

The international debate on Cytotoxicity of molybdenum trioxide nanoplates

Lidia Zapor

Central Institute for Labour Protection, Poland

Introduction & Aim: Nanostructured molybdenum trioxide (MoO₃ -NPs) is promising material in many applications, in coatings, plastics, textiles, pigments, lubricants, ceramics and glass production, as antimicrobial agents and for the detection of Dopamine in pharmaceutical and clinical preparations. In recent years, it was noted that in the case of nanomaterials should carefully evaluate the risks of their use, as they may pose a health risk. The main aim of this study was to assess the cytotoxic activity of MoO₃ -NPs in human pulmonary cells.

Methods: The cytotoxicity of MoO₃ -NPs was assessed on the alveolar carcinoma epithelial cells (A549) and normal bronchial epithelium cells (BEAS-2B) after short and long-term time of exposure. Cytotoxicity studies included the effect of MoO₃ -NPs on cell viability, cell membrane integrity (NRU assay), mitochondrial metabolic activity (MTT assay) and the ability of the cells to proliferation (Clonogenic assay).

Results: MoO₃ -NPs induced a dose- and time-related negative effect on the viability of both kinds of

the cells in the cytotoxic doses range 50-300 µg/ml, depending on cytotoxicity endpoint. In long-term exposure (7 day), MoO₃ -NPs at concentrations about 100 µg/ml impaired proliferations, implying their potential chronic toxicity. A549 cells were less sensitive than BEAS-2B one, to all measurement parameters.

Conclusion: The sensitivity of BEAS-2B cells to MoO₃ -NPs is of particular concern. These cells form a defense line of the body against the penetration of particles into lungs. Inhibition of the ability of BEAS-2B cells to proliferate under the influence of MoO₃ -NPs may be an unfavorable phenomenon for predicting their long-term effects of exposure.

Biography: Lidia Zapor is currently working in the Department of Chemical, Aerosol and Biological Hazards in the Central Institute for Labour Protection, National Research Institute (CIOP-PIB). She is the Head of Laboratory of Toxicology. The main area of her professional interest is problems of human in the working environment and the toxicity of chemical substances as well as methods of estimating the toxicity of substances in vitro.