

# ***THE DANGERS OF TOXIC METALS***

By Dr. Lawrence Wilson

Toxic metals comprise a group of minerals that have no known function in the body and in fact are harmful. Today mankind is exposed to the highest levels of these metals in recorded history, thanks to their industrial use and burning of coal, petroleum and incineration of waste material. They affect everyone and are a major cause of illness, aging and even genetic defects.

The study of toxic metals is part of nutrition and toxicology, areas not emphasized in medical schools. For this reason, these important causes of disease are accorded little attention in conventional mainstream medicine. This article focuses on the extent of toxic metal problems ≠ sources of toxic metals, symptoms and how to remove them.

## **INTRODUCTION TO THE MINERALS**

Minerals are the building blocks of our bodies. They are required for body structure, fluid balance, protein structures and to produce hormones. They are a key for the health of every body system and function. They act as co-factors, catalysts or inhibitors of all enzymes in the body. Copper and iron, for example, along with other minerals are required for the electron transport system, and thus needed for all cellular energy production.

Minerals are classified into four groups: The *macrominerals*, or those needed in large quantity, include calcium, magnesium, sodium, potassium, phosphorus, sulfur, iron, copper and zinc. *Required trace minerals* include manganese, chromium, selenium, boron, bromine, silicon, iodine, vanadium, lithium, molybdenum, cobalt, germanium and others. *Possibly required trace minerals* include fluorine, arsenic, rubidium, tin, niobium, strontium, gold, silver and nickel. *Toxic metals* include beryllium, mercury, lead, cadmium, aluminum, antimony, bismuth, barium, uranium and others.

These categories overlap slightly because assessing minerals that are required by humans is problematic. Some may be needed in minuscule amounts. Clinical studies to prove this by depriving people of vital minerals would be cruel and possibly disastrous. Also, note that minerals needed in lesser quantities are usually toxic in greater amounts. Examples are copper, iron, manganese, selenium and vanadium. Even calcium and sodium are quite toxic in excess.

## TOXIC METAL DANGERS

Today mankind is exposed to the highest levels in recorded history of lead, mercury, arsenic, aluminum, copper, tin, antimony, bromine, bismuth and vanadium. Levels are up to several thousand times higher than in primitive man. In my clinical experience, everyone has excessive amounts of some or all of the toxic metals. Toxic metals are also persistent and cumulative. The late Dr. Henry Schroeder, MD, who was a world authority on trace elements, wrote: “Most organic substances are degradable by natural processes. (However), no metal is degradable and they are here to stay for a long time”.

Toxic metals replace nutrient minerals in enzyme binding sites. When this occurs, the metals inhibit, overstimulate or otherwise alter thousands of enzymes. An affected enzyme may operate at 5% of normal activity. This may contribute to many health conditions. Toxic metals may also replace other substances in other tissue structures. These tissues, such as the arteries, joints, bones and muscles, are weakened by the replacement process. Toxic metals may also simply deposit in many sites, causing local irritation and other toxic effects. They may also support development of fungal, bacterial and viral infections that are difficult or impossible to eradicate until this cause is removed.

The mineral replacement process often involves the idea of *preferred minerals*. For example, the body prefers zinc for over 50 critical enzymes. However, if zinc becomes deficient - and our soil and food are very low in zinc today - or exposure to cadmium, lead or mercury is sufficiently high, the body will use these in place of zinc. Cadmium, in particular, is located just below zinc in the periodic table of the elements, so its atomic structure is very similar to that of zinc. It almost fits perfectly in the zinc binding sites of critical enzymes such as RNA transferase, carboxypeptidase, alcohol dehydrogenase and many others of great importance in the body.

The ability to replace a vital mineral means, however, that toxic metals are not completely harmful. Indeed, they can extend life. They keep bodies functioning when vital minerals are deficient.

An analogy is to imagine taking an automobile journey. If one is far away from a repair shop when a key part like the fan belt breaks, if one had a spare piece of rope, one could tie it around the pulleys and continue the trip slowly. The rope would not function nearly as well as the original part, but would allow one to keep going. This is how toxic metals can function positively in the body. Many people limp along on grossly deficient diets, and are even born deficient and toxic. They do not realize their fatigue and other symptoms are due to the presence of incorrect  $\geq$ replacement parts $\leq$  in their biological engine compartments. Depending on where toxic metals accumulate, the resulting effects may be given names such as hypothyroidism, diabetes or cancer.

## MODERN DIETS AND TOXIC METALS

The danger of toxic metals is greatly aggravated today by the low mineral content of most of our food supply. An abundance of vital minerals protects against toxic metals. Vital minerals compete with toxic metals for absorption and utilization in enzymes and other tissue structures. However, when food is low in essential minerals, the body absorbs and makes use of more toxic metals. To continue the previous analogy, we are not stocking up sufficiently on factory parts, so we must use the greatly inferior replacement parts  $\neq$  toxic metals. Causes for the low mineral content of almost all agricultural products are primarily:

Hybrid crops are bred for production or disease resistance, rather than superior nutrition.

Superphosphate fertilizers produce higher yields by stimulating growth, but do not provide all the trace elements.

Monoculture, the growing of just one crop over and over on the same piece of land, eventually depletes the soil.

Toxic sprays damage soil microorganisms needed to help plants absorb minerals from the soil.

Food refining and processing almost always reduce the mineral content of our food. Whole wheat flour, when milled to make white flour, loses 40% of its chromium, 86% of its manganese, 89% of its cobalt, 78% of its zinc and 48% of its molybdenum. Refining cane into sugar causes even greater losses. EDTA may be added to frozen foods to retain their color. However, this chelating agent removes minerals that otherwise would cause the surface minerals to tarnish, discoloring the vegetables.

According to Dr. Weston Price, author of *Nutrition and Physical Degeneration*, primitive man ate 5 to 11 times the amount of the essential minerals in his diet as modern man. The term 'empty calories' aptly describes most of our food today.

## SOURCES AND DETECTION OF TOXIC METALS

**For a more complete list of sources for each of the major toxic metals organized by the metal, see the Reference Guide at the end of this article.**

**Food Sources.** Food grown near highways or downwind of industrial plants may contain lead and other toxic amounts of metals. Even organic home gardens may be contaminated if, for example, old house paint containing lead leaches lead into the soil. Lead is considered the most widely distributed toxic metal due to its many uses in industry. However, mercury, arsenic, cadmium and particularly aluminum are just as widespread if not more, but are less well-studied.

Pesticides used on fruits, vegetables and many other foods may contain arsenic, lead, copper, mercury and other toxic metals.

Fish, especially those caught near the coast or in contaminated streams or lakes, are universally contaminated. Shellfish and bottom feeders in particular contain excessive cadmium, mercury and other toxic metals. Large fish concentrate mercury a million times or more. The federal government recently issued a warning that pregnant and lactating women should avoid tuna, shark, king mackerel and other large fish. I recommend everyone avoid these fish!

Table salt has aluminum added as an anti-caking agent. Sea salt is much better. Beverages in aluminum cans or food cooked in aluminum may contain elevated levels of aluminum. Ceramic plates and cookware from other nations often contain leaded glazes that come off onto the food.

Hydrogenated oils found in commercial peanut butter, margarines including soy margarine and vegetable shortening may contain nickel and cadmium used as catalysts.

**Drinking Water.** This is the most important source of toxic metals for most people. Aluminum, copper, toxic chlorides and fluorides are added to many municipal water supplies. Aluminum allows dirt to settle out of the water, while copper kills algae that grows in reservoirs. Chlorine is used to disinfect water, although ozone works very well and is a far more healthful treatment. Wells and even municipal water may also contain some lead, arsenic and other undesirable metals. Galvanized and black plastic pipes can be an important source of cadmium. Lead-soldered pipes and copper pipes may increase these metals in the drinking water if the water is soft. It is an uncommon problem in hard water areas.

Fluoride compounds added to drinking water are extremely toxic. They have found their way into ground water supplies, and thus into the food chain. Fluoride levels in foods processed with water may be very high, especially baby foods and reconstituted fruit juices. Health authorities who recommend fluoridating the water rarely if ever take into account fluorides already found in natural foods, foods processed with fluoridated water and fluoridated toothpaste. The combination adds up to overload in all cases. Hydrofluosilicic acid, the chemical often used to fluoridate drinking water, is a smokestack waste that contains lead, mercury, cadmium, arsenic, aluminum, benzene and radioactive waste material.

*Note that carbon and carbon block filters **do not** remove most toxic metals from water. Only distillation and reverse osmosis remove most toxic metals. Good quality spring water is probably best way to avoid the most common source of toxic metals and at the same time obtain vital minerals.*

**Airborne Sources of Toxic Metals.** Most toxic metals are effectively absorbed by inhalation. Auto and particularly aircraft exhaust, industrial smoke and products from incinerators are among the airborne sources of toxic metals and other chemicals. Burned high in the atmosphere, aircraft fuel deposits everywhere and affects everyone on earth. Burning coal can release mercury, lead and cadmium among other metals. Iranian and Venezuelan oil are high in vanadium. Other oil is excessive in toxic sulfur compounds. Tetraethyl lead was added to gasoline for many years. Residues are present on pavement

and may settle on buildings, cropland and elsewhere. Today, manganese is added to gasoline. Uranium exposure is largely from airborne sources such as nuclear tests and accidental nuclear releases.

Older methods of incineration of electronic parts, plastics, treated fabrics, batteries and even diapers release all the toxic metals into the air. The use of scrubbers and newer methods of very high temperature incineration are much better.

Cigarette and marijuana smoke are high in cadmium, found in cigarette paper. Pesticides used on these crops may contain lead, arsenic and other toxic metals.

**Medications.** Many patented prescription and over-the-counter drugs contain toxic metals. Cipro (fluoquinolones) and Prozac (fluoxetine) are fluoride-containing chemicals, for example. Thimerisol, a mercury-containing preservative, is used in some vaccines, including all flu shots. Independent evaluation of a large study that is part of the Centers For Disease Control Vaccine Safety Datalink concluded that “children are 27 times as likely to develop autism after exposure to three thimerisol-containing vaccines than those who receive thimerisol-free versions”.

Thiazide diuretics contain mercury. These include Maxzide, Diazide and many others. Antacids such as Ryopan, Gaviscon, Maalox, Mylanta and many others are very high in aluminum. Antibiotics may also contain toxic substances including metals.

**Direct Skin Contact.** Almost all anti-perspirants and many cosmetics contain aluminum. Dental amalgams contain mercury, copper and other metals. Dental bridges and other appliances often contain nickel. Prostheses and pins used to hold bones together may contain nickel and other toxic metals. Copper intra-uterine devices, if left in place for years, release a tremendous amount of copper into the body. Soaps, body lotions and creams often contain toxic compounds. A few hair dyes contain lead. Selsun Blue shampoo contains selenium that is quite toxic in high doses. Household lawn and garden chemicals may contain lead, arsenic and other compounds. Mercury treated seeds and arsenic-treated wood are other common sources of toxic metals.

**Occupational exposure** is important for plumbers, electricians, auto mechanics, printers, ironworkers, office workers and many other occupations. Workers need to wear gloves, masks and take other precautions when handling inks, metals and other toxic materials.

**Congenital Toxic Metals.** Today, all children are born with some toxic metals acquired in utero. All the toxic metals pass through the placenta from mother to child. This is seen clearly when reviewing mineral analyses of infants, such as that of Chloe, age 4 months, shown in the figure.

## DETECTING TOXIC METALS

Toxic metals are not easy to detect as they lodge deep within tissues and organs. Serum tests are helpful at times, and not helpful for most chronic exposure. Toxic metals are removed from the blood rapidly and deposited in storage organs and tissues where they will do less damage.

Tissue tests such as hair mineral analysis are therefore more often helpful. The United States Environmental Protection Agency reviewed over 400 reviews of the use of hair for toxic metal detection and concluded that:

Hair is a meaningful and representative tissue for (biological monitoring for) antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, vanadium and perhaps selenium and tin.

The author of a study of lead toxicity in Massachusetts school children, Dr. R. Tuthill, concluded: "Scalp hair should be considered a useful clinical and epidemiological approach for the measurement of chronic low-level lead exposure in children."

Skilled interpretation of the hair analysis is required. For example, when aluminum is elevated in the hair, iron and manganese are almost always elevated, but hidden as they do not accumulate in the hair.

Another method of detection is a challenge test in which one takes an injection of a chelating agent such as EDTA or DMPS. Then a 24-hour urine sample is analyzed for toxic metals. This will reveal some metals that are in the arteries, veins and kidneys, but misses most of the others.

*No test can detect anywhere near all the toxic metals in the body.* Often they are sequestered in hard-to-reach places such as the bones or poorly-perfused fatty tissues. They will be revealed, however, as they are excreted through the hair if one performs repeat hair mineral tests. As a clinician, I must assume everyone has toxic metals and any sound health program needs to be designed to remove them.

## SYMPTOMS ASSOCIATED WITH TOXIC METALS

**For a complete list of symptoms for each toxic metal, see the Reference Guide at the end of this article.**

Toxic metals can contribute to any imaginable illness. For example, lead that replaces calcium in the bones can contribute to weakened bones and osteoporosis. Cadmium that replaces zinc in the arteries causes inflammation and hardening of the arteries. Iron that replaces zinc and other minerals in the pancreas, adrenals and elsewhere can contribute to impaired blood sugar tolerance and diabetes. Copper that replaces zinc in the brain is associated with migraine headaches, premenstrual syndrome, depression, anxiety, panic attacks and much more. Mercury and copper that replace

selenium in various tissues impairs the conversion of T4 to T3, contributing to thyroid imbalances.

**Toxic Metals and Aging.** The slow, or not so slow, replacement of vital minerals with toxic metals is an important and neglected cause of aging due to deactivation of enzyme systems and the loss of organ and tissue integrity.

Toxic metal accumulation also feeds on itself. As one's energy production decreases with age, the body is less able to eliminate toxic metals, causing more metal accumulation.

**Toxic Metals and Gene Expression.** Genetic birth defects may be caused by faulty DNA or by faulty gene expression. Even if one's DNA is perfect, the synthesis of proteins from that DNA can be faulty. For example, zinc is required for a key enzyme in gene expression, RNA transferase. Not surprisingly, zinc deficiency is associated with conditions such as neural tube defects. A recent article in the *American Journal of Clinical Nutrition* discussed this hidden cause of genetic defects.

"An alternate form of a gene present in greater than 1% of the population is called a polymorphism".

While the article mainly discusses vitamin deficiencies as a cause for genetic defects, it gives the example that "mutations in Cu/Zn superoxide dismutase cause 25% of amyotrophic lateral sclerosis."

## **SOLUTIONS TO TOXIC METAL OVERLOAD**

One should not fear toxic metals. They cannot be completely avoided, but one can minimize exposure with careful eating and a healthful lifestyle. Also, our bodies have a lot of evolutionary experience with them and effective mechanisms to eliminate them. These can be supported and enhanced by nutritional and other therapies. The following program, when followed faithfully, will lead to the safe removal of toxic metals.

**1. Eat a varied, excellent-quality diet of mineralized foods.** The body will absorb and utilize less toxic metals if it receives more preferred minerals. In a 1994 study in the *Journal of Clinical Nutrition*, food labeled  $\geq$ organic $\leq$  selected randomly from Chicago food markets had an average of twice the mineral content of standard supermarket food. The famed people of Hunza who lived to 120 years or longer in excellent health drank glacial runoff that was so mineral-rich the water was cloudy ( ).

Especially mineral-rich foods include kelp, sea salt, other sea vegetables, small fish and all root vegetables except potatoes and yams. Root vegetables must be cooked at least 45 minutes for their minerals to be most bioavailable.

Adequate protein, especially animal protein, supplies sulfur-containing amino acids which help chelate toxic metals and support liver detoxification pathways.

Other high-sulfur foods include egg yolks and vegetables in the cabbage, radish, garlic and onion families. Sulfur is very helpful for detoxification in general, and for mercury and copper in particular.

Fiber is also helpful to reduce some toxic metals. It reduces bowel transit time, which can limit absorption of toxic metals. Certain fibers such as modified citrus pectin bind some toxic metals that reduce their absorption.

**2. Improve Your Lifestyle and Habits of Living.** Eat regular, sit-down meals. Also, eat quietly and slowly, and chew thoroughly. This can greatly enhance digestion and absorption of vital minerals. Most everyone needs to take digestive enzymes at least for a while to improve digestion. A relaxed and positive outlook also greatly facilitates digestion.

Sleeping 9 or 10 hours per night is most helpful to eliminate toxic metals. Most people do not sleep nearly enough. Six or seven hours per night is not sufficient for healing and detoxification. These are parasympathetic activities that occur mainly during the hours of sleep and rest.

**3. Avoid all extreme or deficient diets.** Strict vegetarian diets, for example, are always deficient in zinc and usually in many other essential nutrients. Raw food diets, while higher in some vitamins and other nutrients, are usually much lower in vital minerals. Cooking does not reduce the mineral content of food and usually makes minerals much more bioavailable by breaking down fiber. Cooking also concentrates the food so that one ends up ingesting many more vital minerals.

Skipping meals or snacking on the run, eating the same foods every day or living on protein drinks also induce mineral deficiencies. For example, egg or whey protein powder is not a substitute for eating eggs or fresh goat milk. The latter are whole foods that are much richer in many minerals. Food supplements are never a substitute for an excellent diet.

Avoid refined foods such as white sugar, white flour, table salt and white rice. These are almost devoid of vital minerals and will cause the body to absorb and utilize more toxic metals.

**4. Take Nutritional Supplements.** Supplements can help reduce the absorption of toxic metals and facilitate their removal. Kelp supplements are one of the best. Kelp contains a wide range of vital minerals. It also contains some toxic metals, as do all products from the sea. However, they are tightly bound. Alginates found in kelp also help bind and remove radioactive minerals, another hidden and important health concern related to toxic metals.

One can use *antagonists* to help eliminate toxic metals. These compete specifically with toxic metals for absorption, transport and utilization in enzyme binding sites and in other tissue structures. For example, zinc and calcium are cadmium antagonists. Selenium and zinc are mercury antagonists.

I worked for a time at the National Institute of Occupational Safety and Health. We investigated a factory in which workers were fed milk to help avoid lead poisoning. While a bit crude, the principle was sound, as calcium is a lead antagonist.

Specific minerals that most people need to add to their daily diet are more zinc, chromium, selenium and manganese. Most multivitamins do not contain enough. Other supplements that are helpful for toxic metals are N-acetyl cysteine, garlic, chlorella, cilantro extract and other sulfur-containing amino acid supplements. Chlorella, raw garlic, cilantro and NAC have a disadvantage in that they are extremely yin in Chinese medical terminology. This is not helpful for most people. The Life Extension Foundation offers a number of excellent mineral supplements, as well as Only Minerals and Phyto-food.

**5. Reduce Airborne Exposure and Skin Contact.** Avoid contaminated air as much as possible. City dwellers should use air filters in their homes and offices that can trap toxic metals. Unfortunately, even rural areas can experience pesticide drift, and auto and industrial fumes. If you must handle toxic materials at home or at work, wear gloves, masks and other protective gear.

Read labels carefully on skin care products. Most cosmetics and skin care products are somewhat toxic.

**6. Improve your energy.** This greatly enhances the body's ability to eliminate toxic metals. Nutritional balancing science using hair analysis is the key to this. It can assess metabolic rate, metabolic type, and exactly which supplements and how much of each are needed. Random supplementation does not work well.

Also, a combination of adequate rest and sleep, excellent diet and a healthful lifestyle are important. When needed, other natural therapies such as chiropractic, body work, energy work and others are also most helpful to restore and maintain an optimum energy level.

**7. Improve your eliminative organs.** In almost everyone, these do not function optimally. They are congested or sluggish due to glandular imbalances and the burden of toxic substances everyone must coped with. Nutritional support includes milk thistle and dandelion root for the liver, uva ursi and parsley for the kidneys, and fiber, digestive enzymes and other products for the bowel. Other excellent therapies include saunas, coffee enemas, colonic irrigation, massage, skin brushing and others.

Excessive sympathetic nervous system activity inhibits detoxification. Supplementary nutrients that inhibit excessive sympathetic activity include calcium, magnesium, zinc, choline, inositol, GABA, taurine and calming herbs. Other helpful therapies for this purpose include saunas, meditation, tai chi and biofeedback.

Saunas (hot air baths) have been used for thousands of years by many cultures. They are quite safe and very effective for detoxification. The New York Times recently reported on the success of saunas when nothing else was effective for the firemen who became ill at the World Trade Center disaster. Saunas draw blood to the surface, powerfully stimulate circulation and decongest the internal organs. Infrared saunas penetrate more deeply and are often more comfortable as they work at lower temperatures. Note that sweating during exercise is not as effective for detoxification as sweating when one is relaxed in a sauna. The best saunas I have experienced are those powered by infrared heat lamps.

**8. Add Chelating Agents.** To chelate means to bind to a metal. Certain substances bind tightly to toxic metals and assist their removal. Natural chelators include vitamin C, sulfur-containing amino acids, and some herbs including yellow dock and bugleweed. Molybdenum complexes with copper and is excellent when used sparingly.

Synthetic chelating agents include penicillamine and BAL (british anti-lewisite) for copper and deferoxamine for iron and aluminum. EDTA (ethylene diamine tetra-acetic acid) is a synthetic amino acid that binds to many minerals, toxic and essential. DMPS (sodium salt of 2,3-dimercapto-1-propane sulfonic acid) and DMSA (meso-2,3-dimercaptosuccinic acid) are synthetic agents used for mercury toxicity. Synthetic chelators are drugs that have more side effects, among which is their tendency to remove more good minerals along with the toxic ones. They may also accumulate in the body, along with the toxic metals they bind.

Toxic metals are in a delicate balance with other nutrients. Aggressive use of any chelator can have adverse and sometimes devastating health effects for this reason. This applies to high dose vitamin C, which powerfully lowers copper, and even moreso to the synthetic agents. For example, DMPS can dislodge mercury from fairly safe storage sites. It may then redeposit in more vital organs. It must be used with utmost caution.

Though chelation is the best known method to eliminate toxic metals, in my experience, synthetic chelators are hardly ever needed if one will undertake a complete healing program.

## **CONCLUSION**

Toxic metal exposure is higher than ever before and an important cause of ill health. I predict that removing them will become recognized as a great secret for healing many health conditions. Unfortunately, few doctors test for or even consider searching for toxic metals.

Reducing our exposure is the simplest and most cost-effective way to prevent toxic metal problems. Efforts to clean up the water, food and air have advanced greatly, but more needs to be done. Governments can do their part, but the public must also learn about the dangers of toxic metals and how to avoid them. It should be a top priority in the education of the children.

Young men and especially young women can do much to help the next generation and themselves to avoid toxic metals by improving their health before having children. Dr. Weston Price discovered that in many primitive cultures, prenatal care for young women began at puberty by feeding the women special foods designed to maximize their vital mineral intake.

One can greatly enhance the elimination toxic metals by reducing exposure, increasing vital minerals in the diet and avoiding mineral-deficient food. Assisting the eliminative organs, improving digestion, taking appropriate supplements, obtaining plenty of rest and using antagonists and perhaps chelators are also most helpful. The general use of inexpensive, infrared electric light saunas would be another excellent additional way to enhance toxic metal removal. These are excellent health insurance and well worth the effort.

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### **About the Author**

Dr. Lawrence Wilson specializes in mineral analysis and the removal of toxic metals, and has done so for 23 years. He consults for Analytical Research Laboratories, a mineral testing facility, where he apprenticed for 14 years with a brilliant biochemist, Dr. Paul C. Eck. He wrote a text about his work, *Nutritional Balancing and Hair Mineral Analysis*.

He has reviewed some 15,000 hair mineral analyses and followed some 5000 patients as they removed their toxic metals and balanced their minerals. He has also experimented extensively with sauna therapy, an emerging treatment modality for toxic metal removal.

**REFERENCE GUIDE  
SOURCES AND  
SYMPTOMS OF THE COMMON TOXIC METALS**

***SOURCES***

**Aluminum** - cookware, beverages in aluminum cans, tap water, table salt, baking powders, antacids, processed cheese, anti-perspirants, bleached flour, antacids, vaccines and other medications and occupational exposure.

**Arsenic** - pesticides, beer, table salt, tap water, paints, pigments, cosmetics, glass and mirror manufacture, fungicides, insecticides, treated wood and contaminated food.

**Beryllium** - air pollution (burning fossil fuels), manufacture of plastics, electronics, steel alloys and volcanic ash.

**Cadmium** - cigarettes, (tobacco and marijuana), processed and refined foods, large fish, shellfish, tap water, auto exhaust, plated containers, galvanized pipes, air pollution from incineration and occupational exposure.

**Copper** - copper water pipes, copper added to tap water, pesticides, swimming in pools, intra-uterine devices, vegetarian diets, dental amalgams, nutritional supplements - especially prenatal vitamins, birth control pills, weak adrenal glands and occupational exposure.

**Lead** - tap water, cigarette smoke, hair dyes, paints, inks, glazes, pesticide residues and occupational exposure in battery manufacture and other industries.

**Mercury** - dental amalgams, large fish, shellfish, medications, air pollution, manufacture of paper, chlorine, adhesives, fabric softeners and waxes.

**Nickel** - hydrogenated oils (margarine, commercial peanut butter and shortening), shellfish, air pollution, cigarette smoke, plating and occupational exposure.

***SYMPTOMS***

**Aluminum** ≠ Alzheimer's disease, amyotrophic lateral sclerosis, anemia and other blood disorders, colic, fatigue, dental caries, dementia dialactica, hypoparathyroidism, kidney and liver dysfunctions, neuromuscular disorders, osteomalacia and Parkinson's disease.

**Arsenic** - abdominal pain, abnormal ECG, anorexia, dermatitis, diarrhea, edema, enzyme inhibitor, fever, fluid loss, goiter, hair loss, headache, herpes, impaired healing, interferes with the uptake of folic acid, inhibition of sulfhydryl enzyme systems, jaundice, keratosis, kidney and liver damage, muscle spasms, pallor, peripheral neuritis, sore throat, stomatitis, stupor, vasodilation, vertigo, vitiligo and weakness.

**Beryllium** - adrenal insufficiency, arthritis, bone spurs, bursitis, depression, fatigue, osteoporosis and symptoms of slow metabolism.

**Cadmium** - hypertension, arthritis, diabetes, anemia, arteriosclerosis, impaired bone healing, cancer, cardiovascular disease, cirrhosis, reduced fertility, hyperlipidemia, hypoglycemia, headaches, osteoporosis, kidney disease, schizophrenia and strokes.

**Copper** - acne, adrenal hyperactivity and insufficiency, agorophobia, allergies, hair loss, anemia, anxiety, arthritis, autism, cancer, chronic candida albicans infection, depression, elevated cholesterol, cystic fibrosis, depression, diabetes, dyslexia, elevated estrogen, failure to thrive, fatigue, fears, fractures of the bones, headaches, heart attacks, hyperactivity, hypertension, hypothyroidism, infections, inflammation, insomnia, iron storage diseases, kidney and liver dysfunctions, decreased libido, multiple sclerosis, nervousness, osteoporosis, panic attacks, premenstrual syndrome, schizophrenia, strokes, tooth decay and vitamin C and other vitamin deficiencies.

**Lead** - abdominal pain, adrenal insufficiency, anemia, arthritis, arteriosclerosis, attention deficit, back problems, blindness, cancer, constipation, convulsions, deafness, depression, diabetes, dyslexia, epilepsy, fatigue, gout, impaired glycogen storage, hallucinations, hyperactivity, impotency, infertility, inflammation, kidney dysfunction, learning disabilities, diminished libido, migraine headaches, multiple sclerosis, psychosis, thyroid imbalances and tooth decay.

**Mercury** - adrenal gland dysfunction, alopecia, anorexia, ataxia, bipolar disorder, birth defects, blushing, depression, dermatitis, discouragement, dizziness, fatigue, headaches, hearing loss, hyperactivity, immune system dysfunction, insomnia, kidney damage, loss of self-control, memory loss, mood swings, nervousness, numbness and tingling, pain in limbs, rashes, excessive salivation, schizophrenia, thyroid dysfunction, timidity, tremors, peripheral vision loss and muscle weakness.

**Nickel** - cancer (oral and intestinal), depression, heart attacks, hemorrhages, kidney dysfunction, low blood pressure, malaise, muscle tremors and paralysis, nausea, skin problems, tetany and vomiting.