

Mouse pulmonary dose- and time course-responses induced by exposure to multi-walled carbon nanotubes

Authors: Porter DW, Hubbs AF, Mercer RR, Wu N, Wolfarth MG, Sriram K, Leonard S, Battelli L, Schwegler-Berry D, Friend S, Andrew M, Chen BT, Shuji Tsuruoka S, Endo M, Castranova V

In 2010 we published the paper “Mouse Pulmonary Dose- and Time Course-Responses Induced by Exposure to Multi-Walled Carbon Nanotubes” in Toxicology (269:136-147; available online in 2009). In this paper, we reported the results of an in vivo dose-response and time course study of MWCNT in mice in order to assess their ability to induce pulmonary inflammation, damage, and fibrosis using doses that approximate estimated human occupational exposures. The data indicated that MWCNT exposure rapidly produces significant pulmonary inflammation, damage and fibrosis. Furthermore, the observation that MWCNT reach the pleura after aspiration exposure indicated that more extensive investigations were needed to fully assess if pleural penetration results in any adverse health outcomes. Later in 2010, NIOSH colleagues published another paper, “Distribution and Persistence of Pleural Penetrations by Multi-Walled Carbon Nanotubes” in Particle and Fibre in Toxicology (7:28) which quantitated the pleural penetrations by MWCNT.

Currently, we are conducting several MWCNT inhalation studies to further investigate MWCNT-induced toxicity. One study is examining the acute and chronic effects of MWCNT inhalation exposure on the pulmonary and central nervous system (CNS) responses. The pulmonary endpoints being examined include pulmonary inflammation, damage, and fibrosis. Clearance of MWCNT is also being determined. The CNS studies are focusing on neuroinflammation and neurodegenerative responses to MWCNT exposures. A second MWCNT study is being conducted to examine lung tumor development after inhalation exposure to MWCNT. Lastly, a third MWCNT inhalation study is being conducted to determine if MWCNT inhalation exposure results in the development of mesothelioma.

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