Cytotoxic effects of nanoparticles on mammalian cells

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Introduction
Due to the increasing amount of technological products containing nanoparticles become available to the customers it is important to understand the potential risk that poses to humans. In this study the toxicity of zinc oxide nanoparticles were investigated on different mammalian cell lines.

Materials and Methods
Lung cells (A-549), fibroblasts (NIH-3T3), liver cells (Hep-G2) and gut cells (Caco-2) were seeded in plates and cultivated in an adequate culture medium in an incubator (37 °C/5% CO₂). After the equilibration zinc oxide nanoparticles are added to the culture medium in different concentrations.

The viability of the cells was determined by the MTT assay which is based on the cleavage of the yellow tetrazolium salt MTT to blue formazan crystals by metabolic active cells. For quantification with a multiwell spectrophotometer the formed formazan salt were solubilized. Beside the MTT assay cytotoxic effects of zinc oxide nanoparticle were investigated by observing the cell morphology.

Results
The treated cells lost their normal morphology into a rounded one and were detached from the surface.

The results of the MTT assay indicate a reduce of viability due to the zinc oxide nanoparticles in the cell culture medium.

Conclusion
It is shown that zinc oxide nanoparticles exhibit a toxic effect on human cell lines. The inhibitory concentration varies depending on the examined cell lines. In the future other cytotoxicity assay could indentify different toxicological effects of nanoparticles.