



Understanding the Hazards of Heavy Metal Toxicity: A Comprehensive Review

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Description

The discussion covers the various routes of exposure, potential health risks associated with prolonged exposure, and the measures taken to mitigate their impact on both human health and the environment. It emphasizes the importance of awareness, regulation, and research in addressing the challenges posed by toxic and heavy metals. Toxic metals and heavy metals, ubiquitous in the environment, pose significant threats to human health and the ecosystem. It provides an in-depth exploration of these metals, shedding light on their sources, health effects, and environmental repercussions.

Natural sources

Metals like arsenic, cadmium, and lead occur naturally in the Earth's crust. Geological processes and weathering of rocks contribute to their release into soil and water. Human activities, such as industrial processes, mining, and agriculture, are major contributors to the release of toxic metals into the environment. Industrial discharges, improper waste disposal, and the use of metal-containing products further exacerbate the issue.

Inhalation of airborne particulate matter containing toxic metals is a common route of exposure, especially in industrial settings or areas

with high vehicular traffic. Contaminated food and water are primary sources of metal exposure. Seafood, crops grown in polluted soil, and drinking water from contaminated sources can introduce toxic metals into the human body. Contact with contaminated soil or surfaces can lead to the absorption of metals through the skin, adding another dimension to potential exposure pathways.

Health implications

Prolonged exposure to lead, often through lead-based paint, water pipes, or industrial processes, can lead to neurological damage, developmental issues in children, and cardiovascular problems. Cadmium, prevalent in tobacco smoke and certain foods, poses risks to the kidneys, bones, and the respiratory system. Long-term exposure may contribute to cancer development. Arsenic exposure, primarily through contaminated drinking water, is associated with skin lesions, cardiovascular diseases, and an increased risk of cancer. Toxic metals accumulate in soil and water, affecting the health of plants, animals, and humans. Runoff from contaminated areas can lead to widespread environmental degradation. Heavy metals can disrupt aquatic ecosystems, affecting fish and other aquatic life. Bioaccumulation of metals in the food chain poses a threat to both wildlife and human consumers. Stringent regulations and standards for industrial emissions, waste disposal, and product manufacturing are essential to control the release of toxic and heavy metals into the environment.

Promoting awareness about the sources and risks of toxic metals is crucial. Education campaigns can empower individuals to make informed choices and advocate for environmental protection. Various remediation techniques, including phytoremediation and bioremediation, are being explored to reduce metal concentrations in contaminated areas. Understanding the sources, exposure routes, and health implications of toxic and heavy metals is imperative for safeguarding human health and the environment. Continued research, strict regulations, and concerted efforts to raise awareness are essential to mitigate the impact of these metals and ensure a healthier, sustainable future.