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# Impact of physicochemical properties of Cerium oxide nanoparticles on their toxicity effects

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## Abstract

The advancing production and application of cerium oxide nanoparticles (CeO<sub>2</sub>-NPs) in recent years have raised scientists concern about their toxicity. Numerous investigations have been performed to study the toxicity of CeO<sub>2</sub>-NPs although their results are sometimes contradictory. In this review, we display the most important factors that are effective in CeO<sub>2</sub>-NPs toxicity. The studies are classified based on the target that is selected for toxicity assessment (cytotoxicity, respiratory toxicity, hepatotoxicity, neurotoxicity, dermal toxicity, phytotoxicity, and environmental toxicity). Various representative examples are presented in each class. It seems to be difficult to achieve a comprehensive view and a deterministic conclusion since several parameters are involved in interpreting the results. In order to reach repeatable and comparable results, it is necessary to design a standard protocol to study the toxicity of CeO<sub>2</sub>-NPs. Physicochemical properties of nanoparticles, experiment set up, and toxicity assessment methods are some parameters that should be considered in this standardization.

**Keywords:** *Cerium oxide nanoparticles; cytotoxicity; neurotoxicity; phytotoxicity; environmental toxicity*

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