



Thirty-fourth Annual Meeting of the Neurobehavioral Teratology Society
Held in Conjunction with the 50th Annual Meeting of the Teratology
Society and the 23rd Annual Meeting of the Organization
of Teratology Information Specialists
Marriott Louisville Downtown,
Louisville, Kentucky, USA,
June 26–30, 2010

2010 RICHARD BUTCHER NEW INVESTIGATOR AWARD

Dominik Biezonski (Nominated by Jerrold Meyer)

University of Massachusetts

Effects of 3,4-Methylenedioxymethamphetamine (MDMA) on Serotonin Transporter and Vesicular Monoamine Transporter 2 Protein and Gene Expression in Rats: Implications for MDMA Neurotoxicity

NBTS CONFERENCE AWARDS

Aliya Frederick (Nominated by Gregg Stanwood)

Vanderbilt University

Molecular (Mal)adaptations in Dopamine-Modulated Signaling Pathways Following Neurodevelopmental Insult

Damiyon Sledge (Nominated by Edward D. Levin)

North Carolina Central University

Early Developmental Chlorpyrifos Causes Persisting Behavioral and Neurochemical Changes in Zebrafish

SOT NEUROTOXICOLOGY SPECIALITY SECTION CONFERENCE AWARD

Kate Saili (Nominated by Robert Tanguay) Oregon State University

Developmental Neurobehavioral Toxicity of Bisphenol A: Defining the Role of Estrogen Related Receptor Gamma

BEHAVIORAL TOXICOLOGY CONFERENCE AWARD

Devon Graham (Nominated by Michael Williams)

University of Cincinnati

The Long-term Behavioral Effects of Exposure to Metals and Chronic Stress During Development

NBTS 2010 PROGRAM

Saturday, June 26, 2010

8:00 a.m.–11:30 a.m.	Teratology Society Education Course*: <i>Marriott Ballroom 6</i>
12:30 p.m.–5:30 p.m.	Teratology Society/OTIS Pregnancy Workshop*: <i>Marriott Ballroom 9</i>
1:30 p.m.–4:45 p.m.	Teratology Society Education Course*: <i>Marriott Ballroom 6</i>
	*Separate Registration through the Teratology Society required
1:00 p.m.–5:00 p.m.	NBTS Registration: <i>Marriott Ballroom 7 Foyer</i>
1:00 p.m.–2:00 p.m.	NBTS Public Affairs Committee: <i>Filly Meeting Room</i>

- 2:00 p.m.–3:00 p.m. NBTS Publications Committee Meeting: *Filly Meeting Room*
- 3:00 p.m.–6:00 p.m. NBTS Council Meeting: *Filly Meeting Room*
- Sunday, June 27, 2010**
- 8:00 a.m.–5:00 p.m. NBTS Registration: *Marriott Ballroom 7 Foyer*
- 7:45 a.m.–8:15 a.m. Continental Breakfast: *Marriott Ballroom 7*
- 8:15 a.m.–8:30 a.m. **President's Welcome and Official Opening of 2010 NBTS Meeting** *Marriott Ballroom 7*
- 8:30 a.m.–12:00 a.m. **Session 1, Behavioral Toxicology Symposium, Behavioral Toxicology of Cognition: Extrapolation from Experimental Animal Models to Humans**
Chairperson: Merle Paule, *National Center for Toxicological Research Marriott Ballroom 7*
- 8:30 a.m.–8:50 a.m. Introduction, Merle Paule, *National Center for Toxicological Research, Jefferson, AR*
- 8:50 a.m.–9:25 a.m. NBTS1. Delay Discounting by Humans and Other Animals: Does the Species Matter? Leonard Green, *Washington University, St. Louis, MO*
- 9:25 a.m.–10:00 a.m. NBTS2. Ontogeny of Hippocampal-Dependent Memory Processes: Developmental Amnesia in Monkeys and Humans, Maria C. Alvarado, Jocelyne Bachevalier, *Yerkes National Primate Research Center, Emory University, Atlanta, GA*
- 10:00 a.m.–10:15 a.m. Break
- 10:15 a.m.–10:50 a.m. NBTS3. Modeling the Cognitive Deficits of Parkinson's Disease, Jay Schneider, *Thomas Jefferson University, Philadelphia, PA*
- 10:50 a.m.–11:25 a.m. NBTS4. Delineating Behavioral Domains Underlying Lead-Induced Cognitive Deficits, Deborah Cory-Slechta, *University of Rochester Medical School, Rochester, NY*
- 11:25 a.m.–12:00 p.m. NBTS5. Perinatal PCB Exposure and Deficits in Inhibitory Control: Parallels Between Animals And Humans, Susan Schantz, *University of Illinois, Urbana, IL*
- 12:00 p.m.–1:20 p.m. **Lunch on your own**
- 1:20 p.m.–3:00 p.m. **Session 2, NBTS Platform Talks:** *Marriott Ballroom 7*
Chairperson: Phillip Bushnell, *US Environmental Protection Agency*
- 1:20 p.m.–1:40 p.m. NBTS6. The Effect of 2,4-Dichlorophenoxyacetic Acid on Anxiety in the Rat. William Hamlet, Sandra McFadden, Russell Morgan, Amy Vaught, *Western Illinois University, Macomb, IL*
- 1:40 p.m.–2:00 p.m. NBTS7. Prenatal Exposure to Phthalates and Newborn Neurobehavior, Kimberly Yolton, Yingying Xu, Jane Khoury, *Cincinnati Children's Hospital, Cincinnati, OH*
- 2:00 p.m.–2:20 p.m. **NBTS Conference Award Recipient**
NBTS8. Early Developmental Chlorpyrifos Causes Persisting Behavioral and Neurochemical Changes in Zebrafish, Damiyon Sledge^{1,2}, Ann Petro², Jerry Yen², Susan Donerly², Elwood Linney², Edward Levin², ¹*Department of Biology, North Carolina Central University,* ²*Duke University Medical Center, Durham, NC*
- 2:20 p.m.–2:40 p.m. NBTS9. Reversal of Chlorpyrifos Neurobehavioral Teratogenicity in Mice by Adult Allographic Subventricular Zone-derived Neural Stem Cell Transplantation, Joseph Yanai^{1,2}, Adi Pinkas¹, ¹*The Ross Lab for Studies in Neural Birth Defects, Department of Medical Neurobiology, IMRIC, Hebrew University-Hadassah Medical School, Jerusalem, Israel,* ²*Department of Pharmacology and Cancer Biology, Duke Medical School, Durham, NC*
- 2:40 p.m.–3:00 p.m. **Behavioral Toxicology Conference Award Recipient**
NBTS10. The Long-term Behavioral Effects of Exposure to Metals and Chronic Stress during Development, Devon Graham^{1,2}, Robyn Amos-Kroohs^{1,2}, Amanda Braun^{1,2}, Curtis Grace^{1,2}, Tori Schaefer^{1,2}, Matthew Skelton^{1,2}, Charles Vorhees^{1,2}, Michael Williams^{1,2}, ¹*Cincinnati Children's Research Foundation,* ²*University of Cincinnati, Cincinnati, OH*
- 3:00 p.m.–3:20 p.m. Break: *Marriott Ballroom 7 Foyer*
- 3:20 p.m.–5:00 p.m. **Session 3, NBTS Platform Talks:** *Marriott Ballroom 7*
Chairperson: Lori Driscoll, *Colorado College*

- 3:20 p.m.–3:40 p.m. **2010 Richard Butcher New Investigator Award Recipient**
NBTS11. Effects of 3,4-Methylenedioxymethamphetamine (MDMA) on Serotonin Transporter and Vesicular Monoamine Transporter 2 Protein and Gene Expression in Rats: Implications for MDMA Neurotoxicity, Dominik Biezonski^{1,2}, Jerrold Meyer¹, ¹University of Massachusetts, Amherst, MA, ²Harvard Medical School, Southborough, MA
- 3:40 p.m.–4:00 p.m. NBTS12. Effects of Prenatal Cocaine on Conditioned Place Preference in Adolescence: Modification by Post-weaning Housing and Sex, Diana Dow-Edwards¹, Sari Izenwasser², ¹State University of New York, Brooklyn, NY, ²University of Miami School of Medicine, Miami, FL
- 4:00 p.m.–4:20 p.m. NBTS13. Evidence for Rapid Sensitization to the Stimulant Effects of MDMA in Adolescent Rats, Jerrold Meyer, Peter Kim, Frederico Fernandes, Dominik Biezonski, Brian Piper, *University of Massachusetts, Amherst, MA*
- 4:20 p.m.–4:40 p.m. NBTS14. Methylphenidate-Induced Developmental Neurobehavioral Toxicity in Zebrafish, Edward Levin¹, Damiyon Sledge^{1,2}, Stephanie Roach¹, Susan Donerly¹, Elwood Linney¹, ¹Duke University, Durham, NC, ²Department of Biology, North Carolina Central University, Durham, NC
- 4:40 p.m.–5:00 p.m. NBTS15. Effects of Overlapping Ages of Exposure to (+)-Methamphetamine (MA) in Rats on Later Allocentric and Egocentric Learning, Charles Vorhees, Matthew Skelton, Devon Graham, Tori Schaefer, Curtis Grace, Amanda Braun, Robyn Amos-Kroohs, Michael Williams, *Cincinnati Children's Hospital Medical Center, Cincinnati, OH*
- 6:00 p.m.–8:00 p.m. **Joint NBTS/TS/OTIS Welcome Reception: Marriott Ballroom 1**
- Monday, June 28, 2010**
- 8:00 a.m.–5:00 p.m. NBTS Registration: *Marriott Ballroom 7 Foyer*
- 7:45 a.m.–8:15 a.m. Continental Breakfast: *Marriott Ballroom 7*
- 8:15 a.m.–9:00 a.m. **Session 4, Elsevier Distinguished Lectureship**
Bisphenol-A Impacts on Sex Differences in Neural Processes
Neil MacLusky, *University of Guelph, ON*
Marriott Ballroom 7
- 9:15 a.m.–11:45 a.m. **Session 5, Reproductive Psychiatry Symposium (NBTS/OTIS/TS)**
Chairpersons: Katherine L. Wisner, *University of Pittsburgh Medical Center* and Adrienne Einarson, *The Motherisk Program*
Marriott Ballroom 6
- 9:15 a.m.–9:20 a.m. Introduction
- 9:20 a.m.–9:50 a.m. NBTS16. Where Does Neonatal Behavioral Syndrome End and Neurobehavioral Teratogenicity Begin? Tim F. Oberlander, *University of British Columbia, Vancouver, BC*
- 9:50 a.m.–10:20 a.m. NBTS17. Messages From the Womb: Maternal Antidepressant Use and Fetal Neurobehavior, Amy L. Salisbury, *Alpert Medical School of Brown University, Providence, RI*
- 10:20 a.m.–10:50 a.m. NBTS18. An Update on Lithium Treatment During Pregnancy and Lactation, Adele C. Viguera, *Neurological Institute, Cleveland Clinic, Cleveland, OH*
- 10:50 a.m.–11:20 a.m. NBTS19. Effects of Developmental Exposure to Methylphenidate on Brain Areas Involved in Cognition, Motivated Behaviors, Appetite and Stress, Teresa Ann Milner, *Weill Cornell Medical College, New York City, NY*
- 11:20 a.m.–11:45 a.m. Discussion: How Do We Incorporate These Data Into Human Risk Assessment? Katherine L. Wisner, *University of Pittsburgh Medical Center, Pittsburgh, PA*
- 12:00 p.m.–1:15 p.m. **Lunch on your own**
- 1:15 p.m.–4:45 p.m. **Session 6, Symposium, Complementary Zebrafish Models for Neurobehavioral Teratology Research: Opportunities and Challenges**
Chairperson: Edward D. Levin, *Duke University Medical Center*
Marriott Ballroom 7
- 1:15 p.m.–1:45 p.m. NBTS20. Embryonic Exposure to Low Levels of Alcohol: Towards the Development of a Realistic Zebrafish Model of Fetal Alcohol Syndrome, Robert Gerlai, *University of Toronto, Toronto, ON*
- 1:45 p.m.–2:15 p.m. NBTS21. Ethanol-induced Effects on Neurobehavioral Function: The Developmental Neurotoxicity of MicroRNAs, Tamara Tal, Katerine Saili, Jill Franzosa, Robert Tanguay, *Oregon State University, Corvallis, OR*

- 2:15 p.m.–2:45 p.m. NBTS22. Do NMDA Receptor Antagonists Alter Structural and Functional Development in Zebrafish? Frank Scalzo, *Bard College, Annandale-on-Hudson, NY*
- 2:45 p.m.–3:00 p.m. Break: *Marriott Ballroom 7 Foyer*
- 3:00 p.m.–3:30 p.m. NBTS23. Evaluating the Behavioral Impact of Toxicants in Larval Zebrafish, Robert MacPhail, *US Environmental Protection Agency, Research Triangle Park, NC*
- 3:30 p.m.–4:00 p.m. NBTS24. Using the Zebrafish (*Danio rerio*) Model to Investigate Changes in Gene Expression and Behavior following Developmental Exposure to Pyrethroid Pesticides, Lori White¹, Keith Cooper¹, Amy DeMicco¹, Jason Richardson², ¹*Rutgers, The State University of NJ, New Brunswick, NJ*, ²*Environmental and Occupational Health Sciences Institute, UMDNJ, Piscataway, NJ*
- 4:00 p.m.–4:30 p.m. NBTS25. Using Zebrafish to Investigate Persisting Cognitive and Sensorimotor Effects of Early Developmental Chlorpyrifos Exposure, Edward D. Levin, *Duke University Medical Center, Durham, NC*
- 4:30 p.m.–4:45 p.m. Discussion
- 5:00 p.m.–7:00 p.m. **Joint Poster Session I (NBTS/TS/OTIS) and Exhibits Open** (Posters set up at 11:45 a.m., attended 5:00 – 7:00 p.m.)
Marriott Ballroom 1
- NBTS26. Neurobehavioral Development following Exposure of Male Mice to Polybrominated Diphenyl Ether 47 on Postnatal Day 10, Virginia Moser¹, Pamela Phillips¹, Katherine McDaniel¹, Jill Gee^{1,2}, ¹*US Environmental Protection Agency, Research Triangle Park, NC*, ²*North Carolina State University, Raleigh, NC*
- NBTS27. Subsequent Effects on Open-field Responses of Exposing Male and Female Hooded Rats Each Day to Alcohol, Caffeine and their Combination during Early and Mid to Late Adolescence, and Early Adulthood, Rob Hughes, *University of Canterbury, Christchurch, New Zealand*
- NBTS28. Gene Expression in Developing Brain is Altered by Modest Reductions in Circulating Levels of Thyroid Hormone, Mary Gilbert, Kevin Crofton, Gail Nelson, Jeremy Knapp, *US Environmental Protection Agency, Research Triangle Park, NC*
- NBTS29. Neurobehavioral Outcome in Mice Exposed In Utero to Chlorpyrifos, Thomas M. Burbacher, Toby B. Cole, Jenna Fisher, Sarah Park, Sungwoo Hong, William C. Griffith, Elaine M. Faustman, *Department of Environmental and Occupational Health Sciences, School of Public Health, University of Washington, Seattle, WA*
- NBTS30. Effects of Methylphenidate on Motivation in Children with Attention-Deficit/Hyperactivity Disorder, John Chelonis^{1,2}, Teresa Johnson², Sherry Ferguson^{1,2}, Brian Kubacak², Mark Edwards², Merle Paule^{1,2}, ¹*National Center for Toxicological Research, FDA, Jefferson, AR*, ²*University of Arkansas for Medical Sciences/Arkansas Children's Hospital, Little Rock, AR*
- NBTS31. Effect of Lifetime Exposure to Acrylamide on Motor Nerve Conduction Velocity in Rats at One Year of Age, Joan Garey¹, Zbigniew Binienda², Merle Paule², ¹*SRC, Inc, Arlington, VA*, ²*National Center for Toxicological Research, FDA, Jefferson, AR*
- NBTS32. Binge Cocaine During Pregnancy in the Rat, Diana Dow-Edwards, *State University Of New York, Brooklyn, NY*

Tuesday, June 29, 2010

- 8:00 a.m.–5:00 p.m. NBTS Registration: *Marriott Ballroom 7 Foyer*
- 7:45 a.m.–8:15 a.m. Continental Breakfast: *Marriott Ballroom 7*
- 8:30 a.m.–9:15 a.m. **Special Lecture (NBTS/TS/OTIS)**
Children's Environmental Health: A Good Start Lasts a Lifetime
Linda S. Birnbaum, *National Institute of Environmental Health Sciences*
Marriott Ballroom 6
- 9:30 a.m.–12:00 p.m. **Session 7, Symposium (NBTS/TS), Advancing Neurodevelopmental Evaluation in Children: An Interdisciplinary Approach**
Chairperson: Susan Makris, *US Environmental Protection Agency*
Marriott Ballroom 6
- 9:30 a.m.–9:55 a.m. NBTS33. The Use of Neurodevelopmental Data in Children for Risk Assessment of Environmental Chemicals, Susan Makris, Ambuja Bale, Kathleen Raffaele, *US Environmental Protection Agency, Washington, DC*

- 9:55 a.m.–10:20 a.m. NBTS34. A Multidisciplinary Approach to Advancing the Science of Neurodevelopmental Testing in Cohorts of Infants and Young Children, Judy S. LaKind, *LaKind Associates, LLC, Baltimore, MD*
- 10:20 a.m.–10:45 a.m. NBTS35. How to Get the Biggest Bang for Your Buck: Choosing Neurodevelopmental Tests that Maximize Power, Lauren Kenworthy, *George Washington University Medical School, Washington, DC*
- 10:45 a.m.–11:10 a.m. NBTS36. Threats to Study Validity: The Flynn Effect, Examiner Drift, Confounders, Lost in Translation, and Other Important Considerations, Laura Gutermuth Anthony, *George Washington University School of Medicine, Washington, DC*
- 11:10 a.m.–11:35 a.m. NBTS37. Weight-of-the-Evidence Assessment in Neurodevelopmental Epidemiology: A Plea for Consistency, Michael Goodman, *Emory University, Atlanta, GA*
- 11:35 a.m.–12:00 p.m. Panel Discussion
- 12:00 p.m.–2:00 p.m. **NBTS/TS Joint Lunchtime Poster Session II and Exhibits Open** (Posters set up at 11:45 a.m., attended 12:00 – 2:00 p.m.)
Marriott Ballroom 1
- NBTS38. Effects of Domoic Acid on Early Visual Memory in Infants from the CoASTAL Cohort, Kimberly Grant¹, Tom Burbacher¹, Sparkle Roberts², Lynn Grattan², ¹*University of Washington, Seattle, WA*, ²*University of Maryland, Baltimore, MD*
- NBTS39. Acute Postnatal Exposure to the PentaBDE Commercial Mixture DE-71 at Low Doses (5 or 15 mg/kg/day) Does Not Produce Learning or Attention Deficits in Rats, Lori Driscoll, *Colorado College, Colorado Springs, CO*
- NBTS40. Gene-Toxicant Interactions: Developmental PBDE Effects on the Behavioral Phenotype of the Mecp2-308 Rett Syndrome Mouse Model, Mari Golub, Roxanne Vallero, Joanne Suarez, Ta Tram Anh, Isaac Pessah, Robert Berman, Janine LaSalle, *University of California Davis, Davis, CA*
- NBTS41. Locomotor Responding in Adolescent CD-1 Mice following Acute and Chronic Cocaine Administration is Unaffected by Low Dose Perinatal Bisphenol A Exposure, Jenna Nelms, Abby Meyer, Mellessa Miller, Melissa Ward, Helen Sable, *University of Memphis, Memphis, TN*
- SOT Neurotoxicology Specialty Section Conference Award Recipient**
- NBTS42. Developmental Neurobehavioral Toxicity of Bisphenol A: Defining the Role of Estrogen Related Receptor Gamma, Katerine Saili, Jane LaDu, Michael Simonich, Robert Tanguay, *Oregon State University, Corvallis, OR*
- 2:00 p.m.–3:40 p.m. **Session 8, NBTS Platform Talks:** *Marriott Ballroom 7*
Chairperson: Diana Dow-Edwards, *Downstate Medical Center*
- 2:00 p.m.–2:20 p.m. NBTS43. Genetic Susceptibility to PCB-induced Motor Dysfunction, Chris Curran, Emily Altenhofen, Amber Evans, Rikki Floyd, Celestine Kamau-Cheggeh, Sarah Kraemer, Breann Hays, Kristi Haik, *Northern Kentucky University, Highland Heights, KY*
- 2:20 p.m.–2:40 p.m. NBTS44. Assessment of Prefrontal Cortical Functions in Mice with Genetic and Dietary Alterations of Folate Status, Jessica Ash, Barbara Strupp, *Cornell University, Ithaca, NY*
- 2:40 p.m.–3:00 p.m. NBTS45. Behavioral Outcome in Children Exposed Prenatally to Lamotrigine, Valproate, or Carbamazepine: Increased Risks for Valproate, Uma Deshmukh¹, Jane Adams², Ruby Dhillon¹, Katherine McCarthy¹, Eric Macklin¹, Lewis Holmes^{1,3}, ¹*Massachusetts General Hospital, Boston, MA*, ²*University of Massachusetts Boston, Boston, MA*, ³*Harvard Medical School, Boston, MA*
- 3:00 p.m.–3:20 p.m. NBTS46. Effects of Age of Exposure to 3,4-Methylenedioxymethamphetamine (MDMA) in Rats on Later Learning and Behavior, Charles Vorhees, Matthew Skelton, Devon Graham, Tori Schaefer, Curtis Grace, Amanda Braun, Michael Williams, *Cincinnati Children's Hospital Medical Center, Cincinnati, OH*
- 3:20 p.m.–3:40 p.m. NBTS47. Predicting the Acute Behavioral Effects in Rats Inhaling Toluene for Up to 24 hrs: Inhaled vs. Internal Dose Metrics and Tolerance, WM Oshiro, QT Krantz, CJ Gordon, EM Kenyon, and PJ Bushnell, *US Environmental Protection Agency, Office of Research and Development, National Health Effects and Environmental Research Laboratory, Research Triangle Park, NC*
- 3:40 p.m.–4:00 p.m. **NBTS Conference Award Recipient**
- NBTS48. Molecular (Mal)adaptations in Dopamine-Modulated Signaling Pathways following Neurodevelopmental Insult, Aliya Frederick, Roger Colbran, Gregg Stanwood, *Vanderbilt University, Nashville, TN*

4:00 p.m.–4:15 p.m. Break: *Marriott Ballroom 7 Foyer*

4:15 p.m.–5:30 p.m. **Annual NBTS Business Meeting:** *Marriott Ballroom 7*

6:00 p.m.–9:00 p.m. **NBTS Social Event, Riverboat Cruise**

Wednesday, June 30, 2010

7:30 a.m.–9:00 a.m. Continental Breakfast: *Marriott Ballroom 7*

9:00 a.m.–10:45 a.m. **Session 9, Future Directions in Neurobehavioral Teratology Roundtable**
Discussants: Philip Landrigan, Jerrold Meyer, Susan Schantz, Lynn Singer, Charles Vorhees
Marriott Ballroom 7

10:45 a.m.–11:00 a.m. Break: *Marriott Ballroom 7 Foyer*

11:00 a.m.–12:00 p.m. **Session 10, National Children's Study Panel (NBTS/TS)** *Marriott Ballroom 6*

12:00 p.m. **NBTS 2010 Formally Adjourned**