https://pmc.ncbi.nlm.nih.gov/articles/PMC10349198/

Nanoparticles-induced potential toxicity on human health: Applications, toxicity mechanisms, and evaluation models

Abstract

Nanoparticles (NPs) have become one of the most popular objects of scientific study during the past decades. However, despite wealth of study reports, still there is a gap, particularly in health toxicology studies, underlying mechanisms, and related evaluation models to deeply understanding the NPs risk effects. In this review, we first present a comprehensive landscape of the applications of NPs on health, especially addressing the role of NPs in medical diagnosis, therapy. Then, the toxicity of NPs on health systems is introduced. We describe in detail the effects of NPs on various systems, including respiratory, nervous, endocrine, immune, and reproductive systems, and the carcinogenicity of NPs. Furthermore, we unravels the underlying mechanisms of NPs including ROS accumulation, mitochondrial damage, inflammatory reaction, apoptosis, DNA damage, cell cycle, and epigenetic regulation. In addition, the classical study models such as cell lines and mice and the emerging models such as 3D organoids used for evaluating the toxicity or scientific study are both introduced. Overall, this review presents a critical summary and evaluation of the state of understanding of NPs, giving readers more better understanding of the NPs toxicology to remedy key gaps in knowledge and techniques.

https://academic.oup.com/joh/article/67/1/uiaf002/7994440

Adverse effects of nanoparticles on humans

It was previously thought that the particles inhaled by humans and having adverse effects were micron-sized; particles with a particularly high content of crystalline silica were thought to have harmful effects. In recent years, manufactured materials have been further refined to nano-level particles, and it has been reported that these ultrafine particles have different adverse effects, making it necessary to perform occupational health management for chemicals that differ from micron-sized particles. Here we report the adverse effects of carbon nanotubes, welding fumes, and organic substances as examples of nanoparticles.

https://www.azonano.com/article.aspx?ArticleID=5113

The Health Impact of Nanotechnology

Nanotechnology is evolving rapidly in industrial applications, medical imaging, disease diagnosis, drug delivery, cancer treatment, and gene therapy, and also to aid in visual imaging. Nanotechnology is at the cutting edge of rapid healthcare product development as it has many potential human health benefits, but it is perceived with some apprehension for its potential human health risks.

https://pmc.ncbi.nlm.nih.gov/articles/PMC5951135/

Impact of nanoparticles on neuron biology: current research trends

Abstract

Nanoparticles have enormous applications in textiles, cosmetics, electronics, and

pharmaceuticals. But due to their exceptional physical and chemical properties, particularly antimicrobial, anticancer, antibacterial, anti-inflammatory properties, nanoparticles have many potential applications in diagnosis as well as in the treatment of various diseases. Over the past few years, nanoparticles have been extensively used to investigate their response on the neuronal cells. These nanoparticles cause stem cells to differentiate into neuronal cells and promote neuronal cell survivability and neuronal cell growth and expansion. The nanoparticles have been tested both in in vitro and in vivo models. The nanoparticles with various shapes, sizes, and chemical compositions mostly produced stimulatory effects on neuronal cells, but there are few that can cause inhibitory effects on the neuronal cells. In this review, we discuss stimulatory and inhibitory effects of various nanoparticles on the neuronal cells. The aim of this review was to summarize different effects of nanoparticles on the neuronal cells and try to understand the differential response of various nanoparticles. This review provides a bird's eye view approach on the effects of various nanoparticles on neuronal differentiation, neuronal survivability, neuronal growth, neuronal cell adhesion, and functional and behavioral recovery. Finally, this review helps the researchers to understand the different roles of nanoparticles (stimulatory and inhibitory) in neuronal cells to develop effective therapeutic and diagnostic strategies for neurodegenerative diseases.

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https://www.edn.com/studies-warn-of-nanoparticle-health-effects/

Studies warn of nanoparticle health effects

https://ec.europa.eu/health/scientific_committees/opinions_layman/en/nanotechnologies/l-3/6-health-effects-nanoparticles.htm

Toxicity Mechanisms, Various