

THE CHEMICAL REACTIVITY OF LUNAR DUST INFLUENCES ITS BIOLOGICAL EFFECT.

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Introduction We have investigated the relationship between the chemical reactivity of lunar dust and its biological effect in the lungs. Using authentic Apollo 14 lunar dust, we evaluated the responsiveness of rat lung macrophages after intratracheal instillation [1], using the zymosan-stimulated macrophage chemiluminescence assay. Three preparations of respirable-sized lunar dust were studied: ball-milled lunar dust, jet-milled lunar dust, and unground lunar dust. At 30 days post-exposure to lunar dust, macrophages from rats that received the most chemically reactive lunar dust exhibited greater responsiveness than macrophages from animals exposed to less chemically reactive forms of the same lunar dust. These results are analogous to the increased toxic effect of highly chemically-reactive mechanically-activated quartz dust [2]. Our results also show that Apollo 14 lunar dust is intermediate in toxicity, between TiO₂ and quartz, and that lunar dust chemical reactivity may be a useful, measurable parameter in assessing *in situ* toxicity.

Acknowledgements We thank the NASA the Lunar Airborne Dust Toxicity Assessment Group for their support, and the NASA Human Research Program for funding this effort.

References: [1] P. A. Santana et. al. (2010), Modeling respiratory toxicity of authentic lunar dust, *NASA Technical Report JSC-CN-22387*. [2] D. W. Porter et al. (2002), Comparison of low doses of aged and freshly fractured silica on pulmonary inflammation and damage in the rat, *Toxicology* 175, 63.