Impact of Different Asbestos Species and other Mineral Particles on Pulmonary Pathogenesis

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Abstract: Factors that are potentially important in the pulmonary pathogenesis of asbestos and other mineral particles are: 1) morphology, 2) Fe-content, 3) solubility under intra-phagosomal conditions, 4) value and sign of the surface potential of the particle, 5) hydrophobicity or hydrophilicity, 6) capacity to activate phagocytic leukocytes, and 7) duration of exposure to the particles. The order of importance of these factors in causing severe or fatal pulmonary pathogenicity is estimated to be: 1 > 3 > 7 > 6 ≫ 5 > 4 > 2. The order of pathogenicity of the minerals is estimated as: amphibole asbestos: crocidolite, tremolite, amosite > erionite > serpentine asbestos: chrysotile > talc > silica > simple metal oxides. Particle length, duration of exposure to the particles, and pre-treatment of the particles may however enhance the pathogenic potential of any of the lower-ranked particles.

Key Words: Asbestos • Clays • Lung • Neutrophils • Pathology • Phagocytosis • Physicochemical • Silica • Talc

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