

Abstract

Nanoplastics as a Vehicle for Environmental Pollutants: A Hazard for Human Health [†]

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Plastic waste degrades into small particles, which depending on their size can be classified as microplastics (0.001–5 mm) or nanoplastics (up to a maximum of 0.001 mm), and which can be transported by air, water and food. In humans, contamination by these particles occurs through the airways, through contact with personal products, and through the consumption of food and water. This causes direct or indirect damage to the body's homeostasis. Studies carried out in the area of nanoplastics verify that due to their size, these particles have a capacity for internalization, causing damage to membranes and organelles, inflammation, cytotoxicity, and cell death, among others.

In addition to these effects per se, nanoplastics are the polymers with the greatest impact on the environment, as they can absorb and, in this way, act as vectors of highly toxic compounds, such as aromatic hydrocarbons, heavy metals, persistent organic pollutants (POPs), and endocrine disrupting chemicals (Bisphenol A, Phthalates), among others. In the specific case of POPs, they are directly linked to hormonal, immunological, neurological, and reproductive dysfunctions. They remain in the environment for a long time and, once ingested, they have the ability to attach themselves to the body fat, blood, and body fluids of animals and humans. Packaged products also contain Bisphenol A in their composition, a known endocrine disruptor, exposure to which is associated with various diseases such as diabetes, polycystic ovary syndrome, infertility, and uterine fibroids, among others.

In summary, given the ubiquity of plastics in the environment, their potential for transporting other toxic substances, as well as their versatility of absorption through different routes of exposure, they meet the conditions to be considered a hazard for human health.

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