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## Iodine and Chelation

Heavy Metals and Halogens

**International Medical Veritas Association**

Chelation bears the government's seal of approval for detoxifying the body, most often after an industrial accident or environmental exposure to hazardous materials. Each year some 60,000 Americans undergo chelation treatments, which are gaining ground as a potential therapy for a range of conditions, from Alzheimer's disease to cancer and heart disease. A preliminary study published in the Archives of Neurology found heavy metals stack up in the brains of Alzheimer's patients. Another survey claimed a 90-percent plunge in cancer deaths during an 18-year follow-up of 59 patients treated with the chelating agent calcium-EDTA.[i]

Heavy metals are found throughout nature but we have opened Pandora's Box by spreading these toxic metals throughout our environment and even injecting them directly into children's bodies and implanting them in their mouths. As levels of heavy metals rise in our air, water, and topsoil, they also rise within our bodies, contributing to chronic diseases, learning disorders, cancer, dementia, and premature aging.

The Environmental Working Group has published a devastating report titled *Body Burden — The Pollution in Newborns*.<sup>[ii]</sup> "U.S. industries manufacture and import approximately 75,000 chemicals, 3,000 of them at over a million pounds per year. Studies show that hundreds of industrial chemicals circulate in the blood of a baby in the womb, interacting in ways that are not fully understood. Many more pollutants are likely present in the womb, but test methods have yet to be developed that would allow health officials to comprehensively assess prenatal exposure to chemicals, or to ensure that these exposures are safe. From a regulatory perspective, fetal exposure to industrial chemicals is quite literally out of control."<sup>[iii]</sup>

The poisoning starts from conception and before.<sup>[iv]</sup>

Humanity is traveling down a deadly path. Awaiting each and every child born on the planet is a life doomed to being poisoned. There is "overwhelming evidence that every child, no matter where in the world he or she is born, will be exposed, not only from birth, but from conception, to man-made chemicals that can undermine the child's ability to reach its fullest potential -- chemicals that interfere with the natural chemicals that tell tissues how to develop and construct healthy, whole individuals according to the genes they inherited from their mothers and fathers," says Dr. Theo Colborn, Senior Program Scientist, at the World Wildlife Fund. This chapter offers a hugely important answer, a guardian angel in chemical form that we can and actually have to use in the highly toxic age we are all living

through. Every pregnant woman should be using iodine and magnesium chloride applied transdermally to initiate protective action from even before conception.

Heavy metals poison us by disrupting our cellular enzymes, which run on nutritional minerals such as magnesium, zinc, and selenium. **Toxic metals kick out the nutrients and bind their receptor sites, causing diffuse symptoms by affecting nerves, hormones, digestion, and immune function.** The heavy metals most often implicated in human poisoning are lead, mercury, arsenic, and cadmium but uranium is playing catch up since depleted uranium became the favorite armament of the United States military. Once in the body, **they compete with and displace essential minerals such as iodine, zinc, copper, magnesium, and calcium, and interfere with organ system function.**

No where is this process more evident than in the case of the halides, which are all antagonistic elements to iodine, meaning they will impede the absorption of iodine. Heavy metals get stored in the same receptors that are looking for iodine. Almost all of us are exposed to bromine and fluorine and are storing these toxic halides in our iodine deficient receptors. The mechanism of iodine in the cells is very ancient and lacking of specificity, in fact, cells are not able to distinguish iodide from other anions of similar atomic or molecular size, which may act as “pseudo-iodides”: bromide, fluoride, chlorine, thiocyanate, cyanate, nitrate, perchlorate, [v]

*In the 1960s iodine added to bread increased the average daily intake 4-5 times RDA levels.*

Then they took the iodine out of the bread and some medical idiot substituted bromide, a bio-poison in its place.[vi] There are actually four halogens: iodine, bromine, fluorine and chlorine. All these halogens use the same receptors in the body. Therefore if a person's diet is deficient in iodine the iodine receptors in the thyroid and stomach, for example, may fill up with bromine which is common in grains, bleached flour, sodas, nuts and oils as well as several plant foods. Iodine is depleted by bromine, which is used as a spray on fruits and vegetables, in baked goods, as a fumigant, and in Prozac, Paxil and many other pharmaceutical drugs. Chlorine, fluorine, and fluoride are chemically related to iodine, and compete with it, blocking iodine receptors in the thyroid gland.

*Iodine intake immediately increases the excretion of bromide, fluoride, and some heavy metals including mercury and lead. Bromide and fluoride are not removed by any other chelator or detoxifying technique.*

Dr. Kenez Gyula Korhaz states that iodine chelates heavy metals such as mercury, lead, cadmium and aluminum and halogens such as fluoride and bromide, thus decreasing their iodine inhibiting effects[vii] especially of the halogens. Iodine has the highest atomic weight of all the common halogens (126.9). Iodine is the only option when it comes to removing these toxic haloids from the thyroid and even the pineal gland where fluoride concentrates, especially when there is a deficiency in iodine in the body. In an age of increasing radioactivity and toxic poisoning specifically with fluoride[viii], chlorine and bromide, and even mercury, iodine is a necessary mineral to protect us from harm for immediately these toxic substances will increasingly flow out of the body in the urine.

Many of us are forced or conditioned to drink fluoridated water and also brush our teeth with fluoride. Could an iodine deficiency be related in some way to the current epidemic of hypothyroidism, breast, and prostate cancers? Are government health officials poisoning the public with fluoride and bromide, aspartame and mercury, and even with rocket fuel,

just to name a few things? Yes this is exactly what they are doing and they are feeling quite defensive about it.

*There is growing evidence that Americans would have better health and a lower incidence of cancer and fibrocystic disease of the breast if they consumed more iodine. A decrease in iodine intake coupled with an increased consumption of competing halogens, fluoride and bromide, has created an epidemic of iodine deficiency in America .*

*Dr. Donald Miller Jr.*

Dr. David Brownstein says that fluoride inhibits the ability of the thyroid gland to concentrate iodine and research has shown that **fluoride is much more toxic to the body when there is iodine deficiency present.** When iodine is supplemented the excretion rate of the toxic halides bromide, fluoride and perchlorate is greatly enhanced. Brownstein says that after only one dose of iodine the excretion of fluoride increased by 78% and this is very important for those who are drinking fluoridated water or are taking medicines with fluoride in them; bromide excretion rates increased by 50%. Our environment is loaded with the toxic halides bromine and fluorine and up to now we have had no way to detoxify the body of these thyroid poisons.

*No chelation or detoxification protocol can afford to ignore iodine.*

Over the last 2 decades bromine has contaminated our bread. Bromine blocks thyroid function and may interfere with the anticancer effect of iodine on the breast. Now, the risk for breast cancer is 1 in 8 and increasing 1% per year. Chlorine also blocks iodine in the body, so chlorinated water (both drinking and bathing) should best be avoided when possible. (See chapter on sodium thiosulfate for chlorine neutralization) Iodine increases mobilization of bromine from storage sites with increased urinary excretion of bromide[ix]. Elevated bromide levels were observed in urine and serum samples,[x] twenty times the levels reported in the literature in normal subjects.[xi]

*Patients who experience side effects while on orthoiodosupplementation are often excreting large amounts of bromide in the urine.*

Chloride competes with bromide at the renal level and increases the renal clearance of bromide[xii] thus magnesium chloride is ideal for magnesium supplementation. Some patients require up to 2 years of iodine therapy to bring post loading urine bromide levels below 10 mg/24 hr, if chloride load is not included in the bromine detoxification program. Rapid mobilization of bromine from storage sites with orthoiodosupplementation combined with increased renal clearance of bromide with a chloride load often causes side effects. Increasing fluid intake and adding a complete nutritional program minimizes these side effects.

Dr. Abraham noted that in some patients the excretion of lead, cadmium and mercury increased several fold after only one day of iodine supplementation and that increased aluminum excretion was noted about a month after beginning supplementation. Orthoiodosupplementation induces a detoxification reaction in some patients with high bromide levels. The symptoms include increased body odor and cloudy urine. The body odor lasts one to two weeks, but the cloudy urine may last several months before clearing up. Side effects can be minimized by increasing fluid intake. Increased fluid facilitates the

excretion of excess iodine and the bromides, fluorides and heavy metals that the iodine displaces. Dr. Abraham also reported that the administration of magnesium in daily amounts up to 1200 mg eliminated the body odor but not the cloudy urine.

*Released bromide from storage sites can induce decreased thyroid function, bromide being a potent goitrogen.*

In the United States especially people will want to note that iodine also is protective and effective at eliminating perchlorate from the body. Perchlorate, the explosive ingredient in solid rocket fuel, has leaked from military bases and defense and aerospace contractors' plants in at least 22 states, is contaminating drinking water, dairy milk, produce and many other foods and plants affecting millions of Americans. In the past year, CDC scientists have found that a significant number of women are at risk of thyroid hormone depression from perchlorate exposure. Perchlorate impairs the thyroid's ability to take up iodide and produce hormones critical to proper fetal and infant brain development. Further, studies show that breast milk may have even more worrisome levels of perchlorate.

*The EPA's proposed safe exposure level for the rocket fuel contaminant perchlorate is not protective of public health. In the past year, CDC scientists have found that a significant number of women are at risk of thyroid hormone depression from perchlorate exposure.[xiii]*

The CDC/BU ( Boston University ) study,[xiv] which examined breast milk from 49 Boston area women, found that the average breast fed infant in this study is being exposed to more than double the dose of perchlorate that the Environmental Protection Agency (EPA) considers safe; highly exposed babies are ingesting up to 10 times this amount. In a related 2006 study, the CDC found perchlorate in the urine of every one of 2,820 people tested, suggesting that food is a key route of exposure in addition to drinking water.[xv] Applying the results of the CDC study to the California population, EWG estimates that at exposure to 5 ppb of perchlorate in drinking water, 1 in 10 California women of childbearing age with low iodine intake would be diagnosed as sub-clinically hypothyroid and require medical treatment when pregnant to protect themselves and their babies.[xvi]

Dr Kellman of the Centre for Progressive Medicine in New York said, "Once damage to the thyroid takes place it affects all the other organs – starting with digestion and absorption. Toxins start accumulating in the system. You can have an array of symptoms: heart disease and its complications, high homocysteine levels, poor circulation, weight gain/loss, no appetite or bingeing, bloating, fluid retention, skin problems, aching joints, low blood pressure, high cholesterol, low libido, hair loss, and sensitivity to cold." [xvii]

Dr. Sebastiano Venturi informs us that "iodine is one of the most abundant electron-rich essential elements we consume and is transported to the cells via iodide transporters. Iodide, which acts as a primitive electron-donor through peroxidase enzymes, seems to have an ancestral antioxidant function in all iodide-concentrating cells. Oxygen is a potent oxidant whose accumulation in terrestrial atmosphere resulted from the development of photosynthesis over three billion years ago, in blue-green algae (*Cyanobacteria*)." Iodine was used by Nature as one of her main strategies of antioxidant defense in plants and animals. The point is that antioxidants, iodine included, are important as protective substances against many chronic and degenerative diseases such as cancer and cardiovascular diseases.

*The antioxidant biochemical mechanism of iodides is probably the most ancient mechanisms of defense from poisonous reactive oxygen species.*

*Dr. Sebastiano Venturi*

“The evolution of oxygen-producing cells was probably the most significant event in the history of life after the beginning of life itself. Oxygen is a potent oxidant and life has to contend with the toxicity of ROS (Reactive Oxygen Species) which react with lipids, proteins, carbohydrates and DNA and thus interfere with the functions of cellular membranes, cell metabolism, cellular signaling, cell growth and differentiation. Oxidative stress has been implicated as a causative process in the development of a vast number of degenerative diseases,”<sup>[xviii]</sup> continues Dr. Venturi. The antioxidant properties of dietary iodide depend on a series of redox reactions underlying the iodination of tyrosine leading to the formation of thyroid hormones. Iodine can react with double bonds on lipids such as polyunsaturated fatty acids rendering them less reactive to ROS.

*Thyroid hormones are known to play a major part in the regulation of mitochondrial oxidative metabolism.*<sup>[xix]</sup>

A newly discovered oxidant defense system is found in the free radical scavenging capacity of thyroid hormones Thyroxine, reverse-T3 and iodothyronines seem to be important as antioxidants and inhibitors of lipid peroxidation<sup>[xx],[xxi]</sup> and **is more effective than vitamin E, glutathione and ascorbic acid.**<sup>[xxii]</sup> Doctors involved in the chelation of children with neurological conditions need to take notice and start treating them with iodine as a primary not secondary form of treatment.

*Mercury is the most toxic non radioactive poison on earth and has the capability to destroy all biological life and activity either through a slow torturous death or a quick one. It qualifies as an intense systemic poison meaning it has its effect which is remote from the site of entry into the body.*

Dr. Brownstein indicates that iodine is also a chelator of mercury and had tested quite carefully the amounts removed.<sup>[xxiii]</sup> Mercury not only poisons the nervous system and digestive tract, **it can also poison the thyroid gland.** There are 4 iodine binding sites or receptors on the thyroid gland. These receptors bind with the iodine we get from our diet. The iodine enters the thyroid and activates it. If the thyroid is not absorbing enough iodine it will not be fully activated and the body's temperature will be abnormally low. Mercury from dental fillings can migrate to the thyroid gland and sit on one or more of the thyroid's 4 iodine receptors blocking the iodine from reaching the receptors and activating the thyroid. When this happens iodine is not absorbed in normal amounts by the thyroid gland. The result is low body temperature or hypothyroidism.

Thanks to the continued promotion of mercury fillings by the American Dental Association and conventional dentists, consumers continue to be poisoned by this heavy metal that's intentionally placed into their mouths. There's so much mercury currently being put into the mouths of humans that the total volume of mercury being dumped into the environment from mercury fillings is nearly equal to that emitted by coal plants. Combine the two sources of mercury with a diet high in fish, which are contaminated with mercury and add a year's flu vaccine that also has mercury in it and we have a huge problem that health officials are not addressing at all.

Several mechanisms are utilized to remove mercury from the body. In order for these detoxification mechanisms to work properly, numerous essential minerals like Iodine, Zinc, Sulfur, Selenium, and Silica stimulate the excretion of mercury. Unfortunately, the average

person's daily intake of Iodine is not high enough to protect them from mercury. The National Health and Nutrition Survey undertaken by the CDC showed iodine levels falling over 50% in the last 30 years. In 1940 the average American got 800 micrograms of iodine in their diet. In 1995 we averaged 135 micrograms; an 83% decline! Eating seafood and seaweed can keep your dietary levels in the healthy range. Supplementing with iodine can offer additional help in maintaining these healthy levels of iodine.

This is a medical disaster already in advanced stages because as the need for iodine has increased daily intake has decreased. *The Rising Tide of Mercury* and the sharp increases in bromide and fluoride are overcoming our body's ability to eliminate. We are staring right in the face of one of the most fundamental building blocks of the modern day plight with chronic diseases including cancer. Iodine is first on the list with magnesium chloride as the surest preventive and treatment of the vast majorities of today's chronic and acute diseases. Allopathic medicine has got it terribly wrong paying no attention to these two emergency room medicines of great importance.

Supplementing with iodine can replenish your iodine stores while flushing out poisons. People usually do not experience the negative effects of some type of detoxification when using iodine unless they are removing unusually high levels of bromide and fluoride. Most people actually notice increased energy, better sleep, and mental clarity.

Mineral replacement therapy (nutritional support) is essential when doing any form of chelation. In fact it is not clinically correct at all to separate chelation from minerals like they are different processes. Trace mineral therapy is important because minerals compete with toxic metals for binding sites. In other words, when ones body is properly mineralized, the absorption and toxicity of heavy metals is greatly reduced. Our bodies should be as strong and healthy as possible before the chelation process should be attempted and minerals top the list not only because they make us stronger, but because they start the chelation process before an "official" chelator is even used.

*The healthy cell wall favors intake of  
nutrients and elimination of waste products.*

The involvement of free radicals in tissue injury induced by magnesium deficiency<sup>[xxiv]</sup> causes an accumulation of oxidative products in the heart, liver, kidney, skeletal muscle tissues and in red blood cells.<sup>[xxv]</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.<sup>[xxvi]</sup> "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," writes Dr. Garry Gordon

### Transdermal Magnesium Therapy

One concern with traditional allopathic chelation therapy in general is that chelating agents are not as specific as we would like and are likely to remove essential trace minerals as well as toxic metals. Mercury drastically increases the excretion of magnesium and calcium from the kidneys.<sup>[xxvii]</sup> Both mercury itself and the drugs used to chelate mercury have a strong impact on mineral levels.

Limitations with the traditional allopathic chelation therapies include the fact that the agents used, while sometimes too specific to the metal targeted for removal, are also not protective enough when it comes to minerals that should be spared. Consequently essential trace minerals are likely to be depleted, making trace mineral replacement therapy absolutely essential. For example, EDTA is not effective for mercury, the number one toxic threat in most people. And DMPS and DMSA are dangerous to use because of their toxicity. Only highly trained physicians can safely administer them and even then we have problems like we do with all allopathic treatments.

Magnesium protects cells from aluminum, mercury, lead, cadmium, beryllium and nickel. 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. 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.[xxviii] 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.[xxix]

“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.”

#### Transdermal Magnesium Therapy

Sea minerals in general are very helpful to doctors because the relative composition of many mineral trace-elements of the animal body is similar to the composition of the sea, where the first forms of life began. The sea is rich in iodine, about 60 micrograms ( $\mu\text{g}$ ) per liter. Brown algae (seaweeds) accumulate iodine to more than 30,000 times the concentration of this element in seawater.[xxx],[xxxi] Marine vegetation concentrates iodine for its antimicrobial and antioxidant properties.[xxxii]

Doctors involved with Chernobyl nuclear plant catastrophe in 1989 used kelp for detoxification and thyroid gland rehabilitation, Modifilan helped thousands of nuclear plant workers and people in the area who were affected by the explosion because the iodine is protective against Strontium 90 and other toxicities.

The most important nutrient provided by kelp is iodine. Seaweed is noted for its ability to bind heavy metals and radioactive pollutants. Dr. Yukio Tanaka of the Gastrointestinal Research Lab at McGill University demonstrated that kelp may inhibit the absorption of lead, cadmium, and radioactive strontium (one of the most hazardous pollutants). 80 to 90 percent of radioisotopes of Strontium 90 could be removed from the intestinal tract in the presence of seaweed. Iodine and the sodium alginates found in seaweed are the specific agents that do the chelation. So much Strontium 90 has been released by nuclear explosions,

power plants, and nuclear weapons facilities that it is believed that every person has detectable levels in their bone tissue. Many cancers are attributable to this contamination.

Some doctors see cancer tumors having characteristics very similar to yeasts. "Seaweeds (iodine) have exceptional value in the treatment of candida overgrowth. They contain selenium and (all the) other minerals necessary for rebuilding immunity; furthermore the rich iodine content is used by enzymes in the body to produce iodine-charged free radicals which deactivate yeasts. Before the advent of anti-fungal drugs, iodine was the standard medical treatment for yeasts. When candidiasis is complicated with tumours or cancers, then seaweed is of additional benefit. Salt should normally be restricted during candida overgrowth".<sup>[xxxiii]</sup>

In today's highly toxic world everyone is being heavily exposed to hazardous materials but for some strange reason the medical mainstream has been unwaveringly critical of the use of chelation in autistic children. The Food and Drug Administration considers treating autistic children with chelating drugs too risky and ineffective to grant approval for such use, though they have no answer themselves for safe and effective treatment of the disorder. An American Academy of Pediatrics article noted no published peer-reviewed research showing chelation therapy has any role to play in autism. The FDA and the AAP could not be more mistaken, more wrong as they deny and defend their insane ideas about the safety of poisons like mercury in vaccines and dental products. There is nothing safe or effective in trusting these organizations' judgments.

Medical authorities warn of possible ill consequences to children undergoing the therapy. Along with metals, it is true that synthetic chelation also can strip the body of essential minerals like zinc and iron. In addition, the treatment can carry risks that include liver and kidney damage, bone-marrow problems, skin rashes, allergic reactions and nutritional deficiencies, doctors said. Medical authorities are correct in this regard for when chelation is done the allopathic way with synthetic drugs like DMPS, DMSA and EDTA, with each holding their own toxicity, we have all the potential problems and complications described above. Yes there are highly skilled physicians who know how to avoid most of these problems but they are rare, hard to find and expensive.

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[http://www.upi.com/Consumer\\_Health\\_Daily/Reports/2007/05/04/ped\\_med\\_chelation\\_stirs\\_controversy/](http://www.upi.com/Consumer_Health_Daily/Reports/2007/05/04/ped_med_chelation_stirs_controversy/)

[ii] <http://www.ewg.org/reports/bodyburden2/execsumm.php>

[iii] <http://www.ewg.org/reports/bodyburden2/part4.php>

[iv] <http://www.ewg.org/reports/bodyburden2/contentindex.php>

[v] Wolff J (1964) Transport of iodide and other anions in the thyroid gland. *Physiol Rev* 44:45-90

[vi] Bromide is an active and painful escharotic, a deodorant and an antiseptic, setting free ozone. Its vapor is highly irritant to the respiratory mucous membrane and the eyes, producing cough, hoarseness and dyspnoea. Internally, it is an active, corrosive poison, causing violent gastritis, depression and collapse. Bromides are pre-eminently depressants of the cerebral and spinal functions, also alterative, antispasmodic and hypnotic. The Potassium salt is especially a cardiac and muscular paralyzant. Bromides reduce the number of the respirations, and the heart's action and force; and though diminishing the calibre of the arterioles, they lower arterial tension. They lessen the activity of the brain cells, producing somnolence; diminish the sensibility of the peripheral nerves, causing anaesthesia of the skin and mucous membranes. They impair motility and the sexual function, cause great pallor and emaciation, lowered body-temperature, acne on the face and upper extremities, fetid breath, dysphagia, sluggish reflexes and defective coordination ; and if long continued may even impair the mental faculties, producing hallucinations in some cases, in others melancholia with suicidal tendency ; also incompetence of the sphincters and paralysis, beginning at the periphery and extending to the centres. The general result of their action is termed "Bromism," and is heralded by the acne and lowered faucial sensibility. It is probably due to the sedative influence of these agents on the sympathetic system, causing general anaemia of the brain, spinal cord, sexual organs, and skin. Differences in Action between the principal Bromides. More and author at this site: <http://www.henriettesherbal.com/eclectic/potter-comp/bromine.html>

[vii] Sticht, G., Käferstein, H., Bromine. In *Handbook on Toxicity of Inorganic Compounds* - Seiler HG and Sigel, H Editors, Marcel Dekker Inc, 143-151, 1988.

[viii] Fluoride is associated with cancer and it also accumulates in the thyroid as well as the pineal gland, an important hormone control center. Dr. Jennifer Luke's found out that the pineal gland which produces serotonin and melatonin was also a calcifying tissue, like the teeth and the bones, so she hypothesized it would concentrate fluoride to very high levels. Luke had 11 cadavers analyzed in the UK and found very high levels of fluoride in the calcium hydroxy apatite crystals produced by the gland. The average was 9000 ppm and went as high as 21,000 in one case. These levels are at, or higher, than fluoride levels in the bones of people suffering from skeletal fluorosis. Luke hypothesizes that one of the four enzymes needed to convert the amino acid tryptophan (from the diet) into melatonin is being inhibited by fluoride. Melatonin is responsible for regulating all kinds of activities including the onset of puberty. It is thought that it is the fall of melatonin levels acts like a

biological clock and triggers the onset of puberty. In her gerbil study she found that the high fluoride treated animals were reaching puberty earlier than the low fluoride ones. When one considers the seriousness of a possible interference by fluoride on a growing child's pineal gland (and for that matter, elderly pineal glands) it underlines the need for higher iodine intake to increase fluoride elimination.

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[xi] Miller, M.E., Cappon, C.J., Anion-Exchange Chromatographic Determination of Bromide in Serum. *Clin. Chem.* 30(5):781-783, 1984.

[xii] Rauws, A.G., Pharmacokinetics of Bromide Ion-An Overview. *Fd. Chem. Toxic.*, 21:379-382, 1983

[xiii] <http://www.ewg.org/issues/perchlorate/20070425/index.php>

[xiv] Breast Milk Iodine and Perchlorate Concentrations in Lactating Boston-Area Women; *J Clin Endocrin Metab.* First published ahead of print February 20, 2007 as doi:10.1210/jc.2006-2738

[http://ewg.org/issues\\_content/perchlorate/20070329/CDC\\_BUstudy.pdf](http://ewg.org/issues_content/perchlorate/20070329/CDC_BUstudy.pdf)

[xv] Rocket Fuel in Lettuce <http://ewg.org/reports/rocketlettuce/>

[xvi] <http://ewg.org/reports/thyroidthreat/>

[xvii] W. S. Langford, A Comprehensive Guide to Managing Autism, The Autism File Supplement, 2001.

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[xxii] Tseng YL, Latham KR (1984) Iodothyronines: oxidative deiodination by hemoglobin and inhibition of lipid peroxidation. *Lipids* 19:96-102

[xxiii] <http://www.internetwks.com/clips/bsDetox.rm>

[xxiv] 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 Life Sci. 1997;60(3):221-36.

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[xxvi] 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.

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