. Calcium, magnesium, and nitrate in drinking water and gastric cancer mortality.

<sup>93</sup> Reuters Health, Feb. 10, 2000 AND the *Journal of Pain and Symptom Management*, Jan. 2000; 19:35-39

<sup>94</sup> Durlach J, Bara M, Guiet-Bara A, Collery P. Relationship between magnesium, cancer and carcinogenic or anticancer metals. *Anticancer Res.* 1986 Nov-Dec;6(6):1353-61.

<sup>95</sup> Prasad AS, Kucuk O. Zinc in cancer prevention. Department of Medicine (Division of Hematology-Oncology), Barbara Ann Karmanos Cancer Institute, Wayne State University School of Medicine Detroit, MI 48201, USA. *Cancer Metastasis Rev.* 2002;21(3-4):291-5.



<sup>96</sup> Mei W et al. Study of immune function of cancer patients influenced by supplemental zinc or selenium-zinc combination. *Biol Trace Elem Res*; 28(1):11-9. Jan 1991.

<sup>97</sup> George Eby. Treatment of acute lymphocytic leukemia using zinc adjuvant with chemotherapy and radiation – a case history and hypothesis. *Medical Hypotheses* (2005) 64, 1124–1126

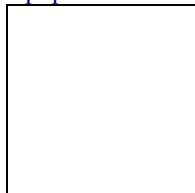
<sup>98</sup> [http://www4.dr-rath-foundation.org/PHARMACEUTICAL\\_BUSINESS/pharmaceutical\\_industry.htm](http://www4.dr-rath-foundation.org/PHARMACEUTICAL_BUSINESS/pharmaceutical_industry.htm)

<sup>99</sup> USE OF CESIUM CHLORIDE TO CURE MALIGNANCIES

<http://www.newswithviews.com/Howenstine/james14.htm>

<sup>100</sup> Magnesium deficiency (MgD) has been associated with production of reactive oxygen species, cytokines, and eicosanoids, as well as vascular compromise in vivo. Although MgD-induced inflammatory change occurs during "chronic" MgD in vivo, acute MgD may also affect the vasculature and consequently, predispose endothelial cells (EC) to perturbations associated with chronic MgD. As oxyradical production is a significant component of chronic MgD, we examined the effect of acute MgD on EC oxidant production in vitro. In addition we determined EC; pH, mitochondrial function, lysosomal integrity and general cellular antioxidant capacity. Decreasing Mg<sup>2+</sup> (< or = 250microM) significantly increased EC oxidant production relative to control Mg<sup>2+</sup> (1000microM). MgD-induced oxidant production, occurring within 30min, was attenuated by EC treatment with oxyradical scavengers and inhibitors of eicosanoid biosynthesis. Coincident with increased oxidant production were reductions in intracellular glutathione (GSH) and corresponding EC alkalinization. These data suggest that acute MgD is sufficient for induction of EC oxidant production, the extent of which may determine, at least in part, the extent of EC dysfunction/injury associated with chronic MgD. Effect of acute magnesium deficiency (MgD) on aortic endothelial cell (EC) oxidant production. Wiles ME, Wagner TL, Weglicki WB. The George Washington University Medical Center, Division of Experimental Medicine, Washington, D.C., USA. [mwiles@nexstar.com](mailto:mwiles@nexstar.com) *Life Sci.* 1997;60(3):221-36.

<sup>101</sup> Martin, H  l  ne. Richert, Lysiane. Berthelot, Alain Magnesium Deficiency Induces Apoptosis in Primary Cultures of Rat Hepatocytes.\* Laboratoire de Physiologie, et



Laboratoire de Biologie Cellulaire, UFR des Sciences M  dicales et Pharmaceutiques, Besan  on, France. 2003 The American Society for Nutritional Sciences J. Nutr. 133:2505-2511, August 2003

<sup>102</sup> A magnesium deficiency can cause the body to lose potassium [Peterson 1963][MacIntyre][Manitius], possibly because of a poorly understood effect of magnesium on the efficiency of energy supply to the sodium pump [Fischer].

<sup>103</sup> Barbagallo, Mario et al. Effects of Vitamin E and Glutathione on Glucose Metabolism: Role of Magnesium; (*Hypertension.* 1999;34:1002-1006.)

<sup>104</sup> Environmental Working Group. <http://www.ewg.org/reports/autism/part1.php>

<sup>105</sup> Linus Pauling Institute <http://lpi.oregonstate.edu/infocenter/minerals/magnesium/index.html#function>

<sup>106</sup> Virginia Minnich, M. B. Smith, M. J. Brauner, and Philip W. Majerus. Glutathione biosynthesis in human erythrocytes. Department of Internal Medicine, Washington University School of Medicine, *J Clin Invest.* 1971 March; 50(3): 507–513. Abstract: The two enzymes



required for de novo glutathione synthesis, glutamyl cysteine synthetase and glutathione synthetase, have been demonstrated in hemolysates of human erythrocytes. Glutamyl cysteine synthetase requires glutamic acid, cysteine, adenosine triphosphate (ATP), and magnesium ions to form  $\gamma$ -glutamyl cysteine. The activity of this enzyme in hemolysates from 25 normal subjects was  $0.43 \pm 0.04$   $\mu$ mole glutamyl cysteine formed per g hemoglobin per min. Glutathione synthetase requires  $\gamma$ -glutamyl cysteine, glycine, ATP, and magnesium ions to form glutathione. The activity of this enzyme in hemolysates from 25 normal subjects was  $0.19 \pm 0.03$   $\mu$ mole glutathione formed per g hemoglobin per min. Glutathione synthetase also catalyzes an exchange reaction between glycine and glutathione, but this reaction is not significant under the conditions used for assay of hemolysates. The capacity for erythrocytes to synthesize glutathione exceeds the rate of glutathione turnover by 150-fold, indicating that there is considerable reserve capacity for glutathione synthesis. A patient with erythrocyte glutathione synthetase deficiency has been described. The inability of patients' extracts to synthesize glutathione is corrected by the addition of pure glutathione synthetase, indicating that there is no inhibitor in the patients' erythrocytes.

<sup>107</sup> Braverman, E.R. (with Pfeiffer, C.C.)(1987). The healing nutrients within: Facts, findings and new research on amino acids. New Canaan: Keats Publishing.

<sup>108</sup> Barbagallo, M. et al. Effects of glutathione on red blood cell intracellular magnesium: relation to glucose metabolism. Hypertension. 1999 Jul;34(1):76-82. Institute of Internal Medicine and Geriatrics, University of Palermo, Italy. [mabar@unipa.it](mailto:mabar@unipa.it)

<sup>109</sup> <http://www.dorway.org/blayoutism.txt>

<sup>110</sup> Mak IT; Komarov AM; Wagner TL; Stafford RE; Dickens BF; Weglicki WB Address Department of Medicine, George Washington University Medical Center, Washington, District of Columbia 20037, USA. Source Am J Physiol, 1996 Jul, 271:1 Pt 1, C385-90

<sup>111</sup> Siwek M., et al. The role of copper and magnesium in the pathogenesis and treatment of affective disorders. Psychiatr Pol. 2005 Sep-Oct;39 (5):911-20. Klinika Psychiatrii Doroslych CM UJ.

<sup>112</sup> <http://mgwater.com/>

<sup>113</sup> Liu XY, Jin TY, Nordberg GF, "Increased urinary calcium and magnesium excretions in rats injected with mercuric chloride." Pharmacol Toxicol, vol. 68 no. 4, pp. 254-259, 1991

<sup>114</sup> Durlach J et al., "Magnesium: a competitive inhibitor of lead and cadmium. Ultrastructure studies of the human amniotic epithelial cell." Magnesium Res, vol 3, pp 31-36, 1990

<sup>115</sup> Soldatovic D et al., "contribution to interaction between magnesium and toxic metals: the effect of prolonged cadmium intoxication on magnesium metabolism in rabbits." Magnes Res, vol. 11, no. 4, pp. 283-288, 1998

<sup>116</sup> Allen VG, "Influence of aluminum on magnesium metabolism." In: Altura BM, Durlach J, Seeling MS, eds., Magnesium in Cellular Processes and Medicine. Krager, Basel, pp.50-66, 1987

<sup>117</sup> Altura BM, Altura BT, "Role of magnesium in patho-physiological process and the clinical utility of magnesium ion selective electrodes." Scand J Clin Lab Invest Suppl, vol. 224, pp.211-234, 1996

<sup>118</sup> v57, Better Nutrition for Today's Living, March '95, p34.

<http://www.mgwater.com/articles.shtm>

<sup>119</sup> Department of Internal Medicine, Overlook Hospital, Summit, NJ, USA. Hypomagnesemia has long been known to be associated with diabetes mellitus. Mather et al confirmed the presence of hypomagnesemia in nearly 25% of their diabetic out-patients. Low serum magnesium level has been reported in children with insulin-dependent diabetes and

through the entire spectrum of adult type I and type II diabetics regardless of the type of therapy. Hypomagnesemia has been correlated with both poor diabetic control and insulin resistance in nondiabetic elderly patients. Hypomagnesemia and diabetes mellitus. A review of clinical implications. Tosiello L; Arch Intern Med. 1996 Jun 10;156(11):1143-8. [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=8639008&dopt=Abstract](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8639008&dopt=Abstract)

<sup>120</sup> Barbagallo, Mario et al. Effects of Vitamin E and Glutathione on Glucose Metabolism: Role of Magnesium; (Hypertension. 1999;34:1002-1006.) American Heart Association [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=10523398&query\\_hl=22](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10523398&query_hl=22)

<sup>121</sup> Hua H. et al: Magnesium transport induced ex vivo by a pharmacological dose of insulin is impaired in non-insulin-dependent diabetes mellitus. Magnes Res. 1995, Dec; Magnes Res. 1995 Dec;8(4):359-66. PMID: 8861135 [PubMed - indexed for MEDLINE] <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?CMD=Display&DB=pubmed>

<sup>122</sup> A tendency for magnesium deficiency in patients with diabetes mellitus is well-established. Glucosuria-related hypermagnesiuria, nutritional factors and hyperinsulinaemia-related hypermagnesiuria all can contribute. The plasma magnesium level has been shown to be inversely related to insulin sensitivity. Magnesium supplementation improves insulin sensitivity as well as insulin secretion in patients with type 2 diabetes. Nevertheless, no beneficial effects of oral magnesium supplementation has been demonstrated on glycaemic control either in patients with diabetes type 1 or 2. Oral magnesium supplementation reduced the development of type 2 diabetes in predisposed rats. There are some indications that magnesium decreases blood pressure, but negative results have been observed in trials that were, however, not designed to test effect on blood pressure as primary parameter. Patients with (severe) retinopathy have a lower plasma magnesium level compared to patients without retinopathy and a prospective study has shown the plasma magnesium level to be inversely related to occurrence or progression of retinopathy. Further study on magnesium (supplementation) is warranted in the prevention of type 2 and of (progression of) retinopathy as well as a means to reduce high blood pressure. Magnesium in Diabetes Mellitus; de Valk HW. Neth J Med. 1999 Apr;54(4):139-46.

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=10218382&query\\_hl=11](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10218382&query_hl=11)

<sup>123</sup> Lower serum magnesium levels are associated with more rapid decline of renal function in patients with diabetes mellitus type 2. Clin Nephrol. 2005 Jun;63(6):429-36. PMID: 15960144 [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15960144&itool=iconabstr&query\\_hl=15](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15960144&itool=iconabstr&query_hl=15)

<sup>124</sup> Diabetic ketoacidosis (DKA) is a dangerous condition that can cause you to lose consciousness. If untreated, it can be fatal. This is a diabetic crisis state, and can quickly lead to fatality, including cerebral edema, most often seen in children. It is also common in DKA to have severe dehydration and significant alterations of the body's blood chemistry. Diabetic ketoacidosis is a triad of hyperglycemia, ketonemia and acidemia. (ketones and acid in the bloodstream) Major components of the pathogenesis of diabetic ketoacidosis are reductions in effective concentrations of circulating insulin and concomitant elevations of counterregulatory hormones (catecholamines, glucagon, growth hormone and cortisol). These hormonal alterations bring about three major metabolic events: (1) hyperglycemia resulting from

accelerated gluconeogenesis and decreased glucose utilization, (2) increased proteolysis and decreased protein synthesis and (3) increased lipolysis and ketone production.

<sup>125</sup> Diabetic ketoacidosis: Check your ketones; From [MayoClinic.com](http://www.mayoclinic.com) Special to CNN.com  
<http://www.cnn.com/HEALTH/library/DA/00064.html>

<sup>126</sup> This article exemplifies the AAFP 1999 Annual Clinical Focus on management and prevention of the complications of diabetes. Diabetic ketoacidosis is an emergency medical condition that can be life-threatening if not treated properly. The incidence of this condition may be increasing, and a 1 to 2 percent mortality rate has stubbornly persisted since the 1970s. Diabetic ketoacidosis occurs most often in patients with type 1 diabetes (formerly called insulin-dependent diabetes mellitus); however, its occurrence in patients with type 2 diabetes (formerly called noninsulin-dependent diabetes mellitus), particularly obese black patients, is not as rare as was once thought. The management of patients with diabetic ketoacidosis includes obtaining a thorough but rapid history and performing a physical examination in an attempt to identify possible precipitating factors. The major treatment of this condition is initial rehydration (using isotonic saline) with subsequent potassium replacement and low-dose insulin therapy. The use of bicarbonate is not recommended in most patients. Cerebral edema, one of the most dire complications of diabetic ketoacidosis, occurs more commonly in children and adolescents than in adults. Continuous follow-up of patients using treatment algorithms and flow sheets can help to minimize adverse outcomes. Preventive measures include patient education and instructions for the patient to contact the physician early during an illness. (Am Fam Physician 1999;60:455-64.) ABBAS E. KITABCHI, PH.D., M.D., and BARRY M. WALL, M.D. University of Tennessee, Memphis, College of Medicine Memphis, Tennessee  
<http://www.aafp.org/afp/990800ap/455.html>

<sup>127</sup> Chronic Renal Failure (Chronic Renal Insufficiency, Kidney Failure, Renal Insufficiency) (CRF) Irreversible, progressive impaired kidney function. The early stage, when the kidneys no longer function properly but do not yet require dialysis, is known as **Chronic Renal Insufficiency** (CRI). CRI can be difficult to diagnose, as symptoms are not usually apparent until kidney disease has progressed significantly. Common **symptoms** include a frequent need to urinate and swelling, as well as possible anemia, fatigue, weakness, headaches and loss of appetite. As the disease progresses, other symptoms such as nausea, vomiting, bad breath and itchy skin may develop as toxic metabolites, normally filtered out of the blood by the kidneys, build up to harmful levels. Over time (up to 10 or 20 years), CRF generally progresses from CRI to **End-Stage Renal Disease** (ESRD, also known as **Kidney Failure**). Patients with ESRD no longer have kidney function adequate to sustain life and require dialysis or kidney transplantation. Without proper treatment, ESRD is fatal.

<sup>128</sup> [http://www.newsday.com/news/health/ny-usdiab074502530nov07\\_0\\_5854471\\_story?coll=ny-health-headlines](http://www.newsday.com/news/health/ny-usdiab074502530nov07_0_5854471_story?coll=ny-health-headlines)

<sup>129</sup> **Hiller TA, Pedula KL. Complications in young adults with early-onset type 2 diabetes: losing the relative protection of youth.** Center for Health Research, Kaiser Permanente Northwest/Hawaii, Portland, Oregon. Diabetes Care. 2003 Nov;26(11):2999-3005. CONCLUSIONS: Early-onset type 2 diabetes appears to be a more aggressive disease from a cardiovascular standpoint. Although the absolute rate of cardiovascular disease (CVD) is higher in older adults, young adults with early-onset type 2 diabetes have a much higher risk of CVD relative to age-matched control subjects.

<http://paktribune.com/news/index.php?id=124683>

<sup>130</sup> American Diabetes Association <http://www.diabetes.org>

<sup>131</sup> Diabetes Care 28:1175-1181, 2005.

<sup>132</sup> New York Times. January 9, 2006

<sup>133</sup> Derrick Z. Jackson, Diabetes and the trash food industry. Boston Globe. January 11, 2006

<sup>134</sup> NY Times. January 11, 2006.

<http://www.nytimes.com/2006/01/11/nyregion/nyregionspecial5/11diabetes.html?th&emc=th>

<sup>135</sup> Increasing rates of type 2 diabetes worldwide suggest that diabetes may be caused by environmental toxins. Cadmium is a widespread environmental pollutant that accumulates in the pancreas and exerts diabetogenic effects in animals. To test the hypothesis that exposure to cadmium is associated with impaired fasting glucose and type 2 diabetes, we examined the associations between urinary cadmium and the prevalence of impaired fasting glucose (prediabetes) and diabetes in the Third National Health and Nutrition Examination Survey (NHANES III). In this large cross-sectional study, urinary cadmium levels are significantly and dose-dependently associated with both impaired fasting glucose and diabetes. These findings, which require confirmation in prospective studies, suggest that cadmium may cause prediabetes and diabetes in humans. Urinary Cadmium, Impaired Fasting Glucose, and Diabetes in the NHANES III Gary G. Schwartz, PHD et al; *Diabetes Care* 26:468-470, 2003 <http://care.diabetesjournals.org/cgi/content/full/26/2/468>

et al; *Diabetes Care* 26:468-470, 2003 <http://care.diabetesjournals.org/cgi/content/full/26/2/468>

<sup>136</sup> Metals such as iron, mercury, arsenic, lead and possibly aluminum may play a role in the actual destruction of beta cells through stimulating an auto-immune reaction to them after they have bonded to these cells in the pancreas. What we will focus on here though is the fact that insulin has three sulfur-containing cross-linkages and the insulin receptor has a tyrosine kinase-containing sulfur bond, which are the preferred targets for binding by both mercury and lead. Should mercury attach to one of these three sulfur bonds it will interfere with the normal biological function of the insulin molecule. In reality there is no should about it, the average adult inhales many trillions of mercury atoms a day from a mouth full of amalgam, fish provide trillions more, the air more, and in children, vaccines provide one day surges of vast trillions of mercury molecules in the form of ethyl-mercury, which is vastly more toxic than metallic mercury. Insulin molecules are directly assaulted as are insulin receptor sites. The Hun Hordes of Mercury; <http://imva.info/>

<sup>137</sup> Toxicity of Fluoride to Diabetic Rats. C.A.Y. Banu Priya et al; International Society for Fluoride Research; FLUORIDE 30 (1)1997, pp 51 - 58 <http://www.fluoride-journal.com/97-30-1/301-51.htm>

<sup>138</sup> Vandiver J, "Chicken Feed," Daily Times (Salisbury, Md.), January 4, 2004.

<sup>139</sup> Tseng CH, Tseng CP, Chiou HY, Hsueh YM, Chong CK, Chen CJ. Epidemiologic evidence of diabetogenic effect of arsenic. *Toxicol Lett.* 2002 Jul 7;133(1):69-76.

<sup>140</sup> Mahfuzar Rahman et al. Division of Occupational and Environmental Medicine, Department of Health and Environment, Faculty of Health Science Linkoping University Sweden. Department of Occupational and Environmental Health(DOEH), National Institute of Preventive and Social Medicine (NIPSOM), Mohakhali, Dhaka-1212 Bangladesh. *American Journal of Epidemiology* 1998; Vol. 148, No.2: 198-203 The crude prevalence ratio for diabetes mellitus among keratotic subjects exposed to arsenic was 4.4 (95% confidence interval 2.5-7.7) and increased to 5.2 (95% confidence interval 2.5-10.5) after adjustment for age, sex, and body mass index.

<sup>141</sup> <http://www.ehponline.org/docs/2003/6407/abstract.html>.

<sup>142</sup> **A solution of alloxan at 2% diluted in saline at 0.9% was administered to the animals in a single dose corresponding to 40 mg of alloxan per kg of animal weight injected into their penial vein.**

**Alloxan induces irreversible *diabetes mellitus* after 24 hours following its administration and the condition proves to be chronic by laboratory tests after seven days. Experimental**

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**Model of Induction of Diabetes Mellitus in Rats; Acta Cir. Bras. vol.18 no.spe S o Paulo 2003 [www.scielo.br/scielo.php?pid=S0102-86502003001100009&script=sci\\_arttext&tlng=en](http://www.scielo.br/scielo.php?pid=S0102-86502003001100009&script=sci_arttext&tlng=en)**

<sup>143</sup> Researchers who are studying diabetes commonly use the chemical to induce the disorder in lab animals. Unfortunately, most consumers are unaware of alloxan and its potentially fatal link to diabetes because these facts are not well publicized, are hidden by FDA approval, and certainly doctors and the food industry are not informing parents that they and their children are being poisoned by white flour containing alloxan. Diabetes and Chemical Poisoning. <http://imva.info/>

<sup>144</sup> Consumer Reports (Feb. 2006):

<sup>145</sup> Genetically Engineered Food Biotech, Biotechnology, GMO, Genetically Modified <http://www.organicconsumers.org/gelink.html>

<sup>146</sup> Health Hazards of Genetically Manipulated Foods; <http://www.soyinfo.com/haz/gehaz.shtml>

<sup>147</sup> Dr Irina Ermakova added flour from a GM soya bean - produced by Monsanto to be resistant to its pesticide, Roundup - to the food of female rats, starting two weeks before they conceived, continuing through pregnancy, birth and nursing. Others were given non-GM soya and a third group was given no soya at all. She found that 36 per cent of the young of the rats fed the modified soya were severely underweight, compared to 6 per cent of the offspring of the other groups. More alarmingly, a staggering 55.6 per cent of those born to mothers on the GM diet perished within three weeks of birth, compared to 9 per cent of the offspring of those fed normal soya, and 6.8 per cent of the young of those given no soya at all.

<http://www.organicconsumers.org/ge/babies010906.cfm>

<sup>148</sup> Malatesta M, Caporaloni C, Rossi L, Battistelli S, Rocchi MBL, Tonucci F, Gazzanelli G (2002) Ultrastructural analysis of pancreatic acinar cells from mice fed on genetically modified soybean. *Journal of Anatomy* 201:409-415

<sup>149</sup> Mary L. Johnson, RN, CDE, International Diabetes Center, Minneapolis, Minnesota, and colleagues[12] evaluated 206 persons for the microvascular complications of peripheral neuropathy, retinopathy, and nephropathy. On average, subjects had diabetes for approximately 10 years and demonstrated good glucose control (hemoglobin A1C 7.3% ±1.4%). Forty-eight percent of study subjects had microvascular complications, even though they had generally good glycemic control and a relatively short duration of diabetes. Diabetic nephropathy was identified in 20% of the study population; retinopathy was identified in 11%; and symptoms of diabetic peripheral neuropathy were identified in 63%. Diagnosis with a 10-g Semmes-Weinstein monofilament only identified 16% of patients with neuropathy. However, over 30% of the subjects exhibited sensory deficits after clinical examination. [www.medscape.com/viewarticle/508218](http://www.medscape.com/viewarticle/508218)

<sup>150</sup> Additional symptoms that may be associated with this disease:

Swallowing difficulty

Speech impairment

Loss of function or feeling in the muscles

Muscle contractions

Muscle atrophy

Uncoordinated movement

Dysfunctional movement

Joint pain

Hoarseness or changing voice

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Fatigue

Facial paralysis

Eyelid drooping

Bowel or bladder dysfunction

Breathing difficulty

From the National Institutes of Health (NIH) National Library of Medicine (NLM)

MEDLINEplus Medical Encyclopedia.

<sup>151</sup> WHO, 2002; <http://www.who.int/mediacentre/factsheets/fs138/en/print.html>

<sup>152</sup> A 10-year clinical study that involved 1,441 volunteers with insulin-dependent diabetes (IDDM) was recently completed by the National Institute of Diabetes and Digestive and Kidney Diseases. The study proved that keeping blood sugar levels as close to the normal range as possible slows the onset and progression of nerve disease caused by diabetes. The Diabetes Control and Complications Trial (DCCT) studied two groups of volunteers: those who followed a standard diabetes management routine and those who intensively managed their diabetes. Persons in the intensive management group took multiple injections of insulin daily or used an insulin pump and monitored their blood glucose at least four times a day to try to lower their blood glucose levels to the normal range. After 5 years, tests of neurological function showed that the risk of nerve damage was reduced by 60 percent in the intensively managed group. People in the standard treatment group, whose average blood glucose levels were higher, had higher rates of neuropathy. Although the DCCT included only patients with IDDM, researchers believe that people with noninsulin-dependent diabetes would also benefit from maintaining lower levels of blood glucose.

<sup>153</sup> 2005 Survey Results Fact Sheet;

<http://www.diabetesincontrol.com/modules.php?name=News&file=article&sid=3253>

<sup>154</sup> Episodes of hypoglycemia will also cause the release of counterregulatory hormones which act to elevate the blood sugars for the following 24-48 hours, further complicating the issue of “good control”. Even the ADA states recognition of the fact that it is difficult to maintain blood glucose levels within their recommendations, for any appreciable length of time. Yet target levels have been lowered over the past few years to levels that may be causing more hypoglycemia than ever before. Studies in children show a high rate of hypoglycemia at night for sustained periods of time. Unnoticed by caregivers. Hypoglycemia can occur before the diagnosis of diabetes, and during treatment with oral antihyperglycemic drugs or insulin injections.

<sup>155</sup> Insulin induced neuropathy has been reported previously in people with diabetes treated with insulin, and subsequently reported in patients with insulinomas. However, neuropathy caused by rapid glycaemic control in patients with poorly controlled diabetes with chronic hyperglycaemia is not a widely recognised entity among clinicians worldwide. It is expected that this phenomenon of paradoxical complication of neuropathy in the face of drastic decreases in glycosylated haemoglobin concentrations will assume greater importance with clinicians achieving glycaemic targets at a faster pace than before. Under-recognised paradox of neuropathy from rapid glycaemic control. Postgrad Med J. 2005 Feb;81(952):103-7. Leow MK, Wyckoff J. Department of Endocrinology, Division of Medicine, Tan Tock Seng Hospital, Singapore. [mleowsj@massmed.org](mailto:mleowsj@massmed.org)

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15701742&itool=iconabstr&query\\_hl=6&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15701742&itool=iconabstr&query_hl=6&itool=pubmed_docsum)

<sup>156</sup> The effect of sustained insulin-induced hypoglycemia on peripheral nerve function and structure was examined in rats. After a period of hypoglycemia (less than 2.5 mmol/L) of at



least 72 h, axonal degeneration and reduction of the maximal amplitude of the evoked muscle action potential occurred, the two abnormalities being correlated negatively ( $r = -0.99$ ,  $2P = 0.00097$ ). One of five rats developed paresis of both hindlegs as well as nerve damage and perikaryal alterations of lower motor neurons. Peripheral neuropathy in rats induced by insulin treatment: P Sidenius and J Jakobsen ; Diabetes, Vol 32, Issue 4 383-386, Copyright 1983 by American Diabetes Association.

<http://diabetes.diabetesjournals.org/cgi/content/abstract/32/4/383>

<sup>157</sup> <http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm#11>

<sup>158</sup> Joslin EP. The menace of diabetic gangrene. N Engl J Med 1934; 211: 16–20

<sup>159</sup> Although the treatment of diabetes has become increasingly sophisticated, with over a dozen pharmacological agents available to lower blood glucose, a multitude of ancillary supplies and equipment available, and a clear recognition by health care professionals and patients that diabetes is a serious disease, the normalization of blood glucose for any appreciable period of time is seldom achieved. In addition, in well-controlled so-called "intensively" treated patients, serious complications still occur, and the economic and personal burden of diabetes remains. Furthermore, microvascular disease is already present in many individuals with undiagnosed or newly diagnosed type 2 diabetes. [http://care.diabetesjournals.org/cgi/content/full/diicare;27/suppl\\_1/s47](http://care.diabetesjournals.org/cgi/content/full/diicare;27/suppl_1/s47)

<sup>160</sup> Andrew J.M. Boulton. Professor of Medicine, University of Manchester, and Department of Medicine, Manchester Royal Infirmary, Manchester, UK [www.d4pro.com/idm/site/leading\\_article5.htm](http://www.d4pro.com/idm/site/leading_article5.htm)

<sup>161</sup> The Ten Commandments of the Diabetic Foot BMJ: 2005;331:1497 (24 December)  
doi:10.1136/bmj.331.7431.1497

<sup>162</sup> <http://diabetes.niddk.nih.gov/dm/pubs/alternativetherapies/>

<sup>163</sup> Total serum magnesium was reduced in the high-fructose group compared with control or high-fructose plus magnesium-supplemented groups. Blood pressure and fasting insulin levels were also lower in the magnesium-supplemented group. These results suggest that magnesium deficiency and not fructose ingestion per se leads to insulin insensitivity in skeletal muscle and changes in blood pressure. Dietary magnesium prevents fructose-induced insulin insensitivity in rats. Batan et al; Hypertension. 1994 Jun;23(6 Pt 2):1036-9.

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=8206589&itool=iconabstr&query\\_hl=7&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8206589&itool=iconabstr&query_hl=7&itool=pubmed_docsum)

<sup>164</sup> Endocrinology & Metabolism Clinics of North America. 24(3):623-41, 1995 Sep.

<sup>165</sup> Carper, J. Mighty Magnesium. USA Weekend. 2002 Aug 30-Sept 1.

<sup>166</sup> Magnesium Deficiency Linked to Type 2 Diabetes <http://www.newstarget.com/006121.html>  
Studies conducted at Harvard University indicate that people who have high levels of magnesium in their blood are less likely to develop type 2 diabetes or insulin resistance than those with lower levels. Studies in Mexico have also found an alleviation of diabetes symptoms in patients who took dietary supplements containing magnesium. Original Source: <http://www.health24.com/dietnfood/General/15-742-775.31268.asp>

<sup>167</sup> Diabetologia” 36(8):767-70, 1993

<sup>168</sup> Low serum magnesium levels and foot ulcers in subjects with type 2 diabetes. Rodriguez-Moran M, Guerrero-Romero F. Arch Med Res. 2001 Jul-Aug;32(4):300-3.  
[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=11440788&itool=iconabstr&query\\_hl=3&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11440788&itool=iconabstr&query_hl=3&itool=pubmed_docsum)

<sup>169</sup> S. E. BROWNE. The Case for Intravenous Magnesium Treatment of Arterial Disease in General Practice. Journal of Nutritional Medicine (1994) 4, 169-177

- <sup>170</sup> Herbert C. Mansmann Jr. MD. Honorary Professor of Pediatrics. P.O. Box 791, Rangeley, ME 04970 Associate Professor of Medicine (1968-03) Director of the Magnesium Research Laboratory (1989-03) Thomas Jefferson University <http://www.magnesiumresearchlab.com>
- <sup>171</sup> <http://health.groups.yahoo.com/group/MagnesiumResearchLab/message/2863>
- <sup>172</sup> <http://magnesiumresearchlab.com/Diabetes-and-Mg-5-11-04.htm>
- <sup>173</sup> The effect of magnesium supplementation in increasing doses on the control of type 2 diabetes. *Diabetes Care*. 1998 May;21(5):682-6.  
[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=9589224&itool=iconfft&query\\_hl=34&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9589224&itool=iconfft&query_hl=34&itool=pubmed_docsum)
- <sup>174</sup> <http://magnesiumresearchlab.com/Diabetes-and-Mg-5-11-04.htm>
- <sup>175</sup> See <http://www.MagnesiumForLife.com> for full information on transdermal magnesium chloride mineral therapy. And go to <http://www.globallight.net> to see the recommended natural seawater product with the highest concentration and lowest toxicity that the International Medical Veritas Association endorses.
- <sup>176</sup> Long term magnesium supplementation influences favourably the natural evolution of neuropathy in Mg-depleted type 1 diabetic patients (T1dm); De Leeuw et al; *Magnes Res*. 2004 Jun; 17(2):109-14  
[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15319143&itool=iconabstr&query\\_hl=12&itool=pubmed\\_docsum](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15319143&itool=iconabstr&query_hl=12&itool=pubmed_docsum)
- <sup>177</sup> <http://mgwater.com/>
- <sup>178</sup> Because fluoride is excreted through the kidney, people with renal insufficiency would have impaired renal clearance of fluoride (Juncos and Donadio 1972). Elderly people are more susceptible to fluoride toxicity.
- <sup>179</sup> Statins and peripheral neuropathy; U. Jeppesen , D. Gaist , T. Smith S. H. Sindrup *European Journal of Clinical Pharmacology* Volume 54, Number 11;835 - 838 January 1999
- <sup>180</sup> The Peripheral Neuropathy Caused by Statins Petition to Pharmaceutical Researchers and Manufacturers of America and companies listed was created by DrugIntel Statin Users with Neuropathy and written by John Lehmann. "We users of statin drugs have experienced some of the symptoms listed below [1] that characterize peripheral neuropathy (damage to nerves outside the brain). Medical research published in peer-reviewed journals has shown that statins are able to cause peripheral neuropathy or a syndrome that is very similar to it. We petition the pharmaceutical manufacturers of statins [2] to: 1. Notify patients (past, current, and prospective users of statins) and healthcare professionals (physicians, pharmacists, nurses, physicians' assistants) of the risk associated with statin use and what to do once the first signs and symptoms of neuropathy have appeared. 2. Sponsor and perform research on how statins cause neuropathy. 3. Sponsor and perform clinical research on how to cure and reverse the neuropathy caused by statins. 4. Perform clinical research and recommend the best drug treatments to mitigate the pain and make other symptoms of statin-induced neuropathy more tolerable. 5. Proactively offer reparation to statin users who have suffered neuropathy. The petition will be presented to the Pharmaceutical Researchers and Manufacturers Association and to the Medical Affairs Departments of the companies listed, as well as any additional companies that may be identified as relevant over time <http://www.petitiononline.com/Statins/petition.html>
- <sup>181</sup> Statins and risk of polyneuropathy  
D Gaist, MD PhD, U Jeppesen, M Andersen, *LAG Neurology* 2002;58:1333-1337 © 2002  
American Academy of Neurology  
Statins and risk of polyneuropathy.



<sup>182</sup> Participants receive injections of the toxin in six places in the calf muscle and then the leg is put into a cast. The idea is that this will help prevent pressure on the ball of the foot during walking. The ball of the foot is the area most affected by foot ulcers and allowing an ulcer to heal completely helps prevent recurrence. <http://www.diabetes-and-diabetics.com/about-diabetes/diabetic-complications-02.php>

<sup>183</sup> Botulinum toxin has been a concern as a potential biological warfare agent since World War II. In response to concerns about Germany's botulinum toxin research, the United States and Great Britain developed countermeasures against the toxin before the invasion of Europe. More recently, Iraq has been accused of producing large amounts of botulinum toxin for use as a biological warfare agent. The extreme toxicity of botulinum toxins and the ease of production, transport, and delivery make this an agent of extreme bioterrorism concern. <http://www.niaid.nih.gov/publications/botulism.htm>

<sup>184</sup> Overview of Botulism:

<http://www.cidrap.umn.edu/cidrap/content/bt/botulism/biofacts/botulismfactsheet.html>

<sup>185</sup> Keen, H., et al., Diabetes Care, 1993; 16: 8-15.

<sup>186</sup> Jamal, G., Diabetic Medicine, 1994; 11(2): 145-49.

[http://www.diabeteslibrary.org/news/news\\_item.cfm?NewsID=241](http://www.diabeteslibrary.org/news/news_item.cfm?NewsID=241)

<sup>187</sup> <http://www.msnbc.msn.com/id/4409271/site/newsweek/>

<sup>188</sup> <http://www.emedicine.com/pmr/topic187.htm>

<sup>189</sup> British Medical Journal 1974 vol. 1 p. 436, Lancet Vol. 2 p. 1313, R. Levy JAMA Feb 15, 1980

<sup>190</sup> R. Peto British Medical Journal 1988 vol. 296 pg. 313-6

<sup>191</sup> <http://www.newswithviews.com/Howenstine/james10.htm>

<sup>192</sup> <http://healthlink.mcw.edu/article/965927519.html>

<sup>193</sup> The Magnesium Solution for High Blood Pressure by Dr. Jay Cohen

<sup>194</sup> One action of neuroprotective agents limits acute injury to neurons in the penumbra region or rim of the infarct after ischemia. Neurons in the penumbra are less likely to suffer irreversible injury at early time points than are neurons in the infarct core. Many of these agents modulate neuronal receptors to reduce release of excitatory neurotransmitters, which contribute to early neuronal injury.

<sup>195</sup> Lampl Y, Gilad R, Geva D, Eshel Y, Sadeh M. Intravenous administration of magnesium sulfate in acute stroke: a randomised double-blind study. Clin Neuropharmacol. 2001;24:11-15.

Abstract

<sup>196</sup> Saver JL, Kidwell C, Eckstein M, et al. Prehospital neuroprotective therapy for acute stroke: results of the field administration of stroke therapy -- magnesium (FAST-MAG) pilot trial. Stroke. 2004;35:106-108.

<sup>197</sup> <http://www.neurosurgery-neff.com/IMAGES.html>

<sup>198</sup> [http://www.nytimes.com/2006/02/12/national/12homicide.html?\\_r=2&th&emc=th&oref=slogin&oref=slogin](http://www.nytimes.com/2006/02/12/national/12homicide.html?_r=2&th&emc=th&oref=slogin&oref=slogin)

<sup>199</sup> Murck H. Magnesium and Affective Disorders. Nutr Neurosci., 2002;5:375-389: Murck showed many actions of magnesium ions supporting their possible therapeutic potential in affective disorders. Examinations of the sleep-electroencephalogram (EEG) and of endocrine system points to the involvement of the limbic-hypothalamus-pituitary-adrenocortical axis because magnesium affects all elements of this system. Magnesium has the property to suppress hippocampal kindling, to reduce the release of adrenocorticotrophic hormone (ACTH) and to affect adrenocortical sensitivity to ACTH. The role of magnesium in the central nervous system could be mediated via the N-methyl-D-aspartate-antagonistic, g-aminobutyric acid A-agonistic or the angiotensin II-antagonistic property of this ion. A direct impact of magnesium on the

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function of the transport protein p-glycoprotein at the level of the blood-brain barrier has also been demonstrated, possibly influencing the access of corticosteroids to the brain. Furthermore, magnesium dampens the calcium ion-protein kinase C related neurotransmission and stimulates the Na-K-ATPase. All these systems have been reported to be involved in the pathophysiology of depression. Murck et al. also demonstrated induced magnesium deficiency in mice to produce depression-like behavior which was beneficially influenced with antidepressants.

<sup>200</sup> Evelyn Pringle: [http://www.lawyersandsettlements.com/articles/ssri\\_offlabel.html](http://www.lawyersandsettlements.com/articles/ssri_offlabel.html)

<sup>201</sup> Izenwasser SE et al. Stimulant-like effects of magnesium on aggression in mice. *Pharmacol Biochem Behav* 25(6):1195-9, 1986.

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<sup>207</sup> Seelig MS, Berger AR, Spieholz N. Latent tetany and anxiety, marginal Mg deficit, and normocalcemia. *Dis Nerv Syst* 36:461-5, 1975.

<sup>208</sup> Durlach J, Durlach V, Bac P, et al. Magnesium and therapeutics. *Magnes Res* 7(3/4):313-28, 1994.

<sup>209</sup> Durlach J. Clinical aspects of chronic magnesium deficiency, in MS Seelig, Ed. *Magnesium in Health and Disease*. New York, Spectrum Publications, 1980.

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<sup>212</sup> Starobrat-Hermelin B, Koziellec T. The effects of magnesium physiological supplementation on hyperactivity in children with attention deficit hyperactivity disorder (ADHD). Positive response to magnesium oral loading test. *Magnes Res* 10(2):149-56, 1997.

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- <sup>224</sup> The effects of magnesium physiological supplementation on hyperactivity in children with ADHD. *Mag Res* 1997; 10(2):149-56.
- <sup>225</sup> Eli Lilly's newest antidepressant, Cymbalta (Duloxetine) had 6 suicides in the clinical trials, before it ever reached the market, and in people with no previous history of depression. The last and most publicized was the death of a young college girl, who had entered the clinical trial for some extra money while she was in school. She had no depression, was a good student, social and well adjusted, found hanging by a noose after a dosage change of this forecasted blockbuster. [http://news.independent.co.uk/uk/health\\_medical/story.jsp?story=648010](http://news.independent.co.uk/uk/health_medical/story.jsp?story=648010)
- Eli Lilly posted the results of 45 clinical trials on their website in cooperation with recommendations for more transparency for the public, but failed to list the 5 trials with the information about these suicidal acts. Lilly defended its drug, saying that 4,142 depressed patients had taken Cymbalta and the deaths represent a 0.097% suicide rate. Besides, it said, it is the underlying depression - not the drug - that causes sufferers to become suicidal. FDA defended Lilly's position. Later a higher than expected rate of suicide attempts was observed in the open-label extensions of controlled studies of Cymbalta for stress urinary incontinence (SUI) in adult women.
- I have lost my appetite (I weigh around 110 lbs) and loss of taste, hearing, sensation and even judgement. I can barely drive or walk. I am a highly educated woman who has lead a national biotechnology company and now I can barely have a conversation that makes sense. I feel absolutely 100% confident that Cymbalta has caused these side effects. I have a bachelors in science with major studies in pharmacology and medical sciences. I previously had meeting with executives and lead conferences that people would learn from me. Now I can not even stand up straight without feeling dizzy, confused, and paranoid. I am currently having problems with spelling and grammer. This use to be a strong skill of mine. I have been known to edit papers and rewrite many documents and now it is difficult for me to write an email. Cymbalta is not approved for the treatment of SUI. The FDA is evaluating additional data to determine the relationship, if any, between suicidality and Cymbalta use. <http://www.fda.gov/cder/drug/InfoSheets/HCP/duloxetineHCP.pdf>
- <sup>226</sup> <http://www.mdheal.org/magnesiul.htm>
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- <sup>231</sup> Research in the last several decades has revealed that at least 11 metals—lead (Pb), mercury (Hg), cadmium (Cd), manganese (Mn), arsenic (As), iron (Fe), copper (Cu), zinc (Zn), silver (Ag), gold (Au), and tellurium (Te)—accumulate in the choroid plexus (Zheng, 2001a, 2002), making the tissue a major target in brain for toxicities associated with environmental exposure to heavy metals.
- <sup>232</sup> Morehead State University: BIOL 231 Human Anatomy  
<http://people.morehead-st.edu/fs/m.mcmurr/231-L25.html>
- <sup>233</sup> University of Manitoba: Cerebral Ventricular System and Cerebrospinal Fluid  
<http://www.umanitoba.ca/faculties/medicine/anatomy/csf-form.htm>
- <sup>234</sup> University of Rochester Environmental Health Sciences Center, Clarkson  
<http://www-apps.niehs.nih.gov/centers/public/res-core/ctr1082-4386.htm>
- <sup>235</sup> Seelig, MS. Athletic stress, performance and magnesium in consequences of magnesium deficiency on the enhancement of stress reactions; preventive and therapeutic implications: a review. *J Am Coll Nutr*, vol.13, no. 5, pp. 429-446, 1994
- <sup>236</sup> Durlach, J. Magnesium in Clinical Practice, Libbey, London, 1988.
- <sup>237</sup> Fehlinger, R. Therapy with magnesium salts in neurological diseases. *Magnes Bull*, vol 12, pp. 35-42, 1990
- <sup>238</sup> Diffusion is the mechanism by which components of a mixture are transported around the mixture by means of random molecular (Brownian) motion (*cf.* permeation: the ability of a diffusant to pass through a body - dependent on both the diffusion coefficient,  $D$ , and the solubility coefficient,  $S$ , *ie*, permeability coefficient,  $P = D.S$ ). [Flynn et al.](#) cite [Berthelot](#) as postulating, at the beginning of the nineteenth century, that the flow of mass by diffusion (*ie*, the flux), across a plane, was proportional to the concentration gradient of the diffusant across that plane. <http://www.initium.demon.co.uk/fick.htm>
- <sup>239</sup> Magnesium chloride is an ionic compound because it has a metal, magnesium, and a nonmetal, chlorine. Magnesium will lose two electrons and form a +2 charge. Chlorine will gain one electron to form a chloride ion with a -1 charge. The formula for the compound is  $MgCl_2$ . To get the formula weight, find the atomic weights and add them together taking the subscripts into account. Magnesium is 24.3; chlorine is 35.5; so two would be 71.0. The total gives 95.3 as the formula weight.
- <sup>240</sup> <http://www.hps-online.com/foodprof14.htm>
- <sup>241</sup> Magnesium Research. Volume 18, Number 3, 187-92, September 2005, original article
- <sup>242</sup> Mittendorf R, Dammann O, Lee KS. Brain lesions in newborns exposed to high-dose magnesium sulfate during preterm labor. Department of Obstetrics and Gynecology, Loyola University Medical Center, Maywood, IL, USA. *J Perinatol*. 2005 Dec 1; doi:10.1038/sj.jp.7211419.
- <sup>243</sup> Dr. Herbert C. Mansmann Jr. and his associates show us the incredible importance of supplementing magnesium in pregnancy. “The survival rate of very preterm, low birth weight infants (weighing less than 1500 g) is 85 per cent in the USA and is ever increasing, while 42 to 75 per cent of extremely premature infants (weighing 751-1000 g) survive. Of great concern is

the lack of consistent decrease in neurological syndromes and associated visual impairments. Because of short gestations, these infants have not had time to accrue up to 80 per cent of magnesium normally present at term. These very preterm infants are at highest risk for cerebral hypoxia/ischemia (H/I), intracranial hemorrhage (ICH), periventricular leukomalacia (PVL) or cystic PVL (CPVL), and possible sequelae, cerebral palsy (CP) and mental retardation (MR).” Department of Pediatrics, Thomas Jefferson University, Philadelphia, PA 19107-5083, USA. The possible role of magnesium in protection of premature infants from neurological syndromes and visual impairments and a review of survival of magnesium-exposed premature infants. *Magnesium Research*. 12(3):201-16, 1999 Sep.

<sup>244</sup> <http://web.mit.edu/newsoffice/2004/magnesium.html>

<sup>245</sup> P. Meisell et al. Magnesium Deficiency is Associated with Periodontal Disease *Dent Res* 84 (10):937-941, 2005 International and American Associations for Dental Research

<sup>246</sup> Bird Flu infecting Vietnamese Girl found Resistant to Primary Drug

<http://www.indystar.com/apps/pbcs.dll/article?AID=/20051015/NEWS01/510150466>

<sup>247</sup> Campbell's recommendation: Begin increasing the amount of vitamin C that you take each day to very high levels, spread over the course of the day, in divided doses taken with meals. Start at 1000 mg per meal, and increase slowly to 2000-4000 mg per meal. (These are adult doses, modify by body weight for children.) Your optimal dose is just below the point where your body complains by giving you mild diarrhea. This is called the "bowel tolerance dose." Such doses are perfectly safe - vitamin C is natural to our bodies and needed for many body processes. Most people don't get nearly enough. Stock up on this vital nutrient - buy in powder form, 1-pound or 3-pound canisters (ascorbic acid form). Mix with water or fruit juice. Be sure to take vitamin C with food that will coat your stomach to prevent stomach upset, such as organic soymilk. <http://www.cqs.com/influenza.htm>

<sup>248</sup> Dr. Klenner used massive doses of Vitamin C for over forty years of family practice. He wrote dozens of medical papers on the subject. A complete list of them is in the *Clinical Guide to the Use of Vitamin C*, edited by Lendon H. Smith, M.D., Life Sciences Press, Tacoma, WA (1988).

<sup>249</sup> The Treatment of Poliomyelitis and Other Virus Diseases with Vitamin C: Klenner, *Southern Medicine & Surgery*, July, 1949 "The treatment employed [in the poliomyelitis epidemic in North Carolina in 1948, 60 cases] was vitamin C in massive doses... given like any other antibiotic every two to four hours. The initial dose was 1000 to 2000 mg., depending on age. Children up to four years received the injections intramuscularly ... For patients treated in the home the dose schedule was 2000 mg. by needle every six hours, supplemented by 1000 to 2000 mg. every two hours by mouth ... dissolved in fruit juice. All patients were clinically well after 72 hours. Where spinal taps were performed, it was the rule to find a reversion of the fluid to normal after the second day of treatment.

<sup>250</sup> A commentary in the *Journal of the Royal Society of Medicine* (Madjid et al. 2003) noted that influenza is readily transmissible by aerosol and that a small number of viruses can cause a full-blown infection. The authors continued: "the possibility for genetic engineering and aerosol transmission [of influenza] suggests an enormous potential for bioterrorism" The possible hostile abuse of influenza virus is seen as a very real threat by public health officials in the USA. \$15 million was granted by the US National Institutes of Health to Stanford University to study how to guard against the flu virus "if it were to be unleashed as an agent of bioterrorism". Stanford University News Release 17 September 2003,

[http://mednews.stanford.edu/news\\_releases\\_html/2003/septrelease/bioterror%20flu.htm](http://mednews.stanford.edu/news_releases_html/2003/septrelease/bioterror%20flu.htm)

<sup>251</sup> The resurrection of 1918 influenza has plunged the world closer to a flu pandemic and to a biodefense race scarcely separable from an offensive one, according to the Sunshine Project, a

biological weapons watchdog. "There was no compelling reason to recreate 1918 flu and plenty of good reasons not to. Instead of a dead bug, now there are live 1918 flu types in several places, with more such strains sure to come in more places," says Sunshine Project Director Edward Hammond, "The US government has done a great misdeed by endorsing and encouraging the deliberate creation of extremely dangerous new viruses. The 1918 experiments will be replicated and adapted, and the ability to perform them will proliferate, meaning that the possibility of man-made disaster, either accidental or deliberate, has risen for the entire world."

<sup>252</sup> <http://reform.house.gov/GovReform/Hearings/EventSingle.aspx?EventID=30083>

<sup>253</sup> [http://www.gilead.com/wt/sec/pr\\_933190157/](http://www.gilead.com/wt/sec/pr_933190157/)

<sup>254</sup> <http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2005/06/24/MNGHTDE8LG1.DTL>

<sup>255</sup> Semczuk M, Semczuk-Sikora A. New data on toxic metal intoxication (Cd, Pb, and Hg in particular) and Mg status during pregnancy. *Med Sci Monit.* 2001 Mar-Apr;7(2):332-40.

<sup>256</sup> *Magnesium*, 1988, vol 7.

<sup>257</sup> Preeclampsia, also known as toxemia, is a complex disorder that affects about 5 to 8 percent of pregnant women. You're diagnosed with preeclampsia if you have high blood pressure *and* protein in your urine after 20 weeks of pregnancy. The condition most commonly shows up after you've reached 37 weeks, but it can develop any time in the second half of pregnancy, as well as during labor or even after delivery (usually in the first 24 to 48 hours). Preeclampsia causes your blood vessels to constrict, resulting in high blood pressure and a decrease in blood flow that can affect many organs in your body, such as your liver, kidneys, and brain. When less blood flows to your uterus, it can mean problems for your baby, such as poor growth, decreased amniotic fluid, and placental abruption — when the placenta separates from the uterine wall before delivery. In addition, your baby may suffer the effects of prematurity if you need to deliver early to protect your health.

<sup>258</sup> Stolkowski J. Magnesium in animal and human reproduction *Rev Can Biol.* 1977 Jun; 36 (2):135-77.

<sup>259</sup> Study by Edward O. Laumann, PhD; Anthony Paik, MA; Raymond C. Rosen, PhD; *JAMA* 2/9/99.

<sup>260</sup> Christopher Gearon; *The Search For A Female*

*Viagra*; <http://health.discovery.com/centers/womens/viagra/viagra.htm>

<sup>261</sup> Basar MM. et al. Relationship between serum sex steroids and Aging Male Symptoms score and International Index of Erectile Function. Department of Urology, University of Kirikkale, Kirikkale, Turkey. *Urology.* 2005 Sep;66(3):597-601.

<sup>262</sup> A deficiency in magnesium causes hyperplasia of the adrenal cortex, elevated aldosterone levels, and increased extracellular fluid volume. Aldosterone increases the urinary excretion of magnesium; hence, a positive feedback mechanism results, which is aggravated since there is no renal mechanism for conserving magnesium.

<sup>263</sup> [http://www.prescriptionsfirst.com/health\\_articles/dhea\\_trying\\_to\\_make\\_evergreen\\_lives.html](http://www.prescriptionsfirst.com/health_articles/dhea_trying_to_make_evergreen_lives.html)

<sup>264</sup> Some reports have suggested that DHEA might reduce the risk of heart disease perhaps by lowering cholesterol levels. Systemic lupus erythematosus (SLE) an autoimmune disease has been linked to abnormalities in sex hormone metabolism. Supplementation with very large amounts of DHEA (200 mg per day) improved clinical status and reduced the number of exacerbations of SLE in a double-blind trial A preliminary trial has confirmed the benefit of 50-200 mg per day of DHEA for people with SLE. People infected with HIV and those with insulin-dependent diabetes, congestive heart failure, multiple sclerosis, asthma, chronic fatigue syndrome, rheumatoid arthritis, osteoporosis, and a host of other conditions have been reported to have low levels of DHEA. Most, studies have found that people with Alzheimer's have



lower blood DHEAS levels than do people without the condition. Thus all of these conditions will respond to transdermal magnesium chloride therapy, which clinically would be a safer way to raise DHEA levels.

<sup>265</sup> <http://www.betterway2health.com/cwr-dhea.htm> (Last visited December 11, 2005)

<sup>266</sup> Andre, C. et al. Testimony of the correlation between DHEA and bioavailable testosterone using a biochromatographic concept: effect of two salts. *J Pharm Biomed Anal.* 2003 Dec 4;33(5):911-21.

<sup>267</sup> Dahl, 1950; Nida and Broja, 1957; Goldsmith, 1963; Goldsmith et al., 1970; Goldsmith, 1971.

<sup>268</sup> United States Patent Application 20050089581 Shealy, C. Norman April 28, 2005 Magnesium containing compositions and methods for enhancing dehydroepiandrosterone levels.

<sup>269</sup> Omu AE, Al-Bader AA, Dashti H, Oriowo MA. Magnesium in human semen: possible role in premature ejaculation. Department of Obstetrics and Gynaecology, Faculty of Medicine, Kuwait University, Safat. *Arch Androl.* 2001 Jan-Feb;46(1):59-66.

<sup>270</sup> H Teragawa, M Kato, T Yamagata, H Matsuura, G Kajiyama. The First Department of Internal Medicine, Hiroshima University School of Medicine, 1-2-3 Kasumi, Minamiku, Hiroshima, Japan

<sup>271</sup> Magnesium, The Nutrient That Could Change Your Life: <http://www.mgwater.com/rod07.shtml>

<sup>272</sup> <http://www.bioticsresearch.com/PDF/Thyrostim.pdf>

<sup>273</sup> In a very tightly controlled three-month US study the effects of magnesium depletion on exercise performance in 10 women were observed – and the results make fascinating reading . In the first month, the women received a magnesium-deficient diet (112mgs per day), which was supplemented with 200mgs per day of magnesium to bring the total magnesium content up to the RDA of 310mgs per day. In the second month, the supplement was withdrawn to make the diet magnesium-deficient, but in the third month it was reintroduced to replenish magnesium levels. At the end of each month, the women were asked to cycle at increasing intensities until they reached 80% of their maximum heart rate, at which time a large number of measurements were taken, including blood tests, ECG and respiratory gas analysis. The researchers found that, for a given workload, peak oxygen uptake, total and cumulative net oxygen utilization and heart rate all increased significantly during the period of magnesium restriction, with the amount of the increase directly related to the extent of magnesium depletion. In plain English, a magnesium deficiency reduced metabolic efficiency, increasing the oxygen consumption and heart rate required to perform work – exactly what an athlete doesn't want!

<sup>274</sup> *J Am Diet Assoc*;86: 251–3 (1986) and *Nutr Res*;7:27–34 (1987)

<sup>275</sup> *Med Sci Sports Exerc*; 18(suppl):S55–6 (1986)

<sup>276</sup> *J Appl Physiol* 65:1500-1505 (1988)

<sup>277</sup> *Endocrinol Metab Clin N Am* 22:377-395 (1993)

<sup>278</sup> Brilla, Lorrie. *ACSM journal, Medicine and Science in Sports and Exercise*, Vol. 31, No. 5, May 1999.

<sup>279</sup> *Med Exerc Nutr Health* 4:230-233 (1995)

<sup>280</sup> Pre and post leg strength measurements were made using a Biodex isokinetic dynamometer." The strength of the ZMA group increased by 11.6% compared to only a 4.6% increase in the placebo group.

<sup>281</sup> G. Stendig-Lindberg, et al., "Predictors of maximum voluntary contraction force of quadriceps femoris muscle in man. Ridge regression analysis," *Magnesium* 2 (1983): 93-104.

<sup>282</sup> Frustaci, A., et al. Marked Elevation of Myocardial Trace Elements in Idiopathic Dilated Cardiomyopathy Compared With Secondary Dysfunction. Department of Cardiology, Catholic University, Rome Italy Journal of the American College of Cardiology. Vol. 33, No. 6, 1999, pp. 1578-1583: A large increase (>10,000 times for mercury and antimony) of TE concentration has been observed in myocardial but not in muscular samples in all pts with IDCM. Patients with secondary cardiac dysfunction had mild increase (<5 times) of myocardial TE and normal muscular TE. In particular, in pts with IDCM mean mercury concentration was **22,000 times** (178,400 ng/g vs. 8 ng/g), antimony 12,000 times (19,260 ng/g vs. 1.5 ng/g), gold 11 times (26 ng/g vs. 2.3 ng/g), chromium 13 times (2,300 ng/g vs. 177 ng/g) and cobalt 4 times (86.5 ng/g vs. 20 ng/g) higher than in control subjects.

<sup>283</sup> C. Consolazio, et al., "Excretion of sodium, potassium, magnesium, and iron in human sweat and the relation of each to balance and requirements," J. Nutr 79 (1963): 407-415.

<sup>284</sup> R. McDonald and C. Keen, "Iron, zinc, and magnesium nutrition and athletic performance," Sports Med. 5 (1988): 171-184.

<sup>285</sup> P. Deuster, et al., "Magnesium homeostasis during high-intensity anaerobic exercise in men," J. Appl. Physiol. 62 (1987): 545-550.

<sup>286</sup> According to Dr. Jeffrey Sankoff, "Because our bodies can only function within a narrow range of temperature, mechanisms exist for cooling. The most important of these mechanisms is the production of sweat. When sweat is formed on the skin, the heat from the body evaporates the water and energy is dissipated. However, if it is very hot sweating becomes less efficient as the air -- rather than heat generated by the body -- evaporates the sweat. And in humid conditions water evaporation slows, so sweating becomes less effective." <http://www.insidetri.com/train/tips/articles/2218.0.html>

<sup>287</sup> The average size amalgam filling contains approximately 750,000 micrograms of mercury (Hg) which releases part of that everyday for as long as the filling is in a person's mouth. A microgram (mcg) is 1/1,000 of a milligram in weight or one-millionth of a gram. A milligram (mg) is 1/1,000 of a gram by weight. People with amalgam are exposed to from tens to several hundreds of micrograms of mercury per day depending on how many fillings are in their mouth, how old the fillings are, how much a person brushes their teeth, chews and eats, the bacteria count in the mouth, and even the temperature of the body. Dr. Murry Vimy, professor of dentistry says, "It is estimated that the average individual, with eight biting surface mercury fillings, is exposed to a daily dose uptake of about 10 micrograms mercury from their fillings. According to Dr. Magnus Nylander, "Data suggest that approximately 19 to 20% of the general population may experience sub-clinical CNS and/or kidney function impairment as a result of the presence of amalgam fillings." Dr. Robert Gammal states, "Mercury from amalgam fillings has been shown to be neurotoxic, embryotoxic, mutagenic, teratogenic, immunotoxic and clastogenic. It is capable of causing immune dysfunction and auto-immune diseases." It is important to remember that mercury toxicity is a retention toxicity that builds up during years of exposure. The toxicity of a singular level of mercury is greatly increased by current or subsequent, low exposures to lead or other toxic heavy metals.

<sup>288</sup> Y. Rayssiguier, C. Y. Guezennec, and J. Durlach. INRA, Laboratoire des Maladies Métaboliques, France: Urinary Mg losses during an endurance event could play a role in this depletion but are often reduced, reflecting renal compensation. Loss of Mg by sweating takes place only when there is a failure in sweat homeostasis, a situation which arises when exercise is made in conditions of damp atmosphere and high temperature. Stress caused by physical exercise is capable of inducing Mg deficit by various mechanisms. A possible explanation for decreased plasma Mg concentration during long endurance events is the effect of lipolysis.



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Since fatty acids are mobilized for muscle energy, lipolysis would cause a decrease in plasma Mg.

<sup>289</sup> Y. Rayssiguier<sup>1</sup>, C. Y. Guezennec, and J. Durlach. INRA, Laboratoire des Maladies Métaboliques, France

<sup>290</sup> Karppanen H, Karppanen P, Mervaala E. Why and how to implement sodium, potassium, calcium, and magnesium changes in food items and diets? Institute of Biomedicine, Pharmacology, University of Helsinki. [J Hum Hypertens](#). 2005 Dec;19 Suppl 3:S10-9.

<sup>291</sup> Sloan Kettering Health Care Information for Professionals:

<http://www.mskcc.org/mskcc/html/11571.cfm?RecordID=481&tab=HC>

<sup>292</sup> <http://www.umm.edu/altmed/ConsSupplements/Interactions/Magnesiumcs.html>

<sup>293</sup> [http://www.navi.net/~rsc/mgcl2\\_txt.html](http://www.navi.net/~rsc/mgcl2_txt.html)

<sup>294</sup> [http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=9068914&dopt=Abstract](http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9068914&dopt=Abstract)

<sup>295</sup> [http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=8988330&dopt=Abstract](http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=8988330&dopt=Abstract)

[http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=7847586&dopt=Abstract](http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=7847586&dopt=Abstract)

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