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MEETING ABSTRACTS

ONE-DIMENSIONAL NANOMATERIALS AND THEIR (NON)TOXICITY

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This presentation will introduce one-dimensional nanomaterials that we have been developing for various applications over past years. Two main types of materials will be discussed – nanofibers of inorganic oxides and nanotubes of TiO_2.

In the first part, the first comprehensive toxicity study of Al_2O_3, SiO_2, ZrO_2, TiO_2 and WO_3 nanofibers effects in cultured epithelial A549 cells will be presented. The nanofibers were produced by centrifugal spinning from suitable spinning solutions and have an average diameter in the sub-micrometer range. At first, we characterized the nanofibers for their morphological, compositional and structural properties. Then, we estimated the biological effects of nanofibers in pulmonary epithelial A549 cells comparing them with biological effects of Al_2O_3, SiO_2, ZrO_2, TiO_6 and WO_3 nanoparticles. Multiwalled carbon nanotubes (MWCNT) were used as a positive control. The cells were treated with 1, 10 and 100 $\mu g.mL^{-1}$ concentrations of a nanomaterial for 24 and 48 h. The dehydrogenase activity and glutathione levels were determined in cells as markers of cell injury. Experimental details and results of these investigations will be presented and discussed (1).

In the second part, the comprehensive toxicity study of TiO_2 nanotubes, prepared by anodic oxidation of Ti and followed by various post-treatments, will be presented.

Keywords: fibers; nanoparticles; nanotubes; toxicity; A549 cells

References

1. J. Bacova, L. Hromadko, T. Rousar, J.M. Macak et al., Ms submitted.
2. H. Sopha, T. Rousar, J.M. Macak et al., Ms in preparation.