Poster: nanotoxicology / nanobiotechnology

The use of precision cut lung slices to assess nanoparticle mediated toxicity

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The production and use of engineered nanoparticles has dramatically increased due to their various applications such as in medicine, information technology, and chemistry. The unique physiochemical characteristics of nanoparticles as compared to their bulk material challenge their toxicological risk assessment. To date most studies investigate the effects of a specific material on a particular model system separately, making extrapolations of the same material for e.g. different sizes or surfaces difficult. The exposure route of highest concern for occupational and public exposure to nanoparticles in humans is inhalation. Currently, *in vivo* inhalation studies are required for the investigation of nanoparticle induced effects on the respiratory tract. These experiments are resource intensive and, especially for nanoparticulate matter, technically challenging. Therefore fast but reliable and relevant alternative methods that can be standardized are required. In this study, which is part of the FP6 CellNanoTox project, rat precision cut lung slices (PCLS) were investigated as a model for the respiratory tract. PCLS show characteristic responses to typical pro-inflammatory stimuli and thus provide an appropriate *in vitro* technique to predict the immunomodulatory and cytotoxic potency of inhaled substances. This tissue slice culture is a promising tool e.g. for dose finding for inhalation studies. Likewise precision cut lung slices may be employed for grouping approaches in which a limited number of nanoparticles of a physiochemcial group are tested *in vivo* and toxic properties for others are extrapolated from the *in vitro* methods. The aim of the study was to investigate the effects of different nanoparticles for their toxic potential. We have assessed the effects of cobalt nanoparticle aggregates, and cobalt ferrites at different sizes with and without serum protein stabilization and possibly to extrapolate from physiochemical properties to toxic effects. We have demonstrated that this *in vitro* system is a suitable tool to investigate the effects on nanoparticles on the respiratory tract.

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