

THE PATHOGENIC ACTION OF INHALED MICA

Necropsy Findings: Rats

MR-582 - H-2837, 2838, 2840, 2864

The pathologic anatomical findings in the four experiments comprising this study are assembled in Tables 1 to 5.

Strict comparison of the relative effects recorded for each variant of mica is not possible since dust concentrations varied from 6.6 mg/lit for the mica coated with calcined TiO_2 , to 8.1 mg/lit for the mica coated with hydrous TiO_2 , 22.34 mg/lit for the carbon coated mica and 24.38 mg/lit for the uncoated concord 200/325 mica.

Thus, the more prominent effects on the lungs and kidneys observed for the latter two agents may be partly due to the higher dust concentrations employed. However, it seems permissible to infer that the carbon coated mica had a significantly greater effect on the lungs, to judge by the relative increase in lung weights. In this group the weights of the liver, spleen, and kidneys also showed slight relative preponderance.

Another factor to consider is the temporal distribution of these experiments. The two tests with titanium coated mica were concluded during February, 1961, whereas the exposures to the carbon coated and uncoated mica were concluded during May, 1961. During this interval we have seen an appreciable increase in

severity of endemic pneumonitis in the strain of rats currently in experimental use at the Haskell Laboratory.

The difference in lung weights for the rats exposed to the four mica aerosols also matches the severity of symptoms. Thus, slight respiratory impairment was noted in the rats which inhaled the titanium coated mica and those which inhaled the uncoated mica. In the group which inhaled the carbon coated mica the respiratory discomfort was more severe.

The kidney, spleen, lymph node and thymus reactions referred to in Tables 1 to 4 may be coincidental findings. Similar abnormalities sporadically occur in rats never exposed to harmful agents.

The biological activity of inhaled fibrous silicates cannot be assessed on a fifteen-day basis. While one may infer from the present study that alarming acute pulmonary reactions may not result from the brief single inhalations of low concentrations of the four varieties of mica dust, a thorough investigation extending over one or more years is needed to eliminate the possibility of cumulative pneumoconiotic reaction in human subjects repetitively exposed to the dusts. The pathogenicity of fibrous silicates is also influenced to a marked degree by the length and caliber of the fibrous particles. These factors have not been specified, but need careful review for proper toxicological evaluation of these agents.

GWHS/ah
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G. W. H. Schepers, M.D.

GROSS PATHOLOGY SUMMARY

[illegible]

+ = Slight reaction
1 = Irregular congestion
* = 65% Mica, 35% calcined TiO_2 1-100 μ

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TABLE 2

GROSS PATHOLOGY SUMMARY

Haskell No: 2837 Material: Mica Coated with Hydrous TiO₂* Excipient: Dry A
 MR No: 582 Test: ALC Species: ChRCD Male Procedure: Dust Inhalation/
 Ref. No: _____ Experiment Period: 2-1-61 - 2-15-61 Rat T.I. S.M. Prosec

Dose mg/lit	Animal No.	Survival Days		Cause of Death	Pulmonary Lesions		Miscellaneous
		Test	After		1	2	
8.1	45830		14	K	+		
"	45831		"	"			
"	45832		"	"			Spleen, large
"	45833		"	"	+	+	

Comment:

+ = Slight reaction

1 = Irregular congestion

* = 75% Mica, 25% TiO₂ 1-100 μ

2 = Focal atelectasis



G. W. H. Schepers, M.
 Pathologist
 5-31-61

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GROSS PATHOLOGY SUMMARY

[illegible]

1 = Irregular congestion
2 = Regional atelectasis
3 = Hyperinflation
4 = Speckled surface
5 = Cortical Streaks

Dr. W. H. Schepers
G. W. H. Schepers, M.D.
Pathologist
5-31-61

GROSS PATHOLOGY SUMMARY

[illegible]

2 = Speckled surface

P. D. Schepers
G. W. H. Schepers, M.D.
Pathologist
5-31-61