

Chronic Mercury Poisoning

A Summary of the Science

Chronic mercury poisoning is an under-diagnosed condition, described in the medical and toxicology literature but not yet recognized by most physicians or institutions.

Symptoms

Symptoms are nonspecific and varied, and may include chronic fatigue, chemical sensitivities, fibromyalgia, immune dysfunction (including autoimmunity), allergies, food intolerances, gut dysbiosis, hormone imbalances, infertility, insomnia, tinnitus, erethism, psychiatric disorders, and neurodegenerative problems. Having multiple health problems suggests that mercury is the root cause.

Mechanisms

In addition to general oxidative damage (e.g., of cell membranes and proteins), the mechanism for mercury's broad toxicity is its affinity to bind to sulfhydryl groups, which are ubiquitous in the body -- in enzymes, in membrane transport proteins, in structural proteins, and in DNA. Mercury also binds to selenium, a cofactor in several key enzymes. At the cellular level, the binding to sulfhydryl means that both mineral transport proteins and metabolic enzymes are blocked. (Minerals are cofactors for enzymes, and enzymes are what drive nearly every biochemical process). Mercury also causes retention of other heavy metals by blocking both detoxification enzymes and their mineral cofactors. Overall, outward symptoms appear non-specific and highly variable -- they depend on biochemical individuality and on nutritional status.

No good tests

There is a wide misunderstanding, even among physicians, about the meaning of blood mercury levels -- they reveal only recent, not chronic, exposures. In fact, mercury resides only briefly in the blood before migrating to fatty tissues like the brain, where it cannot be measured directly except on autopsy, and where its half-life is estimated in decades.

Urine mercury tests indicate excretion but reveal nothing about retention.

With low sensitivity and high specificity, a porphyrins test can identify severe chronic mercury poisoning. But since porphyrins are easily destroyed by heat, light, or motion, the risk of false negatives is high.

A trace mineral analysis of hair is informative, but there are no standard guidelines for interpretation, thus counter-intuitive results are easily misinterpreted. Specifically, since mercury blocks the transport of minerals, hair mercury may appear low when the body burden is high.

Thus, mercury poisoning is inferred if the results for most "essential minerals" appear abnormally high and/or low instead of average, suggesting a mineral transport disorder, the only known cause of which is mercury.

In summary, most chronic mercury poisoning must be assessed indirectly, based on symptoms and minor lab anomalies.

A mind-blowing epidemic?

Unfortunately, human population studies of mercury are generally too crude to detect associations between chronic, low-dose toxins and diseases that involve long latencies, genetic susceptibilities, and non-specific symptoms. In addition, many human studies naively used blood or urine mercury levels to represent body burden, thus are of little value. Consequently, few conclusions can be drawn from most human or population studies. But based on compelling research using lab animals and cell cultures, mercury appears to play a primary role in many chronic diseases, particularly Alzheimer's, MS, and autism. It appears to play a synergistic role with other toxins in Parkinson's and ALS.

Genes

Several genetic polymorphisms -- including the ApoE4 allele implicated in Alzheimer's -- are associated with poor heavy-metal detoxification, resulting in susceptibility to mercury poisoning. Such a genetic component would explain why population studies have often found no association between mercury exposure and disease. (If a key variable is omitted from a statistical analysis, the results are invalid).

Exposure

Sources of mercury are numerous. The mother's womb and milk supply toxic mercury along with essential minerals. Dental issues like bruxism, malocclusion, and mixed metals affect the release of mercury from dental amalgam. Improper removal of amalgams can result in severe exposure. Combustion of coal and hazardous waste spreads mercury into the food chain -- and levels of mercury in fish have increased significantly in the last decade. Antibiotics can potentiate mercury's toxicity. Nutritional factors affect detoxification ability; for example, zinc is required for many detoxification enzymes; and high vitamin D induces detoxification enzymes by several-fold.

Treatment

Unlike most conditions for which it may be mistaken, chronic mercury poisoning appears to be curable. Some methods are more effective and more economical than others. Unfortunately, some methods can be dangerous, causing redistribution of mercury to the brain.