

Thallium

DISCLAIMER: the following is not meant to treat anyone with advice or tell you what you should do, such as relative to use of medication, exercise, or changing your diet. The information in this handout is merely offering what has been published in the research literature, as well as based on my professional experience. Talk to a doctor or other appropriate professionals as to what is best for your own specific needs.

It should also be appreciated that everyone has their own perspective on how to improve health. Nutritionists do it through food. Physicians do it through medicine. Psychologists do it through changing thoughts, feelings, and behaviors. Consequently, what is offered here is a reflection of my own bias and perspective.

Thallium has been called ‘the poisoner’s poison’ because of its historic use in homicide; it is colorless, odorless, and tasteless. It is a trace metal found in the earth’s crust. It is odorless and tasteless. It can be found by itself or mixed in as an alloy with other substances such as fluorine, chlorine, bromine and iodine. There are two forms of it (thallous and thallic, with the former more common and stable). It is present in air, water, and soil, but the air and water have low levels of it.

It has been used to treat syphilis, tuberculosis night sweats, and as a rat poison. Some say that the greatest exposure to it comes from eating food such as fruits and green vegetables that have been contaminated by the metal. Kale and other cruciferous vegetables are said to pick it up from soil in higher amounts, and some research has found that organically grown kale accumulates more than conventionally grown ones. Others, including Dr. Andrew Weil (www.drweil.com, “Is kale a killer?” 12/15/16), largely dismiss this issue of veggies like kale being hazardous due to thallium. Some have said that staying hydrated, eating a high-fiber diet, avoiding inflammatory foods like sugar, and sweating regularly can help reduce risk from eating kale and other cruciferous vegetables as to their thallium content. (www.mindbodygreen.com, “Is kale really toxic? Everything you need to know about heavy metals” Robin Berzin, MD 3/31/21).

Others say that the greatest exposure to thallium is from air pollution such as from burning fossil fuels; it occurs in petroleum. It also is in the ash from coal-fired combustion plants such as for power generation and manufacturing. Perversely, coal companies have sold the coal ash as a fertilizer for crops like corn and soybeans that are grown as animal feed. The crops absorb the thallium, the animals eat it and the resulting manure which contains it can be re-used on ‘organic farms.’ ‘Fly ash’ which contains it is usually captured by ‘scrubbers.’ However, coal-fired plants in China go unregulated and do not have scrubbers and so can release large amounts that can impact the world. (Other chemicals that may be in fly ash include arsenic, beryllium, boron, cadmium, chromium, hexavalent chromium – made famous by the Erin Brockovich movie – lead, manganese, mercury, molybdenum, selenium, strontium, and vanadium.)

It is used mostly in the manufacture of electronic devices, switches and closures. It also used in medical procedures such as evaluating heart disease. It also results from cement factories and smelting operations. Hazardous waste sites also have thallium at higher levels and just touching the soil at such sites can expose you to it.

Cigarette smoking is another source of getting it into one's body. Fish can take up thallium but it is unknown whether that eating fish can increase the levels in our bodies. It can be inhaled through the air, consumed in water contaminated with it, and through skin contact. And it is also used in chemicals to kill rodents (rodenticides), making optical lenses, and imitation jewelry.

When swallowed it is rapidly absorbed and especially by the liver and kidneys. It is excreted mostly through the urine and less so through the bowel. It can be found in urine as long as two months after exposure. The half-life in your body is about 3 days.

It is highly toxic to human health even in low doses such as below 100 mcg/L. Mitochondria, the powerhouse of cells is the main target of thallium. Individuals with chronic fatigue syndrome with or without fibromyalgia are said to often have high thallium levels in their urine. It accumulates in the brain and causes severe damage in the central nervous system. It also can cross the placenta and cause premature birth, low birth weight, and birth defects.

It also can affect the lung, heart, liver and kidneys. The kidneys shown the highest concentration of it within 24 hours of ingestion, and the brain does so after that. Temporary hair loss, vomiting and diarrhea can occur along with death if there is a large exposure to it in a short period of time. As little as 1 gram can be fatal. Tests for it can be done on urine and hair. Urinary amounts are typically under 1 ppm, and hair 5-10 ppb. One can indirectly assume the presence of thallium by low levels of potassium shown on a hair analysis. It inhibits an important enzyme needed to pump potassium in and sodium out of cells. It does not stay in the blood for long so that is a less accurate measurement of it.

It also appears to interfere with vitamin B1 metabolism. It also can disrupt vitamin B2 which is involved with energy production in the body. It mimics potassium and interferes with iron and calcium too. It can upset sugar metabolism and produces symptoms of diabetes. Men can become impotent.

Initial symptoms of thallium poisoning include fever, GI problems, delirium, convulsions and coma. It can impact the heart, liver and kidneys and nervous system if large amounts are received in a short period of time. It can also cause a subarachnoid hemorrhage in the brain.

Research is coming out that thallium exposure below the EPA level of 2 mcg/L is hazardous to human health, but the EPA has not changed its regulatory level.

It is said to be more toxic than mercury, cadmium, lead, copper, or zinc. It has not been studied as much as other heavy metals like lead, cadmium, or mercury.

Symptoms of thallium toxicity include:

- ❖ loss of the use of the legs or partial paralysis of them
- ❖ swelling of the feet and legs
- ❖ joint pain
- ❖ excessive physical sensitivity especially of the skin
- ❖ mental confusion
- ❖ angina-like pain
- ❖ inflammation of the kidneys
- ❖ muscle wasting
- ❖ rapid hair loss than affects the scalp, eyebrows, eyelashes, and limbs. Rodenticides with the chemical have been implicated in inducing massive hair loss.
- ❖ loss of appetite
- ❖ fatigue
- ❖ severe pain the calves of the legs
- ❖ albumin in the urine, a typical symptom of kidney disease
- ❖ inflammation of the optic nerve causing blurred vision
- ❖ potassium deficiency (such as irregular rapid pulse, pins and needles, irritability, nausea, vomiting, diarrhea, low blood pressure, mental apathy).

Most of it is excreted through urine and some through stool. It can be found in urine for as long as two months after exposure. Its half-life is said to be about three days. However, others say that that it can persist for as long as 21 months in untreated cases.

Ways to detox from thallium are said to include use of potassium ferric hexacyanoferrate (aka: Prussian Blue) although it has serious side effects. Potassium in simpler forms may help according to some. Others say activated charcoal or gastric lavage can be used. Others say dialysis can be used or meds to increase the kidneys' excretion of the thallium. Selenium can counteract heavy metals including thallium (along with cadmium, inorganic mercury, and methylmercury).

It is advisable to talk to a professional before you start any detox procedure). Some say that it can take two years to dislodge thallium from storage sites in the body and that a slow detox is needed because going too fast could exacerbate toxicity symptoms. Fatigue is a main symptom found during detox by report.