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ter understand the partitioning of CPF in blood and its fractions. Blood was collected from CD rats (nonpregnant, GD 10, 15, 18, 20, and lactation day [LD] 1, 5; n=3/time point). Pooled fetal and pup bloods were collected on GD 18, 20, LD 1 and 5. Blood samples were fortified with 3 or 100 ng/ml 3H-CPF, mixed, and centrifuged. Radiolabel partitioning was determined by liquid scintillation spectroscopy using fractions of: 1) red blood cells (RBCs) vs. plasma and 2) low-density vs. high-density components of plasma. The amount of CPF in plasma increased about 2.5X during pregnancy, and the amount of CPF in plasma lipids increased about 3X. Plasma CPF was found predominantly in the low-density lipid fraction. Similar to dams, CPF in fetal blood was mostly in the plasma fraction (2X), but contrary to dams, was mostly in the high-density fraction. The amount of CPF in the plasma fraction of pups increased after birth, but the CPF was now found mostly in the low-density fraction. Conclusion: Interpretation of exposure and biologic implications of blood levels of lipophilic chemicals is not straight forward because the lipophilic chemical is a marker of both exposure and lipid profile. A careful consideration of the biologic context of the measurement is necessary.

1249 PYRETHROID EXPOSURE IN THE INDOOR ENVIRONMENT FOLLOWING USE OF CYPERMETHRIN FOGGERS

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Pyrethroids are low to moderately toxic insecticides used worldwide in home and agricultural pest management. Ten families from 5 different states were recruited that planned on using pesticides, in the form of pyrethroid foggers, to deal with an indoor insect problem. Pyrethroids are used in this study as models for semi-volatile chemical exposure because of their availability to the general public, low to moderate toxicity in mammals, and ease of biomonitoring. Trace, parts per billion, metabolite levels were measured in almost all samples taken. This study involved use of a commercially available indoor fogger (Raid Deep Reach Fogger) with 1.7 % cypermethrin as the active ingredient. Families included a total of 85 subjects, of which 47 were considered children (<18 years old), the youngest of which was 3 years old at the study time. These families were biomonitored for 8 days by either 24-hour, am/pm, or am sampling strategies. Fogging was performed on day 1.5 which allowed, depending on the sampling strategy employed, at least 2 samples that could be used to determine background levels, and at least 6 samples post-application. Total µg/kg pyrethroid equivalents were 11, 3.4, and 2.3 for age groups 0-11, 12-17, 18-65 years old, respectively. Exposure peaked on day 4 for both adults and children, reaching levels of 2.2, 0.8, and 0.6 µg/kg pyrethroid equivalents for age groups 0-11, 12-17, 18-65 years old, respectively. Exposure above background persisted for at least 6 days and environmental data suggests cypermethrin remains available for transfer and absorption for at least 14 days post-application. These exposures are below known LOAELS and regulatory NOAELS for cypermethrin.

1250 MEASUREMENT OF EXPOSURE TO COMPLEX MIXTURES OF POLYCYCLIC AROMATIC HYDROCARBONS IN HUMAN POPULATIONS

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Polycyclic aromatic hydrocarbons (PAH) are released from the incomplete combustion of organic materials such as gas, oil, and wood. PAH contamination occurs as complex mixtures that often contain over one hundred chemicals. Humans may be exposed to polycyclic aromatic hydrocarbons (PAHs) in the environment from many sources, including tobacco smoke, diet, and industrial processes. Animal studies have clearly linked exposure to PAHs with a variety of cancers. Human populations may also be at increased risk of cancer if the dose and duration of exposure are adequate. However, there is limited information regarding the absorption and distribution of PAHs from non-occupational exposures. Biomarkers have been measured in plasma and urine from three generations in a total of 70 families (37 urban, 33 rural) from the country of Azerbaijan. Measurements collected from these populations include the concentration of PAHs in plasma, PAH-DNA adducts in peripheral lymphocytes, and 1-hydroxypyrene in urine. The median serum concentration for total PAHs in the urban population was 148 ng/mL, while a median level of 67 ng/mL total PAHs were detected in the rural population. Total DNA adduct levels were significantly higher in the urban population than in the rural population. Analyses of urine samples from urban and rural populations indicate that 1-hydroxypyrene concentrations are highly variable. Cotinine levels are

also being measured to account for PAHs from tobacco smoke exposure. Overall, the results indicate there is a correlation between PAHs in environmental samples and PAH adducts in an exposed population.

1251 ESTIMATION OF GENOTOXIC EXPOSURES IN CHILDREN WITH NEURAL TUBE DEFECTS IN SHANXI, CHINA

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Maternal exposure to genotoxic chemicals may produce a variety of adverse birth outcomes. Depending on the dose and duration of exposure, adverse birth outcomes can range from premature or low-birth weight, to congenital abnormalities including neural tube defects (NTDs). This abstract reports on a study being conducted in the province of Shanxi, China. Shanxi Province has one of the highest rates of birth defects in the world. In 2003, the frequency of NTDs in Shanxi was 139 per 100,000 live births. While a portion of these birth defects are likely to be related to nutrition, it is also likely that environmental factors play a significant role. This on-going genotoxicity study is collecting data to measure concentrations of polycyclic aromatic hydrocarbons (PAHs) in house dust. Levels of PAHs in plasma and DNA adducts in placenta have also been quantified. Carcinogenic PAH levels in dust collected from kitchen floors ranged from 5,000 to 56,000 ng/m². Placenta tissue from children born with NTDs were found to have significantly higher levels of the less polar bulky DNA adducts when compared to matched controls (3.4 ± 1.3 per 10⁷ nucleotides in case subjects, and 1.1 ± 0.8 per 10⁹ nucleotides in control subjects). The less polar DNA adducts appear to be induced by carcinogenic PAHs. These compounds have been detected in house dust as well as in plasma samples from children's parents. *In vitro* and *in vivo* studies indicate that DNA adducts are correlated with PAH concentrations in dust. The data suggest that children born with NTDs may be at increased risk due to exposure to genotoxic PAHs.

1252 EXPOSURE AND GENOTOXIC EFFECTS IN MASTIC ASPHALT WORKERS EXPOSED TO FUMES AND AEROSOLS OF BITUMEN

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1-hydroxypyrene (1-OHP) in urine as well as 8-oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodGuo) and the formation of DNA strand breaks and alkali-labile sites in white blood cells were determined before and after shift in 66 mastic asphalt workers exposed to fumes and aerosols of bitumen. In addition, personal exposure measurements were carried out in order to assess external exposure to fumes and aerosols of bitumen. Identical analyses were carried out in 49 construction workers without exposure to bitumen but similar working tasks. Concentration of fumes and aerosols of bitumen in air correlated significantly with the concentrations of 1-OHP (r = 0.27; P = 0.03). Increased DNA strand breaks were observed in mastic asphalt workers compared to the reference group at both time points (P < 0.0001). DNA strand breaks were also highly associated with 1-OHP in post-shift urine samples (r = 0.32; P = 0.001). Age, smoking and nationality had no significant influence on DNA strand breaks. 8-oxodGuo adduct levels did not show any association with DNA strand breaks. Furthermore, 8-oxodGuo levels were associated neither with personal exposure to fumes and aerosols of bitumen nor with 1-OHP in urine. However, significantly more 8-oxodGuo was observed after shift in both, bitumen-exposed workers and the reference group. Only low-exposed workers (<10 mg/m³) had significantly elevated 8-oxodGuo adduct levels before (P = 0.0002) as well as after shift (P = 0.02, respectively). Our results demonstrate that exposure to fumes and aerosols of bitumen may contribute to an increased number of DNA strand breaks. However, DNA strand breaks in white blood cells of workers are associated to other factors rather than oxidative DNA damage. In the study presented here 8-oxodGuo seems to be a biomarker of general "stress" (e.g., heavy work load) rather than a biomarker of effect due to exposure to bitumen.

1253 HIGH BACKGROUND LEVELS OF URINARY BENZENE METABOLITES FOUND IN VOLUNTEER STUDY

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Both OSHA and the ACGIH have established levels of urinary metabolites above which there is concern about overexposure to benzene. The OSHA benzene standard states that if a worker is exposed to benzene in an emergency situation and