

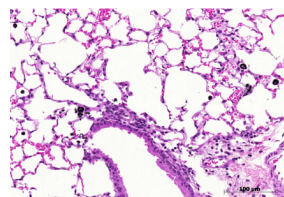
Latest News

Fraunhofer Institute for Toxicology and Experimental Medicine

How dangerous are carbon nanoparticles?

Press Release 10.08.2010

Fraunhofer ITEM is participating in a research alliance on the health risks of carbon black



Mouse lung tissue with carbon black particles (ingested by macrophages)

Carbon black is an industrial chemical that is manufactured in large quantities worldwide. It consists of smallest nanoparticles and is used, for example, in the manufacturing of automobile tires and other plastic materials. A health risk from carbon black nanoparticles (CBNP) can, as yet, not be ruled out, and the World Health Organization has classified these particles as possibly carcinogenic. The German Federal Ministry for Education and Research (BMBF) is now funding the research alliance "Prediction of human toxicological effects of synthetic carbon black nanoparticles" with an amount of 2.5 million euros, aimed at finding out to what extent the hazard potential depends on the varying properties of different types of carbon black. The Fraunhofer Institute for Toxicology and Experimental Medicine

ITEM in Hannover, Germany, tests above all the toxicological effects in human lung cell lines and lung slices and verifies them in animal models. Other partners cooperating in this alliance include working groups from the University of Luebeck, the Technical University of Karlsruhe, the University of Marburg, and the Research Center Borstel which coordinates the activities.

Over the next three years, the scientists in this alliance want to develop a multi-step test system that will allow the toxic effects of different carbon black nanoparticles on human lungs and airways to be determined. The lung is the most important route by which airborne nanoparticles enter the human body: each day, a human being breathes in about 10,000 liters of air. The scientists intend to quantify the potential risk in different test systems: in lung cell cultures, lung slices (precision-cut lung slices, PCLS), tissue cultures, and in animal models as part of inhalation studies. As the surface of the upper airways – the trachea and bronchi – is morphologically and functionally different from the lower airways, cells and tissue from different areas will be tested and analyzed in this project.

At the Fraunhofer ITEM, PCLS have been found to offer major advantages over other in vitro methods. This model, which has been developed over the past few years, enables tests in tissue that includes different cell types, cell-cell interactions, and cell polarity. The PCLS system is thus of high biological relevance and is currently being pre-validated in another BMBF project as an alternative method for testing the toxicity of inhalable chemicals.

The aim of the scientists in the carbon black research alliance is to eventually find modifications of carbon black nanoparticles that pose no hazard to human health and can thus be commercially exploited without risk.

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