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## Abstract

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# Exposure to silver nanoparticles induces size- and dose-dependent oxidative stress and cytotoxicity in human colon carcinoma cells.

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## Author information

### Abstract

The antimicrobial properties of silver nanoparticles (AgNPs) have made these particles one of the most frequently utilized nanomaterials in consumer products; therefore, a comprehensive understanding of their toxicity is necessary. In particular, information about the cellular uptake and size dependence of AgNPs is insufficient. In this study, we evaluated the size-dependent effects of AgNPs by treating the human LoVo cell line, an intestinal epithelium model, with spherical AgNPs of well-defined sizes (10, 20, 40, 60 and 100nm). The cellular uptake was visualized by confocal laser scanning microscopy, and various cytotoxicity parameters were analyzed in a size- and dose-dependent manner. In addition, the cellular proteomic response to 20 and 100nm AgNPs was investigated to increase the understanding of potential mechanisms of action. Our data indicated that cellular uptake and toxicity were regulated by size; smaller particles easily penetrated the cells, and 100nm particles did not. It was hypothesized that this size-dependent effect resulted from the stimulation of a signaling cascade that generated ROS and inflammatory markers, leading to mitochondrial dysfunction and subsequently inducing apoptosis. By contrast, the cell proliferation, was independent of AgNPs particle size, indicating a differentially regulated, ROS-independent pathway.

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**KEYWORDS:** Cellular uptake; Cytotoxicity; LoVo cell line; Silver nanoparticles

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