being measured in experimental rodent models as endpoints for assessing the carcinogenic potency of chemical exposures. By integrating spontaneous levels of human oncomutations, and population variability in these levels, with spontaneous and chemically-induced levels of oncomutations in rodents, we are developing a cancer-relevant endpoint which may enhance our ability to predict human tumor incidences associated with particular exposures.

PS 1864 BIOMARKER ANALYSIS OF 1, 6-HEXAMETHYLENE DIISOCYANATE EXPOSURE.

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Urinary 1,6-hexamethylene diamine (HDA) is used as a biomarker for systemic exposure to 1,6-hexamethylene diisocyanate (HDI) in occupationally exposed workers but the quantitative relationships between dermal and inhalation exposure to HDI and urine HDA levels have not been established. We investigated the quantitative and time-dependent relationship between dermal and inhalation exposure to HDI and urine HDA levels in 48 automotive spray-painters. During each sampling visit, breathing-zone air samples were collected during each clear-coat paint task, and immediately after dermal tape-strip samples were collected. One urine sample was collected before start of work and multiple samples were collected during the workday from each worker. HDA level, creatinine concentration, and specific gravity were determined in each urine sample. HDA concentrations varied throughout the day and ranged from 0 to 65.92 μg/l with a geometric mean and standard deviation of 0.10±6.68 μg/l. Dermal and respirator-adjusted inhalation exposure were both significant predictors of urine HDA levels (p-values ≤0.06). The results indicated biphasic elimination kinetics for HDA with a fast phase of 2.9 h. Creatinine concentration, (p<0.0001), weekday (p=0.056), and use of coveralls (p=0.12) were significant predictors of HDA levels. The use of coveralls (p=0.001), respirator type (p=0.005), smoker status (p=0.039), paint booth type (p=0.003), and worker's race (p=0.063) significantly affected HDA levels adjusted for creatinine concentration. In summary, urine HDA is significantly associated with systemic HDI exposure through both the skin and lungs and can be used as a biomarker to evaluate HDI exposure. The results also indicate the importance of both proper dermal and respiratory protection. Supported by NIOSH R01-OH007598, T42/CCT422952, and T42 OH008673; NIEHS P30ES10126 and T32 ES007018; American Chemistry Council RSK0015-01.

PS 1865 PHARMACOKINETICS OF 3, 5, 6-TRICHLORO-2-PYRIDINOL (TCPY), A CHLORPYRIFOS METABOLITE, IN RAT SALIVA.

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Novel non-invasive techniques are being developed for biological monitoring (biomontitoring) of a variety of potential toxicants, including pesticides like chlorpyrifos (CPF); and saliva has been suggested as an ideal body fluid to biomonitor. In order to be acceptable, there is a need to understand salivary pharmacokinetics of CPF metabolites for extrapolation of saliva measurements to whole body exposures. In this context, in vivo pharmacokinetics of 3,5,6-trichloro-2-pyridinol (TCPy), a major metabolite of CPF, was quantitatively evaluated in rat saliva. Experimental results suggest that TCPy partitioning from plasma to saliva in rats is relatively constant over a range of varying physiological conditions. TCPy pharmacokinetics were very similar in blood and saliva (area under the curve (AUC) values were proportional and elimination rates ranged from 0.007 to 0.019 h-1) and saliva/blood TCPy concentration ratios were not affected by TCPy concentration in blood (p = 0.35) or saliva flow rate (p = 0.26). The TCPy concentration in saliva was highly correlated to the amount of unbound TCPy in plasma (r = 0.96), and the amount TCPy protein-binding in plasma was substantial (98.5%). The median saliva/blood concentration ratio (0.049) was integrated as a saliva/blood TCPy partitioning coefficient within an existing physiologically based pharmacokinetic and pharmacodynamic (PBPK/PD) model for CPF. The model accurately predicted TCPy concentrations in saliva over a range of blood concentrations. These studies suggest that saliva TCPy concentration can be utilized to ascertain CPF exposure, and it is envisioned that the PBPK/PD can likewise be used to estimate CPF dosimetry based on the quantitation of TCPy in spot saliva samples obtained from biomonitoring studies. Supported by Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (CDC/NIOSH) grants R01 OH008173 and R01 OH003629.

PS 1866 ELABORATION OF MICROPLATE SPECTROSCOPIC METHODS FOR BIOMONITORING OF WARFARE ORGANOPHOSPHATES SOMAN AND RUSSIAN VX.

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The scale of organophosphates (OPs) application demands strict control and safety of the personnel, population and environmental objects. The chemical methods are laborious, time consuming and require costly high precision equipment; also, they are relatively insensitive compared to biochemical ones. Two microplate spectroscopic methods for determination of organophosphates, based on inhibition of acetylcholinesterase (AChE) activity, have been elaborated and evaluated for determination of the chemical weapon agents soman and Russian VX (RVX). The limits of quantification were lower for the Ellman method, though the sensitivity coefficients were in favor of the Hestrin method. The effects of the main hydrolysis products were consistent for the two methods. The main components of decontaminating solutions showed differential effects: while monoethanolamine had no influence upon results obtained by either method, hydrogen peroxide interfered with the Ellman method at far lower concentrations that with the Hestrin method. We have also adapted the method of Ellman to microplate version with human neuroblastoma cell line SH-SY5Y as a carrier of AChE, and tested it with soman and RVX, as well as their mixtures. The limits of quantification have been found to be (1±0.2)*10E-8 mg/ml for soman and (0.5±0.2)*10E-8 mg/ml for RVX. The linear ranges were determined to be 0.5*10E-8 to 8*10E-8 mg/ml for RVX and 2*10E-8 to 1*10E-7 mg/ml for soman. An additive character of action of the two agents has been revealed. For biomonitoring purposes, we advertise the following advantages of the methodology developed: 1) High productivity and efficiency; 2) Elimination or reduction of false-positive and false-negative results; 3) Reduction of amount of samples for biochemical and possible chemical analyses; 4) Reduction of time necessary for analyses to be done.

PS 1867 PESTICIDE DISTRIBUTION AFTER RELEASE OF CYPERMETHRIN AND CHLORPYRIFOS INDOOR FOGGERS.

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Pesticides distribute in and on targeted and non-targeted surfaces after fogger use, inevitably leading to unintentional and unavoidable human exposure at some level. The deposition and distribution of indoor surface residues will likely be determined by the nature of the formulation and treated surface, application procedure, and the reactivity of the product. In this study, one cypermethrin fogger and two chlorpyrifos foggers discharged in the same 10 × 10 ft test room on two separate occasions. Surface residue (SR) was measured by determining the amount of insecticide deposited on aluminum foil coupons in three directions on the floor (A, B, C). Average SR following cypermethrin fogger use in directions A, B, and C was 3.6 ± 0.6 μg/cm^2. SR ranged from 3.6 ± 0.2 μg/cm^2 at 0 m from the fogger to 3.8 ± 0.4 μg/cm^2 at 1.2 m from the fogger. SR following chlorpyrifos fogger use in directions A, B, and C was 19.5 ± 0.6 μg/cm^2. SR at 0 m from the fogger was 45.8 ± 5.7 μg/cm^2 and SR at 1.2 m was 4.0 ± 1.0 μg/cm^2. SR and air monitoring accounted for only 35% of the chlorpyrifos released and 75% of the cypermethrin released, likely because of the higher vapor pressure of chlorpyrifos as compared with cypermethrin. SR was not affected by direction in either fogger but distance from the fogger differed significantly between chlorpyrifos and cypermethrin. Differences in SR distribution are likely due, in part, to product specific particle sizes and not chemical properties of the particular active ingredients. More evenly distributed SR enhances the accuracy of residential exposure algorithms used to calculate potential dose rates. Further, exposure to children and adults is likely increased if levels of pesticide are elevated in the middle of a treated room.

PS 1868 MEASUREMENT OF AIR CONCENTRATION AND DEPOSITION ON COTTON DOSIMETERS OF METOFLUTHRIN GENERATED BY A PERSONAL OUTDOOR INSECT REPELLENT DEVICE IN AN OUTDOOR ENVIRONMENT.

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OFF!® Clip-on personal repellent device was introduced into the market last year as an outdoor personal area mosquito repellent product providing up to 12 hours of protection in the immediate area around the person using the device. This device contains a pad cartridge impregnated with 15 mg of the active metofluthrin(refill

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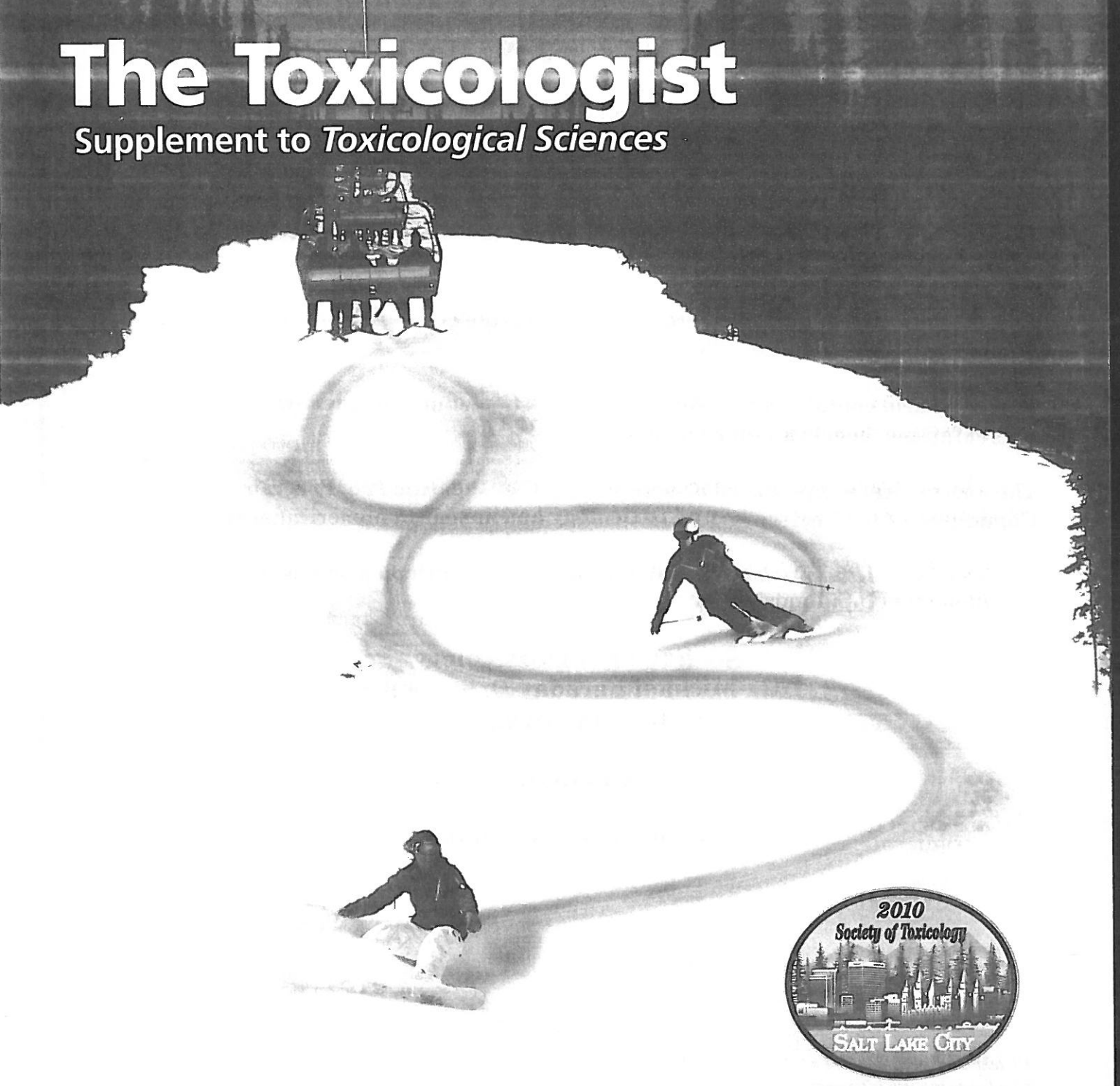

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Preface

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.

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