"Aluminum is a protoplasmic poison and a pernicious and persistent neurotoxin." It has a tendency to accumulate in the brain and bones.

Aluminum is the most abundant metal in the earth's crust; it is classified as a heavy metal (as is arsenic, lead, and mercury). Everyone is exposed to low levels of aluminum from food, air, water, and soil. There is no known physiologic need for aluminum.

Aluminum toxicity was described in the mid-to-late 1970s in a series of renal dialysis patients in Newcastle, England. It was known as early as 1900 by a number of medical practitioners. There are many tests which can be easily done at home to show the reactiveness of aluminum. My favorite is the use of aluminum foil with baking soda to remove the tarnish from silverware.

Signs

The principal symptom of aluminum poisoning is the loss of intellectual function: forgetfulness, memory loss, inability to concentrate, and in extreme cases, full blown dementia.

Hypersensitivity is another symptom. It is progressive, and if left untreated can escalate into irrational anger and displays of violence. What are the symptoms of hypersensitivity?

- Emotional instability
- Nervousness
- Heightened sensitivity to light or darkness
- Abnormal sensitivity to hot and cold temperatures
- An aversion to noise, touch, movement, odors, etc.
- Unexplained feelings of apprehension or uneasiness
- Feelings of inferiority, embarrassment or shame
- Feelings of irritability, agitation or annoyance

If symptoms of hypersensitivity are not appropriately treated, they can progress into more serious disorders, such as panic attacks, phobias (excessive fear) and other traumatic emotional and mental illnesses. Even manic-depression and schizophrenia can be directly caused by overexposure to aluminum.

Related physiological disorders:

- Breathing disorders
- Bowel and urinary dysfunction (incontinence)
- Headaches
- Cardiac complications (including congestive heart failure)
- Fatigue (extreme exhaustion)
- Eye disorders
- Ear disorders, including hearing loss
- Imbalance
- Immune dysfunction
- Motor tics (involuntary muscle twitches)
- Muscle weakness
- Organ dysfunction (pancreas, thyroid, etc.)
- Parkinsonian symptoms (AD-related)
- Sleep disorders

Aluminum can inhibit the body's ability to digest and make use of calcium, magnesium, iron, phosphorus and fluoride. This can cause anemia, prevent bone growth, and reduce bone density. Aluminum can also cause conditions which actually force calcium out of the bones. Either of these situations can bring on weakness and deformation in the bone structure with crippling effects.

Toxicity can also result in aching muscles, speech problems, digestive problems, lowered liver function, colic, and impaired kidney function.

Sources of Aluminum

- Over the counter medications: buffered aspirin, antacids.
- Personal care products: antiperspirants, deodorant "crystals," douche, toothpaste.
- Medical products: intravenous fluids and vaccines (which contain aluminum hydroxide, aluminum phosphate, or aluminum sulfate). Aluminum intoxication is common in patients with chronic renal failure because of absorption of aluminum during dialysis from aluminum-containing dyalysate water and ingestion of phosphate binders containing aluminum.
- Beverages in aluminum containers. This includes virtually all canned sodas and beers.
- Food that has been cooked or stored in aluminum pots and aluminum foil; more aluminum is leached into acidic foods. Estimates say that as much as 4 milligrams of aluminum can be transferred to each serving of an acidic food such as tomatoes or citrus fruits that has been heated or stored with aluminum.
- Stainless steel cookware can be a source as well as it is made by bonding the stainless steel with layers of aluminum. Evidence shows that after stainless steel cookware has been used for a short period of time, aluminum traces begin to enter the food.
- Food additives: sodium aluminum phosphates (baking powder) and anti-caking agents. They are added to cake mixes, frozen dough, pancake mixes, self-rising flours, processed cheese and cheese foods. Also alum, a form of aluminum sulfate, is used to pickles cucumbers. Some food colors are made with aluminum.
- Soy-based infant formula may contain higher levels of aluminum as compared to milk-based infant formulas and breast milk.
- Most water utilities use aluminum sulphate to clarify drinking water.
- The air when it is polluted by the effluent of aluminum processing factories and plants such as mines and coal-fired power plants and incinerators.
- Food plants and animals that are exposed to aluminum. It is believed that aluminum is not accumulated to a significant extent in most plants or animals and it is not expected to undergo bio-magnification. There are some exceptions (of course).

Anodized aluminum: Aluminum is strengthened and made more durable through a process called anodizing. Anodizing is accomplished by passing an electric current through a chemical acid bath in which the aluminum is placed. This causes the surface of the aluminum to oxidize (essentially rust) and then become aluminum hydrate which is extremely hard. The porous nature of the anodized layer allows the product to be dyed any color that is required. Some methods of anodizing can be done at home!

Hard anodizing produces a much thicker coating of aluminum oxide, penetrating holes and fissures in the surface to create a more uniform appearance than regular anodized aluminum. Hard anodizing can incorporate Teflon or other substances during the electrolytic process.

Anodized aluminum cookware is popular, appearing in products branded as Calphalon, Anolon, and Circulon. Such pots have a surface that is less reactive and scratch- and stick-resistant. Calphalon describes their cookware as hard anodized with a "virtually nonporous" surface that resists sticking. Anodized aluminum cookware will leach aluminum, although less than untreated aluminum provided that the surface has not been damaged.

Metal foil was first made from tin that was beaten and rolled into thin paper-like sheets. Tin was replaced by aluminum in 1910 and aluminum foil was born. It has been used ever since as a wrapper for food items. Thin foils are often laminated to other materials such as plastics or paper to make them more useful. Aluminum foil has a shiny side and a matte side, the actual difference in reflective properties between the two sides is imperceptible without instrumentation. I read somewhere that the matte side has a plastic coating which is best not put in contact with food; I have yet to find any corroboration.

How Aluminum Enters and Leaves Our Bodies

When you ingest aluminum in your food and liquids, very little goes from your stomach into your bloodstream (note that gastro-intestinal absorption is facilitated by lactate, citrate, and ascorbate). Most aluminum leaves your body quickly in the feces. The small amount of aluminum that does enter the bloodstream leaves in the urine. You can breathe in a very little aluminum from the air, and less can enter your body through the skin; I am unsure if these quantities are limited physiologically or by exposure quantities.

Toxic effects are dependent upon the amount of metal ingested, entry rate, tissue distribution, concentration achieved, and excretion rate. When the amount of aluminum ingested exceeds the body's excretory capacity, the excess is deposited in various tissues, including nerve tissues, brain, bone, liver, heart, spleen, and muscle.

Researchers have suggested that aluminum may be more likely to accumulate in the brains of persons whose diets are deficient in magnesium.

Aluminum causes an oxidative stress within brain tissue. Since the elimination half life of aluminum from the human brain is seven years, this can result in cumulative damage.

Aluminum can get into the brain at any age. Because aluminum can cross the placenta, aluminum toxicity can begin in the fetus.

Diagnosis

There are tests to measure aluminum in blood, urine, and feces. The amount in your urine can tell you whether you have been exposed to higher than normal levels of aluminum. Tests can also detect aluminum in your hair and fingernails. These tests are not routinely performed at your doctor's office but your doctor can take blood, urine, or tissue samples and send them to a testing laboratory.

It is also possible to measure aluminum in bone, which can indicate exposure to high levels, but this requires a bone biopsy.

Treatment and Recovery

- Avoid exposure to aluminum. This is the single best way to stop continued accumulation.

- Avoid eating restaurant food as it is almost all prepared with aluminum cookware.
- Aluminum foil is safer when it is used to wrap food after it has cooled.
- Block its uptake with supplements of calcium, magnesium, or iron.
- Eat foods that are rich in sulfur as these help your body to eliminate aluminum. Helpful foods include: garlic, cabbage, beans and lentils, egg yolks, and onions.
- Take supplements of magnesium and malic acid. Adequate amounts of magnesium can help block the toxic effects of aluminum. Malic acid binds with aluminum so that it can be flushed from the body avoiding aluminum build-up, and is especially effective at decreasing aluminum toxicity in the brain. Magnesium malate provides both magnesium and malic acid. One recommendation: take 200 to 2400 mg. of malic acid combined with 300 to 600 grams of magnesium for a period of four to eight weeks.
- The best remedy for aluminum poisoning may be homeopathic. These formulas (or single remedies) can safely chelate heavy metal toxicity and take it out of your body. Rely on a homeopath to select the appropriate remedy. *Homeopathic Remedies: Your Easy-to-Use Guide to Common Disorders and Their Homeopathic Treatments* by Asa Hershoff and Jane Seymour (1999) says "Numerous animal studies have proven the effectiveness of homeopathy in clearing heavy metals from the body. . . . A chosen remedy can be used in a 6, 12, or 30c daily for 7 to 14 days. This regimen can be repeated monthly, until results are obtained." For aluminum poisoning, they recommend: "*Bryonia* is an acute antidote, with constipation and internal dryness. *Plumbum* is the main antidote, with abdominal cramps and muscle atrophy. *Alumina* can be used for symptoms of identity confusion & time distortions, as well as chronic constipation and frequent vaginal discharge."
- Eating clay may be helpful as it is able to pull stored toxins from the body. The best book to read about medicinal clays is *Our Earth Our Cure* by Raymond Dextreit and translated by Michel Abehsera (1974).