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Respiratory Toxicity Study on Sepiolite

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Two kinds of sepiolite, a 500℃ heat treated sepiolite, and a 700℃ heat treated sepiolite were analyzed for their physicochemical properties. After these asbestos substitutes were instilled into rat lungs, the effects of these asbestos substitutes on lung function, biochemical and pathological changes were evaluated. In addition, the fibers in the lungs were counted and characterized after the lungs were treated for electron microscopical analysis. The lungs instilled with sepiolites increased their weight and tidal volume statistically significantly compared with the unexposed control. The pathological examination further showed increased legions of granuloma with early fibrosis. The numbers of lymphocytes and polymorphonuclear cells (PMN) in the bronchoalveolar lavage (BAL) fluid also increased compared with the control, indicating the sepiolite induced inflammation. The heat treated sepiolites, however, did not show any toxicological differences from the untreated sepiolites. the fiber dimension in the lungs did not show any changes among the instilled sepiolites. Although sepiolite showed less change in fiber compositions than chrysotile, the durability of the fibers in the lungs could not be determined in this subchronic experiment. Thus chronic experiments are needed to evaluate the durability of mineral fibers, which is an essential experiment for evaluating biopersistence of fibers in lungs.

Keyword: Sepiolite, Asbestos, TEM-EDS, Lung