

A reevaluation of the threshold exposure level of inhaled JP-8 in mice.

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Department of Pediatrics, Arizona Health Sciences Center, The University of Arizona College of Medicine, 1501 N. Campbell Avenue, Tucson, AZ 85724, USA. C57BL/6 mice were nose-only exposed to JP-8 jet fuel at average concentrations of 45, 267, and 406 mg JP-8/m³ for 1 hr/d for 7 days to further test the hypothesis that exposure to JP-8 concentrations below the current permissible exposure level (PEL) of 350 mg/m³ will induce lung injury, and to validate a new "in-line, real-time" total hydrocarbon analysis system capable of measuring both JP-8 vapor and aerosol concentrations. Pulmonary function and respiratory permeability tests were performed 24 to 30 hr after the final exposures. No significant effects were observed at 45 or 267 mg/m³. The only significant effect observed at 406 mg/m³ was a decrease in inspiratory dynamic lung compliance. Morphological examination and morphometric analysis of distal lung tissue demonstrated that alveolar type II epithelial cells showed limited cellular damage with the notable exception of a significant increase in the volume density of lamellar bodies (vacuoles), which is indicative of increased surfactant production, at 45 and 406 mg/m³. The terminal bronchial epithelium showed initial signs of cellular damage, but the morphometric analysis did not quantify these changes as significant. The morphometric analysis techniques appear to provide an increased sensitivity for detecting the deleterious effects of JP-8 as compared to the physiological evidence offered by pulmonary function or

respiratory permeability tests. These observations suggest that the current 350 mg/m(3) PEL for both JP-8 jet fuel and for other more volatile petroleum distillates should be reevaluated and a lower, more accurate PEL should be established with regard human occupational exposure limits.

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