cells; and increased iNOS and MCP-1, decreased Edn1 and ECE-1, but caused no change in eNOS, GCLC or GCLM expression in SVEC cells. These results suggest that DEP induces changes in the expression of genes important in the synthesis of vasoactive molecules in the endothelium when either directly exposed to DEP or when exposed to the secretions of macrophages exposed to DEP. This work was supported by NIEHS grants 1P50ES015915, P30ES07033 and T32ES07032.

PS 1494 CYP-DEPENDENT SENSORY IRRITATION OF NAPHTHALENE AND STYRENE.

D. N. Willis and J. B. Morris. *Toxicology Program, University of Connecticut, Storrs, CT.*

Naphthalene and styrene are sensory irritants in the mouse but little is known about the mechanism(s) through which this response is initiated. These two agents are also nasal cytotoxicants; the cytotoxic response is thought to be due to the formation of epoxide metabolites within the nose by cytochrome P450 (CYP) 2F2. The current study was performed to determine if the sensory irritant response to naphthalene and styrene is dependent upon CYP biotransformation. Toward this end, the sensory irritation response to naphthalene (8 ppm), and styrene (75 ppm) was measured in female C57BL/6J mice with and without prior intraperitoneal injection of the CYP inhibitor, metyrapone at a dose (50 mg/kg) known to inhibit nasal metabolism of these agents. In the mouse, sensory irritation is mediated by nasal trigeminal nerve activation and is characterized by the induction of braking at the onset of each expiration. To quantify the sensory irritation response, the duration of braking was measured during irritant exposure by non-invasive plethysmography. Both naphthalene and styrene induced a marked sensory nerve response (average duration of braking approximately 450 and 330 msec, respectively). For both irritants, the response was almost completely abolished in animals pretreated with metyrapone. These results suggest that biotransformation of these two compounds within the nasal cavity by CYP is a prerequisite for trigeminal nerve activation and initiation of the sensory irritant response in the mouse. Recently it has been shown that the TRPA1 receptor, present on nasal trigeminal nerve C fibers, is sensitive to oxidants and electrophiles. Perhaps the epoxide metabolites of naphthalene and styrene act through this receptor pathway.

PS 1495 AUTOMATED AEROSOLIZATION, DISPERSION, AND CONCENTRATION CONTROL OF SILICA POWDER FOR USE IN INHALATION EXPOSURE STUDIES.

W. McKinney, A. Afshari, B. Chen and D. Frazer. *NIOSH / CDC, Morgantown, WV.* Sponsor: V. Castranova.

Inhalation exposure systems are necessary tools for determining the dose response relationship of inhaled toxicants under a variety of exposure conditions. The objective of this project was to develop an automated computer controlled system to expose small laboratory animals to precise concentrations of uniformly dispersed airborne silica particles. An acoustical aerosol generator was developed which was capable of suspending a respirable fraction of particles from bulk powder [Mckinney et al. Inhal Toxicol 21(12):1053-1061]. The aerosolized silica output from the generator was introduced into the throat of a venturi tube. The high velocity air stream within the ventui tube further broke up and dispersed the aerosolized powder. This air was then used to expose small laboratory animals to constant aerosol concentrations, up to 20 mg/m3, for durations lasting as long as 8 hours. Particle distribution and morphology of the silica aerosol delivered to the exposure chamber were measured to verify that a fully dispersed and respirable aerosol was being delivered to the animals' breathing space. The inhalation exposure system utilized a combination of air flow controllers, particle monitors, data acquisition devices, and custom software with automatic feedback control to achieve constant and repeatable exposure chamber temperature, relative humidity, pressure, aerosol mass concentration, and particle size distribution. The automatic control algorithm was capable of delivering median aerosol concentrations to within +/- 0.2 mg/m3 of a user selected target value during inhalation exposures lasting from 4 to 8 hours. The system was capable of reaching 95% of the target value in less than 15 minutes during the start up phase of an inhalation exposure. This exposure system provides a highly automated tool for exposing small laboratory animals to precise concentrations of uniformly dispersed airborne silica particles.

PS 1496 COMPARISON OF COMPOSITION OF PM2.5 FROM PAVED ROADS AND IN AMBIENT AIR.

J. L. Mauderly and J. D. McDonald. *Lovelace Respiratory Research Institute, Albuquerque, NM.*

A portion of exposures to fine respirable particulate matter (PM2.5) occurs on or near paved roads. Much attention has been given to vehicle tailpipe emissions, but little is known about the composition of fine (PM2.5) paved road dust (PRD) resuspended by traffic. PRD was collected by air re-suspension from active traffic surfaces of residential and urban arterial streets, freeways, center-city street canyons, and industrial areas in Atlanta, El Paso, Los Angeles, and New York City. The PRD was sieved and re-aerosolized, and the PM2.5 fraction was collected and analyzed chemically. Results were compared to the composition of ambient airborne PM2.5 at nearby speciation monitoring stations. Although the samples were not matched perfectly in location and time, the comparison is revealing. As expected, the PRD contained a much larger crustal component and a smaller inorganic ion component than ambient PM2.5. An interesting finding was that PRD had a much larger component of reactive metals (chromium, copper, iron, nickel, vanadium). The results suggest that the inhaled "dose" of reactive metals during short times on or adjacent to roadways may be equivalent to the dose received from many hours of exposure to regional ambient PM2.5. Research funded by multiple government and industry sponsors through the National Environmental Respiratory Center.

PS 1497 PRELIMINARY RESULTS INVESTIGATING DIESEL EXHAUST PARTICULATE MEDIATED LUNG INFLAMMATION IN WILD TYPE AND GCLM-HETEROZYGOUS MICE.

C. S. Weldy[1], C. C. White[1], T. V. Larson[2], J. A. Stewart[1] and T. J. Kavanagh[1]. *[1]Environmental and Occupational Health, University of Washington, Seattle, WA and [2]Civil and Environmental Engineering, University of Washington, Seattle, WA.*

Diesel exhaust particulate (DEP) is a major component of airborne particulate matter (PM) and exposure to DEP has been associated with pulmonary irritation, inflammation and exacerbation of asthma symptoms. DEP and PM can produce an inflammatory response in the lungs by producing reactive oxygen and nitrogen species. This induction of oxidative/nitrosative stress can lead to the synthesis of proinflammatory cytokines, attracting neutrophils to the site of injury. Glutathione (GSH) is an important antioxidant tri-peptide thiol composed of glutamate, cysteine and glycine. The rate-limiting enzyme in the synthesis of GSH is glutamate cysteine ligase (Gcl), composed of catalytic (Gclc) and modifier (Gclm) subunits. Our lab has developed Gclm null mice that may be useful for investigating the role of oxidative stress and GSH in DEP induced pathology. Thus, we exposed C57Bl/6 wild type (WT) and Gclm heterozygous (HT) mice to DEP via intranasal instillation. Animals received a total of 20µl of PBS or 20µl of a 10 mg/ml DEP solution (10 µl per nostril). After 6 hours, mice were sacrificed and bronchial alveolar lavage (BAL) was performed. BAL cells were stained with the macrophage marker F4/80 and the granulocyte marker Gr1, and evaluated via FACS for the percentage of F4/80+ and Gr1+ cells. DEP instillation induced neutrophilia in both WT and HT mice and preliminary data indicate that HT mice are slightly more sensitive than WT mice to this effect. These data suggest that GSH levels may influence the degree of DEP-induced inflammation in the lung. This work was supported by NIEHS grants 1P50ES015915, P30ES07033 and T32ES07032.

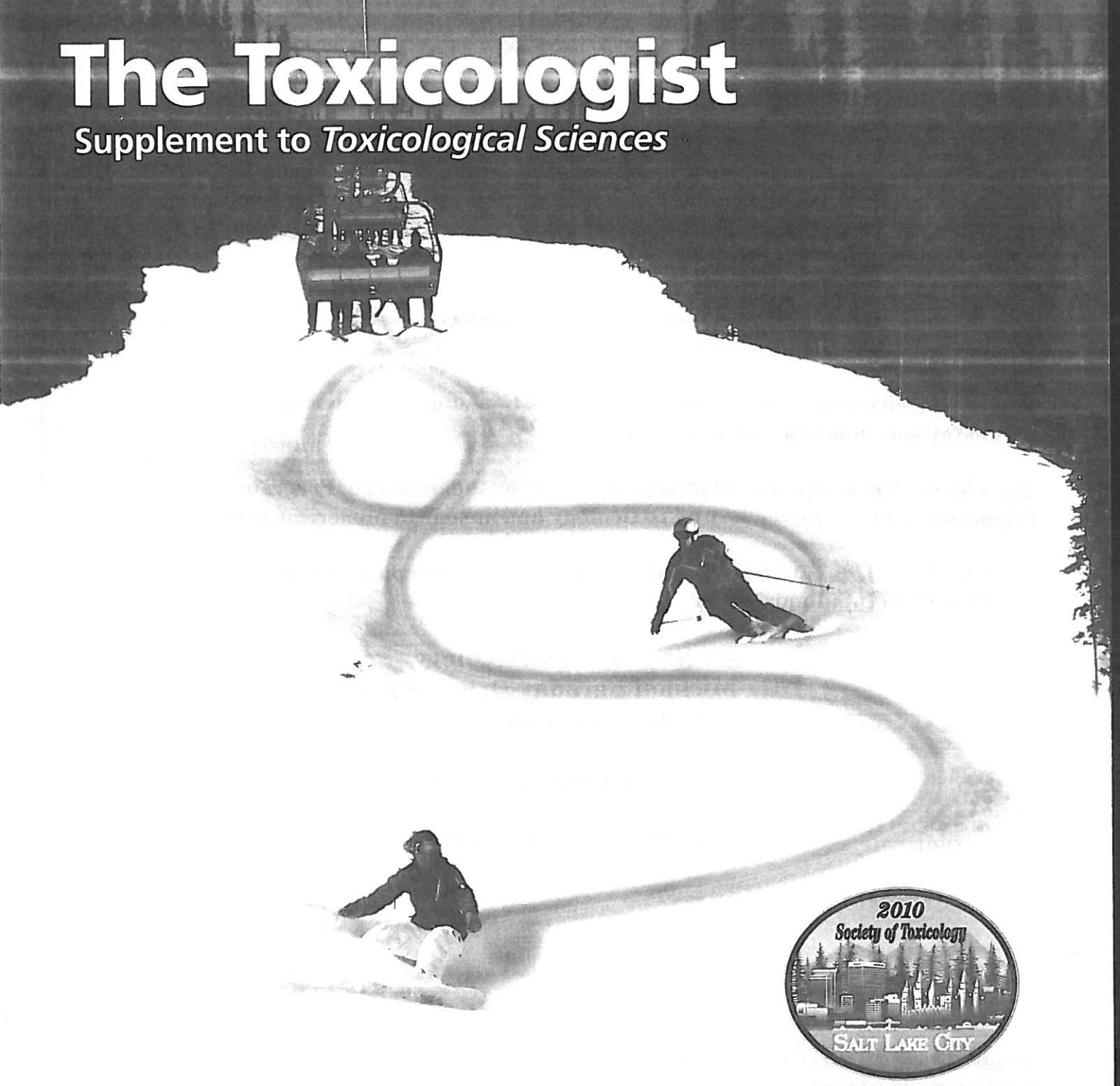
PS 1498 DIFFERENTIAL ELECTROCARDIOGRAM EFFECTS IN NORMAL AND HYPERTENSIVE RATS AFTER INHALATION EXPOSURE TO TRANSITION METAL RICH PARTICULATE MATTER.

C. M. Lamb[1], N. Haykal-Coates[2], A. P. Carll[1], M. S. Hazari[2], D. W. Winsett[2], D. L. Costa[3] and A. K. Farraj[2]. *[1]University of North Carolina Chapel Hill, Chapel Hill, NC, [2]Environmental Public Health Division, U.S. EPA, Research Triangle Park, NC and [3]Office of Research and Development, U.S. EPA, Research Triangle Park, NC.*

Inhalation of particulate matter (PM) associated with air pollution causes adverse effects on cardiac function including heightened associations with ischemic heart disease, dysrhythmias, heart failure, and cardiac arrest. Some of these effects have been attributable to transition metal components of PM. Recent epidemiologic data (Bell et al, 2009) shows associations of cardiac hospitalization with fine PM-associated Ni and V. Residual oil fly ash (ROFA), a waste product of fossil fuel combustion from boilers, is rich in the transition metals Fe, Ni, and V, and when released as a fugitive particle, is an important contributor to ambient fine particulate air pollution. We hypothesized that a single acute inhalation exposure to transition metal-rich particulate matter designed to mimic ROFA will cause greater cardiopulmonary toxicity in Spontaneously Hypertensive (SH) rats than in similarly exposed Wistar Kyoto rats with normal blood pressure. Rats were exposed once by nose-only inhalation for 4 hours to approximately 500 µg/m3 of a synthetic particulate matter consisting of Fe, Ni and V sulfates that is similar in composition to a well-studied ROFA sample. PM exposure in SH rats caused an increase in T-wave

The Toxicologist

Supplement to *Toxicological Sciences*



An Official Journal of the Society of Toxicology

SOT | Society of Toxicology

Creating a Safer and Healthier World by Advancing the Science of Toxicology

49th Annual Meeting and ToxExpo™

Salt Lake City, Utah

www.toxsci.oxfordjournals.org

OXFORD UNIVERSITY PRESS

ISSN 1096-6080
Volume 114, Number 1, March 2010

Preface

This issue of *The Toxicologist* is devoted to the abstracts of the presentations for the Continuing Education courses and scientific sessions of the 49th Annual Meeting of the Society of Toxicology, held at the Salt Palace Convention Center, March 7–11, 2010.

An alphabetical Author Index, cross referencing the corresponding abstract number(s), begins on page 473.

The issue also contains a Key Word Index (by subject or chemical) of all the presentations, beginning on page 496.

The abstracts are reproduced as accepted by the Scientific Program Committee of the Society of Toxicology and appear in numerical sequence.

Copies of *The Toxicologist* are available at $45 each plus $5 postage and handling (U.S. funds) from:

Society of Toxicology
1821 Michael Faraday Drive, Suite 300
Reston, VA 20190

www.toxicology.org

© 2010 Society of Toxicology

All text and graphics are © 2010 by the Society of Toxicology unless noted. For promotional use only. No advertising use is permitted.

This abstract book has been produced electronically by ScholarOne, Inc. Every effort has been made to faithfully reproduce the abstracts as submitted. The author(s) of each abstract appearing in this publication is/are solely responsible for the content thereof; the publication of an article shall not constitute or be deemed to constitute any representation by the Society of Toxicology or its boards that the data presented therein are correct or are sufficient to support the conclusions reached or that the experiment design or methodology is adequate. Because of the rapid advances in the medical sciences, we recommend that independent verification of diagnoses and drug dosage be made.