

Exposure to Environmental Pollutants and their Impact on Human Health

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Abstract

Air and water have been contaminated by pollutants that are toxic to humans, animals, and plants. Heavy metals such as Lead, Mercury, Arsenic, Cadmium, Manganese, and Chromium have a high degree of toxicity and are of public health significance. Most heavy metal ions are carcinogens that pose a threat to both human health and ecological balance. They are systemic toxicants that are known to induce multiple organ damage, even at a lower level of exposure can lead to diseases like Cancer, Asthma, Mental retardation, damage to the nervous system, and physical and muscle weakness. Various instruments were used to analyze the presence of heavy metals in air and water, such as Inductive coupled plasma mass Spectrometry (ICP-MS), Spectrophotometry, Transmission electron microscopy (TEM), inductively coupled plasma-atomic emission spectroscopy (ICP-AES), Atomic Absorption spectrometry (AAS), etc. In the present work, the effects of some heavy metals, i.e. arsenic, lead, mercury, cadmium, chromium, and nickel, on the environment and living organisms, mainly human beings were reviewed. The primary way in which heavy metal toxicity operates involves the production of free radicals, leading to oxidative stress and harm to essential biological components like enzymes, proteins, lipids, and nucleic acids. Additionally, it can lead to DNA damage, which plays a pivotal role in the development of both cancer and neurotoxic effects. Heavy metal toxicity can manifest as either acute or chronic conditions, with prolonged exposure potentially resulting in organ damage, including the brain, lungs, liver, and kidneys, which can give rise to various diseases in the body. Effective legislation and international cooperation are vital to prevent heavy metal exposure and its adverse effects. Scientific monitoring can play a pivotal role in reducing the occupational and environmental exposure.