

whole diesel exhaust (DE) at the time of Bla g 2 challenge. Further research will enable us to examine age-dependent differences in immune response, to delineate the adverse effects of DE inhalation on these responses, and to quantify the relative contribution of biological and environmental factors on the exacerbation of pediatric asthma.

**822** SUPPRESSION AND ENHANCEMENT OF ALLERGIC AIRWAY RESPONSES BY PM<sub>2.5</sub> IS DEPENDENT ON PHYSICOCHEMICAL CHARACTERISTICS.

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Increased concentrations of fine particulate matter (PM<sub>2.5</sub>) have been associated with increased symptoms in asthmatic patients. Eosinophilic inflammation, excessive airway mucus and mucous cell metaplasia/hyperplasia (MCM) are common histopathologic features of asthmatic airways. We tested the hypothesis that exposure to concentrated fine airborne particles (CAPs) from two urban areas with qualitatively disparate PM atmospheres will exacerbate allergen-induced MCM and inflammation in airways of Brown Norway (BN) rats. Male BN rats were exposed in whole-body exposure chambers, located within a mobile laboratory located in either urban southwest Detroit, MI (DTW) with impact from local and transported PM sources, or Grand Rapids, MI (GRR), with transported and mobile PM sources. Ovalbumin (OVA)-sensitized BN rats were exposed to CAPs or filtered air (FA) for 1 day (7:00 am to 3:00 pm). A Harvard/EPA ambient fine particle concentrator was used to generate the CAPs from the urban air in DTW (542 µg/m<sup>3</sup>) and GRR (519 µg/m<sup>3</sup>). One hour before exposure, rats were intranasally challenged with 0.5% OVA in saline or with saline alone (SA). Rats were sacrificed 16h later and bronchoalveolar lavage fluid (BALF) was collected from right lung lobes. Left lung lobes were processed for light microscopy and morphometric analysis of intraepithelial mucosubstances (IM; measure of MCM) in pulmonary axial airways. In both DTW and GRR, SA/CAPs rats (controls) had no airway inflammation or MCM. In contrast, OVA/FA rats had more neutrophils (25-30-fold), eosinophils (8-10x), and total protein (3-4x) in BALF than controls. DTW CAPs enhanced all allergic endpoints by 30-100%, whereas GRR CAPs suppressed all allergic responses by 50%. GRR CAPs was derived primarily from motor vehicle sources. Conversely, DTW CAPs had high sulfate, smaller sized particles and originated from both coal and local combustion sources. These data demonstrate opposing effects of PM on allergic airway disease depending on source and characteristics of particles. (Supported HEI and MEDC)

**823** ASSESSING THE RESPIRATORY SENSITIZATION POTENTIAL OF PROTEINS USING THE MOUSE INTRANASAL TEST (MINT).

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A need exists for a simple predictive animal model to identify proteins with the potential to induce respiratory sensitization in humans. The MINT has been successfully used to predict human sensitivity to inhaled industrial enzymes, however, its utility in predicting the allergenicity of other classes of proteins is untested. In this study, BDF1 mice were intranasally instilled on days 1, 3, 10, 17 and 24 with 0, 0.5, 5, or 25 µg Subtilisin Carlsberg (SUB; known respiratory sensitizer), ovalbumin (OVA; potent food allergen), β-lactoglobulin (BLG; moderately potent food allergen), or keyhole limpet hemocyanin (KLH; strong immunogen with no reports of respiratory sensitization). Pulmonary function (PF) data were collected for methacholine (MCh) or specific protein aerosol challenge using whole-body plethysmography (WBP). Bronchoalveolar lavage (BAL) was performed to evaluate cellular inflammation, and serum was collected to determine protein-specific IgG1/IgG2a levels (ELISA) and specific IgE by passive cutaneous anaphylaxis (PCA). All proteins induced significant eosinophilia (70-83%). BLG and KLH had no effect on PF parameters following MCh or protein challenge. Protein challenge using SUB and OVA altered minute volume and tidal volume responses, but only mice exposed to SUB demonstrated airflow restriction. Specific IgE PCA titers were ranked SUB>OVA>KLH>BLG. Based on IgG ELISA titers SUB, OVA and KLH were immunologically more potent than BLG, but only SUB and OVA had high IgG1/IgG2a ratios suggesting a Th2-oriented immune response. Acute phase airway response to inhaled protein in "sensitized" mice was not a better predictor of respiratory sensitization potential than MCh challenge. WBP did not appear to be a sensitive measure in comparison to antibody measurements. Using these endpoints the MINT can be used to identify allergenicity potential of potent protein allergens. These endpoints may not be effective for classification of proteins with weaker potential, and appear to be confounded by proteins with strong immunogenicity.

**824** RELATIVE ORAL BIOAVAILABILITY OF POLYCHLORINATED DIBENZO-P-DIOXINS/DIBENZOFURANS IN SOIL.

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Bioavailability is a key consideration in quantitative assessments of the potential risk posed to humans exposed to polychlorinated dibenzo-*p*-dioxins/dibenzofurans (PCDD/Fs). Because PCDD/Fs are persistent in the environment, ingestion of soil may be an important route of exposure in some circumstances. The oral bioavailability of PCDD/Fs in soil samples collected from five representative locations at an industrial site was evaluated in female Sprague Dawley rats. The PCDD/F content of the soil was dominated by dibenzofurans; dibenzo-*p*-dioxins were responsible for less than 5% of the soil TEQ. Relative bioavailability determinations were based on comparisons of the concentration of PCDD/Fs in the liver of rats treated with an aqueous soil suspension to those in animals treated with a reference formulation. The reference formulations were prepared in corn oil and contained the seventeen 2,3,7,8-substituted PCDD/Fs in proportions similar to those in the soil. Each animal received a single oral gavage dose of a soil suspension or reference formulation, and liver samples were collected 24 hours after dosing. Eight to 16 PCDD/F congeners were detected at sufficient concentrations to be included in the bioavailability determinations for each soil. The bioavailability of individual PCDD/Fs was inversely correlated with the degree of chlorination, and the mean values ranged from 15% for 1,2,3,7,8,9-HxCDF to 90% for 1,2,3,7,8-PeCDD. The overall relative bioavailability of PCDD/Fs in the soil samples (on a TEQ basis using the 2005 WHO toxic equivalency factors) ranged from 17 to 51% with a mean of 38%. There was no correlation between overall bioavailability and the concentration of PCDD/Fs in the soil samples. These data indicate that the oral bioavailability of PCDD/Fs can vary by congener or location and suggest that site-specific evaluations should be utilized in quantitative risk assessments. The results of this study also indicate that reliance on a default assumption of 100% bioavailability may result in substantially overestimated values for the risk posed by PCDD/Fs in soil from this site.

**825** ABSOLUTE ORAL BIOAVAILABILITY OF POLYCHLORINATED DIBENZO-P-DIOXINS/DIBENZOFURANS IN SOIL.

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The absolute oral bioavailability of polychlorinated dibenzo-*p*-dioxins/dibenzofurans (PCDD/Fs) in soil samples collected from five locations at an industrial site in the southwestern United States was evaluated in female Sprague Dawley rats. Bioavailability was calculated by comparing the concentration of PCDD/Fs in the liver of rats treated with an aqueous soil suspension by oral gavage to those treated with a reference formulation by via a 3-hour intravenous infusion. The reference formulations contained the seventeen 2,3,7,8-substituted PCDD/Fs in proportions similar to those present in the soil. Each animal received a single dose of the reference formulation or soil sample, and the liver was collected 24 hours after dosing. The overall absolute bioavailability of PCDD/Fs in the soil samples (on a TEQ basis using the 2005 WHO toxic equivalency factors) ranged from 11% to 38% with a mean of 27%. There was no correlation between the overall bioavailability of PCDD/Fs and the TEQ concentration of the soil samples. The absorption of individual PCDD/Fs in the soil samples was inversely correlated with the degree of chlorination, and the mean absolute bioavailability values ranged from 4% for OCDF to 110% for 2,3,7,8-TCDF. It was believed that the short initial half-life of 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, and 1,2,3,7,8-PeCDF in liver resulted in the calculation of erroneously high absolute bioavailability values for those congeners. The bioavailability of 2,3,7,8-TCDD could not be determined due to its low concentration in soil at this site. The bioavailability values for the remaining thirteen congeners, which accounted for 89-96% of the TEQ concentration of the soil samples, were considered to be reliable. These data are suitable for use in quantitative risk assessments of PCDD/Fs in soil from this site and may be applicable to other experimental or environmental scenarios in which PCDD/F exposure occurs by the oral route.

**826** POLYCHLORINATED DIBENZO-P-DIOXINS, POLYCHLORINATED DIBENZOFURANS AND DIOXIN-LIKE PCBs IN HUMAN ADIPOSE TISSUE IN TURKEY.

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During the twentieth century, production and use of toxic chemicals has increased rapidly thousands of chemicals have been introduced into the environment. Persistent organic pollutants (POPs) are very important group of these chemicals.