

Toxic-Metal Contamination: Mercury

John Neustadt, ND, and Steve Pieczenik, MD, PhD

Both essential heavy metals (for example, copper, iron, zinc) and toxic heavy metals (for example, arsenic, cadmium, lead, mercury) can cause medical difficulties when they reach excessive levels in the body. Of all heavy-metal toxicity, mercury, named for the planet, is one of the most prevalent and persistent problems. Although mercury was once believed to have medicinal qualities—and was, in fact, widely used in the United States and Europe, in particular to treat syphilis during the 15th-century European syphilis pandemic—all forms of mercury are toxic to humans.

What are Symptoms of Mercury Toxicity?

Mercury toxicity can express itself in many different symptoms (see Table 1). The problem arises because toxicity can cause an increase in free-radical damage, which is a risk factor for heart disease and other health problems. Any molecule that has an unpaired electron in its outermost shell is considered to possess a free radical. For most biological structures, free-radical damage is closely associated with oxidative damage. As the name suggests, antioxidants such as vitamins A, C, and E can minimize oxidation when they serve as electron donors.

Anxiety	Irritability
Autoimmune diseases	Memory loss
Depression	Recurrent infections
Difficulty with balance	Restlessness
Drowsiness	Tremors
Fatigue	Temper outbursts
Hair loss	Ulcers
Insomnia	

How are People Exposed to Mercury?

Exposure to mercury and other toxic metals comes from a variety of sources (see Table 2), with one of the most common for mercury being amalgam dental fillings. Chewing food and gum, brushing your teeth, and consuming hot beverages all release mercury vapor from the fillings, which can then be absorbed into your body. The fillings weigh 1.5 to 2.0 grams each and contain approximately 50% elemental mercury as well as other metals such as silver, copper, and tin.

Another major source of mercury toxicity is fish consumption. Fish with the highest levels of mercury are king mackerel, shark, swordfish, tilefish, and tuna. The U.S. Environmental Protection Agency (EPA) published guidelines for the amount of all types of fish people should consume, recommending that women of childbearing age, pregnant women, nursing mothers, and children completely

Source	Metals
Dental amalgam fillings	Mercury, silver, copper, tin
Fish consumption	Mercury
Dietary supplements	Arsenic, lead
Cigarette smoking	Cadmium
Occupation (eg, welding)	Various, depending on the occupation
Living near, downstream, or downwind from manufacturing facilities	Various, depending on the manufacturing activity

avoid eating fish with the highest levels of mercury. They should also eat no more than 12 ounces per week of seafood that is lower in mercury (for example, catfish, pollock, salmon, shrimp, and canned light tuna). (See Table 3.)

The EPA provides a state advisory for fish (see <http://epa.gov/waterscience/fish/states.htm>). When there are no advisories about eating local fish, the EPA recommends women at risk and children consume no more than 6 ounces per week of fish caught from local waters, and consume no other fish that week.

Completely avoid	Eat less than 6 ounces (1 average meal) a week	Eat less than 12 ounces (2 average meals) a week
King Mackerel	Albacore (“white”) tuna	Catfish
Shark	Any fish for which no local advisory is available	Pollock
Swordfish		Salmon
Tilefish		Shrimp
		Tuna, canned light

Dietary supplements also have the potential to expose you to metals, including arsenic, lead, and mercury. In particular, multiple studies have detected toxic levels of metals

in dietary supplements from Asia. You can protect yourself from possible exposure by making sure the ingredients in the dietary supplements you purchase have been tested for purity. One of the best ways to do this is to go to ConsumerLab (www.consumerlab.com), a company that tests products for various quality-assurance parameters. To learn more about quality-assurance issues, you can also go to www.imjournal.com and click on “Quality Assurance” in the left lower side bar. You will find a series of articles on the subject.

How is Metals Toxicity Diagnosed?

Healthcare providers screen for toxic metals using various tests, and the best method depends on the type of metal for which the doctor is looking. Diagnosis of metal toxicity can be made by analyzing blood, hair, serum, or urine. However, different types of mercury do not show up in the same way in all of these places. Working with a doctor who is knowledgeable about environmental medicine is the best way to ensure that you get the right tests to rule out mercury toxicity.

If I Have Toxic Metals in My Body, How Can I Remove Them?

Treatment to remove toxic metals has three goals: 1) Eliminate or minimize exposure to the toxic metal, 2) decrease the body's burden of heavy metals by increasing excretion

through urine and feces, and 3) protect organs from potential heavy-metal damage during the detoxification process.

Since the major cause of chronic mercury exposure comes from amalgam fillings, it is important to find a “biological dentist”—one who is experienced in doing safe mercury extraction—the process releases mercury vapors. Dentists who perform this procedure should use a dental dam and a suction device to protect the patient from inhaling the mercury vapors during extraction. Reducing or eliminating the consumption of king mackerel, shark, swordfish, tilefish, and tuna may also be necessary.

John Neustadt, ND, is medical director of Montana Integrative Medicine and president and CEO of Nutritional Biochemistry, Incorporated (NBI), both in Bozeman, Mont.

Steve Pieczenik, MD, PhD, trained in psychiatry at Harvard and has an MD from Cornell University Medical College and a PhD in International Relations from MIT. He is a board-certified psychiatrist and was a board examiner in psychiatry and neurology. He is chairman of the board of NBI and a consultant to Montana Integrative Medicine.

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