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**ADVERSE EFFECTS OF INDUSTRIAL MULTI-WALLED CARBON NANOTUBES
ON HUMAN PULMONARY CELLS.**

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The aim of this study was to evaluate adverse effects of multi-wall carbon nanotubes (MWCNT) produced for industrial purposes, on the human epithelial cell line A549. MWCNT were dispersed in dipalmitoyl lecithin (DPL), a component of pulmonary surfactant, and the effects of dispersion in DPL were compared to those in 2 other media: ethanol (EtOH) and phosphate buffer saline (PBS). Effects of MWCNT were also compared to those of 2 asbestos fibers (chrysotile and crocidolite) and carbon black (CB) nanoparticles, not only in A549 cells, but also on mesothelial cells (MeT5A human cell line), used as an asbestos-sensitive cell type. MWCNT formed agglomerates on top of both cell lines (surface area 15-35 μm^2), that were significantly larger and of a higher number in PBS than in EtOH and DPL. Whatever the dispersion media, incubation with 100 $\mu\text{g}/\text{ml}$ MWCNT induced a similar decrease in metabolic activity without changing cell membrane permeability or apoptosis. Neither MWCNT cellular internalization nor oxidative stress was observed. In contrast, asbestos fibers penetrated into the cells, decreased metabolic activity but not cell membrane permeability and increased apoptosis, without decreasing cell number. CB was internalized without any adverse effects. In conclusion, this study demonstrates that MWCNT produced for industrial purposes exert adverse effects on without being internalized by human epithelial and mesothelial pulmonary cell lines.