

Rogelio Tornero-Velez, Research Physical Scientist, in EPA's National Exposure Research Laboratory

Computational Exposure Division

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Area of Expertise: My expertise is in exposure assessment and pharmacokinetic modeling. I have employed physiologically-based pharmacokinetic (PBPK) models to provide mechanistic insight into exposure-biomarker relationships. In my thesis work I used PBPK modeling to compare the relative importance of direct exposure to styrene-7,8-oxide (SO) versus SO formed via metabolism of inhaled styrene. These evaluations were aimed at understanding styrene exposures in reinforced plastics industry. PBPK modeling allowed explicit consideration of the so-called 'privileged access' mechanism of *in-situ* formed SO (from styrene). This mechanism helped explain the greater bioavailability of airborne SO (ppb) versus SO via styrene (ppm). I am currently developing PBPK models to describe pyrethroid disposition in humans following exposure through diet, residential use, or other pathways. Environmental exposures tend to pose a greater challenge than occupational exposures in that they are much less predictable. We are also developing models of exposure and coupling these to pharmacokinetic models. Ultimately these models will allow the Agency to replace its default approaches and consider the probabilistic nature of exposure, and take into account ADME in risk assessment.

Recent Publications:

M.-R. Goldsmith, D.T. Chang, R. Tornero-Velez, S. Little, M. Pasquinelli, J. Rabinowitz, and C.C. Dary. A Consensus Docking Study on the Stereoselectivity of Pyrethroid-like Compounds in Carboxylesterase (in preparation).

Mirfazaelian A, Kim KB, Anand SS, Kim HJ, Tornero-Velez R, Bruckner JV, Fisher JW. (2006). Development of a physiologically based pharmacokinetic model for deltamethrin in the adult male Sprague-Dawley rat. *Toxicol Sci.* 93(2):432-42.

Granville CA, Ross MK, Tornero-Velez R, Hanley NM, Grindstaff RD, Gold A, Richard AM, Funasaka K, Tennant AH, Kligerman AD, Evans MV, DeMarini DM. (2005). Genotoxicity and Metabolism of the Source-Water Contaminant 1,1-Dichloropropene: Activation by GSTT1-1 and Structure-Activity Considerations *Mutat Res* 572 (1-2):98-112.

Lipscomb J, Barton H, Tornero-Velez R, Evans MV, Alc Casey S, Snawder JE, Laskey J. (2004). The Metabolic Rate Constants and Specific Activity of Human and Rat Hepatic Cytochrome P450 2E1 Toward Chloroform. *Journal of Toxicology and Environmental Health* 67:1-17 .

Luderer U, Tornero-Velez R, Shay T, Rappaport S, Heyer N, Echeverria D. (2004). Temporal association between serum prolactin concentration and exposure to styrene. *Occup Environ Med.* 61:325-33,

Tornero-Velez R, Ross MK, Granville C, Laskey J, Jones JP, DeMarini DM, Evans MV
Metabolism and Mutagenicity of Source Water Contaminants 1,3-Dichloropropane and 2,2-Dichloropropane (2004). *Drug Metabolism and Disposition* 32:123-131.

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Education:

- PhD, Environmental Sciences and Engineering, 2001, University of North Carolina
- MSPH, Environmental Sciences and Engineering, 1994, University of North Carolina
- BS, Chemistry, 1989, University of North Carolina

Professional Experience:

- Research Physical Scientist, US EPA, NERL, 2005 to present
- Postdoctoral Fellow, US EPA, NERL, 2002 to 2005
- Postdoctoral Fellow, UNC/EPA Cooperative Agreement, 2001 to 2002