

## **BIOSAFETY EVALUATION AND ANTI-OXIDATIVE EFFECTS OF CERIA NANOPARTICLES IN VITRO**

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Ceria nanoparticles are well known as high-performance catalysts due to the presence of mixed valence states of Ce<sup>3+</sup> and Ce<sup>4+</sup>, and the presence of oxygen vacancies. Ceria nanoparticles are also potent free-radical scavengers due to its SOD mimics, catalase mimics and oxidase mimics. It is speculated that nanoceria would promote cell survival under conditions of oxidative stress due to its selective antioxidant properties. The antioxidant properties can be affected by the physicochemical properties of the materials and the target cells species. Therefore, in the present study, we evaluate the biosafety and protective effect of two different sizes of ceria nanoparticles in human umbilical vein endothelial cells (HUVECS) and human bronchial epithelial cells (HBE), as they are the primary routes of human exposure to nanoparticles through inhalation and injection. Based on the results of cell viability assay and cell membrane integrity assay, we found that ceria nanoparticles of both sizes are biocompatible to both HUVECS and HBE cells, though ceria nanoparticles have a slightly interference in the intracellular redox balance. In addition, ceria nanoparticles showed protective effect on the cell viability of both cells under oxidative stress. Detailed studies on the intracellular molecular mechanisms for the anti-oxidative effects will be studies to understand the nanoparticles-cell interactions. These results obtained in vitro may provide insights for real biomedical applications and risk assessment of ceria nanoparticles.