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Pulmonary Effects of Pyrotechnically Disseminated Titanium Dioxide Smoke in Rats

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Abstract: The Fast Obscurant Grenade (FOG) is a bursting type grenade that has been developed within the Family of Tactical Obscuration Devices to fulfill the small through medium area screening obscuration need. After the **health** hazards were analyzed for the currently used obscurant payloads, **titanium** dioxide (TiO2) was chosen as the candidate smoke, while maintaining the necessary performance characteristics. Many studies have been performed evaluating the toxicity of inhaled TiO2; however, most have evaluated long exposure times (i.e., 30 min) at low concentrations. For the current need supported by FOG, elevated concentrations for short exposure times would be the predominant operational scenario for inhalation exposures to TiO2 smoke. Acute and repeat exposures are therefore possible as maneuvers are performed in confined areas and in close proximity to the dissemination source. The current study evaluated clearance of the smoke material from the respiratory system, as well as other biological **effects**. Groups of rats were exposed for 10 min to high concentrations of smoke generated from the FOG. Broncheoalveolar lavage, histopathology, particle size analysis, and chemical characterization of the aerosol were performed to assess the toxicity of the inhaled smoke.

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