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In Vitro Toxicity of Aluminum Nanoparticles in Rat Alveolar Macrophages

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Abstract: The purpose of this research was to investigate and characterize the in vitro cellular effects of exposing rat lung macrophages to **aluminum oxide** nanoparticles (30 and 40nm average size) compared to **aluminum** metal nanoparticles (50, 80, and 120nm). This study used toxicity endpoints involving cell viability, mitochondrial function, phagocytotic ability, and inflammatory response. Results indicated none to minimal toxicological effects occurred with exposure of macrophages as high as 500 microg/ml for 24 hours with **aluminum oxide** nanoparticles. However, there was significant delayed toxicity that occurred at 96 and 144 h post exposure. Exposure to **aluminum** metal nanoparticles indicated slight to moderate toxicity after 24 hours exposure at 100 and 250 microg/ml. The phagocytic ability of these cells was significantly hindered by exposure to all tested **aluminum** nanoparticles at 25 microg/ml for 24 hours, but not by the **aluminum oxide** nanoparticles. A series of cytokine and nitric **oxide** assays performed showed **aluminum** nanoparticles did not induce an inflammatory response.

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Limitations: APPROVED FOR PUBLIC RELEASE
Description: Final rept. Jun 1993-Mar 2001
Pages: 10
Report Date: MAR 2006
Report Number: A865544

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