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Title: Fate of inhaled ultrafine carbon particles after one week; human exposure using a novel aerosol with ¹¹¹indium

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Body: Particulate air pollution, such as nanosized particles <100 nm in diameter, has negative health effects. But, there is still limited knowledge regarding the fate of inhaled particles in the human body. Controlled exposure conditions provide information about the biological pathways of particle pollutants, such as deposition and retention, in human body. Recently we have developed a method for labelling ultrafine carbon particles with an indium isotope (¹¹¹In), and generating an aerosol, which enables long-term deposition and retention studies in humans (Sanchez-Crespo, et al. 2011: "¹¹¹Indium-labeled ultrafine carbon particles..." *Inhal Toxicol* 23(3): 121-128). In the present study ten healthy volunteers were exposed for the aerosol (particle size range 58-124 nm) and followed for seven days. One volunteer was followed for totally 29 days. One week after the exposure, pulmonary particle retention was 92%. There was no elimination of particles from the body via urine. The total in vitro leaching of free non-bound activity was 3.2%, which indicates a stable bonding between the particles and ¹¹¹In. The volunteer that was followed for totally 29 days, demonstrated 10% further clearance of particles out of the lungs. There was marginal translocation of carbon particles out of lungs to blood (0,3%), which supports our earlier results on with ⁹⁹Tcm labelled ultrafine carbon particles with the size of 35 nm (Wiebert et al 2006: "No significant translocation of inhaled 35-nm carbon particles to the circulation in humans." *Inhal Toxicol* 18(10): 741-747). We conclude that measurements with indium-111 enables longer follow-up studies as the labelling have higher levels of activity.