

ATLAS

16. INTERNATIONAL CONGRESS ON ADVANCED
SCIENTIFIC STUDIES AND INTERDISCIPLINARY
RESEARCH

November 23-30 - 2025 - Mecca, SAUDI ARABIA



PROCEEDINGS BOOK

EDITORS

Prof. Dr. Nermin MERİÇ
Assoc. Prof. Dr. Hatice KARAER YAĞMUR

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HEAVY METALS: FROM PHYSIOLOGICAL BASIS TO PSYCHOLOGICAL OUTCOMES

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ABSTRACT

In this paper, we investigated physiological and mental impacts of heavy metal exposure on humans. Heavy metals are defined as metals which have five or higher density. Several trace metals are vital for human body functioning, such as nickel (Ni), copper (Cu), zinc (Zn), manganese (Mn), or iron (Fe); for example, Fe is crucial for oxygen transportation, erythropoiesis, hemoglobin synthesis, or myelination; or Mn is necessary for mitochondrial function, neurotransmitter synthesis, or autophagy. However, exposure of some heavy metals, mercury (Hg), zinc (Zn), arsenic (As), chromium (Cr), cadmium (Cd), are known to its toxic impact on human body, such as hexavalent chromium (Cr VI) is thought be carcinogenic; or Cd is several times related with kidney and bone damage. In human mental well-being, moreover, heavy metal toxicity has significant impact. Over the years, several heavy metals have been mentioned their disruptive effects on human psychology: studies found that Pb and Hg were correlated with attention deficit hyperactivity disorder (ADHD) risk. Another study posit that Hg exposure linked with autism spectrum disorders (ASD) with increased risk of 1.7-fold more. Pb toxicity can cause disturbance in cognitive functioning in children; additionally, it was correlated with ADHD and ASD. Heavy metal exposure, also, may alter human behaviors. In addition, several studies suggested that heavy metal exposure can contribute such psychological manifestations, for example, depression, anxiety, stress, fatigue, restlessness, decreased tolerance, and aggression. Even though some heavy metals are necessary for human's biological functioning, their overload can emerge physiological and psychological symptoms, such as Mn overload is known its neurotoxicity effect causing Parkinson's disease, or speech disorders; or elevated Cu exposure has been mentioned to cause depression, affective, psychotic, or cognitive disorders.

Keywords: Heavy Metals, Physiological Outcomes, Mental Outcomes,