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INDUSTRIAL DUSTS

255 Phagocytosis, Mucous Flow, and Ciliary Action. A. C. Hilding. Arch. Environmental Health 6, 61-74 (Jan. 1963).

The nose acts as an efficient air-cleaning and air-conditioning mechanism. Much, perhaps most, particulate matter is caught in the nose and escalated back and down on the mucous blanket by ciliary action to the "incinerator" in the stomach. The character of the lining epithelium varies with its exposure to the inflowing air. The mucous blanket is produced by the epithelium and varies in viscosity and probably, general chemical nature according to circumstances. The dense pollutant cigarette smoke, unlike most other pollutants, bypasses the nose entirely. The physiologic drainage of the bronchial tree is accomplished by the mucous blanket, which, motivated by underlying cilia, constitutes the ciliary stream. From respiratory bronchioles to esophagus, the stream bed narrows markedly, and probably the velocity of mucous flow increases as the stream bed narrows. The ciliary stream encounters a number of naturally occurring obstructions in the form of squamous islands, bronchial openings, and the vocal cords. Retardation of the ciliary stream may occur at such areas and may be enhanced by cigarette smoke or other air pollutants which slow or temporarily stop ciliary action, facilitating prolonged action of any carcinogen in the ciliary stream at these spots. Probably most of the particulate matter that gains access to the alveoli and alveolar ducts is removed by phagocytic action and carried out the tracheobronchial tree into the esophagus. Some gains access to the interstitial tissue, lymphatics, and lymph nodes. Whether this is always accomplished by phagocytic action is a moot point. -- Author's summary

256 Pneumoconiosis: The Requirements for Lymphatic Dust Transport. P. Gross and T. Hatch. Intern. Arch. Gewerbepathol. Gewerbehyg. 19, 660-666 (1962). English. Reprints available from the Industrial Hygiene Foundation upon request.

The theory of the cellular transport of dust into lymph vessels is briefly discussed and objections to this theory of cellular dust transport are listed. Experimental evidence is summarized which indicates that dust particles may penetrate the respiratory membrane without the aid of cells. Although such penetration may offer a reasonable explanation for a minor part of the dust deposited in lymph nodes, it cannot account for the greater portion of the lymph nodal deposit. If dust particles penetrating the alveolar membrane constituted the major portion of the lymph nodal mineral content, then maximal lymph node deposition should occur shortly after the lung dust burden has become established. Experimental evidence, however, indicates that significant lymph nodal dust deposition does not occur until about 3 months after the establishment of a lung dust burden. Dust plaques or nodules attached to those alveolar walls which abut against blood vessels and bronchi are believed to be the reserviors which furnish a continuing supply of dust particles for lymphatic transport. Because the basement membrane of the alveolar wall is probably destroyed during the formation of the dust depot the dust particles are already within the interstitium when the dust cells die and disintegrate. Because the cytotoxicity of the dust determines the probability of its extracellular status and since an extracellular status is necessary for dust transport; the greater the cytotoxicity of an inhaled dust, the greater is the tendency for its translocation to the lymph nodes. This is corroborated by experimental findings. -- Authors' summary

257 Mineral Content of Lung in Certain Pneumoconioses. A. J. Vorwald, J. D. MacEwen and R. G. Smith. Arch. Pathol. 74, 267-274 (Oct. 1962).

The usefulness of chemical analysis of lung tissue in diagnosing certain pneumoconioses is emphasized. Morphological and chemical analyses are presented for lung tissues containing iron oxide, free silica, and mica. Analytical chemistry data are most useful when base

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