

Recent studies have provided increasing evidence that lung cancer incidence is associated with exposure to airborne particulate matters of less than 2.5 μ m in diameter (PM_{2.5}). The mutagenic compounds, among them the carcinogenic metals, may play very important roles in carcinogenesis in lung. Urinary and fingernail metals are biological indices of metal exposure. In this work, we examined the metal content of nail and urine samples from traffic agents and compared the metal levels with metal composition of the airborne PM_{2.5} to which these traffic agents were exposed. Ambient PM_{2.5} samples were collected with personal air samplers while the agents were on duty and the metal content was determined by ICP-MS method. We also supplemented the study with a complete health check, and questionnaire about life style and medical history. Results: We have recruited 29 traffic agents in Hsinchu area to participate in the study. They were exposed to an ambient air with PM_{2.5} concentration of 39.5 to 244.8 μ g/m³. Urinary arsenic and lead concentrations were higher in subjects with abnormal triglyceride level; cadmium and nickel concentrations were higher in subjects with abnormal AST levels. Airborne PM_{2.5} As concentration was correlated to urinary As concentration (Pearson 0.424, $p < 0.05$). Two subjects were diagnosed with lung pulmonary fibrosis through chest X-ray ($n = 25$, 8%).

SP-150

Modification Genes for CYP1A2 Inducibility among People Exposed to Polychlorinated Biphenyls(PCBs) and Dibenzofurans(PCDFs)

Ping-Wei Huang¹, Yueliang Leon Guo^{1,2}, Pau-Chung Chen¹, George Lambert³

1. National Taiwan University, Taiwan
2. National Taiwan University Hospital, Taiwan
3. Center for Child and Reproductive Environmental Health; Department of Pediatrics, RWJMS, UMDNJ, USA

Background: Approximately 2000 people were exposed to rice oil contaminated with PCBs and their heat-degradation products, mainly PCDFs in central Taiwan in 1979. CYP1A2 activity was found to be induced by such exposure in exposed individuals. The aryl hydrocarbon receptor (AhR) pathway was known to be critical in mediating such enzyme induction. AhR nuclear translocator (ARNT) and AhR repressor (AhRR) played important roles in transcriptional regulation of AhR.

Objective: To determine whether the ARNT and AhRR polymorphisms are associated with individual inducibility of CYP1A2.

Method: Among the people exposed to PCBs/PCDFs and their community controls, 173 previously participated in a study on CYP1A2 activity as measured by caffeine metabolic rate, which was in turn found to be positively associated with serum 2,3,7,8-TCDD toxic equivalency (TEQ). Genotyping was done for the following SNPs :

AhRR:(rs2292596)(C/G),
 ARNT:rs7517566(A/G),rs3820541(C/G),rs3768016(C/T), and rs2228099(C/G).

Result & Conclusion: At a similar TEQ dose range, those subjects with AhRR GG genotype had the highest induced CYP1A2 activity, ;Those with CC genotypes had lowest inducibility ($p < 0.05$). ARNT(rs3768016) CC genotype had highest inducibility, followed by CT and TT genotypes. ARNT (rs2228099) GG genotype had highest inducibility, followed by CG and CC genotypes. We conclude that AhRR and ARNT genotypes might interact with PCBs/PCDFs in cytochrome P450 enzyme induction effects.

SP-151

Exposure Monitoring on Respiratory and Dermal Routes and Biological Monitoring of Para-Dichlorobezene in Repellent Workplace

Jui-Shu Chou¹, You-Ching Song², Ching-Chang Lee², Tung-Sheng Shih¹, Lien-Hsiung Lee¹

1. Institute of Occupational Safety and Health, Council of Labor Affairs, Taiwan
2. National Cheng Kung University, Taiwan

Objective: To explore the relationship between ambient and dermal exposure p-DCB concentrations. In addition, to explore whether the accumulation of the urinary 2,5-DCP existed or not, and to determine the metabolic kinetic parameters of urinary 2,5-DCP.

Method: 16 p-DCB-exposed workers were selected to monitor their ambient p-DCB exposure levels, skins exposure dose, and urinary 2,5-DCP levels at both pre-shift and post-shift during 3 consecutive day. Eight p-DCB processing workers were chosen to monitor 24-hour urinary metabolites of p-DCB for set up the metabolic kinetic parameters.

Result: The geometric mean and standard deviation of ambient p-DCB concentrations were 15.1 $\pm$ 1.37 ppm. The geometric mean and standard deviation of skin exposure levels of p-DCB were 5.65 $\pm$ 2.35 μ g/cm² and the highest level was found in palm, neck was the lowest. The geometric mean and standard deviation of differential values of pre- and post urinary p-DCB and 2,5-DCP were 0.45 $\pm$ 8.49 及 1.75 $\pm$ 3.65 μ g/L respectively, and only showed significant correlation with skin exposure levels of p-DCB. The statistical data of three-days urinary p-DCB levels showed that the urinary p-DCB were not accumulated, but the urinary 2,5-DCP levels significantly raised with the sampling time. The half life of urinary 2,5-DCP was estimated as 4 hours. According the walk-through records of the plant, the personal protective measures were suggested to effectively reduce the exposure of p-DCB.