

TITLE: Metal-based nanoparticles' effects on the Central Nervous System

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Development of structures and drug delivery vehicles at the nanoscale has been a multidisciplinary field of interest during the last decade. Metal-based nanostructures, upon entering the Central Nervous System, may exhibit toxic effects. In the present study, we conducted a literature review for the examination of nanoparticles' cytotoxicity either in brain or spinal cord, and the molecular pathways involved in it. Innovative multifunctional nanocarriers should be characterised by biodegradability, reproducibility and limited toxicity when administered in vivo or in vitro. Dependent on their surface charge and size, metal based nanocarriers may disrupt cell integrity via oxidative reactions and DNA alterations. The ultimate goal of cytotoxicity studies is to reveal the molecular pathways that are involved and explore new ways of lessening toxicity and enhancing the therapeutic effect of the nanocarrier. Thus, next-generation medicinal products could be more safe for the environment and human health, as well as consistent with the existing regulatory frameworks, for market approval.

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