Toxicity of ultrafine particles on A549 cells and whole blood: both collected combustion particles and engineered silver nanoparticles

Lung and blood cells react to wood smoke particles more than diesel exhaust particles.A new PhD project from Health, Aarhus University, shows the source and shape of particles influence their effects on human lung and blood cells. Wood smoke particles induced higher reactive oxygen species in tested cells compared to diesel exhaust particles. The project was carried out by Yuduo Zheng, a M.Sc. who is defending his dissertation on 28th Oct.

Combustion emissions are the main source of ambient fine/ultrafine particle matter. The use of engineered nanoparticles, which is a potential source of fine/ultrafine particles in environment, is increasing. Adverse health effects of fine particulate matter have been demonstrated by epidemiological studies, especially for pulmonary and cardiovascular diseases. However, the effect of particles on respiratory and circulatory systems are not fully understood. At the same time, it is a demanding task to evaluate the inhalation safety of a large number of exsiting and newly emerging particles. In this projects, reactive oxygen species assay in human whole blood was established. Wood smoke and diesel exhaust particles were collected at various burning conditions and silver nanoparticles with different shapes were synthesized. The particles were tested in the whole blood assay as well as in human lung cell line A549 in vitro. This project found that in vitro cell and whole blood assays are useful in assessing and comparing the effects of different particles. Consistent with previous studies, this project found that wood smoke particles are potentially more harmful than diesel exhaust particles. The project was carried out by Yuduo Zheng, who is defending his dissertation on 28th Oct 2016.

The defence is public and takes place on 28th Oct 2016 at Jeppe Vontillius (Room 310) in Søauditorierne (Building 1252), Aarhus University, Bartholins Allé 3, 8000 Aarhus C. The title of the project is "Toxicity of ultrafine particles on A549 cells and whole blood: both collected combustion particles and engineered silver nanoparticles". For more information, please contact PhD student Yuduo Zheng, email: yzhe@ph.au.dk, Phone +45 5016 7263.