Thirty-Sixth Annual Meeting of the Neurobehavioral Teratology Society
Held in Conjunction with the 52nd Annual Meeting of the Teratology Society and the 25th Annual Meeting of the Organization of Teratology Information Specialists
Marriott Baltimore Waterfront, 700 Aliceanna St., Baltimore, MD 21202
June 23rd–27th, 2012

2012 RICHARD BUTCHER NEW INVESTIGATOR AWARD
Tori Schaefer (nominated by Charles Vorhees)
Cincinnati Children’s Hospital Medical Center
Illicit and Prescription Drugs Targeting the Developing Serotonergic System Have Deleterious Effects on Cognition

NBTS CONFERENCE AWARDS
Jenna Fielding (nominated by Helen Sable)
University of Memphis
Perinatal Exposure to Polychlorinated Biphenyls in Rats Alters Cocaine-Induced Dopamine Efflux in the Nucleus Accumbens

Brian Powers (nominated by Barbara Strupp)
Cornell University
Perinatal Choline Supplementation Improves Learning and Attention in Ts65Dn Mice and Disomic Littermates without Altering the Nucleus Basalis Cholinergic Neuronal Phenotype

Lindsay Silva (nominated by Diana Dow-Edwards)
State University of New York, Downstate Medical Center
Prenatal Drug Exposure and Maternal Behavior Have Distinct and Persistent Effects on Offspring Behavior

Ramon Velazquez (nominated by Barbara Strupp)
Cornell University
Perinatal Choline Supplementation Improves Spatial Learning and Increases Cholinergic Neuron Density in the Medial Septal Nucleus in the Ts65Dn Mouse Model of Down Syndrome

NBTS 2012 PROGRAM
Saturday, June 23, 2012

8:00 AM–12:00 PM Teratology Society Education Course Session I (separate registration required)
Maternal and Fetal Immunology: Implications for the Prevention of Birth Defects and Infections

1:00 PM–4:30 PM Teratology Society Education Course Session II (separate registration required)
Infections during Pregnancy: Implications for the Prevention of Birth Defects

12:00 PM–5:00 PM NBTS Registration — Grand Foyer North

1:00 PM–2:00 PM NBTS Public Affairs Committee Meeting — Bristol

2:00 PM–3:00 PM NBTS Publications Committee Meeting — Bristol

3:00 PM–6:00 PM NBTS Council Meeting — Bristol
Sunday, June 24, 2012

8:30 AM–5:00 PM  **NBTS Registration** — Grand Foyer North

8:45 AM–9:15 AM  **Continental Breakfast** — Grand Ballroom IX

9:15 AM–9:30 AM  **President’s Welcome** — Grand Ballroom IX

9:30 AM–10:45 AM  **Session 1: Elsevier Distinguished Lecturer** — Grand Ballroom IX
Adolescents and Alcohol: Acute Sensitivities, Enhanced Intake, and Later Consequences
Linda Patia Spear, Binghamton University, Binghamton, NY

10:45 AM–1:00 PM  **Session 2: NBTS Platform Presentations** — Grand Ballroom IX
Chair: Bruce Beyer, Sanofi US, Inc., Bridgewater, NJ

10:45 AM–11:05 AM  NBTS 01: Does Pharmacotherapy of Preterm Labor Sensitize the Brain to Neurotoxicants? Sequential Exposure to Dexamethasone and Chlorpyrifos
Edward Levin, Marty Cauley, Joshua Johnson, Hannah Sexton, Karen Gordon, Frederic Seidler, Theodore Slotkin, Duke University Medical Center, Durham, NC


11:25 AM–11:45 AM  NBTS 03: Simple Forms of Environmental Enrichment Affect Neurobehavioral Status of Laboratory Mice
Tommy Saborido, Cathryn S. Coke-Murphy, Matthew A. Buendia, Gregg Stanwood, Vanderbilt University, Nashville, TN

11:45 AM–12:00 PM Break

12:00 PM–12:20 PM  NBTS 04: Comparison of Delayed Matching-to-Sample Performance in Children and Adult Rhesus Monkeys
John Chelonis1,2, Seth Osborn2, Matthew Glenn2, Merle Paule1,2
1National Center for Toxicological Research, Jefferson AR, 2University of Arkansas for Medical Sciences, Little Rock, AR

12:20 PM–12:40 PM  NBTS 05: Hair Cortisol as a Novel Biomarker of Stress
Jerrold Meyer, Melinda Novak, University of Massachusetts, Amherst, MA

12:40 PM–1:00 PM  NBTS 06: Prenatal Exposure to Organophosphate Pesticides and Infant Neurobehavior
Kimberly Yolton1,2, Yingying Xu1, Ann Popelar1, Heidi Sucharew1,2, Jane Khourey1,2
1Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, 2University of Cincinnati, Cincinnati, OH

1:00 PM–2:30 PM Lunch

2:30 PM–5:30 PM  **Session 3: NBTS/TS/OTIS Joint Symposium** — Grand Ballroom VI
Strategies for Reducing the Impact of Known Teratogens
Chairs: Katherine L. Wisner, Gale A. Richardson, University of Pittsburgh School of Medicine, Pittsburgh, PA

2:30 PM–2:35 PM Introduction
Gale A. Richardson, University of Pittsburgh School of Medicine, Pittsburgh, PA

2:35 PM–3:05 PM  NBTS 07: The Potential Benefit of a Multi-Micronutrient Supplement in Pregnant Women Who Consume Alcohol
Christina D. Chambers, University of California, San Diego, CA

3:05 PM–3:35 PM  NBTS 08: Thyroid Hormone to Reduce Impact of Gestational Alcohol Use in the Rat
Eva E. Redei, E. Tunc-Ozcan, Northwestern University, Feinberg School of Medicine, Chicago, IL

3:35 PM–3:50 PM Break

3:50 PM–4:20 PM  NBTS 09: Antiepileptic Drugs: Cellular, Physiological, and Behavioral Evidence of Developmental Neurotoxicity
Karen N. Gale, Georgetown University, Washington, DC

4:20 PM–4:50 PM  NBTS 10: Folic Acid Modifies Abnormal Phenotypes in Animal Models
Richard H. Finnell, University of Texas, Austin, TX

4:50 PM–5:10 PM Future Directions
Katherine L. Wisner, University of Pittsburgh School of Medicine, Pittsburgh, PA
Monday, June 25, 2012

8:00 AM–5:00 PM  
**NBTS Registration** — Grand Foyer North

8:00 AM–8:45 AM  
**NBTS Strategic Planning Committee Meeting** — Bristol

8:30 AM–9:00 AM  
**Continental Breakfast** — Grand Ballroom IX

9:00 AM–11:45 AM  
**Session 4: Behavioral Toxicology Symposium** - Grand Ballroom IX  
Neurotoxic Effects on Emotion and Social Behavior  
Chair: Edward D. Levin, Duke University Medical Center, Durham, NC

9:00 AM–9:15 AM  
Introduction and Overview  
Edward D. Levin, Duke University Medical Center, Durham, NC

9:15 AM–9:45 AM  
NBTS 11: The Voices of Yesterday's Children: The Late Consequences of Childhood Lead Poisoning  
Kim Dietrich1, Kim Cecil2, 1University of Cincinnati College of Medicine, Cincinnati, OH, 2Cincinnati Children's Hospital Medical Center, Cincinnati, OH

9:45 AM–10:15 AM  
NBTS 12: Use of Rodent Tests of Depression in Neurobehavioral Toxicology  
Sherry Ferguson, Division of Neurotoxicology, National Center for Toxicological Research/FDA, Jefferson, AR

10:15 AM–10:30 AM  
Break

10:30 AM–11:00 AM  
NBTS 13: The Calm Before the Storm: Neural Activity Predicts Socio-Affective Vulnerabilities to Stress  
Herbert Covington1,3, Rainbo Hultman1, Sunil Kumar1, Stephen Mague1, Michael Lacagnina1, Howard Bomze1, Kafui Dzirasa2,3, 1Duke University, Department of Psychology and Neuroscience, Durham, NC, 2Duke University, Department of Psychiatry and Behavioral Sciences, Durham, NC, 3Duke University, The Duke Institute for Brain Sciences, Durham, NC

11:00 AM–11:30 AM  
NBTS 14: Embryonic Alcohol Exposure Impairs Shoaling and the Dopaminergic and Serotonergic Systems in Zebrafish  
Robert Gerlai, University of Toronto Mississauga, Mississauga, Canada

11:30 AM–11:45 AM  
Discussion

12:00 PM–1:30 PM  
**Lunch on your own**  
(NTT Editorial Board Luncheon — for board members only)

1:30 PM–3:30 PM  
**Session 5: NBTS Symposium** — Grand Ballroom IX  
Cannabinoids and Mental Disorders  
Chairs: Diana Dow-Edwards, SUNY Downstate Medical Center, Brooklyn, NY; Nancy L. Day, University of Pittsburgh School of Medicine, Pittsburgh, PA

1:30 PM–2:00 PM  
NBTS 15: Cannabinoids and Brain Development  
Diana Dow-Edwards, State University of New York, Downstate, Brooklyn, NY

2:00 PM–2:30 PM  
NBTS 16: Developmental Cannabis Exposure and its Epigenetic Consequences  
Yasmin Hurd, Mount Sinai School of Medicine, New York, NY

2:30 PM–3:00 PM  
NBTS 17: Endocannabinoid-CB1R Signaling: A Link between Early Life Stress and Changes in Limbic System Function?  
Cecilia J. Hillard, Dylan Coss, Medical College of Wisconsin, Milwaukee, WI

3:00 PM–3:30 PM  
NBTS 18: Developmental Effects of Marijuana Exposure: Gestation and Early Adolescence  
Nancy L. Day, University of Pittsburgh School of Medicine, Pittsburgh, PA

3:30 PM–3:45 PM  
Break

3:45 PM–5:05 PM  
**Session 6: NBTS Platform Presentations** - Grand Ballroom IX  
Chair: Vincent Smeriglio, Retired Branch Chief, National Institute on Drug Abuse
2012 Richard Butcher New Investigator Award Recipient
NBTS 19: Illicit and Prescription Drugs Targeting the Developing Serotonergic System have Deleterious Effects on Cognition
Tori Schaefer1, Curtis Grace2, Devon Graham3, Matthew Skelton1, Michael Williams1, Charles Vorhees3,
1Cincinnati Children’s Research Foundation, Cincinnati, OH, 2U.S. Environmental Protection Agency, Research Triangle Park, NC, 3Vanderbilt University, Nashville, TN

NBTS 20: Differential Effects of Prenatal Cocaine and/or Nicotine on Indices of Psychiatric Disorders in Elderly Rats
Sonya K. Sobrian1, Katherine Ressman1, Lara Marr1, LaPorcia Wagner1, R. Robert Holson1,2, 1Howard University College of Medicine, Washington, DC, 2New Mexico Tech, Socorro, NM

NBTS 21: Twelve-Month Outcomes of Methyleneoxyxymethamphetamine (MDMA), Polydrug-Exposed Infants in the United Kingdom
Lynn T. Singer1, Derek G. Moore1,2, Meeyoung O. Min1, Julia Goodwin1,2, John J.D. Turner1,2, Sarah Fulton1, Andrew C. Parrott1,2, 1Case Western Reserve University, Cleveland, OH, 2The University of East London, Stratford Campus, London, UK

NBTS 22: L-Carnitine Attenuates Anesthetic-Induced Increases in a Marker of Glial Activation in the Developing Monkey Brain
Merle Paule1, Xuan Zhang1, Glenn Newport1, Shuliang Liu1, Fang Liu1, Ralph Callicott1, Marc Berredge2, Scott Apana3, Joseph Hanig1, William Slikker1, Cheng Wang1, 1National Center for Toxicological Research/FDA, Jefferson, AR, 23D-Imaging, Little Rock, AR, 3Center For Drug Evaluation and Research/FDA, White Oak, MD

Session 7: NBTS/TS/OTIS Joint Poster Session — Grand Ballroom V
NBTS P01: Prenatal Phenytoin Exposure Disrupts Behavioral and Neuroendocrine Processes of Female Rats
Madeline Rhodes, Marlene Vasquez, McDaniel College, Westminster, MD

NBTS P02: Effects of Anxiety on Motivation in Children as Measured By Progressive Ratio Task Performance
John Chelonis1,2,3, Haley Aaron1,2,3, Georgia Belk2,3, Juan Castro1, Shelly Baldwin3, Andrea Sutton1,2, Merle Paule1,2,3, 1National Center for Toxicological Research, Jefferson, AR, 2Hendrix College, Conway, AR, 3University of Arkansas for Medical Sciences, Little Rock, AR

NBTS P03: NBTS Conference Award Recipient: Perinatal Exposure to Polychlorinated Biphenyls in Rats Alters Cocaine-Induced Dopamine Efflux in the Nucleus Accumbens
Jenna Fielding, Tiffany Rogers, Abby Meyer, Mellessa Miller, Jenna Nelms, Melissa Ward, Guy Mittleman, Charles Blaha, Helen Sable, University of Memphis Department of Psychology, Memphis, TN

NBTS P04: Decreased Anxiety in Adult Rats Developmentally Exposed to Methylphenidate
Leah Fisher1, Sherry Ferguson2, 1University of Arkansas at Little Rock, Little Rock, AR, 2NCTR/FDA, Jefferson, AR

NBTS P05: Substance Use, Externalizing Behavior Problems, and Quality of Family Relations in Prenatally Cocaine-Exposed Adolescents
Meeyoung Min, Sonia Minnes, Adelaide Lang, Miaoping Wu, Lynn Singer, Case Western Reserve University, Cleveland, OH

NBTS P06: Developmental Methylphenidate Exposure Does Not Alter Rodent Righting Reflex or Slant Board Behaviors
Kaitlyn Maior, Sherry Ferguson, NCTR/FDA, Jefferson, AR

NBTS P07: Developmental Bisphenol A Exposure in Mice Does Not Impair Performance on a Spatial Reversal Learning Task
Melissa Ward, Jenna Nelms, Mellessa Miller, Abby Meyer, Guy Mittleman, Helen Sable, University of Memphis, Memphis, TN

NBTS P08: NBTS Conference Award Recipient: Perinatal Choline Supplementation Improves Spatial Learning and Increases Cholinergic Neuron Density in the Medial Septal Nucleus in the Ts65Dn Mouse Model of Down Syndrome
Ramon Velazquez1, Jessica Ash1, Christy Kelley2, Brian Powers3, Myla Strawderman1, Elliot Mufson2, Stephen Ginsberg2, Barbara Strupp1, 1Cornell University, Ithaca, NY, 2Rush University, Chicago, IL, 3Nathan Kline Institute/NYU Langone Medical Center, Orangeburg, NY

NBTS P09: NBTS Conference Award Recipient: Perinatal Choline Supplementation Improves Learning and Attention in Ts65Dn Mice and Disomic Littermates without Altering the Nucleus Basalis Cholinergic Neuronal Phenotype
Brian Powers1, Christy Kelley2, Jessica Ash3, Ramon Velazquez1, Myla Strawderman1, Elliot Mufson2, Stephen
Ginsberg, Barbara Strupp, 1Cornell University, Ithaca, NY, 2Rush University Medical Center, Chicago, IL, 3Nathan Kline Institute/New York University Langone Medical Center, Orangeburg, NY

NBTS P10: **NBTS Conference Award Recipient:** Prenatal Drug Exposure and Maternal Behavior Have Distinct and Persistent Effects on Offspring Behavior

Lindsay Silva, Diana Dow-Edwards, State University of New York, Downstate Medical Center, School of Graduate Studies, Program in Neural and Behavioral Science, Brooklyn, NY

NBTS P11: Substance Use in Prenatally Cocaine-Exposed Adolescents

Sonia Minnes, Meeyoung O. Min,

NBTS P12: Dopamine Receptor Reporter Mice: Are They Useful as a Tool for Developmental Pharmacological and Behavioral Studies?

Devon Graham, Katie Sprinkel, Matthew Buendia, Tommy Saborido, Gregg Stanwood, 1Pharmacology, Vanderbilt University Medical Center, Nashville, TN, 2Vanderbilt Kennedy Center for Research on Human Development, Nashville, TN

8:00 PM–10:30 PM  
**TS/MARTA Student Career Event — Grand Foyer West**

**Tuesday, June 26, 2012**

8:00 AM–5:00 PM  
**NBTS Registration — Grand Foyer North**

8:30 AM–9:00 AM  
**Continental Breakfast — Grand Ballroom IX**

9:30 AM–10:00 AM  
**Session 8: NBTS/TS Joint Special Lecture — Grand Ballroom IX**

NBTS 23: Addiction: A Developmental Disorder  
Joseph Frascella, National Institute on Drug Abuse, Bethesda, MD

10:00 AM–12:30 PM  
**Session 9: NBTS/TS Joint Symposium — Grand Ballroom IX**  
Effects of Prenatal Methamphetamine: Clinical, Preclinical, and Translational Aspects  
Chair: Nicolette Borek, Food and Drug Administration, Rockville, MD; Gregg D. Stanwood, Vanderbilt University, Nashville, TN

10:00 AM–10:30 AM  
NBTS 24: Growth and Neurodevelopmental Outcomes in Children Prenatally Exposed to Methamphetamine  
Lynne Smith, L. LaGasse, C. Derauf, E. Newman, R. Shah, A. Arria, M.A. Huestis, W. Haning, A. Strauss, S. DellaGrotta, L.M. Dansereau, C. Neal, W. Haning, A. Strauss, S. DellaGrotta, L.M. Dansereau, C. Neal, Vanderbilt University, Providence, RI, University of Hawaii, Honolulu, HI, The University of Tulsa, Tulsa, OK, Blank Hospital Regional Child Protection Center, Des Moines, IA, National Institute on Drug Abuse, NIH, Baltimore, MD, Miller Children's Hospital Long Beach, Long Beach, CA, University of Maryland School of Public Health, College Park, MD

10:30 AM–11:00 AM  
NBTS 25: Brain Imaging in Children Prenatally Exposed to Methamphetamine  
Linda Chang, C. Cloak, S. Buchthal, T. Wright, C. Jiang, K. Oishi, J. Skranes, L. Fujimoto, S. Mori, T. Ernst, John A. Burns School of Medicine, University of Hawaii, Manoa, Honolulu, HI, Johns Hopkins University School of Medicine, Baltimore, MD, Norwegian University of Science and Technology, Trondheim, Norway

11:00 AM–11:15 AM  
Break

11:15 AM–11:45 AM  
**NBTS 26: Rat Model of Third Trimester Methamphetamine Exposure: Effects on Behavior, Neurotransmitters, and Receptors**  
Charles V. Vortee, Cincinnati Children's Research Foundation, Cincinnati, OH

11:45 AM–12:15 AM  
**NBTS 27: Fetal Oxidative Stress, DNA Damage and Repair in Methamphetamine Neurodevelopmental Deficits in Mice**  
Peter G. Wells, L. Miller, A. Ramkissoon, A.M. Shapiro, Faculty of Pharmacy, University of Toronto, Toronto, ON, Canada, Dept. of Pharmacology & Toxicology, University of Toronto, Toronto, ON, Canada

12:15 PM–12:30 PM  
Discussion: Translational Aspects: How Can Affected Children Be Treated?

1:00 PM–2:15 PM  
**NBTS Business Meeting — Grand Ballroom IX**

2:30 PM–5:20 PM  
**Session 10: NBTS Symposium — Grand Ballroom IX**  
Genetic Bases of Chemical Sensitivity  
Chair: Philip Bushnell, U.S. Environmental Protection Agency, Research Triangle Park, NC
2:30 PM–2:35 PM  Introduction  
Philip Bushnell, U.S. EPA, Research Triangle Park, NC

2:35 PM–3:05 PM  NBTS 28: Integrating Genetic and Toxicogenomic Information to Understand Susceptibility to Developmental Toxictants  
Elaine Faustman, J.F. Robinson, X. Yu, S. Hong, W.C. Griffith, University of Washington, Seattle, WA

3:05 PM–3:35 PM  NBTS 29: The Genetic Basis for Natural Variation in Alcohol Sensitivity in Drosophila  
Tatiana Morozova1,2, Sruthipriya Sridhar1, Michael Magwire2,3, Trudy F. C. Mackay2,3, Robert R. H. Anholt1,2,3,  
1Department of Biology, 2W.M. Keck Center for Behavioral Biology, 3Department of Genetics, North Carolina State University, Raleigh, NC

3:35 PM–3:50 PM  Break

3:50 PM–4:20 PM  NBTS 30: Dopaminergic Modulation of Phototaxis in Zebrafish Larvae  
Harold A. Burgess, Kandice Fero, National Institute of Child Health & Human Development, Bethesda, MD

4:20 PM–4:50 PM  NBTS 31: Behavioral Phenotyping of Two Mouse Lines with Reduced Antioxidant Capacity  
Chris Curran1, Ying Chen2, Daniel Nebert2, Krishna Patel2, Michael Williams3, Charles Vorhees3  
1Northern Kentucky University, Highland Heights, KY, 2University of Cincinnati College of Medicine, Cincinnati, OH, 3Cincinnati Children’s Research Foundation, Cincinnati, OH

4:50 PM–5:20 PM  NBTS 32: A Framework to Study Gene-Environment Interactions in Child Development  
Robert Wright, Harvard School of Public Health, Cambridge, MA

Evening

NBTS Social Event

Wednesday, June 27, 2012

8:00 AM–8:30 AM  Continental Breakfast — Grand Ballroom IX

8:30 AM–9:30 AM  Session 11: NBTS/TS Joint Lecture — Grand Ballroom VI  
NBTS 33: The Consequences of Barriers to Prenatal Care in Less Developed Countries: Important Lessons for Everyone  
Chair: Edward W. Carney, The Dow Chemical Company, Midland, MI  
Janet R. Hardy, Consultant in Global Maternal, Reproductive & Child Health Research

9:40 AM–12:00 PM  Session 12: NBTS Symposium — Grand Ballroom IX  
21st Century Methodologies for Hazard and Risk Characterization  
Chair: Susan Makris, U. S. Environmental Protection Agency, National Center for Environmental Assessment, Washington, DC

9:40 AM–10:05 AM  NBTS 34: Potential Use of Omics Data in a Mode-of-Action Analysis of Neurobehavioral Toxicity of Methylmercury  
Ambuja Bale1, David Szabo2, Raghu Nath1, Suryanarayana Vullimiri1  
1ORD/NCEA, Washington, DC, 2ORISE/ORD/NCEA, Washington, DC

10:05 AM–10:30 AM  NBTS 35: Systems Biology Approach for Better Understanding of Mechanisms of Neurodevelopment Toxicity: A Case Study Using the Major Flame Retardant HBCD  
David Szabo1, Ruchir Shah2, Susan Sumner3, Linda Birnbaum4  
1ORISE/NCEA/US EPA, Washington DC, 2SRA, Research Triangle Park, NC, 3RTI, Research Triangle Park, NC, 4NCI/NIEHS, Research Triangle Park, NC

10:30 AM–10:45 AM  Break

10:45 AM–11:10 AM  NBTS 36: Ex Vivo Models and Chemical Neurotoxicity Assessment  
Andrew Kraft, Ambuja Bale, National Center for Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC

11:10 AM–11:35 AM  NBTS 37: Statistical Significance versus Biological Relevance: A Case Study in Neurobehavioral Testing  

11:35 PM–12:00 PM  NBTS 38: Interaction of Nonchemical Stressors with Developmental Neurotoxicants  
Deborah Segal, U.S. Environmental Protection Agency, Washington, DC
12:00 PM  
**NBTS 2012 Formally Adjourned**

12:45 PM–4:00 PM  
**Teratology Society National Children's Study Program**  
(separate registration required)  
See [http://teratology.org](http://teratology.org) for detailed agenda.