Immunotoxic Effects in the Rat Lung from Inhalation of Vanadium. **T. P. McManus, J. T. Zelikoff, R. B. Schlesinger, and M. D. Cohen. New York University Department of Environmental Medicine, Tuxedo, NY, 10987.**

Male Fisher 344 rats (10 wk old, 200-250 g) were exposed to atmospheres containing 2 mg vanadium(V)/m3 (as ammonium metavanadate NH_4VO_3, 0.32 μm diameter particles) for 8 hr/d for 4 d in a nose-only exposure system. In exposed rats, lung burdens of vanadium increased in a time-dependent fashion. Nearly all (88%) metal-exposed rats displayed markedly increased levels of bronchus-associated lymphoid tissue (BALT) after each exposure, though the effect was only transitory. Analysis of lung cells and lavage fluid 24 hr after the final exposure suggested that a strong inflammatory response was elicited; levels of free neutrophils and immature monocytes, as well as of lavage protein and lactate dehydrogenase, were greatly elevated as compared with levels observed in air-exposed controls. Vanadium also affected the capacity of pulmonary macrophages (PAM) to both produce and respond to important immunoregulatory cytokines. PAM production of tumor necrosis factor-α in response to lipopolysaccharide was significantly inhibited, as was the ability of PAM to synthesize/place MHC Class II/Ia molecules on their cell surfaces in response to interferon-γ (IFNγ). The PAM from V-exposed hosts were also inhibited in their ability to be primed by IFNγ to produce superoxide anion and hydrogen peroxide in response to stimulation with opsonized zymosan. These studies indicate that subchronic inhalation exposure of rats to V, at levels encountered in the workplace, can cause strong immunomodulatory effects in the lungs, with the major effect occurring at the level of cytokine-related functions. These alterations may be underlying mechanisms for the well-documented increases in bronchopulmonary infections and cancers in workers chronically exposed to V-containing workplace atmospheres. This study was supported by the National Institute for Occupational Safety and Health (OH03064-01).

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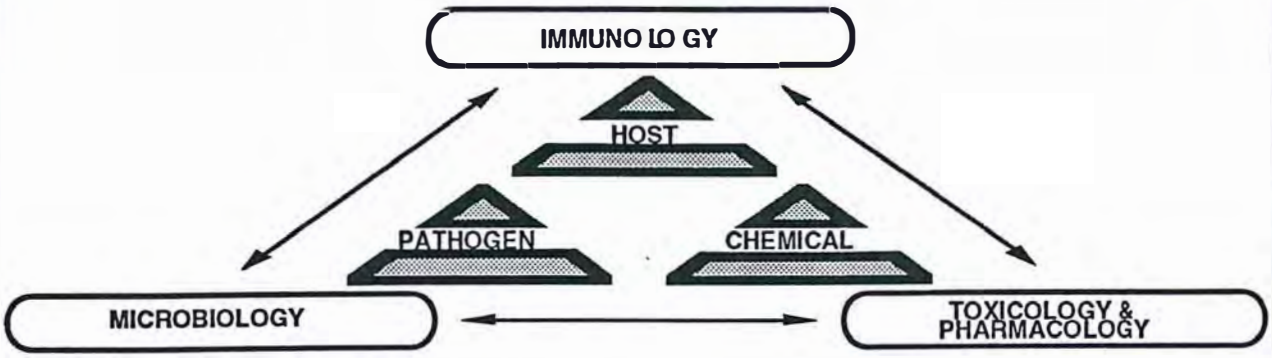

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ABSTRACTS

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