and the pyriform cortex. Ultrastructural study showed enhanced accumulation of lysosomes. Data suggest that perturbation of ubiquitin processing may enhance TMT toxicity by delaying protein degradation during neural repair. (Supported by ES 10153 and CIHR MT-15134)

902 ALTITUDE AS A FACTOR IN PARTICULATE MATTER RISK ASSESSMENT.

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Epidemiological studies report increased morbidity and mortality associated with exposure to ambient particulate matter (PM) in older subjects suffering from a multiplicity of cardiorespiratory conditions. Although most of these studies were conducted at or near sea level, more than 35 million people live or visit altitudes above 1,500 m in the United States; worldwide, the figure is closer to 80 million. Moreover, nearly 60% of travelers to higher elevations are older than age 40 and 13% are older than age 60. The population at altitude comprises residents, fully adapted to altitude, and sojourners; it is the sojourner who is at greater risk from exposure to PM. Several features of the altitude environment, specifically the decreased oxygen tension (hypoxia), humidity and temperature, can affect dosimetry and the toxicity of PM in cardiopulmonary-impaired subjects. Hypoxia increases with elevation and intensifies the hypoxemia extant in cardiopulmonary impaired subjects. Airflow is increased by the respiratory response to hypoxia and changes in airflow affect PM deposition patterns. The drier air at altitude and the potential for respiratory tract dehydration increase mucus viscosity and decrease mucociliary clearance. Dry air also increases airway reactivity. The cold air intensifies the pulmonary vasoconstriction response at altitude, increasing pulmonary blood pressure, and also elicits bronchoconstriction. The range of pathophysiological responses evoked during exposure to higher elevations depends on the attained altitude, the intensity of cold and aridity, and the state of health of the individual. Therefore, older subjects with cardiorespiratory disease who are exposed to PM in the more stressful altitude environment can be expected to suffer adverse health outcomes at lower PM concentrations than subjects exposed at sea level.

903 PULMONARY INFLAMMATION AFTER INTRATRACHEAL INSTILLATION OF ABRASIVE BLASTING SUBSTITUTES.

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The use of blasting (silica) sand in abrasive blasting has been associated with pulmonary disease. Therefore, a need exists for the identification of less toxic substitutes. We assessed the toxicity of several abrasive blasting substitutes and compared the pulmonary effects to those caused by two blasting sands. Rats received a single 10 mg dose of either nickel slag, copper slag, crushed glass, olivine, steel grit, or two blasting sands with PBS as the vehicle (control) by intratracheal (IT) instillation. At four weeks post-IT, the right lung lobe was lavaged to isolate bronchoalveolar lavage (BAL) cells and acellular BAL fluid (BALF); the left lung lobe was inflated with 10% neutral buffered formalin and processed for histopathology. Pulmonary inflammation was monitored by measuring BAL polymorphonuclear leukocytes (PMN) and alveolar macrophage (AM) chemiluminesence (CL). Cytotoxicity was measured by analysis of acellular BALF lactate dehydrogenase (LDH) activity and albumin (ALB) concentration. Examination of the data indicates that in comparison to PBS-exposed rats, all the materials except steel grit caused elevated PMNs, AM CL, and BALF LDH and albumin. Comparing the substitutes to the blasting sands showed that olivine was the most potent. With the exception of steel grit, all the other substitutes exhibited similar potency to that of blasting sand. Preliminary data indicates that steel grit was substantially less reactive than the blasting sands, causing a response similar to PBS-exposed rats. At four weeks post-exposure, these data indicate that except for steel grit these abrasive blasting substitutes did not appear to be less toxic in rats than blasting sands.

904 HOSPITAL ADMISSIONS FOR CARDIOVASCULAR DISEASES FOR DENVER, JULY-AUGUST, 1993 TO 1997.

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Daily numbers of hospital admissions for cardiovascular diseases in Denver from July-August, 1993 to 1997 were modeled as functions of daily temperatures and air pollutant concentrations. The purpose of these models was to estimate how exposures to both higher temperatures and air pollutant concentrations, that could occur as a result of climate change, could affect the daily number of hospital admissions for these diseases for males and females > 65 years of age. This age group was considered because people > 65 years of age have been shown to have higher incidences of mortality and morbidity for heat and air pollutant related diseases. Generalized linear models (GLMs), assuming a Poisson error structure for the selected cardiovascular disease hospital admissions, were constructed using daily maximum temperature (T_{max}) and daily average concentrations of nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3) and particulate matter ≤ 10 µm (PM_{10}) as model covariates. The analyses were conducted using single and multipollutant models with lag times of 1-4 days in Tmax and air quality covariates, interaction terms and adjustments for gender, weather, year and day of the week. The results show that there are significant associations between July-August concentrations of O_3, SO_2 and CO for specific cardiovascular diseases. Because there are different mechanisms for each of these diseases, some are chronic deterioration in cardiac function and some are acute cardiac distress, it is important to analyze the response of these diseases individually. There are also significant differences in hospital admissions between males and females for the same disease. However, as a group of diseases, higher temperatures do not appear to be an important factor, except for congestive heart failure. Exposures to higher air pollutant concentrations, however, appear to be significantly associated with all of these diseases.

905 PARTICULATE AIR POLLUTION AND HOSPITAL ADMISSIONS FOR COPD: TWO STATISTICAL MODELS, ONE RESULT.

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Two statistical regression models, the AutoRegressive Integrated Moving Average (ARIMA) and the Generalized Additive Model (GAM), were compared in this study for their ability to assess the association between ambient particulate air pollution concentrations and daily hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) in Reno/Sparks, Nevada during the period 1990-1994. The study involved 3115 admissions for COPD. The daily average concentration of ambient PM_{10} was 36.55 µg/m^3. After adjusting for the effects of weather variables, day-of-the-week, seasons, and time trend, both the ARIMA and GAM methods consistently found that PM_{10} is a statistically significant predictor of daily hospital admissions for COPD. The percentage increase of hospital admissions for COPD for an interquartile increase (26.6 µg/m^3) of the 24-h average of PM_{10} on the 14 prior days is 4.29% (95% CI 1.22-7.36%) with ARIMA analysis and 5.62% (95% CI 2.16-9.08%) with GAM analysis. The percentage increase of hospital admissions for COPD for an increase of 26.6 µg/m^3 of the 24-h average of PM_{10} on the concurrent day was 4.73% (95% CI 0.88-8.58%) with the GAM analysis. Comparisons of both methods showed that the GAM was more sensitive than the ARIMA analysis in predicting correlations between PM_{10} levels and hospital admissions for COPD. However, the ARIMA method is a more powerful technique in dealing with the problems of high order autocorrelation errors.

906 DEVELOPMENT OF ASSAYS IN ASSESSING CYTOTOXICITY OF ROADSIDE AIR POLLUTION IN HONG KONG.

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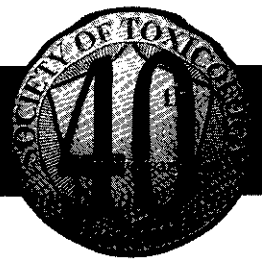
Air pollution has become a major health concern in Hong Kong recently. The increasing traffic volume highly contributes to the seriousness of the problem, the automobile emission may affect the health conditions of pedestrians. Particulate air pollution is of special concern and the pulmonary epithelium and resident macrophages are the potential targets of the toxic actions. The present study demonstrates assays in assessing the *in vitro* cytotoxic effects of roadside dust samples and particulate matter (PM) and their associated toxic substances like heavy metals and PAHs. Roadside dust samples and PM were collected from various sites in Hong Kong seasonally from 2000 to 2001. Airborne particulate tends to aggregate as larger particles and settle as dust, and roadside dust samples were chosen as the ease of collection and availability. Alveolar macrophages isolated from male SD rat were treated for 24 hrs at 37¢J, 5% CO_2 with different concentrations of heavy metals and benzo[a]pyrene in DMEM, the viability was studied using MTT or alamar Blue assay. Preliminary findings showed that LC_{50} cannot be determined from



Society of Toxicology

40th Annual Meeting

An Official Journal of the
Society of Toxicology
Supplement

TOXICOLOGICAL SCIENCES
Formerly Fundamental and Applied Toxicology

The Toxicologist

Abstracts of the 40th Annual Meeting

Oxford University Press

Volume 60, Number 1, March 2001

Preface

This issue of *The Toxicologist* is devoted to the abstracts of the presentations for the symposium, platform, poster discussion, workshop, roundtable, and poster sessions of the 40th Annual Meeting of the Society of Toxicology, held at the Moscone Convention Center, San Francisco, California, March 25–29, 2001.

An alphabetical Author Index, cross referencing the corresponding abstract number(s), begins on page 451.

The issue also contains a Keyword Index (by subject or chemical) of all the presentations, beginning on page 479.

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