



Heavy metal pollution and its impact on human health

Kei Nakatawa*

Department of Integrated Science and Technology, Nagasaki University, Nagasaki, Japan.

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DESCRIPTION

The term heavy metal refers to any metallic chemical element that having relatively high density and is toxic or poisonous at low concentrations. Examples of heavy metals include mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), and lead (Pb).

Heavy metals are found in natural component of the earth's crust. They cannot be mined or destroyed. They enter into our bodies through food, drinking water, and air. Some heavy metals (copper, selenium, zinc, etc.) are trace elements that are essential for maintaining the metabolism of the human body. However, high concentrations can lead to poisoning. Heavy metal poisoning could result, for instance, from drinking-water contamination through lead pipes, high ambient air concentrations near emission sources, or intake via the food chain.

Heavy metals are very dangerous because they tend to accumulate in the body. Bio accumulation means that the concentration of chemicals in an organism increases over time compared to the concentration of chemicals in the environment. Compounds always accumulate in an organism when absorbed and stored faster than they are degraded (metabolized) or excreted. Heavy metals can enter water supplies through industrial and consumer waste, as well as acid rain. Acid rain dissolves soil and releases heavy metals into streams, lakes, rivers and groundwater. Heavy metal pollution is a serious global environmental problem because it adversely affects plant growth and genetic variation. It also alters the composition and activity of soil microbial communities

IMPACT ON HUMAN HEALTH

Heavy metals are well-known environmental pollutants because of their toxicity, environmental persistence, and bioaccumulation. Its natural sources include weathering of metal-containing rocks and volcanic eruptions, and anthropogenic sources include mining and various industrial and agricultural activities. This heavy metal pollution, which has a major impact on human health includes:

Cadmium

Itai-itai disease is caused by cadmium (Cd) exposure. Cadmium derives its toxicological properties from its chemical similarity to zinc an essential micronutrient for plants, animals and humans. Cadmium is bio persistent and, once absorbed by an organism, remains resident for many years (over decades for humans) although it is eventually excreted.

In humans, long-term exposure is associated with renal disfunction. High exposure can lead to obstructive lung disease and has been linked to lung cancer, although data concerning the latter are difficult to interpret due to compounding factors. Cadmium may also produce bone defects in humans and animals. In addition, the metal can be linked to increased blood pressure and effects on the myocardium in animals, although most human data do not support these findings.

Cadmium poisoning includes cough, anemia, and kidney failure (possibly leading to death). Similar to zinc, long-term exposure to cadmium fumes can cause lifelong anosmia.

Lead

Heavy metals are known as environmental pollutants because of their toxicity. Persistent human exposure to lead can have a variety of biological effects, depending on the level and duration of exposure. Various effects occur over a wide dose range, and developing foetus and infants are more sensitive than adults. High exposure can result in toxic biochemical effects on humans, which cause problems with hemoglobin synthesis, effects on the kidneys, gastrointestinal tract, joints and genital system, and acute or chronic damage to the nervous system.

Lead exposure can result from drinking water, food, air, soil, and dust from old lead paint. In the general non-smoking adult population, the main route of exposure is through food and water.

Mercury

High exposure to methyl mercury is known as Minamata disease. Exposure of children to methyl mercury can cause acrodynia (pink disease) in which the skin turns pink and peels off. The main natural sources of mercury are from the earth's crust, emissions from volcanoes, and evaporation from natural water bodies.