nicipal waste handling centre having a composting plant for biological waste. Samples were collected 1) next to composting windrow, 2) approximately 150 m away from the windrow in the perimeter of the dumping ground, and 3) in the nearby residential area, located 1 km away. Samples were collected for 48 h with a flow rate of 4 l/min on PVC filter (0.8 µm pore size). Mouse RAW264.7 macrophages were exposed to three doses (1, 5, 25 µg/ml) of collected particle samples, and the cell viability and production of proinflammatory cytokines IL-6 and TNF-alpha were measured after 24 hours. Responses induced by the dose of 5 µg/ml were selected for comparisons on the basis of dose-response studies. All the collected bioaerosol samples induced more cell death and cytokine release than respective control filter samples. The most profound effects were seen in IL-6 production: samples collected next to composting piles induced 14-times higher and those collected from the residential area 7.9 times higher IL-6 responses than control filter samples. When responses were calculated in relation to mean particle load per m3 of air, samples collected next to composting piles were the most potent inducers of proinflammatory cytokines whereas samples collected 150 m away from the composting piles and in residential area induced similar responses in mouse macrophages. These results indicate that bioaerosols present in composting grounds are potent inducers of inflammatory responses in mammalian cells and thus may be related to adverse health effects observed in individuals working in biowaste handling.

1097 COMPARISON OF LUNG INJURY FOR JP-8 *VERSUS* S-8 JET FUELS AT THRESHOLD CONCENTRATIONS.

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We studied lung injury parameters in C57BL/6 male mice exposed to either JP-8 or S-8 jet fuels at 53 mg/cubic meter for seven consecutive days in a nose-only exposure scenario. Our "in-line, real-time" jet fuel delivery system allowed us to utilize a very low jet fuel exposure concentration in order to determine the most sensitive areas of the lungs to injury from the fuel exposures. S-8 jet fuel exposure caused a significant decrease in total dynamic lung compliance compared to control values. However, there was no difference in dynamic lung compliance between the JP-8 and control groups. However, JP-8 jet fuel exposure caused a significant increase in inspiratory lung resistance. Electron micrographic analyses demonstrated a significant injury of the alveolar type II cells in JP-8 mice, but not S-8 mice, versus controls. In contrast, the small airways of the S-8 jet fuel-exposed mice showed injury in comparison to the control and JP-8 jet fuel-exposed animals. There are slight differences in the formula weights of JP-8 and S-8 jet fuels and this may partially account for the different lung injury scenarios at this threshold jet fuel concentration. The U.S. Armed Forces eventually will utilize S-8 (synthetic jet fuel) as a major fuel source and it vitally important to understand its toxicity potential (Supported by AFOSR Grant # FA9550-07-1-0142).

1098 EXTRAPULMONARY TISSUE DISTRIBUTION OF METALS FOLLOWING REPEATED LUNG EXPOSURES TO WELDING FUMES WITH DIFFERENT ELEMENTAL PROFILES.

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Welding fumes (WF) are a complex mixture of different metals. The pulmonary effects of WF have been well studied. Little is known about possible non-pulmonary effects (e.g., neurological, cardiovascular, renal). The goal was to study the translocation of metals from the lungs to other organ systems after treatment with chemically distinct WF. Fumes were collected from different welding processes: gas metal arc-mild steel (GMA-MS); manual metal arc-hardsurfacing (MMA-HS); flux-cored arc-hardsurfacing (FCA-HS). Metal analysis of WF indicated that GMA-MS was primarily composed of Fe (1.08 µg/gm) and Mn (0.32 µg/gm), whereas the Mn content of FCA-HS (2.0 µg/gm) and MMA-HS (1.8 µg/gm) was ~6x higher than in GMA-MS. FCA-HS (0.07 µg/gm) and MMA-HS (0.30 µg/gm) contained Cr which was present in only trace amounts in the GMA-MS WF. The FCA-HS and MMA-HS WF were found to be more water-soluble than the GMA-MS WF. Male Sprague-Dawley rats were intratracheally treated with 0.5 mg/rat of the different WF 1/wk x 7 or 11 wk. Controls were treated with saline. Four days after the last treatment, the animals were sacrificed, and multiple organs and discrete brain regions were recovered for metal analysis. Significant increases in lung and kidney Mn and Cr, blood Mn, and heart Mn were observed for the FCA-HS and MMA-HS groups compared to the GMA-MS and control groups after 11 wk. Lung Fe and Mn were significantly elevated in all three welding groups compared to controls after 11 wk. Slight elevations in Mn levels were observed in the striatum and cortex of brains from animals treated for 7 wk with each of the three WF compared to controls. These findings indicate that Cr and Mn, two potentially toxic metals, may translocate from the lungs to other organs after treatment with highly soluble WF generated from hardsurfacing processes. Welding particle source, composition, and solubility appear to be determinants of tranlocation to extrapulmonary tissues.

1099 DESIGN OF AN INHALATION EXPOSURE SYSTEM TO STUDY SPOT WELDING FUME CHARACTERISTICS AND BIOLOGICAL EFFECTS.

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Millions of workers worldwide are exposed to welding aerosols daily. Health effects in welders have included, metal fume fever, decreased lung function, and chronic bronchitis. Resistance spot welding (RSW) using adhesives is common in the automotive, aircraft, and appliance industries for fabricating with sheet metal where high speed, repetitive welding is needed and relatively thin section sizes are welded. Preliminary air sampling in an automotive plant during RSW detected numerous volatile organic compounds (VOCs) such as methyl methacrylate, toluene, benzene, that were also found in adhesives used in the process. The goals of this study were to develop an automated RSW generation and inhalation system for laboratory animals and to physically and chemically identify and characterize the aerosols formed. The system is divided into three different areas: (1) enclosed control room, (2) spot welder, and (3) animal exposure chamber and aerosol characterization equipment. RSW is performed on low carbon and galvanized steel (1/32" thick, up to 1-1/2" wide) conveyed from a pair of spools at a controlled rate using an automated welder equipped with two copper alloy electrodes. Adhesives commonly used during RSW are evenly dispensed at a controlled rate between the strips of metal to be welded. Welding aerosols are transported via a flexible trunk to the animal exposure chamber. Airborne emissions in the animal breathing zone are collected onto desorption tubes for identification and measurement of VOCs. Fume morphology, composition, and size are determined by electron microscopy, atomic emission spectroscopy, and particle impactors, respectively. With the development of this novel system, it is possible to investigate in an animal model the pulmonary effects of welding fume generated from RSW on metal coated with adhesives.

1100 A NOVEL METHOD FOR THE CHEMICAL CHARACTERIZATION OF GENERATED JET FUEL VAPOR AND AEROSOL FOR ANIMAL STUDIES.

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Human exposure to JP-8 (Jet Propellant 8) and other fuels through dermal and respiratory pathways is of concern for the U.S. Department of Defense (DoD). This work highlights the lack of standardized laboratory methods to generate and characterize inhalation exposures of animals to complex hydrocarbon mixtures such as jet fuel and proposes improvements for future studies. A systematic comparison of published inhalation studies is complicated by the use of different generation systems (atomizer, nebulizer, ultrasonic, bubbler, etc.) which leads to widely different fuel component concentrations in the vapor and aerosol phases. In many cases the chamber fuel atmosphere is not adequately characterized. Total aerosol concentrations using quartz or glass fiber filters are biased since most jet fuel components are extremely volatile. Studies by our group showed mass loss from 20 to 33% occurring within 2-4 minutes while sampling jet fuel aerosol using filters. Presented here is a novel method to improve the measurement of the hydrocarbon composition of jet fuel aerosol and vapor. Aerosol phase composition is obtained from the difference between measurements of total composition (vapor and aerosol) and vapor phase composition by itself. These are sampled and preserved using adsorbent material (CarboTrap, Supelco, Bellefonte, PA). Glass filters are used to remove the aerosol at flow rates (400 mL/min) and sampling durations (1 min) which limit the issues mentioned earlier. The tubes are thermally desorbed into a GC/MS to minimize loss of volatile compounds. Complete and accurate chemical characterization of generated exposures is critical for data interpretation especially considering that DoD is evaluating the use of a synthetic jet fuel (S-8) made using Fischer-Tropsch process which has significantly different compositions than JP-8. (This work was supported by AFOSR Grant 2006-0010A, VA RR&D grants C3575R and C4613L and the American Petroleum Institute.)

1101 SELECTIVITY OF NEUROPEPTIDE RELEASE FROM PULMONARY CAPSAICIN-SENSITIVE AFFERENTS IN RELATION TO DIESEL EXHAUST EXPOSURE.

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Substance P (SP) and/or calcitonin gene-related peptide (CGRP) immunoreactivity (IR) in lungs were examined in capsaicin-pretreated or intact rats exposed to the ambient and occupational levels of diesel exhaust, respectively. Although that they exhibit coexisting relationships between each other in C-fibers, only SP displays a

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