

## Water Contamination and Heavy Metals

Momina Iftikhar<sup>1</sup>; Kingsley Erhons Enerijiofi<sup>2</sup>; Muhammad Akram<sup>1\*</sup>; Surendar Rangasamy<sup>3</sup>; Francisco Garcia-Sierra<sup>4</sup>; MD Al Hasibuzzaman<sup>5</sup>; Fethi Ahmet Ozdemir<sup>6</sup>; Gawel Sołowski<sup>6</sup>; Najmiatul Fitria<sup>7</sup>; Marcos Altable<sup>8</sup>; Adonis Sfera<sup>9</sup>

<sup>1</sup>Department of Eastern Medicine, Government College, University Faisalabad, Pakistan.

<sup>2</sup>Department of Biological Sciences, Glorious Vision University, Ogwa, Edo State, Nigeria.

<sup>3</sup>Department of Community Medicine, Sri Venkateshwaraa Medical College Hospital & Research Centre (SVMCH & RC), Puducherry, India.

<sup>4</sup>Department of Cell Biology, Center of Research and Advanced Studies of the National Polytechnical Institute, Mexico City, Mexico.

<sup>5</sup>Department of Nutrition and Food Science, University of Dhaka, Dhaka 1000, Bangladesh.

<sup>6</sup>Department of Molecular Biology and Genetics, Faculty of Science and Art, Bingol University, Bingol 1200, Turkey.

<sup>7</sup>Department of Pharmacology and Clinical Pharmacy, Universitas Andalas, Indonesia.

<sup>8</sup>Department of Neurology, Neuroceuta, (Virgen de Africa Clinic), Spain.

<sup>9</sup>Department of Psychiatry, Patton State Hospital, USA.

### Corresponding Author: Muhammad Akram

Department of Eastern Medicine, Government College,  
University Faisalabad, Pakistan.

Email: makram\_0451@hotmail.com

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### Abstract

Water contaminated by heavy metals is a serious worldwide environmental and public health issue. Heavy metals such as arsenic, lead, mercury, cadmium, and chromium can enter water systems as a result of a mix of natural and human activities, such as inappropriate waste disposal, industrial runoff, and agricultural runoff. These metals can accumulate and remain in water, endangering both human health and ecosystems. Heavy metal-contaminated water can result in long-term health problems like cancer, kidney damage, and neurological disorders in addition to acute poisoning. Pregnant women and children are two of the most susceptible demographics that heavy metal exposure can harm in terms of long-term health and development. Heavy metals pose a hazard to biodiversity and environmental stability because they can bioaccumulate in species, destabilize aquatic ecosystems, and biomagnify along the food chain. For the purpose of determining the degree of contamination and putting remediation plans into action, monitoring heavy metal levels in water bodies is essential. In order to remove heavy metals from contaminated water, improved water treatment technology, regulatory frameworks, and systems for monitoring water quality are examples of effective management measures. Mitigating the harmful effects of heavy metal contamination on human health and the environment requires public awareness and education regarding the origins, hazards, and avoidance of heavy metal contamination. Ensuring safe and sustainable water resources for current and future generations necessitates concerted efforts at the local, national, and international levels to address heavy metal contamination of water.

**Keywords:** Water contamination; Heavy metals; Copper; Lead; Environment.

### Introduction

The term “water pollution” describes the unfitness of bodies of water (lakes, rivers, seas, and groundwater) for their intended use, be it drinking, recreational, agricultural, or aquatic life support, due to the presence of dangerous materials or con-

taminants. There are many different natural and artificial sources of water pollution, which can have detrimental effects on the environment and human health. Elements that have high atomic weights and densities are known as heavy metals [1]. They consist of elements such as arsenic, chromium, cadmium, mercury, lead, and others. Though they can also be discharged

into the environment by industrial processes like mining, smelting, and manufacturing, these metals are found naturally in the Earth's crust. Due to their tendency to accumulate in living things, heavy metals can be hazardous to ecosystems and humans even at low quantities, raising major health and environmental issues. Ingestion of contaminated food or water, skin absorption, or inhalation are the three ways they might enter the body. The densities of heavy metals are typically higher than those of non-metallic elements and compounds. Mass per unit volume, or grams per cubic centimeter ( $\text{g/cm}^3$ ) or kilograms per liter ( $\text{kg/L}$ ), is the unit of measurement used to describe density of a substance. Metallic elements classified as toxic can build in the body over time or be exposed to high concentrations, which can have detrimental effects on people and other living things [2]. Acute exposure to high copper levels or persistent accumulation over time can both have detrimental consequences on the body, which are referred to as copper poisoning. An excessive amount of copper can have negative health effects, even though it is a necessary trace element for many biological activities, such as iron metabolism and enzyme function [3].

### Water contamination

Global public health and environmental issues are greatly impacted by water pollution. To maintain sustainable and safe water resources for present and future generations, addressing it calls for a combination of technology advancements, regulatory actions, and public involvement [4].

### Bioaccumulation

For the purpose of maintaining ecosystem sustainability, human health, and environmental health, an understanding of bioaccumulation is essential. Reduced effects of bioaccumulative substances on wildlife and human populations depend on actions taken to remediate current contamination and reduce pollutant inputs [5].

### Hideous swelling

The term "hideous swelling" usually describes an atypical and frequently grotesque expansion of a body component as a result of a number of underlying disorders. There are various causes of swelling, and the reason behind it will determine the swelling's look and intensity [6].

### Heavy metal toxicity

Because heavy metals are present in many environmental settings and may have long-term health effects, they pose a serious threat to public health. In order to minimize exposure and lessen the effects of heavy metal toxicity, prevention measures and early diagnosis are essential [7].

### Lead poisoning

Lead poisoning is entirely preventable. With early discovery and treatment, lead exposure's long-term health effects can be minimized. In order to protect the public's health, especially that of susceptible populations such as children and expecting mothers, it is imperative to uphold safe environments and eliminate any potential sources of lead exposure [8].

### Lead and the blood-brain barrier

Understanding the interaction between lead and the blood-brain barrier is crucial for comprehending how lead exposure leads to neurological damage and developmental impairments. Efforts to reduce lead exposure, especially in vulnerable populations, and to enhance understanding of the mechanisms involved in lead neurotoxicity are essential for protecting public health and promoting brain development and function [9].

### Conclusion

In conclusion, there are significant barriers to the sustainability of the ecosystem and public health caused by the presence of heavy metals in water sources. Mitigating contamination through effective monitoring, treatment, and regulatory procedures is essential to ensuring sustainable and healthy water supplies for current and future generations.

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