Jonathan D. Urban, Ph.D., DABT

MANAGING SCIENTIST

CONTACT INFORMATION

ToxStrategies, Inc.
9390 Research Blvd, Suite 100
Austin, TX 78759
Phone (512) 351-7358
jurban@toxstrategies.com

PROFESSIONAL PROFILE

Dr. Jonathan Urban is a Managing Scientist with ToxStrategies, Inc., in Austin, TX. Dr. Urban is a board-certified toxicologist with more than ten years' experience studying and evaluating the potential health effects of a wide range of chemicals of concern (e.g., halogenated aromatic hydrocarbons, solvents, pesticides, metals, hazardous air pollutants), food-related compounds, and consumer product ingredients and contaminants. He is currently supporting the firm's efforts developing and applying systematic review methods to the chemical risk assessment process. Specifically, Dr. Urban is experienced in developing problem formulation and PECO questions, literature identification and screening protocols (search strategies, inclusion and exclusion criteria), application of critical appraisal tools for evaluating individual studies for internal (i.e., risk of bias) and external validity, and qualitative and quantitative evidence integration. Dr. Urban has used this expertise in the development of critiques and recommendations regarding risk-based toxicity criteria for regulatory agencies, industry, and private-sector businesses. In addition to chemical toxicology evaluations, he specializes in conducting human health risk assessments, federal and state site remediation investigations, and biomonitoring studies. He also develops and provides oversight for GLP and non-GLP studies in support of the FDA's pre-IND application process for biological pharmaceuticals, including CRO site study monitoring of non-clinical studies. Furthermore, Dr. Urban has considerable experience managing and providing technical and logistical assistance on tobacco-product toxicology and risk assessment projects in support of the Center for Tobacco Products (FDA).

Dr. Urban earned a Ph.D. in toxicology at the University of North Carolina at Chapel Hill, where he developed and advanced various *in vitro* assays for studying receptor-based signaling pathways associated with cellular G-protein coupled receptor (GPCG) activation in neurological models. He is a Diplomate of the American Board of Toxicology, is a member of the Scientific Review Panel for the National Library of Medicine's Hazardous Substance Databank, has published academic and professional studies in the peer-reviewed literature, and is a reviewer for various scientific journals. While in graduate school, Dr. Urban also served as an enlisted communications specialist in the United States Marine Corps Reserves (Communications Company, Greensboro, NC).

EDUCATION AND DEGREES EARNED

Ph.D., Toxicology, University of North Carolina at Chapel Hill, 2006

B.S., Biological Sciences, University of Maryland at College Park, 1999

PROFESSIONAL ASSOCIATIONS AND AWARDS

Diplomate of the American Board of Toxicology (since 2013; recertified 2018)

Society of Toxicology (since 2004): 2006 Graduate Student Travel Award

Risk Assessment Specialty Section, SOT (since 2008)

American College of Toxicology (since 2012)

Society of Environmental Toxicology and Chemistry (2011)

Society for Neurosciences (student member 2003–2005)

PROFESSIONAL ACTIVITIES

2017–2019	Scientific Review Panel (Permanent Member): National Library of Medicine's Hazardous Substances Data Bank. Meetings #99 (May 19–20, 2017), #100 (September 14–16, 2017), #101 (January 18–20, 2018), #102/103 (September 27-29, 2018), and #104 (March 28-31, 2019)
2016–2017	Scientific Review Panel (Invited Guest): National Library of Medicine's Hazardous Substances Data Bank. Meetings #97 (September 22–24, 2016) and #98 (January 12–14, 2017)
2013	Co-chaired SOT Continuing Education Course: Approval of Biosimilar Monoclonal Antibodies: Scientific, Regulatory and Legal Challenges (AM04)

SELECTED PEER REVIEW

Web of Science ResearcherID: I-5896-2019
Environmental Toxicity and Chemistry
Toxicological Sciences
Food and Chemical Toxicology
Regulatory Toxicology and Pharmacology
Environmental Science and Technology
Human and Experimental Toxicology
Food Additives and Contaminants
Molecular Pharmacology
Mutation Research/Genetic Toxicology and Environmental Mutagenesis
Neuropsychopharmacology
Toxicology Reports
Journal of Food Biochemistry
Journal of Pharmacological and Experimental Therapeutics
BMC Genetics

SELECTED PROJECT EXPERIENCE

Systematic Review and Evidenced-Based Toxicology

Applied systematic review concepts of internal, external, and construct validity to a comprehensive evaluation of the *in vitro* literature reporting relative potency (REP) values for dioxin-like PCBs using various human cell models and AhR pathway endpoints. Following a weight-of-evidence integration and decision framework, this effort resulted in the application of a study relevance/quality weighting scheme to the updated REP database for PCB126 to inform an updated toxic equivalency factor (TEF) for the DL-PCB congener.

Developed a comparative assessment of *in vitro* critical appraisal tools (ToxRTool, SciRAP, EPA-OPPT's TSCA tool) using published data sets generated from human and animal cell models in support of risk evaluations related to *in utero* exposures to trichloroethylene.

Conducted a risk-of-bias (RoB) assessment per the NTP's Office of Health Assessment and Translation (OHAT) guidelines on the animal and human peer-reviewed studies that make up the database in support of the hypothesis that *in utero* exposure to TCE causes congenital heart defects.

Conducted a systematic review of the relationship of sperm quality and pre- and perinatal dioxin exposures in human and animal studies. Used the NTP-OHAT Risk of Bias Tool to evaluate epidemiology and *in vivo* studies. The resulting animal evidence base was integrated into a weighted, meta-regression analysis to characterize the dose-response relationship in rats.

Participated in an evaluation for the improvement of the SciRAP *in vitro* critical appraisal tool, the product of a collaboration between the researchers at Stockholm University (Department of Environmental Science and Analytical Chemistry) and the Karolinska Institutet (Institute of Environmental Medicine).

Evaluated a systematic critical appraisal tool developed by the Department of Defense for evaluating non-cancer *in vivo* data sets in support of the development of an occupational exposure level (OEL). The appraisal system developed by the DoD is a fit-for-purpose approach that integrates elements of several available critical appraisal tools and is currently under NAS review.

Participated in a systematic review effort to update caffeine risk assessment, evaluating consumption levels associated with adverse effects in humans. Helped develop several endpoint-specific systematic review protocols, and developed and applied DistillerSR screening forms for populating the evidence base for endpoints of concern. Used the NTP-OHAT Risk of Bias Tool to evaluate epidemiology (experimental and observational) studies.

Developed a systematic map comparing the literature relevant to biomarkers associated with critical health endpoints related to the use of conventional and alternative tobacco products (including heat-not-burn and electronic cigarettes).

Toxicology and Risk Assessment

Managed the evaluation of industrial hydrogen cyanide emissions in support of a state air permitting amendment. This project involved a comprehensive assessment of the occupational and toxicology peer-reviewed and gray literature, evaluation of federal and state monitoring and modeling tools (e.g., NATA, RSEI), coordination and drafting of an extensive summary report, and communication of toxicology and risk information to area residents at a public meeting coordinated by state regulatory agency.

Investigated the proposed use of USEPA TCE RfC as a short-term/immediate remediation action level; reviewed animal toxicology, epidemiology, and toxicokinetic data on reproductive and developmental effects of TCE, specifically as it related to fetal cardiac malformations. Worked with a state agency to develop a health hazard-based and scientifically defensible level of concern for residential TCE exposures via vapor intrusion.

Provided toxicology support on a project in which regulatory modeled TCE air emission estimates associated with a facility's permitted TCE use raised concerns that potential residential exposures exceeded low level health-based air standards developed by the state regulatory agency.

Analyzed toxicogenomics data from an *in vivo* bioassay that incorporated comprehensive dose-response study design to derive estimates of relative potency (REPs) for dioxin-like compounds, comparing these early-stage genomics-based REPs with those that had been reported using later stage endpoints (e.g., protein activity, pathological events, etc.).

In an effort to identify potential genetic sources of dioxin sensitivity, evaluated single nucleotide polymorphism (SNP) data for several genes involved in the underlying mechanism of action for dioxin by estimating population frequency and using *in silico* methods to predict their potential impact on protein structure and activity.

Composed a state-of-the-science toxicology report in support of updating an outdated but commonly utilized reference dose (RfD) for copper based on chronic exposure scenarios. Critical human and animal studies were identified from a comprehensive review of the literature and used to develop an updated RfD. The report was submitted to a state environmental regulatory agency, and the recommendations made in this report led the agency to update the toxicity value they used to develop their risk-based environmental copper limits (e.g., Cu-contaminated soils).

In a project involving legacy antimony (Sb) smelter operations, performed extensive research on the toxicology and bioavailability of various forms of antimony, the results of which were submitted to a state environmental regulatory agency in the form of state-of-the-science reports. The recommendations made in these reports led the state regulatory agency to update the toxicity values they used to develop their risk-based environmental antimony limits (e.g., Sb-contaminated soils).

Evaluated the potential impact of toxicological effects in rodents observed in NTP's 2016 antimony trioxide (Sb_2O_3) inhalation bioassay report on state soil cleanup level using preliminary benchmark dose (BMD) analytical estimates of non-cancer and cancer endpoint potencies.

Project manager for the evaluation of perfluorononanoic acid (PFNA), 1,4-dioxane, and 1-methylnaphthalene toxicology in support of an effort to provide a state regulatory agency with a scientifically defensible alternative for deriving a toxicity value to serve as the basis for establishing a water criterion.

Conducted and published a comprehensive human health hazard and cancer risk assessment on the ingestion of fish sampled from the Lower Passaic River. This evaluation was comprised more than 150 chemicals of potential concern, including PCDD/Fs, PCBs, metals, and several other organic compounds, and utilized peer-reviewed site-specific exposure and consumption data to reduce assessment uncertainty.

Managed and conducted an analytical assessment of PCNs, PCDD/Fs, and dioxin-like PCBs in based on sediment sampling for a prominent harbor water body in the Northeast United States. Used preliminary TCDD-based TEFs for PCN congeners to characterize PCN contribution to overall sample TEQs. Employed PCA fingerprinting analyses to compare PCN congener profiles between sediment and technical mixtures in an effort to identify potential PCN sources.

Served as lead investigator in an evaluation of a sediment contamination site covered by the Great Lakes Legacy Act. The investigation included a robust toxicology evaluation, including a comparative assessment of several chemicals of potential concern (PCBs, PCNs, mercury). Also included was an analysis of the sediment data and recommendations of analytical approaches for future sediment sampling studies.

Provided toxicological expertise in a comprehensive analysis of impacts to an urban area in North Texas from shale gas drilling and production.

In support of a comprehensive assessment of extensive air monitoring data collected in a South Texas community, performed a critical review of a national report on air quality around schools across the nation based on USEPA's RSEI model.

Conducted comprehensive literature reviews on the human health effects of multiple nickel and lead compounds in support of the European Union's Registration, Evaluation & Authorisation of Chemicals (REACH) initiative, and populated the International Uniform Chemical Information Database (IUCLID) substance with relevant substance-specific data. Evaluated key studies for reliability and relevance, synthesized large volumes of data, and generated integrative reports.

Managed the development of blood VOC reference values for the general U.S. population based on an extensive analysis of the available biomonitoring data in CDC's NHANES continuous database (1999-2004).

Food and Consumer Products

Coordinated and managed subcontractor services providing toxicological guidance and expertise in support of an initiative by FDA's Center for Tobacco Products to develop risk assessments on unregulated tobacco products (e.g., electronic cigarettes). Comprehensive reviews of the peer-reviewed literature were conducted and distilled into summary documents for various tobacco-related chemicals (nicotine, tobacco-specific nitrosamines NNN and NNK, acrolein) and numerous tobacco product ingredients (flavor additive and enhancer compounds, and complex essential oils). In addition, we provided the client with dose-response modeling results on relevant studies of NNK carcinogenicity, and guidance on how to present such data in exposure-response arrays.

Provided an internal assessment for a client on the potential human health risk associated with dermal exposures to an essential oil-based residential insecticide product, using QRA models published by the Research Institute for Fragrance Materials (RIFM), as well as the USEPA's residential pesticide exposure model.

Managed the development of no-significant-risk levels (NSRLs) for beta-myrcene based on the 2010 NTP bioassay report according to Proposition 65 regulatory guidance set forth by California's Office of Environmental Health Hazard Assessment (OEHHA).

Managed the development of an indoor air quality model tool kit for quantifying exposure and human health risk associated with trace volatile organic compounds present in the propellants used in consumer aerosols.

Researched and developed the safety sections of GRAS reports submitted to the U.S. Food and Drug Administration on non-caloric sweetener products.

Researched and published review manuscripts on the potential genotoxic and allergenic hazards related to consumption of highly purified, non-caloric sweetener products.

Served as an expert panel member for the GRAS evaluation of a high purity, non-caloric general-purpose sweetener.

Researched and drafted comments on the carcinogenicity or developmental/reproductive toxicity of pyrethroids (type 1 as a group and deltamethrin, respectively) for consideration by OEHHA Proposition 65 expert panels (DARTIC and CIC, respectively).

Conducted comprehensive investigation into the mechanistic and empirical evidence supporting a potential association between certain food preservatives (sodium benzoate, parabens) with neurodegenerative disease.

Developed risk-based toxicity values for acrylamide based on extensive review of the literature and the most recent cancer bioassay data released by the National Toxicology Program.

Conducted health evaluation of benzidine-based dyes commonly used in consumer products, as well as the non-legacy PCBs (e.g., 3,3'-dichlorobiphenyl, or PCB11) formed as contaminants in the manufacturing of these dyes.

Provided toxicology analysis for a human health risk assessment related to a detergent contaminant (nonylphenol ethoxylate) found at low levels in a product marketed for consumption. Integral to this assessment was the identification of a toxicological effects level used to develop a health benchmark and the calculation of exposure estimates, key determinants in decisions related to product shelf retention.

Pharmaceuticals and Drug Development

Visited the campuses of several different CROs to conduct site monitoring of pre-clinical toxicology studies, including the dosing, handling and care of non-human primates, rabbits, and rodents. These were performed in support of investigational new drug (IND) application efforts for biological drug development. Responsibilities included evaluating CRO staff knowledge and adherence to proscribed treatment protocols, as well as general observations on laboratory conditions and laboratory feedback from regulatory agency inspections.

Provided toxicology and pharmacology expertise in support of a pre-IND application for a novel vaccine. Involved interpreting toxicology and pharmacology study data and facilitating sponsor and laboratory communication on study results and future study design.

Researched and developed a comprehensive summary of the toxicology data on an over-the-counter antihistamine pharmaceutical being considered for inclusion in a novel therapeutic formulation.

Conducted toxicological evaluations of chemical substances present or potentially present in vaccines, and also derived safe levels for excipients, detergents, surfactants, and other chemicals used in the production or inactivation of vaccine products.

Designed and performed *in vitro* assays to evaluate the diverse G-protein coupled receptor-based binding and signaling profiles of several dopaminergic ligands, with a focus on atypical antipsychotic drugs and non-clinical development of novel Parkinson's Disease pharmacotherapies.

Occupational Health

Coordinated and provided technical support for the development of strategies to reduce worker exposure to chemicals of potential concern at a primary magnesium production facility. Evaluated industrial hygiene and biomonitoring data for dioxin-like compounds and hexachlorobenzene relative to the general population, determining whether the measured levels posed a threat to worker health, and coordinated with a certified industrial hygienist to develop recommendations on improving occupational protocols and procedures.

Developed historical exposure reconstruction analysis of coke-oven workers exposed to the benzene-soluble fraction of total particulate matter present in coke-oven emissions. Exposure estimates were derived from regulatory and industrial personal and area monitoring efforts for each specific coke-oven job and were used to develop cumulative exposure and cancer risk estimates.

Conducted an extensive review of the reproductive and developmental toxicology and epidemiology literature of glycol ethers and their respective acetates identified in more than 100 products that represented potential exposure hazards to semiconductor facility employees. Occupational exposure was evaluated using historical industrial hygiene data, product purchasing data, and thousands of material safety data sheets (MSDSs). Hazard was assessed by comparing estimated exposures with toxicity criteria and regulatory exposure guidelines.

Performed a comprehensive toxicological review of various chemicals (VOCs, semi-volatile compounds, metals) identified in various industrial products and processes to which employees of a laminated plastics plant had potentially been exposed. In addition, employee symptoms and health complaints were compared with the toxicological profiles of each chemical of potential concern to focus the subsequent exposure assessment.

Assisted in biomonitoring analysis focused on exposures of former and current employees to dioxins and metals at copper smelter facilities. This work involved data analyses and interpretation regarding the levels of dioxin-like compounds in blood samples, the results of which were compared with the levels reported in other regional and national biomonitoring efforts to assess relative body burden.

PUBLICATIONS

Urban J, Wikoff D, Haws L, Fitch S, Ring C, Thompson C, Suh M. 2018. Systematic review protocol: Systematic review and meta-regression to characterize the dose-response relationship between exposure to dioxin-like compounds during sensitive windows of development and reduced sperm count. Zenodo. http://doi.org/10.5281/zenodo.1636357.

Wikoff D, **Urban JD**, Harvey S, Haws LC. 2018. Role of risk of bias in systematic review for chemical risk assessment: A case study in understanding the relationship between congenital heart defects and exposures to trichloroethylene. Int J Toxicol 37(2):125–143.

Wikoff D, Welsh BT, Henderson R, Brorby GP, Britt J, Myers E, Goldberger J, Lieberman HR, O'Brien C, Peck J, Tenebein M, Weaver C, Harvey S, **Urban J**, Doepker C. 2017. Systematic review of the potential adverse effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. Food Chem Toxicol 109(Pt1):585–648.

Wikoff D, Doepker C, Welsh B, **Urban J**, Henderson R, Brorby G, Britt J, Harvey S, Goldberger J, Myers E, O'Brien C, Peck J, Lieberman H, Weaver C, Tenebein M. 2015. Systematic review of the adverse cardiovascular effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. PROSPERO 2015:CRD42015026673. Available from http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015026673

Wikoff D, Doepker C, Welsh B, **Urban J**, Henderson R, Britt J, Harvey S, Goldberger J, Myers E, O'Brien C, Peck J, Lieberman H, Weaver C, Tenebein M. 2015. Systematic review of the adverse bone and calcium balance effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. PROSPERO 2015:CRD42015026609 Available from http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015026609

Wikoff D, Doepker C, Welsh B, Harvey S, Goldberger J, Lieberman H, Myers E, O'Brien C, Peck J, Tenebein M, **Urban J**, Weaver C. Systematic review of the adverse reproductive and developmental effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. PROSPERO 2015:CRD42015026736 Available from http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015026736

Wikoff D, Doepker C, Welsh B, Harvey S, Goldberger J, Lieberman H, Myers E, O'Brien C, Peck J, Tenebein M, **Urban J**, Weaver C. Systematic review of acute adverse effects of caffeine consumption in healthy adults, pregnant women, adolescents, and children. PROSPERO 2015:CRD42015026704 Available from http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015026704

Urban JD, Carakostas MC, Taylor SL. 2015. Steviol glycoside safety: Are highly purified steviol glycoside sweeteners food allergens? Food Chem Toxicol 75:71–78.

Bunch AG, Perry CS, Abraham L, Wikoff DS, Tachovsky JA, Hixon JG, **Urban JD**, Harris MA, Haws LC. 2014. Evaluation of impact of shale gas operations in the Barnett Shale region on volatile organic compounds in air and potential human health risks. Sci Tot Environ 468–469:832–842.

Urban JD, Wikoff DS, Bunch AT, Harris MA, Haws LC. 2014. A review of background dioxin concentrations in urban/suburban and rural soils across the United States: Implications for site assessments and the establishment of soil cleanup levels. Sci Tot Environ 446–467:586–597.

Rowlands JC, Budinsky R, Gollapudi B, Black M, Wolfinger R, Cukovic D, Dombkowski A, Thompson C, **Urban JD**, Thomas R. 2013. A genomics-based analysis of relative potencies of dioxin-like compounds in primary rat hepatocytes. Toxicol Sci 136(2):595–604.

Urban JD, Carakostas MC, Brusick, DJ. 2013. Steviol glycoside safety: Is the genotoxicity database sufficient? Food Chem Toxicol 51:386–390.

Fowler JC, Bhattacharya S, **Urban JD**, Vaidehi N, Mailman RB. 2012. Receptor conformations involved in dopamine D2L receptor functional selectivity induced by selected transmembrane 5 serine mutations. Mol Pharmacol 81(6):820–831.

Thompson CM, Hixon JG, Proctor DM, Haws LC, Suh M, **Urban JD**, Harris MA. 2012. Assessment of genotoxic potential of Cr(VI) in the mouse duodenum: An in silico comparison with mutagenic and nonmutagenic carcinogens across tissues. Regul Toxicol Pharmacol 64(1):68–76.

Urban JD, Budinsky RA, Rowlands JC. 2012. An evaluation of single nucleotide polymorphisms in the human heat shock protein 90kDa alpha and beta isoforms. Drug Metab Pharmacokinet 27(2):268-278.

Rowlands JC, **Urban JD**, Wikoff DS, Budinsky RA. 2011. An evaluation of single nucleotide polymorphisms in the human aryl hydrocarbon receptor-interacting protein (AIP) gene. Drug Metab Pharmacokinet 26(4):431–439.

Tichomirowa MA, Bariler A, Daly AF, Jaffrain-Rea M-L, Ronchi CL, Yaneva M, **Urban JD**, Petrossians P, Elenkova AP, Tabarin A, Desailloud R, Maiter D, Schürrmeyer T, Cozzi R, Theodoropoulou M, Sievers C, Bernabeu I, Naves LA, Chabre O, Fajardo Montañana C, Hana V, Halaby G, Delemer B, Labarta JI, Sonnet E, Ferrandez A, Hagelstein MTs, Caron P, Stalla GK, Bours V, Zacharieva S, Spada A, Brue T, Beckers A. 2011. High prevalence of AIP gene mutations following focused screening in young patients with sporadic pituitary macroadenomas. Eur J Endocrinol 165(4):509–515.

Urban JD, Rowlands JC, Budinsky RA. 2011. Single nucleotide polymorphisms in the human aryl hydrocarbon receptor nuclear translocator (ARNT) gene. Drug Metab Pharmacokinet 26(6):637–645.

Tachovsky JA, **Urban JD**, Wikoff DS, Haws LC, Harris MA. 2010. Reduction of a large fish tissue analyte database: Identifying and assessing data specific to a remediation site for risk assessment application. Chemosphere 80(5):481–488.

Urban J, Tachovsky JA, Haws L, Wikoff Staskal D, Harris M. 2010. Response to Mugdan et al.'s comment on Urban et al., "Assessment of Human Health Risks Posed by Consumption of Fish from the Lower Passaic River, New Jersey." Sci Tot Environ 408(6):1468–1470.

Urban JD, Tachovsky JA, Haws LC, Staskal DF, Harris MA. 2010. Response to Buchanan et al.'s comment on Urban et al., "Assessment of Human Health Risks Posed by Consumption of Fish from the Lower Passaic River, New Jersey." Sci Tot Environ 408(8):2004–2007.

Urban JD, Tachovsky JA, Staskal DF, Haws LC, Harris MA. 2009. Assessment of human health risks posed by consumption of fish from the Lower Passaic River, New Jersey. Sci Tot Environ 408(2):209–24.

Scott LLF, Staskal DF, Haws LC, Luksemburg WJ, Birnbaum LS, **Urban JD**, Williams ES, Nguyen LM, Paustenbach DJ, Harris MA. 2009. Levels of polychlorinated dibenzo-p-dioxins, dibenzofurans, and biphenyls in southern Mississippi catfish and estimation of potential health risks. Chemosphere 74(7):1002–1010.

Staskal DF, Scott LLF, Birnbaum LS, Williams ES, Haws LC, Luksemburg WJ, **Urban JD**, Nguyen LM, Paustenbach DJ, Harris MA. 2008. Polybrominated diphenyl ethers in farm-raised and wild-caught catfish from southern Mississippi. Environ Sci Technol 42(17):6755–6761.

Urban JD, Clarke WP, von Zastrow M, Kobilka B, Nichols DE, Weinstein H, Javitch JA, Roth BL, Christopoulos A, Sexton PM, Miller KJ, pedding M, Mailman RB. 2007. Functional selectivity and classical concepts of quantitative pharmacology (Perspective in Pharmacology). J Pharmacol Experimental Therapeut 320(1):1–13 [Journal Cover].

Urban JD, Vargas G, von Zastrow M, Mailman RB. 2007. Aripiprazole has functionally selective actions at D2 receptor-mediated signaling pathways. Neuropsychopharmacol 32(1):67–77.

Gay EA, **Urban JD**, Nichols DE, Oxford GS, Mailman RB. 2004. Functional selectivity of D2 receptor ligands in a Chinese hamster ovary hD2L cell line: Evidence for induction of ligand-specific receptor states. Molec Pharmacol 66(1):97–105.

Invited Lectures and Presentations

Urban, J.D., K. Burkhalter, J.A. Tachovsky, C. Thompson, L.C. Haws, and M.A. Harris. 2010. Evaluation of Polychlorinated Naphthalenes (PCNs) in Newark Bay Sediment. Presented during the Dioxin-Like Compounds in Urban Waterbodies Session at the 30th International Symposium on Halogenated Persistent Organic Pollutants. September 14, 2010. San Antonio, Texas.

Urban, J.D. and R.B. Mailman. 2005. Functional selectivity as a mechanism of action for newer atypical antipsychotic drugs. Presented at: Merck, West Point, Pennsylvania.

Abstracts and Presentations

Urban JD, Wikoff DS, Fitch S, Ring CL, Haws LC, Harris MA. An assessment of the relative potency of the dioxin-like polychlorinated biphenyl PCB126: Are the human *in vitro* studies sufficient? Presented at the 39th International Symposium on Halogenated Persistent Organic Pollutants, Kyoto, Japan, August 25–30, 2019.

Urban JD, Fitch SE, Pham L, Wikoff DS. Critical appraisal tools for the evaluation of *in vitro* study bias and quality in risk assessment: Utilities and challenges. Presented at the Society of Risk Analysis 2019 Annual Meeting, Arlington, VA, December 8–12, 2019.

Urban JD, Wikoff DS, Fitch S, Ring CL, Haws LC, Harris MA. An evaluation of the utility of human cell models for characterizing relative potency for dioxin-like compounds. Presented at the IUTOX 15th International Congress of Toxicology (ICTXV), Honolulu, HI, July 15–18, 2019.. Abstract #0948.

Urban JD, Wikoff DS, Haws LC. Three-tiered approach to integrating evidence streams assessing gestational trichloroethylene exposure and congenital heart defects (TCE-CHD). Presented at the National Academy of Sciences, Engineering and Medicine Workshop: Evidence Integration in Chemical Assessments: Challenges Faced in Developing and Communicating Human Health Effect Conclusions. Washington DC, June 3–4, 2019.

Urban JD, Wikoff D, Suh M, Britt J, Fitch S, Chappell G, Haws LC. Comparison of NTP OHAT and USEPA TSCA study quality criteria — Trichloroethylene (TCE) and congenital heart defects (CHDs) as a case study. Presented at the 58th Annual Meeting of Society of Toxicology. Baltimore, MD. March 10-14, 2019, Abstract #2801-P305.

Ring CL, **Urban JD**, Wikoff D, Thompson CM, Budinsky RA, Haws LC. Application of systematic review and quantitative evidence integration methods to support risk assessment: Characterization of the dose-response relationship between exposure to dioxin-like compounds (DLC) and sperm count. Presented at the 58th Annual Meeting of Society of Toxicology. Baltimore, MD, March 10-14, 2019, Abstract #3492-P288.

Wikoff D, **Urban J**, Chappell G, Haws LC. Application of mechanistic data quality criteria in assessment of the relationship between congenital heart defects and tce exposure — A case study. Presented at the National Academy of Sciences, Engineering and Medicine Workshop: Strategies and Tools for Conducting Systematic Reviews of Mechanistic Data to Support Chemical Assessments. Washington DC, December 10-11, 2018.

Wikoff D, Ring CL, Thompson C, **Urban J**, Budinsky RA, Haws LC. Characterization of the dose-response relationship for TCDD and changes in sperm concentration in rats using meta-regression: A feasibility assessment of quantitative evidence integration techniques. Presented at the 38th International Symposium on Halogenated Persistent Organic Pollutants. Krakow, Poland, August 26-31, 2018.

Urban JD, Harvey S, Wikoff D, Haws LC. 2018. Assessment of Study Quality (Risk of Bias) in Understanding the Relationship Between Congenital Heart Defects (CHDs) and Exposures to Trichloroethylene (TCE). Presented at the 57th Annual Meeting of Society of Toxicology. March 11-15, 2018. San Antonio, TX. Abstract # 2842-P365.

Borghoff SJ, Wikoff D, **Urban JD**, Rager JE. 2018. A Systematic Approach to Identify Plausible Mode-of-Actions (MOAs) for an Increased Incidence of Lung Tumors in Mice with Chronic Exposure to 4-Methylimidazole (4-MEI). Presented at the 57th Annual Meeting of Society of Toxicology. March 11-15, 2018. San Antonio, TX.

Urban JD, Thompson CM, Plunkett LM, Perry CS, Haws LC. 2015. A state of the science copper reference dose for soil remediation. Presented at the Society of Toxicology's 54th Annual Meeting, March 22–26, 2015. San Diego, CA.

Urban JD, Perry C, Wikoff D, Abraham L, Harris MA. 2015. Lower Passaic River RM0-8: An alternative human health risk assessment. Presented at the 8th International Conference on Remediation and Management of Contaminated Sediments. January 12-15, 2015. New Orleans, LA. Abstract # 272.

Abraham L, Harris MA, Perry C, **Urban JD**, Wikoff D, Kinnell JC, Bingham M, Hickman S. 2015. Lower Passaic River RM0-8: An alternative preliminary remediation goal. Presented at the 8th International Conference on Remediation and Management of Contaminated Sediments. January 12-15, 2015. New Orleans, LA. Abstract # 187.

Urban JD, Doepker CL, Cuellar-Kingston N, van de Ligt J, Carakostas M. 2013. Do highly purified steviol glycoside sweeteners cause food allergies? Presented at the Society of Toxicology's 53rd Annual Meeting, March 23–27, 2014. Phoenix, AZ.

Urban JD, Thompson CM, Deskin R, Waite M, Haws LC. 2013. Development of an oral cancer slope factor for acrylamide based on tumors relevant to humans. Presented at the 52nd Annual Meeting of Society of Toxicology. March 10–14, 2013. San Antonio, TX. Abstract #2221-419.

Urban J, Rowlands JC, Budinsky R, Dombkowski A, Thompson CM, Thomas R. 2012. A genomics-based benchmark dose analyses of relative potencies of dioxin like compounds in primary rat hepatocytes. Presented at the 51st Annual Meeting of Society of Toxicology. March 11–15, 2012. San Francisco, CA. Abstract # 1726. [Top 10 abstract in SOT Risk Assessment Specialty Section.]

Perry C, Tachovsky JA, Ke M, **Urban J**, Haws L. 2012. Natural gas exploration and production in the Barnett Shale: Assessment of exposures to volatile organic compounds (VOCs). Presented at the 51st Annual Meeting of Society of Toxicology. March 11–15, 2012. San Francisco, CA. Abstract # 108.

Rowlands JC, Budinsky R, Gollapudi B, Cukovic D, Salagrama S, Dombkowski A, **Urban J**, Thompson C, Thomas R. 2011. An evaluation of relative changes in genomic gene expression in primary rat hepatocytes exposed to TCDD, 4-PeCDF, and TCDF. Presented at the 31st International Symposium on Halogenated Persistent Organic Pollutants. August 21–25, 2011. Brussels, Belgium.

Rowlands JC, **Urban J**, Wikoff DS, Budinsky R. The presence and estimated functional effect of single nucleotide polymorphisms at the AIP, ARNT, HSP90AA1, and HSP90AB1 loci in the human population. Presented at the 31st International Symposium on Halogenated Persistent Organic Pollutants, August 21–25, 2011. Brussels, Belgium.

Thomas RS, Rowlands JC, Budinsky RA, Thompson CM, **Urban JD**, Dombkowski A. Genomic approaches for relative potency assessment. Presented at the 31st International Symposium on Halogenated Persistent Organic Pollutants. August 21–25, 2011. Brussels, Belgium.

Budinsky R, **Urban J**, Rowlands JC. An evaluation of single nucleotide polymorphisms in the human aryl hydrocarbon receptor nuclear translocator gene. Presented at the Society of Toxicology's 50th Annual Meeting, March 6–10, 2011. Washington, D.C.

Fitzgerald L, Burkhalter B, **Urban J**, Staskal D, Harris M, Haws L. VOC serum levels in the general U.S. population: An analysis of the 2003-2004 NHANES dataset. Presented at the Society of Toxicology's 50th Annual Meeting, March 6–10, 2011. Washington, D.C.

Urban J, Fitzgerald L, Burkhalter B, Staskal D, Harris M, Haws L. BTEX serum levels in the general U.S. population: An analysis of 2003-2004 NHANES dataset. Presented at the Society of Toxicology's 50th Annual Meeting, March 6–10, 2011. Washington, D.C.

Haws L, Tachovsky JA, Staskal-Wikoff D, Aylward L, Burkhalter B, **Urban J**, Simon T, Harris M. 2010. An evaluation of the influence of different soil cleanup levels on the concentration of dioxin-like compounds in human serum. Presented at the 30th International Symposium on Halogenated Persistent Organic Pollutants. September 12–17, 2010. San Antonio, TX.

Urban J, Burkhalter B, Tachovsky JA, Haws L, Harris M. Evaluation of polychlorinated naphthalenes (PCNs) in Newark Bay sediment. Presented at the 30th International Symposium on Halogenated Persistent Organic Pollutants. September 12–17, 2010. San Antonio, TX.

Harris M, Tachovsky JA, Staskal-Wikoff D, Simon T, Burkhalter B, **Urban J**, Haws L. Assessment of the impact of various soil cleanup levels on serum concentrations of dioxin-like compounds in humans. Presented at the 49th Annual Meeting of Society of Toxicology. March 7–11, 2010. Salt Lake City, Utah.

Tachovsky A, Staskal D, **Urban J**, Harris MA, Haws L. Assessment of environmental data collected in a community with numerous petroleum refining and petrochemical facilities. Presented at the 49th Annual Meeting of Society of Toxicology. March 7–11, 2010. Salt Lake City, Utah.

Urban JD, Tachovsky JA, Staskal DF, Haws LC, Harris MA. Human health risk assessment of consumption of fish from the Lower Passaic River. Presented at the 48th Annual Meeting of Society for Toxicology. March 15–19, 2009. Baltimore, MD.

Urban JD, Haws LC, Staskal DF, Scott LF, Scott PS, Tachovsky AT, Unice KM, Harris MA. 2008. A framework for evaluating serum dioxin data derived from biomonitoring studies. Presented at the 28th International Symposium on Halogenated Persistent Organic Pollutants. August 17–22, 2008. Birmingham, England.

Urban JD, Haws LC, Scott LF, Scott PS, Staskal DF, Tachovsky AT, Unice KM, Harris MA. 2008. A framework for evaluating serum dioxin data derived from biomonitoring studies. Presented at the 47th Annual Meeting of Society for Toxicology. March 16–20, 2008. Seattle, WA. Abstract # 1198–637.

Urban JD, Thornley K, Wightman RW, Mailman RB. Pharmacological characterization of the N27-D2L cell line: Assessment as a viable cell model for investigating D2L receptor dopaminergic-coupled functions. Presented at the 46th Annual Meeting of Society for Toxicology. March 25–29, 2007. Charlotte, NC. Abstract # 1058–231.

Fuhrmann K, **Urban J**, Mailman R. 2006. TM5 serines effect on D_{2L} dopamine receptor partial agonist pharmacology: Elucidating functional selectivity. Presented for the 2006 Summer Undergraduate Research Experience, University of North Carolina, Chapel Hill, NC. July 26, 2006.

Urban JD, Jin J, Mailman RB. 2006. N27 dopaminergic cell line: A useful model for studying the mechanisms of action of functionally selective dopaminergic compounds. Presented at the 45th Annual Meeting of Society for Toxicology. March 5–9, 2006. San Diego, CA. Abstract # 1374.

Urban JD, Mailman RB. Characterization of the N27 dopaminergic cell line as a model for elucidating the actions of functionally selective dopaminergic ligands. Presented at the 35th Annual Neuroscience Meeting. November 12–16, 2005. Washington, DC. Abstract # 32.21.

Urban JD, Mailman RB. 2005. Functional selectivity as a mechanism of action for newer atypical antipsychotic drugs. Presented at: Merck, West Point, Pennsylvania, USA.

Urban JD, Gay, Mailman RB. Functional selectivity as a mechanism of action of newer atypical antipsychotic drugs. Presented at the 34th Annual Neuroscience Meeting. October 23–27, 2004. San Diego, CA. Abstract # 163.4.

Urban JD, Gay EA, Mailman RB. 2004. Decreased neurological side-effects with aripiprazole: A result of functional selectivity of the D2 receptor? Presented at the 43rd Annual Meeting of Society for Toxicology. March 21–25, 2004. Baltimore, MD. Abstract # 313.

SELECTED CONTINUING EDUCATION

Embryology and Developmental Toxicity Testing. Society of Toxicology. March 13, 2016.

Human Health Risk Assessment: A Case Study Application of Principles. Society of Toxicology. March 13, 2016.

Adverse Outcome Pathway (AOP) Development and Evaluation. Society of Toxicology. March 13, 2016.

Gonadal Development, Function, and Toxicology. Society of Toxicology. March 10, 2013.

Approval of Biosimilar Monoclonal Antibodies: Scientific, Regulatory and Legal Challenges. Society of Toxicology. March 10, 2013.

Best Practices for Developing, Characterizing, and Applying Physiologically Based Pharmacokinetic Models in Risk Assessment. Society of Toxicology. March 6, 2011.

Beyond Science and Decisions: From Problem Formulation to Dose-Response. Workshop I. Alliance for Risk Assessment. March 16-18, 2010.

Epidemiology for Toxicologists: Introduction. Society of Toxicology. March 16, 2008.

Dose Response Modeling for Occupational and Environmental Risk Assessment. Society of Toxicology. March 16, 2008.

Allergy and Allergic Disease: A Primer for Toxicologists. Society of Toxicology. March 25, 2007.

Neuropathology for the Toxicologist. Society of Toxicology. March 5, 2006.

Essentials of Metal Toxicology. Society of Toxicology. March 5, 2006