Insights into nanoparticles-induced neurotoxicity and cope up strategies

_____ [1,*], _____ [2], _____ [3], _____ [4], _____ [5], _____ [1], _____ [6], _____ [7], _____ [8], _____ [6]

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Abstract

Nanoparticle applications are becoming increasingly popular in fields such as photonics, catalysis, magnetics, biotechnology, manufacturing of cosmetics, pharmaceuticals, and medicines. There is still a huge pile of undermining information about the potential toxicity of these products to humans, which can be encountered by neuroprotective antioxidants and anti-inflammatory compounds. Nanoparticles can be administered using a variety of methods, including oronasal, topical applications, and enteral and parenteral routes of administration. There are different properties of these nanomaterials that characterize different pathways. Crossing of the blood-brain barrier, a direct sensory nerve-to-brain pathway whose barriers are bypassed, these checks otherwise prevent the nanoparticles from entering the brain. This inflicts damage to sensory neurons and receptors by nanoparticles that lead to neurotoxicity of the central nervous system. A number of routes make nanoparticles able to penetrate through the skin. Exposure by various routes to these nanoparticles can result in oxidative stress, and immune suppression triggers inflammatory cascades and genome-level mutations after they are introduced into the body. To out-power, these complications, plant-based antioxidants, essential oils, and dietary supplements can be put into use. Direct nanoparticle transport pathways from sensory nerves to the brain via blood have been studied grossly. Recent findings regarding the direct pathways through which nanoparticles cross the blood-brain barriers, how nanoparticles elicit different responses on sensory receptors and nerves, how they cause central neurotoxicity and neurodegeneration through sensory nerve routes, and the possible mechanisms that outcast these effects are discussed.