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EFFECTS OF COPPER OXIDE NANOPARTICLES ON CELL MEMBRANE FATTY ACID COMPOSITION OF PROTOZOA *TETRAHYMENA THERMOPHILA*

Monika Mortimer[1, 2], Maša Vodovnik[3], Romana Marinšek Logar[3], Henri-Charles Dubourguier[1], Anne Kahru[1]

[1] *Laboratory of Molecular Genetics, National Institute of Chemical Physics and Biophysics, Tallinn, Estonia,*

[2]*Institute of Chemistry, Tallinn University of Technology, Tallinn, Estonia,* [3] *Zootechnical Department, Biotechnical Faculty, University of Ljubljana, Domzale, Slovenia*

e-mail: monika.mortimer@kbfi.ee

Engineered nanoparticles (eNPs) are already widely used in various everyday applications, but their impact on environment and human health has still not been adequately studied. In the current study a eukaryotic unicellular freshwater ciliate *Tetrahymena thermophila* was used as a model organism to study the mechanisms of toxic action of copper oxide NPs. As protozoa feed by internalizing of nanoscale (<100 nm) and microscale (100–100 000 nm) particles, they are excellent eukaryotic models for nanotoxicology. We have shown previously that nanoCuO exerts toxic effects at a much lower concentrations than its bulk counterpart. Considering the small size and high surface area of CuO NPs, we assumed that nanosized particles would have more pronounced effect on cell membrane fatty acid composition than bulk CuO due to the possible physical interactions with the membrane, but also because of the potential generation of the reactive oxygen species (ROS). In this study the cultures of *T. thermophila* were exposed to nano- and bulk sized CuO, to $CuSO_4$ (as an ionic control) and 3,5-dichlorophenol (as an organic control) solutions at their respective EC20 and EC50 values for 2 and 24 hours at 25°C. The fatty acids from 80 freeze-dried samples were methylated (HCl/MeOH), extracted and analyzed by gas chromatography. Dose and time dependent changes in the fatty acid profile of *T. thermophila* were observed. The changes were more pronounced after 24 h exposure and at the higher concentrations of the chemicals. Preliminary data show that the mechanism of action of nanoCuO on protozoan membranes differs from the effect of bulk CuO, $CuSO_4$ and 3,5-dichlorophenol.

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