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Human Exposure to Microplastics and its Health Effects: Epidemiological Evidence

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Abstract

Microplastics are emerging potential threat to whole biosphere of earth. Microplastics are ubiquitous synthetic materials which is omnipresent in all the environment systems with a size of ≤ 5 mm. A microplastic particle is found in many forms such as fragments, fibres, granules, and spheres. These particles pose serious threat due to its size and density characteristics also acts as a medium to carry the other contaminants. The presence, distribution, and life span of microplastic in environment is galactic, thus arises the question on its exposure. Three pathways of microplastic entry into the human body is via ingestion, inhalation, and dermal contact. Ingestion is the major predominant pathway of microplastics via food and water consumption causing potential toxic effects on humans like physical stress, apoptosis, necrosis, inflammation, oxidative stress, immune response, metabolic homeostasis, genotoxicity, nephrotoxicity, cytotoxicity, renal failure. Inhalation is another highest exposure medium for microplastics causes lung cancer and pulmonary diseases. Dermal contact is one serious and unnoticed area of direct microplastic exposure to humans leads to skin irritation, inflammation etc. Particles of polystyrene, polyethylene etc., in the size range of 20 nm to 20 µm can easily cause the ailments in human body. In addition, much epidemiological studies suggests that a spectrum of chronic diseases link to exposure of microplastics. Finally, we put forward the gaps in microplastics exposure to humans' health and their future research development directions. This study will be helpful for the better understanding of the risk exposure and potential human health hazards of microplastics.