

Toxicant

[Science](#), [Biology](#)



LEAD AS A TOXICANT Introduction Lead is one of the heavy metals found naturally in solid form on and below the surface of the earth. The metal has no biological value to the human body. However, it is known to accumulate in the various body systems and organs, causing anemia and high blood pressure. The metal also accumulates in bones and joints and damages the developing brains of foetuses and young children resulting in mental retardation, learning disabilities and behavioral problems. A high content of the metal in the blood system may result in convulsions, coma and eventually death (National Research Council (U. S.), 2013). With such a profile, one would expect that there would be no intake of the metal in humans. However, the metal that is a common pollutant in soil, water and air is exposed to humans through these agents as well as food and consumer products (Kacew & Lee, 2013). The greatest exposure occurs through breathing it in or swallowing.

Methods of exposure

Exposure through the air is mainly as a result of motor vehicle exhaust resulting from the use of leaded gasoline (Who. int, 2014). The exhaust avails the lead in air, which is then taken into the body through breathing. Then there are the industrial sources such as lead manufacturing and recycling industries as well as smelters that result in the release of the metal into the air in the process of workings (National Research Council (U. S.), 2013). At home lead paints act as the main source of exposure through the air. The paint chips from the walls or movable objects, creating lead dust. Naturally, lead occurs in small amounts in source water. However, the use of lead plumbing materials has made the metal available in drinking water in

large amounts. The pipes leach the metal slowly into the water. Depending on the temperature, acidity and standing time on the water, large concentrations of lead may result from the plumbing with the low detectability of the metal making it prone to consumption (Who. int, 2014). The high cost of removing the old piping propagates this method of exposure. However, the contamination and therefore exposure to lead through water may be the result of secondary pollution of water by industrial effluents (National Research Council (U. S.), 2013). Exposure through foods results from the consumption of foods handled using lead based containers. Lead cans and ceramics provide chippings that are consumed with the food.

Exposure limits

The presence of lead in the body may be detected by studying blood cells using a microscope for changes or using X-rays with the metal appearing as dense lines of the bones of children. However, the most concrete way is to measure the blood lead level. Although the metal is very toxic, it is found in small amount in the bloodstreams of nearly everyone. For centuries man has been exposed to the metal with the effects not being significant when it was in small amounts (National Research Council (U. S.), 2013). That being said, there is no proper threshold below which the amount of lead exposure can be said to be safe. However, there is a standard exposure limit set by the Centers for Disease Control to ensure the safety of the population. For adults the limit is set at 10 micrograms per 100 grams of whole blood with the value set at 5 for children.

Health effects

Although the human body contains small amounts of lead, over exposure

results in it being toxic. The general symptoms are skin pigmentation, colics and paralysis. The effects are neurological and teratogenic (Lenntech. com, 2014). Necrosis of neurons is caused by organic lead while inorganic lead results in demyelination and axonal degeneration. However, overexposure of both types of lead may result in the development of cerebral congestion and oedema (Kacew & Lee, 2013). Organic lead compounds that are absorbed quickly may turn out to be carcinogenic. Evidence from animal studies, mostly rats has shown that the metal's overexposure may stimulate the development of cancers. People with high blood lead levels have also been found to have cancer (National Research Council (U. S.), 2013).

Conclusion

Lead is a very toxic heavy metal that has been used by humans for centuries exposing them to the effects. In today's world, the exposure to lead is mainly our fault due to the use of lead based products. The exposure has created a number of health issues with cancer being a possible effect. As such, it is necessary to avoid the use and development of lead based products to avoid the risks.

References

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