

Abstract 162 S. 67. Febr. 72

ABSTRACTS

161. THE EFFECTS OF MASS LOADING OF DUST ON BRONCHIAL CLEARANCE

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Studies are being conducted to determine the effects of the mass loading of inert dusts on particle deposition and clearance. The effect of large amounts of inert dust on alveolar clearance, following intratracheal injection rather than by inhalation, has been studied by others. These studies showed that increasing the lung burden of particles increased the amount of alveolar clearance up to a point; beyond which clearance was reduced as the lungs became congested.

In-vivo inhalation tests are being conducted using high concentrations of preclassified coal dust. The test subjects are miniature donkeys whose bronchial clearance patterns were previously established. The coal dust aerosol has a CMD = $2.90\mu\text{m}$ and a $\sigma_g = 1.30$, as determined by optical sizing techniques. The retentions of ^{99}Tc tagged ferric oxide particles in the deep lungs, main bronchi and upper thorax regions are measured simultaneously to determine the clearance waves in additional control tests, and in tests immediately following coal dust exposures.

The coal dust aerosol is generated with a Wright Dust Feed, which requires the use of dry compressed air. To eliminate the effects of dry air inhalation on the clearance pattern, a special humidifier was developed. The dust laden air stream leaves the humidifier at a dry bulb temperature of 38°C and a 95% relative humidity, and the donkey breathes from this 30 lpm air stream via nasal catheters. The breathing rate is monitored during the periods of dust inhalation.

The effects of high concentrations of coal dust on tagged particle clearance will be described and discussed.

162. BIOLOGIC DIFFERENCES IN RESPONSE TO LONG AND SHORT ASBESTOS FIBERS

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Six preparations of chrysotile were tested by intrapleural injection of hamsters with 25 mg sample suspended in 0.5 ml saline. Each preparation was tested in a group of 50 hamsters maintained for periods up to 700 days.

Extensive pleural adhesions developed in hamsters in 3 groups treated with chrysotile preparations having mean fiber lengths of 32.5 to 38.9 microns as measured by optical microscopy and 5.3 to 6.9 microns as measured by electron microscopy. In these 3 groups, intrathoracic tumors with characteristics of pleural mesotheliomas developed in 8, 9 and 10 hamsters, respectively.

Three other groups of hamsters were treated with preparations of these chrysotiles after further milling that reduced mean fiber lengths to 0.37 to 0.86 microns as measured by electron microscopy. Only rare fibers exceeded 5 microns in length. These 3 preparations induced relatively thin pleural adhesions. No mesotheliomas occurred in hamsters treated with them.

The findings afford evidence that fibrogenic and carcinogenic actions of chrysotile are related to physical properties of the fibers.

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