HEALTH RESEARCH ABSTRACT SUBMISSIONS #19

Name *	Xin Hu
Email *	xin-hu@uiowa.edu
Educational Level *	PhD Candidate
If Selected Other	
College *	College of Public Health
Department *	Human Toxicology
Title of Research *	Subchronic inhalation exposure study of an airborne polychlorinated biphenyl (PCB) mixture resembling the Chicago ambient air congener profile
Other Authors *	Xin Hu; Andrea Adamcakova-Dodd, PhD; Hans-Joachim Lehmler, PhD; Dingfei Hu, PhD; Keri Hornbucke, PhD; Peter Thorne, PhD
Introduction & Purpose *	Inhalation exposure to atmospheric polychlorinated biphenyls (PCBs) is universal and has become a substantial concern in urban areas. In this study, we sought to generate a PCB vapor mixture that can reflect the Chicago airshed environment and mimic the congener profile in Chicago air. The objective was to investigate the body burden of inhaled PCB congeners and to evaluate the biological consequences caused by subchronic inhalation exposure to airborne PCBs using animal model.

Experimental Design *

Vapor-phase PCBs were generated from a Chicago Air Mixture (CAM) under carefully-controlled conditions into a moving airflow that was supplied to a nose-only exposure system. Chamber outflow was sampled by XAD cartridges. Sprague-Dawley rats were exposed to the CAM vapor for 1.6 hr/day via nose-only inhalation for 4 wks, 520±10 μg/m3. Congener-specific quantification in tissue and air samples was performed by GC/MS/MS. A variety of biological endpoints were assessed to catalog the effects of exposure, including immune responses, enzyme induction, cellular toxicity and histopathologic abnormalities.

Results *

In contrast to the lower-chlorinated congener enriched vapor, body tissues mainly contained tri- to hexachlorobiphenyls. Congener profiles varied between vapor and tissues, and among different organs. The toxic equivalence (TEQ) and neurotoxic equivalence (NEQ) were investigated to reveal the selective congener accumulation. Despite of the significant PCB uptake in lung, blood, liver, brain and adipose tissues, no changes were seen in pulmonary cellularity, inflammatory cytokine level or CYP enzyme activity. No treatment-related histopathologic abnormalities of major tissues were found. However, GSSG/GSH ratio was increased in blood of exposed animals, accompanied by elevation of hematocrit, indicating a more oxidized environment in blood circulation after exposure.

Conclusions *	This study demonstrated that inhalation contributed to the body burden of mostly tri- to hexa-chlorobiphenyls and produced a distinct profile of congeners in tissue, yet minimal toxicity was found at this exposure dose estimated at 134 μg/rat.

Created	

29 Mar 2012 12:03:28 PM	
PUBLIC	