

**TWENTY-SECOND INTERNATIONAL NEUROTOXICOLOGY CONFERENCE**

**“Environment and Neurodevelopmental Disorders”**

September 11-14, 2005 • Sheraton Imperial Hotel & Conference Center • Research Triangle Park, North Carolina, USA

**NEAR - FINAL PROGRAM – 8/31/05**

**Sunday Afternoon & Evening 11 Sept 2005 1:30 – 8:30 PM**

**1:00 PM Conference Registration Opens**  
**1:30 PM NIEHS Town Meeting Opens**  
**1:30 – 8:30 PM NIEHS Town Meeting & Public Forum**  
(See separate brochure on NIEHS Town Meeting)

Please Come and Participate !

All persons attending the 22<sup>nd</sup> International Neurotoxicology Conference are enthusiastically invited to participate in the NIEHS Town Meeting. Note: The evening Public Forum is part of the Town Meeting as well as the opening session of the Conference. All Sunday activities and food are free and Everyone is Welcome!

**1:30 – 3:00 PM**

**Environment and Neurodevelopmental Disorders Over the Lifespan**

**1:40 – 1:55 PM**  
**Environment and Neurodevelopmental Disorders: Implications over the Lifespan**

Dr. G. Jean Harry ~ *Neurotoxicologist, NIEHS*  
Dr. Cynthia Bearer ~ *Neonatologist, Case Western Reserve University*

**1:55 – 2:05 PM**  
**Environment and Children’s Disorders (e.g., Autism)**

Dr. Martha Herbert ~ *Pediatric Neurologist, Massachusetts General Hospital & Harvard Medical School*

**2:05 – 2:15 PM**  
**Adult Disease and the Environment**

(e.g., Parkinson’s, Alzheimer’s disease, Schizophrenia)

Dr. Don Schmechel ~ *Duke University*  
*Neurologist and expert on neurodegenerative diseases*

**2:15 – 3:00 PM**  
**Q&A: OPEN DIALOGUE WITH THE PUBLIC**

**3:00 – 3:15 PM – REFRESHMENT BREAK**

**3:15 – 4:00 PM**

**Keynote Address & Open Dialogue with the Director of NIEHS**

**Dr. David A. Schwartz ~ Director**  
*National Institute of Environmental Health Sciences of NIH*

**4:00 – 5:30 PM**

**Local Issues & Open Dialogue**

**5:30 PM..... “Meet, Greet and Eat”**

**Sunday 11 Sept 2005 5:30 PM... “Meet, Greet & Eat”**

Free and open to the public,  
all Conference participants & guests

**5:30 PM . . .**  
**“Meet, Greet & Eat”**

Refreshments & Buffet (Cash Bar)

**Informal discussion. Networking. Camaraderie, Visit Exhibits.**

Free food and refreshments provided for NIEHS Town Meeting participants and Neurotoxicology Conference participants in a comfortable informal social setting.

**Sunday Evening 11 Sept 2005 6:30 PM – 8:30 PM**

**Joint Session: Town Meeting Continues & NTX XXII Opens**

**6:30 - 8:30 PM**

**SESSION I. OPENING OF THE 22<sup>ND</sup> CONFERENCE**

**Conference Chair: Joan M. Cranmer, PhD, ATS**

**Advocacy Session / Public Forum**

**SESSION II. NEUROTOXICANTS AND LEARNING AND DEVELOPMENTAL DISABILITIES: TRANSLATING THE SCIENCE INTO EDUCATION AND PUBLIC POLICY**

**Session Co-Chairs: Elise Miller, MEd**  
**J. Peterson Myers, PhD**

**Theme:** The conference will start with a public forum on the latest science linking neurotoxicants to learning and developmental disabilities (LDDs) and the need to educate health-affected constituencies about these issues and to foster stronger policy to protect children’s environmental health.

Researchers are often reluctant to become involved in educating the general public about technical subjects or the intersections of science and public policy for fear that such activities will take them away from more important work or raise questions about their objectivity. This session will highlight why researchers can and need to play an important role in helping to translate science into stronger public policy. After an overview of the science and related policies, including examples of how the precautionary principle can be implemented in this context, panelists will describe model environmental health programs initiated by learning and developmental disabilities organizations. This public forum is open not only to researchers and scientists, but to educators, administrators, parents of children with LDDs and anyone else who is concerned about environmental contributors to the apparent rise in LDDs.

**Presentations**

**Overview of Emerging Science on Neurotoxicants in Relation to Learning and Developmental Disabilities**

*Ted Schettler, MD, MPH ~ Science and Environmental Health Network*

### Autism, Genes and the Environment

Dr. Martha Herbert, MD, PhD ~ *Massachusetts General Hospital, Harvard Medical School*

### Specific Policies Related to Regulating and Reducing Neurotoxicants

Lynn R. Goldman, MD, MPH ~ *Johns Hopkins University*

### Panel Discussants

#### Overview of the Learning and Developmental Disabilities Initiative

Elise Miller, MEd ~ *Institute for Children's Environmental Health*

#### Autism Society of America's efforts in this regard

Lee Grossman, *Autism Society of America* [www.autism-society.org](http://www.autism-society.org)

#### Learning Disabilities Association of America's efforts in this regard

Kathy Lawson, *Healthy Children's Project, LDA*

#### American Association on Mental Retardation's efforts in this regard

Michele Gagnon, *Environmental Health Initiative, AAMR*

**Monday Morning 12 Sept 2005 8:30 – 11:40 AM**

### Symposium

#### SESSION III-A. PBPK/PD MODELS FOR DEVELOPMENTAL NEUROTOXICOLOGY: RISK ASSESSMENT STRATEGIES AND RESEARCH RECOMMENDATIONS

**Session Chairs:** William Slikker, Jr., PhD  
Donald R. Mattison, MD

**Theme:** Over the past decade regulatory agencies in developed countries have recognized that infants, children, and adolescents handle chemicals differently than adults (indeed, adults are not pharmacologically homogeneous). While recognizing those pharmacological differences has led to increased attention to preclinical and clinical data gaps, the information needed to fill those gaps can not be simply addressed by testing chemicals in pediatric populations. The concepts of efficacy and safety must be reformulated in the context of development, and new approaches for preclinical and clinical testing (including clinical trial designs) developed and validated in immature animals and humans. These testing methods, especially for the nervous system, must be grounded on an understanding of healthy developmental trajectories as well as the impact of disease and treatment on healthy development. Clearly this constraint suggests that there is little of relevance from adult pharmacology and it is necessary to develop preclinical and clinical testing for pediatric pharmacology and developmental neurotoxicology.

8:30 – 8:45 AM

#### PBPK/PD Models for Developmental Neurotoxicology: Introduction and Overview of Session

**Chair:** William Slikker, Jr., PhD ~ *FDA - NCTR*

8:45 – 9:10 AM

#### Computational Tools for Comparisons across Stages of Neurodevelopment

Julia M. Gohlke, PhD ~ *NIH-NIEHS*

9:10 – 9:35 AM

#### Inclusion of "omics" Data in Model Development for the Nervous System

Rory Conolly, PhD ~ *EPA-NCCT*

9:35 – 10:00 AM

#### PB/PK Modeling of Early Life Stages in Rodents

Hugh Barton, *EPA-NCCT*

Near - Final Program of 08/31/05

All symposia, platform & poster sessions are in the Empire Ballroom or Auditorium. IX-B Dev Tox Workshop is in Royal. Pig Pickin' is in Crystal Coast.

10:00 – 10:25 AM

#### Which PBTK Model Outputs Should be Considered as Inputs for Pharmacodynamic Modeling of Neurodevelopmental Effects?

Dale Hattis, PhD ~ *Clark University, Worcester, MA*

10:25 – 10:45 AM Break

10:45 – 11:15 AM

#### Panel Discussion of Kinetic Modeling

**Panel Discussants:** Above speakers plus:

R. Woodrow Setzer, Jr., PhD ~ *EPA-NCCT*

Linda Sheldon, PhD ~ *EPA/NERL*

#### Questions to Invited Experts:

- How do you integrate exposure assessment into mathematical models of effect?
- How do pharmacokinetic parameters change as a function of life stage and other modifiers?
- How do you estimate cumulative risk using pk models?
- Relevant questions of dosimetry?
- Actual examples of the progression of models to address these questions with regards to developmental toxicity and neurotoxicity and how they might play into the risk assessment process.

11:15 – 11:30 AM

#### The Next Generation of Models: Vision of the Future

Donald R. Mattison, MD ~ *NIH/NICHD*

11:30 – 11:40 AM

#### Session Summary and Research Recommendations \*

**Co-Chairs:** William Slikker, Jr., PhD and Donald R. Mattison, MD

\* **Note:** Session Summaries and Research Recommendations will be published in the *NeuroToxicology* issue following the Conference along with the Meeting Report and Abstracts.

11:40 AM – 1:00 PM Break for Lunch (on your own)

**Monday Morning 12 Sept 2005 9:00 – 11:30 AM**

### Workshop

#### SESSION III-B. DEVELOPMENTAL EFFECTS ON THE IMMUNE SYSTEM: IMPLICATIONS FOR AUTISM AND NEURODEVELOPMENTAL DISORDERS

**Session Co-Chairs:** G. Jean Harry, PhD  
Monica Carson, PhD

**Theme:** In recent years, evidence for the role of infectious and inflammatory processes as mediators of brain injury has been growing. The immune response within the brain as well as linkages between the immune and nervous system are becoming well documented. With regards to development, clinical correlations between fetal plasma cytokines and neurological outcomes in the premature infant have been established. Recent work suggests that maternal infection and inflammatory responses in the offspring are associated with increased risk for diseases such as schizophrenia and autism. Several studies have reported systemic immunologic aberrations in autism spectrum disorders (ASD) that are associated with both autoimmunity and with dysfunctional immunity such as abnormalities or deficits of function in immune cell subsets. The following sessions will focus on work underlying these hypotheses in both the human clinical setting as well as the establishment of experimental animal models. The translation of adverse effects as the result of an innate immune response in the brain

Page 2 of 14

following exposure to environmental agents and the contribution of the immunological competence as a factor determining susceptibility will be discussed. Such interactions may contribute to the phenotypic differences of diseases seen in the human population.

**This session is sponsored by the National Institute of Environmental Health Sciences (NIEHS).**

9:00 – 9:15 AM

**Introduction: Immune-Mediated Responses During Development**  
Jean Harry, PhD ~ *Laboratory of Neurobiology, NIEHS*

9:15 – 9:45 AM

**Microglia: A Heterogeneous Population of CNS-Specific Macrophages**  
Monica Carson, PhD ~ *University of California – Riverside*

9:45 – 10:15 AM

**Prenatal Exposure to Maternal Infection and Cortex Development**  
John H. Gilmore, MD ~ *UNC Schizophrenia Research Center, University of North Carolina – Chapel Hill*

10:15 – 10:30 AM Break

10:30-11:00 AM

**Autism and the Immune System: An Overview**  
Kimberly A. Stigler, MD ~ *Indiana School of Medicine*

11:00 – 11:30 AM

**Neuroinflammatory and Neuroglial CNS Responses in Autism**  
Carlos Pardo-Villamizar, MD ~ *Johns Hopkins University School of Medicine*

11:30 AM – 12:30 PM Break for Lunch (on your own)

Monday Afternoon 12 Sept 2005 12:30 PM – 2:30 PM

*Workshop - continued*

**SESSION III-B. DEVELOPMENTAL EFFECTS ON THE IMMUNE SYSTEM: IMPLICATIONS FOR AUTISM AND NEURODEVELOPMENTAL DISORDERS**

**Session Co-Chairs:** Cindy Lawler, PhD  
Judy van de Water, PhD

**Theme:** Several studies have reported systemic immunologic aberrations in autism spectrum disorders (ASD) that are associated with both autoimmunity and with dysfunctional immunity such as abnormalities or deficits of function in immune cell subsets. The relationship between these abnormalities and the development of neuropathologic changes is not yet known. There has been speculation, however, that aberrant immune system activation occurring during critical periods of nervous system development and maturation may significantly contribute to the susceptibility of the organism to environmental exposure. Such interactions may contribute to the phenotypic differences of diseases seen in the human population.

Invited experts will present **clinical and epidemiological evidence** of an involvement of immune status and immune mediated responses during development and relationship to long term neurobehavioral changes. This session is sponsored by the National Institute of Environmental Health Sciences.

12:30 – 12:45 PM

**Introduction: Environmental Perturbations of the Immune System: Implications for Autism and other Neurodevelopmental Disorders**  
Cindy Lawler, PhD ~ *NIEHS*

12:45 – 1:15 PM

**A Case-Control Study Of Antibodies to Central Nervous System Proteins and Measles Virus in Children with Autism.**  
William McMahon, MD ~ *University of Utah*

1:15 – 1:45 PM

**Suboptimal IgG Response to Bacterial Vaccine Antigens in Patients with Autism Spectrum Disorder (ASD)**  
Judy van de Water, PhD ~ *UC-Davis*

1:45 – 2:15 PM

**Maternal Immune Status During Pregnancy and Childhood Autism**  
Lisa Croen, PhD ~ *Kaiser Permanente Division of Research*

2:15 – 2:30 PM

Roundtable Discussion

Monday Afternoon 12 Sept 2005 2:45 – 5:05 PM

*Platform Session*

**SESSION IV-A. CHILDREN'S ENVIRONMENTAL HEALTH**

**Session Co-Chairs:** Cynthia Bearer, MD, PhD  
William Suk, PhD, MPH

2:45 – 3:05 PM

**Environmental Accumulation and Synergy of Multiple Neurotoxins and Children's Learning Achievement in New Orleans, Louisiana, USA**  
Howard W. Mielke, PhD ~ *Xavier University of Louisiana*

3:05 – 3:25 PM

**Clearance of Neurotoxins by Phospholipid Emulsion in Autism and PDD**  
Patricia Kane, PhD ~ *Haverford Wellness Center*

3:25 – 3:45 PM

**Sensitivity Analysis in Studies of Continuous Outcome Measures: The Example of Methylmercury Exposure and Neuropsychological Testing in Children**  
Michael Goodman, PhD, MPH ~ *Emory University School of Public Health*

3:45 – 4:05 PM

**Effect of Solvents on L1 Distribution in Lipid Rafts.**  
Cynthia F. Bearer, MD, PhD ~ *Case Western Reserve University*

4:05 – 4:25 PM

**Seychelles Child Development Study: Analysis of Postnatal MeHg Exposure**  
Gary Myers, MD ~ *University of Rochester Medical Center*

4:25 – 4:45 PM

**Sensitive Brains—Lasting Harm: Environmental Neurotoxins and Learning and Developmental Disabilities in Children**  
Kathleen Schuler, MPH ~ *Institute for Agriculture and Trade Policy*

4:45 – 5:05 PM

**Preventing Neurodevelopment Disorders: The CDC Should Lower the Blood Lead Action Level From 10 to 2 µg/dL**  
Steven G. Gilbert, PhD ~ *Institute of Neurotoxicity & Neurological Disorders*

Monday Afternoon 12 Sept 2005 1:00 – 5:00 PM

**Symposium**

**SESSION IV-B. NEUROTOXICANT EXPOSURES IN MILITARY DEPLOYMENTS AND PUTATIVE ASSOCIATIONS WITH NEURODEGENERATIVE DISEASES**

**Session Co-Chairs:** Susan P. Proctor, DSc  
COL Karl E. Friedl, PhD

**Theme:** Topics presented in this session will include epidemiologically focused research on neurotoxicant exposures and putative associations with neurodegenerative diseases. This session will feature presentations of on-going projects sponsored by the US Army Military Research and Materiel Command, Military Operational Medicine Research Program and the US Army Research Institute of Environmental Medicine. This session is sponsored by the US Army Research Institute of Environmental Medicine (USARIEM) and the Neurotoxin Treatment Research Program of the US Army Medical Research and Materiel Command (USAMRMC).

1:00 – 1:20 PM

**Overview: Neurotoxicant Exposures in Military Deployments and Putative Associations with Neurodegenerative Diseases**  
Susan P. Proctor, DSc and COL Karl E. Friedl, PhD ~ *U.S. Army Research Institute of Environmental Medicine*

1:20 – 2:00 PM

**Prospective Study of Military Service and Risk of Amyotrophic Lateral Sclerosis and Parkinson's Disease**  
Marc Weisskopf, PhD ~ *Harvard School of Public Health*

2:00 – 2:40 PM

**Polychlorinated Biphenyls, Organochlorines, and Parkinson's Disease (PD) Risk: A Case Control Study in Alaskan Natives**  
Carolyn M. Tanner, MD, PhD ~ *The Parkinson's Institute*

2:40 – 3:00 PM Break

3:00 – 3:40 PM

**Polychlorinated Biphenyls Alter Dopamine Function in Older Capacitor Workers.**  
Richard F. Seegal, PhD ~ *New York State, Dept of Health*

3:40 – 4:20 PM

**SHOAMP: The Study of Health Outcomes in Aircraft Maintenance Personnel.**  
Catherine D'Este, PhD ~ *Royal Newcastle Hospital, Newcastle, NSW, Australia -on behalf of the SHOAMP Team*

4:20 – 5:00 PM

**Discussion, Session Summary and Research Needs**

5:00 PM – 7:00 PM Break for Dinner (on your own)

Monday Evening 12 Sept 2005 7:00 – 9:00 PM

**Symposium**

**EVENING SESSION A. AQUATIC AND INVERTEBRATE MODELS OF DEVELOPMENTAL NEUROTOXICITY FOR MECHANISTIC AND HIGH THROUGHPUT STUDIES**

**Session Co-Chairs:** Edward D. Levin, PhD  
Jonathan Freedman, PhD

**Theme:** Fish and invertebrates offer useful models complementary to the classic mammalian and in vitro models of neurotoxicity. These simple but functionally intact systems provide visual access during the process of development that is unavailable in mammals. The aquatic and invertebrate models provide the anatomic and temporal integrity of the whole animal unavailable with in vitro preparations. Elegant genetic

methods are available for sophisticated studies of the molecular bases of developmental neurotoxicity. Rapid assessment techniques using *C. elegans* and zebrafish embryos are being developed for high throughput screening studies. Reliable behavioral assays are being constructed to determine the functional consequences of neurodevelopmental insults. These newer complementary models can provide important information for initial triage of the multitude of chemicals to be tested in the necessary but more expensive and time consuming mammalian studies as well as identifying important molecular targets for the toxicodynamic effects of toxicants on neurodevelopment.

7:00 – 7:10 PM

**Overview**

Edward D. Levin, PhD ~ *Duke University Medical Center*

7:10 – 7:30 PM

**Development of Medium-Throughput Toxicity Screens Using *C. Elegans*.**

Jonathan Freedman, PhD ~ *Duke University*

7:30 – 7:50 PM

**A Novel *C. Elegans* Model for Determining Metal-induced Dopamine Neurodegeneration and Alternations in Neurodevelopment**

Richard Nass, PhD ~ *Vanderbilt University*

7:50 – 8:10 PM

**Strategies Towards Using Zebrafish as a Complementary Neurotoxicological Model**

Elwood Linney, PhD ~ *Duke University*

8:10 – 8:30 PM

**Neurobehavioral Consequences of Neurodevelopmental Toxicity Zebrafish**

Edward D. Levin, PhD ~ *Duke University Medical Center*

8:30 – 9:00 PM

**Discussion, Session Summary and Research Needs**

Monday Evening 12 Sept 2005 7:00 – 9:00 PM

**Symposium**

**EVENING SESSION B. ENDOCRINE ACTIVE COMPOUNDS AND THEIR EFFECTS ON BRAIN DEVELOPMENT: INTEGRATION OF METHODS AND APPROACHES**

**Session Co-Chairs:** Eva Polston, PhD  
Robert Handa, PhD

**Theme:** Throughout an animal's lifetime, steroid hormones have profound effects on brain function. Because the brain is sensitive to low concentrations of steroids and steroid-like compounds, there is growing concern that low levels of endocrine-active compounds (EACs) in the environment may exert toxicological effects in the brain. In contrast to necrosis-inducing neurotoxins that cause histopathological damage, the effects of EACs are likely to result in subtle and specific alterations of neuronal function. This workshop will present a multifaceted approach through which changes in the developing and adult brain can be assessed. Talks will focus on cellular/molecular, neuroanatomical, and functional approaches for detecting perturbations in hormone-sensitive neuronal systems.

7:00 – 7:10 PM

**Endocrine Active Compounds and their Effects on Brain Development: Integration of Methods and Approaches**

David C. Dorman, DVM, PhD ~ *CIIT Centers for Health Research*

7:10 – 7:30 PM

**Prenatal Exposure to Fenitrothion: Are Changes in the SDN-POA a Concern?**

Melanie Struve, PhD ~ *CIIT Centers for Health Research*

7:30 – 7:50 PM

**Estrogen Receptor Signaling in Sexual Differentiation of the Brain: Can We Teach an Old Dogma New Tricks?**

Robert Handa, PhD ~ *Colorado State University*

7:50 – 8:10 PM

**Sex and the Brain: Evaluating Sex Differences in Neuroendocrine and Behavioral Circuits**

Eva Polston, PhD ~ *CIIT Centers for Health Research*

8:10 – 8:30 PM

**Beyond the Brain: How EAC's Affect Neuroendocrine Systems and Complex Behaviors**

Heather Patisaul, PhD ~ *CIIT Centers for Health Research*

8:30 – 8:50 PM

**Does Sex Matter? Male Brains, Female Brains, and Environmental Exposures**

Bernard Weiss, PhD ~ *Department of Environmental Medicine, University of Rochester School of Medicine and Dentistry*

8:50 – 9:00 PM

**Discussion, Session Summary and Research Needs**

**Tuesday Morning 13 Sept 2005 8:30 AM – 11:30 AM**

**Symposium**

**SESSION V. MOLECULES TO (WO)MAN: A. ANIMALS**  
*Dissecting the Dysfunction to Look at the Whole Picture*

**Session Co-Chairs:** Isaac N. Pessah, PhD  
Richard F. Seegal, PhD

**Theme:** Invited Speakers in this Symposium will present an integrated overview of the multidisciplinary approaches needed to understand risk factors contributing to developmental disorders and aging. Goal: To provide mechanistic data that will aid in the interpretation of epidemiological data and in understanding the role that environmental agents play in inducing central nervous system dysfunctions. Identifying the principal molecular targets that are responsible for producing toxicosis has been a cornerstone of risk assessment. Prominent examples include the activity of dioxins at the AhR, anticholinesterase activity of organophosphates and carbamates, and the interaction of pyrethroids with sodium channels. Understanding the relationship among low level exposure to environmentally persistent chemicals, their critical molecular targets, ensuing cellular dysfunction, and defining often subtle consequences on animal and human neurodevelopment is perhaps one the most challenging goals of modern toxicology.

8:30 – 8:35 AM

**Overview and Goals of Molecule to (Wo)Man Session – Part A: Animals**

Co-Chairs: Isaac N. Pessah, PhD and Richard F. Seegal, PhD

8:35 – 9:00 AM

**Genetic and Epigenetic Mechanisms Conferring Susceptibility to Environmental Agents**

Isaac N. Pessah, PhD ~ *UC Davis*

9:00 – 9:30 AM

**PCBs, Methylmercury and Dopamine: From Tissue Culture to Humans**

Richard F. Seegal, PhD ~ *Wadsworth Center, NYSDOH*

9:30 – 10:00 AM

**Defining Mouse Behaviors Related to Autism**

Jacqueline N. Crawley, Ph.D., *National Institute of Mental Health IRP and University of North Carolina*

10:00 – 10:20 AM Break

10:20 – 10:50 AM

**Murine Models of Social Behavior: Gene Toxicant Interactions**

Robert F. Berman, PhD ~ *University of California School of Medicine, Davis*

10:50 – 11:20 AM

**Cholinergic Involvement in Neurocognitive Function: From Zebra Fish to Humans**

Edward D. Levin, PhD ~ *Duke University Medical Center*

11:20 – 11:30 AM

**Discussion**

**11:30 AM – 12:45 PM Break for Lunch (on your own)**

**Tuesday Afternoon 13 Sept 2005 12:45 – 3:45 PM**

**Symposium**

**SESSION V: MOLECULES TO (WO)MAN – B. HUMANS**  
*Dissecting the Dysfunction to Look at the Whole Picture*

**Session Co-Chairs:** Susan L. Schantz, PhD  
S. Jill James, PhD

12:45 – 12:50 PM

**Overview and Goals of Molecule to (Wo)Man Session – Part B: Humans**

Susan L. Schantz, PhD ~ *University of Illinois*

12:50 – 1:15 PM

**Applying Data from Animal Models in Epidemiological Research**

Susan L. Schantz, PhD ~ *University of Illinois*

1:15 – 1:40 PM

**Oxidative Stress in Children with Autism: Metabolic Biomarkers and Genetic Polymorphisms**

S. Jill James, PhD ~ *University of Arkansas for Medical Sciences, and Arkansas Children's Hospital Research Institute*

1:40 – 2:05 PM

**Defining the Autism and Broad Autism Phenotypes**

Joseph Piven, MD ~ *Director, Autism Center, Univ of North Carolina*

2:05 – 2:20 PM Break

2:20 – 2:45 PM

**From Antiquity to the 21<sup>st</sup> Century: The Past, Present and Future of Lead Toxicity**

Herbert L. Needleman, MD ~ *Dept of Psychiatry, Univ of Pittsburg School of Medicine*

2:45 – 3:15 PM

**Update on the National Children's Study**

Carole A. Kimmel, Ph.D. ~ *Consultant, National Children's Study Program Office, NICHD – NIH*

3:15 – 3:45 PM

**Q&A, Open Discussion, Session Summary and Research Needs\***

Speakers from both morning and afternoon sessions will provide questions related to the above topics (how best to incorporate lab science results into clinical and epidemiological studies; how to facilitate bi-directional information transfer) to stimulate audience discussion.

**\* Note:** Session Summaries and Research Recommendations will be published in the *NeuroToxicology* issue following the Conference along with the Meeting Report and Abstracts.

Tuesday Afternoon 13 Sept 2005 3:45 – 5:45 PM

**Cash Bar & Snacks**

**Poster Session**

**SESSION VII: GENERAL POSTER SESSION**

Poster abstracts are numbered from P-73 to P-134.

The poster session is a highlight of this conference series. It has proven to be an effective venue for informal, in-depth discussion and collaboration building -- as well as an important networking opportunity for all participants. Papers on any aspect of neuroscience, toxicology, children's environmental health, public health & policy are welcome! Judging and selection of Student Awardees will be made during the poster session.

**STUDENT AWARD COMPETITION**

The Student Award Competition is divided into four groups: 1 for post-doctoral competition and 3 for pre-doctoral competition by general topic (i.e., metals, pesticides & PCBs, other.) There is approximately the same number of posters in each group.

A winner will be chosen from each group for a total of four awards. Competing students are expected to give an overview of their work in 2-3 minutes to the judges followed by a brief set of questions and answers. Originality, significance, hypothesis, presentation material and style, as well as knowledge of the subject, will be considered in selecting the winners. All papers presented for the Student Awards must be presented from poster.

**GROUP 1: POST-DOCTORAL COMPETITION**

*Group 1: Post-Doctoral Student Award Committee*

1. Kenneth Reuhl, Ph.D. ~ *Chair*
2. Stephanie Padilla, Ph.D.
3. Isaac Pessah, Ph.D.

*Group 1: Post-Doctoral Students (9)*

Ambuja Bale	Mentor: Timothy J. Shafer, Ph.D.
Wendy Donlin	Mentor: M. Christopher Newland, Ph.D.
Anne Dreiem	Mentor: Richard Seegal, Ph.D.
Julia Gohlke	Mentor: Christopher J Portier, Ph.D.
Ruth Jameson	Mentor: Ted Slotkin, Ph.D.
Kennita Johnson	Mentor: Robert Maronpot, Ph.D.
Tal Kenet	Mentor: Michael Merzenich, Ph.D.
Elizabeth Roberts	Mentor: David Dorman, D.V.M., Ph.D.
Marcelo J. Wolansky	Mentor: Kevin Crofton, Ph.D.

**GROUP 2: NEUROTOXICITY OF METALS**

*Group 2: Pre-Doctoral Student Award Committee*

1. Michael Aschner, Ph.D. ~ *Chair*
2. David Dorman, D.V.M., Ph.D.
3. Timothy J. Shafer, Ph.D.

*Group 2: Pre-Doctoral Students (11)*

Christopher Choi	Mentor: Anumantha G. Kanthasamy, PhD
Joel F. Cooper	Mentor: Alexander Kusnecov, PhD
Jeremy J. Day	Mentor: M. Christopher Newland, PhD
John C. Heath	Mentor: M. Christopher Newland, PhD
Christina J. Herden	Mentor: William D. Atchison, PhD
Jayme D. Mancini	Mentor: William D. Atchison, PhD
Erin F. Pesek	Mentor: M. Christopher Newland, PhD
Miranda Reed	Mentor: M. Christopher Newland, PhD
M.A. Polunas	Mentor: Kenneth Reuhl, PhD
Feng-Chiao Su	Mentor: Pau-Chung Chen, M.D., PhD
Blair C. Weig	Mentor: Kenneth Reuhl, PhD

**GROUP 3: NEUROTOXICITY OF PESTICIDES AND PCBs**

*Group 3: Pre-Doctoral Student Award Committee*

1. Toshio Narahashi, Ph.D. ~ *Chair*
2. Anumantha G. Kanthasamy, Ph.D.
3. Virginia (Ginger) Moser, Ph.D.
4. Bob Sonawane, Ph.D.

*Group 3: Pre-Doctoral Students (10)*

Cary Coburn	Mentor: Margarita C. Curras-Collazo, Ph.D.
Lisa M. Domica	Mentor: Keith R. Cooper, Ph.D., Gail Zeevalk, Ph.D. (co-advisor)
Josh A. Harrill	Mentor: Kevin Crofton, Ph.D.
Chia-Jung Hsieh	Mentor: Pau-Chung Chen, M.D., Ph.D.
Zhenquan Jia	Mentor: Hara Misra, B.V.Sc., M.S., Ph.D.
Todd A. Jusko	Mentor: Irva Hertz-Picciotto, M.D.
Edward C. Meek	Mentor: Janice E. Chambers, Ph.D.
David S. Sharlin	Mentor: R. Thomas Zoeller, Ph.D.
Tram-Anh N. Ta	Mentor: Isaac N. Pessah, Ph.D.
Jennifer Watkins	Mentor: Timothy J. Shafer, Ph.D.

**GROUP 4: OTHER COMPOUNDS/GENERAL NEUROTOXICOLOGY**

*Group 4: Pre-Doctoral Student Award Committee*

1. M. Christopher Newland, Ph.D. ~ *Chair*
2. Edward Levin, Ph.D.
3. Eva Polston, Ph.D.

*Group 4: Pre-Doctoral Students (8)*

Michele A. Cheh	Mentor: Margarita C. Curras-Collazo, Ph.D.
Robert Giddings	Mentor: Timothy J. Shafer, Ph.D.
Elizabeth Gribble	Mentor: Kevin Crofton, Ph.D.
Lynn Parsons Heibrun	Mentor: Claudia S. Miller, M.D., M.S.
Jinghong Kou	Mentor: Jeffrey R. Bloomquist, Ph.D.
Sharon Oxendine	Mentor: Stephanie Padilla, Ph.D.
Faneng Sun	Mentor: Anumantha G. Kanthasamy, Ph.D.
Daniella Urbach	Mentor: Alexander Kusnecov, Ph.D.

**Tuesday Evening 13 Sept 2005 5:30 – 10:00 PM**

**SESSION VIII**

*Conference Social Evening*

5:30 – 6:30 PM

*Poolside Cocktails*

*Presentation of Student Awards*

6:30 – 10:00 PM

*North Carolina Pig Pickin'*

**Wednesday Morning 14 Sept 2005 8:30 AM – 11:30**

**Symposium**

**SESSION IX-A. CONTEMPORARY HEALTH ISSUES ASSOCIATED WITH OVER EXPOSURE TO MANGANESE**

**Session Co-Chairs:** Michael Aschner, PhD  
Thomas Gunter, PhD

**Theme:** This multidisciplinary session will address contemporary research issues associated with the health effects of manganese (Mn) both in humans and animal models. Speakers will discuss recent findings on the specific cellular, molecular, and physiologic mechanisms by which manganese mediates its adverse effects. Speakers will also note factors, such as age, pre-existing disease, and genetics, as conditions that might predispose individuals to enhanced susceptibility to manganese toxicity. The session will span studies in various tissue culture models to non-human primates, incorporating diversity of techniques, from molecular biology to imaging.

**Timely Topics to be Addressed:**

- Consideration of the relevant health issues associated with over exposure to manganese.
- Characterization of exposures
- Development of appropriate biomarkers of exposure.
- Quantifying the relationships between exposure and ill health, including pharmacokinetics.
- Understanding the mechanisms of transport, damage and repair
- Understanding and utilizing invertebrate models such as the *c. elegans* to probe for mechanisms of Mn neurotoxicity

8:30 – 8:40 AM

**Introduction**

Michael Aschner, PhD ~ *Vanderbilt University*

8:40 – 9:10 AM

**Factors that Influence the Pharmacokinetics of Inhaled Manganese**

David Dorman, DVM, PhD ~ *CIIT*

9:10 – 9:40 AM

**Manganese Transport in the CNS**

Michael Aschner, PhD ~ *Vanderbilt University*

9:40 – 10:10 AM

**Characterization of Welding Fumes and their Potential Neurotoxic Effects**

James Antonini, PhD ~ *NIOSH*

10:10 – 10:30 AM Break

10:30 – 11:00 AM

**Discovery of Biomarkers of Manganese Exposure in Humans**

Wei Zheng, PhD ~ *Purdue University*

11:00 – 11:30 AM

**Neurochemical Changes in the Living Non-human Primate Brain following Chronic Manganese Exposure**

Tomás Guilarte, PhD ~ *Johns Hopkins University*

11:30 AM – 1:00 PM Break for Lunch (on your own)

**Wednesday 14 Sept 2005 8:30 AM – 4:00 PM**

**NOTE:**

Attendance at the Developmental Toxicology Technical Workshop is limited to 50 registrants in addition to the 20 invited experts on the panel. Pre-registration is required and attendance will be on a "first-come" basis. Lunch will be provided for the 20 panelists who will work through lunch. Others will have lunch on their own.

**Wednesday 14 Sept 2005 8:30 AM – 4:00 PM**

**Developmental Toxicology Technical Workshop**

**SESSION IX-B. OPTIMIZING THE DESIGN AND INTERPRETATION OF EPIDEMIOLOGICAL STUDIES FOR ASSESSING NEURODEVELOPMENTAL EFFECTS FROM IN UTERO CHEMICAL EXPOSURE**

**Session Chair:** Roger Ladda, MD ~ *Hershey Medical Center*

**Session Theme and Description:** While many epidemiologic studies of children's environmental health have been completed, and more are being planned, a comprehensive critical examination of the methodologies commonly used in past studies has not been conducted. In fact, in some of the completed studies (e.g., those related to pharmaceuticals and environmental chemicals such as lead, methylmercury, and PCBs), the authors have acknowledged the limitations of existing methods. Currently, there is a great deal of interest in conducting additional epidemiologic investigations into environmental chemicals and children's health. For example, the proposed National Children's Study (NCS) is likely to investigate environmental and other factors influencing the health and development of children in utero, through birth, childhood, and into young adulthood.

Therefore, as new studies are being planned, this is an appropriate time to determine whether existing methods as they have been practiced will serve future studies, especially those designed to assess the potential impacts at current exposures. In short, such an examination serves to identify the key methodological factors that ultimately determine the value and strength of future research. Thus, investigators designing new studies will benefit from this thoughtful examination as they develop future study designs and analyze resulting study data. The outcome of this session will provide valuable input not only to the design of future investigations, but also metrics whereby scientists and others can judge the adequacy of reported studies. However, the scope of the session will focus only on scientific methodological issues (i.e., the development of 'best practices' for future study design, conduct, reporting and interpretation); that is, specifically, it will not include an evaluation of conclusions or findings from previous epidemiological studies of environmental health.

The Expert Panel assembled for this session will address a series of topics with related questions prior to, and during, the session. These topics and questions include:

### Study Design:

? What is the best experimental design and methodology to assess the likelihood that *in utero* exposure to an environmental chemical can result in adverse neurodevelopmental effects in newborns that continue into childhood?

? What are the statistical issues that must be addressed to conclude with adequate confidence that an *in utero* exposure to a specific environmental chemical can result in adverse neurodevelopmental effects?

### Measurement Tool:

? What specific measurement tools/tests are best suited and validated for assessing the variety of potential neurodevelopmental and behavioral deficits? What is the known sensitivity, specificity and predictive value of each endpoint being measured? How reproducible is/are the measurement(s)?

? Are there particular sampling strategies or data collection methods that are especially relevant to detecting potential neurodevelopmental effects from *in utero* exposure? What sampling and analysis strategies can be employed to avoid Type II (failure to detect a real effect) errors?

? What is the relationship between the estimated window of exposure and the *nature* of a potential effect, and how might this affect the selection of tests?

? How might data and methods from the field of molecular epidemiology be used to enhance traditional epidemiologic approaches?

### Exposure Assessment:

? Which specific measurement tools and biomarkers are best suited and validated for assessing the nature, extent, and patterns of *in utero* exposure to a particular environmental chemical? How might these differ from tools and biomarkers used to assess post-natal exposure?

? To avoid exposure misclassification or misleading estimates when assessing potential exposure, how frequently should exposure be estimated (i.e., what temporal units should be used for serial exposure measurements)? If appropriate temporal units are chemical- or tissue-specific, what data or criteria should be used to determine the optimal units? How should critical timeframes – critical windows of vulnerability in neurodevelopment - be taken into account when designing an exposure assessment approach?

? How should potential aggregate exposure from multiple routes (inhalation, ingestion, dermal) be addressed? How should potential cumulative exposure to multiple chemicals be addressed? How can trends in exposure and trends in neurodevelopmental outcomes be assessed?

? How long should the subject be followed with appropriate studies (e.g., school age, puberty, reproductive ages)?

### Participant Selection:

? What is the most appropriate and valid way to select and follow exposed and control groups for studies attempting to demonstrate an association between *in utero* exposure to a specific environmental chemical and adverse neurodevelopmental effects?

### Confounders:

? What guidance can be offered with respect to selecting and measuring potential confounders? What criteria should be applied when selecting control variables for inclusion in a multivariate analysis? How should potential mediating factors be identified and analyzed?

? Are there cultural aspects to neurodevelopmental tests that should be considered before use?

### Reporting:

? How is clinical significance versus population significance defined and reported?

? How do researchers address the issue of labeling of children based on study results and how should the study results be reported to parents?

### Research Needs and Recommendation:

? What are the key needs for future research? What are the primary uncertainties and gaps in our knowledge that should be addressed with future research?

### Expert Panel of Participants

Robert W. Amler, MD, FAAP, FACPM  
Dean and Professor, New York Medical College

Stanley Barone, Jr., Ph.D.  
Research Biologist, Effects Identification & Characterization Workgroup  
NCEA/ORD, Neurotoxicology Division, US EPA

Aysenil Belger, Ph.D.  
Associate Professor, Department of Psychiatry, UNC at Chapel Hill

Cheston M. Berlin, Jr., MD (Steering Committee)  
University Professor of Pediatrics, Professor of Pharmacology

Department of Pediatrics, Children's Hospital  
Milton S. Hershey Medical Center

Christopher Cox, Ph.D.  
Professor of Epidemiology, Department of Epidemiology  
Johns Hopkins University

Harry Frank, Ph.D.  
Professor Emeritus of Psychology, The University of Michigan

Michael Goodman, MD, MPH  
Assistant Professor, Department of Epidemiology  
Emory University School of Public Health

Jean Harry, Ph.D.  
Head, Neurotoxicology Group, Laboratory of Neurobiology  
National Institute of Environmental Health Sciences

Stephen R. Hooper, Ph.D.  
Professor of Psychiatry, Research Professor of Psychology, Clinical  
Professor of Education  
Associate Director of the Center for Development and Learning  
Director, Child and Adolescent Neuropsychology Consultation Program  
Clinical Center for the Study of Development and Learning  
University of North Carolina School of Medicine

Roger Ladda, MD, Workshop Chair  
David S. and Amy S. Goldberg Professor of Genetics and Pediatrics  
Chief, Division of Human Genetics, Growth and Development  
Milton S. Hershey Medical Center  
Pennsylvania State University College of Medicine

Judy S. LaKind, Ph.D. (Steering Committee)  
LaKind Associates, LLC  
Hershey Medical Center, Penn State College of Medicine  
University of Maryland School of Medicine

Paul H. Lipkin, M.D.  
Assistant Professor of Pediatrics  
The Johns Hopkins University School of Medicine

Lewis P. Lipsitt, Ph.D.  
Professor Emeritus of Psychology, Medical Science, & Human  
Development  
Research Professor of Psychology  
Department of Psychology, Brown University

Matthew N. Lorber  
National Center for Environmental Assessment, US EPA

Ann M. Mason (Steering Committee)  
Managing Director  
Research Foundation for Health and  
Environmental Effects

Gary Myers, MD  
Professor of Neurology and Pediatrics, Division of Pediatric Neurology  
University of Rochester Medical Center

Larry L. Needham, Ph.D.  
Chief, National Center of Environmental Health  
Division of Environmental Health Laboratory Sciences  
Centers for Disease Control and Prevention

Theodore D. Wachs, Ph.D.  
Professor, Dept of Psychological Sciences, Purdue University

Janice W. Yager, Ph.D., MPH (Steering Committee)  
Research Program Manager  
Environment Division  
Electric Power Research Institute

**Wednesday Morning 14 Sept 2005 8:30 AM – 11:30 AM**

**Platform Session**

**SESSION IX-C: NEUROTOXICITY OF MIXTURES, SOLVENTS, AND METALS IN VIVO AND IN VITRO**

**Session Co-Chairs:** Evelyn Tiffany-Castiglioni, PhD  
Virginia Moser, PhD

**Theme:** Session IX-C will present an overview of the neurotoxicity of mixtures and multiple agents, including insecticides, metals, and solvents. Topics will include both in vivo and in vitro approaches for understanding the mechanisms and toxicologic interactions of organophosphate (OP) compounds in vivo and in vitro. The influence of age (young vs. adult) as well as dose sequence on the outcome of OP pesticide mixtures will be described. State-of-the-art physiologically based pharmacokinetic and pharmacodynamic (PBPK/PD) modeling approaches will be illustrated for OP compounds. Talks will also focus on in vitro models for screening and investigating interactions of complex mixtures and multiple sequential agents, as well as neurotoxicity of solvents and copper. The focus of in vitro studies will be mechanisms and relevance to neurologic disease.

8:30 – 8:35 AM  
**Overview**  
Virginia Moser, PhD ~ USEPA

8:35 – 8:55 AM  
**Comparison of the Non-Additive Interactions of an Organophosphorus Pesticide Mixture in Adult and Prewaning Rats**  
Virginia Moser, PhD ~ NTD/NHEERL/ORD, US EPA, RTP, NC USA

8:55 – 9:15 AM  
**Exposure Sequence Influences Cholinergic Toxicity in Neonatal Rats Exposed To Two Organophosphorus Insecticides**  
Carey N. Pope, PhD ~ Oklahoma State University, OK, USA

9:15 – 9:35 AM  
**Effects of Binary or Ternary Mixtures of Organophosphates on Esterases In Vitro**  
Janice E Chambers, PhD ~ Mississippi State University, MS, USA

9:35 – 9:55 AM  
**In Vitro Models for Assessing Neurotoxicity of Mixtures**  
Evelyn Tiffany-Castiglioni, PhD ~ Texas A&M University, TX, USA

9:55 – 10:15 AM Break

10:15 – 10:35 AM  
**Dietary Copper Supplementation Enhances the Peripheral Myelinopathy Produced by Dithiocarbamates in Rats**  
William M. Valentine, PhD, DVM ~ Vanderbilt University Medical Center, TN, USA

10:35 – 10:55 AM  
**Copper-Regulated APP Expression in Human Astrocytoma Cells**  
Yongchang Qian, PhD ~ Texas A&M University, TX, USA

10:55 – 11:30 AM  
**Discussion, Session Summary and Research Needs**

11:30 AM – 1:00 PM Break for Lunch (on your own)

**Wednesday Afternoon 14 Sept 2005 1:00 – 3:45 PM**

**Symposium – continued**

**SESSION IX-A. CONTEMPORARY HEALTH ISSUES ASSOCIATED WITH OVER EXPOSURE TO MANGANESE**

**Session Co-Chairs:** Tomás Guilarte, PhD  
Anumantha Kanthasamy, PhD

1:00 – 1:30 PM  
**MN<sup>2+</sup> Interference With CA<sup>2+</sup> Activation of ATP Production by Mitochondria: A Novel Hypothesis of MN Neurotoxicity**  
Thomas Gunter, PhD ~ University of Rochester

1:30 – 2:00 PM  
**The Role of Prion Protein in Manganese Neurotoxicity**  
Anumantha Kanthasamy, PhD ~ Iowa State University

2:00 – 2:30 PM  
**Manganese-induced Dopamine Neurodegeneration in *C. elegans*: Pharmacogenetic Analysis in a Novel Model of Manganism**  
Richard Nass, PhD ~ Vanderbilt University

2:30 – 2:50 PM Break

2:50 – 3:20 PM  
**A Study of the Nervous System in Welders**  
Dag Ellingsen, MD, PhD ~ National Institute of Occupational Health, Oslo, Norway

3:20 – 3:45 PM  
**Discussion, Session Summary and Research Needs**

**Wednesday Afternoon 14 Sept 2005 1:00 – 4:00 PM**

**Platform Session**

**SESSION X: ENVIRONMENTAL TOXICANTS AND DISEASES**

**Co-Chairs:** Toshio Narahashi, PhD ~ Northwestern University  
Prasada Kodavanti, PhD ~ EPA

**Theme:** Environmental agents not only could cause direct toxic effects on humans but also are suspected to be related to various diseases.

These direct and indirect effects are in most cases the result of interactions with specific target receptors or molecules. This session deals with a few examples of such studies ranging from pesticides/heavy metals to Alzheimer's disease/peripheral myelinopathy.

1:00 – 1:05 PM

**Overview**

Toshio Narahashi, PhD ~ *Northwestern University Medical School*

1:05 – 1:25 PM

**Studies of Autoimmune and Neurological Diseases in Communities Concerned About Environmental Exposures**

Dee Williamson, PhD ~ *Agency for Toxic Substances and Disease Registry*

1:25 – 1:45 PM

**Role of Neuroreceptors in Selective Toxicity of Insecticides In Insects and Mammals**

Toshio Narahashi, PhD ~ *Northwestern University Medical School*

1:45 – 2:05 PM

**Developmental Pesticide Exposure Alters the Dopaminergic System and Increases MPTP Toxicity**

Jason R. Richardson, PhD ~ *Environmental and Occupational Health Sciences Institute*

2:05 – 2:25 PM Break

2:25 – 2:45 PM

**Effects of Peripheral Inflammation on the Dopaminergic Toxicity of the Fungicide Maneb in Two Strains of Mice.**

Nick M. Filipov, PhD ~ *College of Veterinary Medicine Mississippi State*

2:45 – 3:05 PM

**Gamma-Interferon (IFN $\gamma$ ) Causes Dendritic Retraction in Sympathetic Neurons *In Vivo***

Pamela J. Lein, PhD ~ *Oregon Health & Science University*

3:05 – 3:25 PM

**Alzheimer's Drug Modulation of Nicotinic Receptors and NMDA Receptors: Basis for Therapeutic Effects**

Toshio Narahashi, PhD ~ *Northwestern University Medical School*

3:25 – 4:00 PM

**Discussion, Session Summary and Research Needs**

**Thursday Morning & Afternoon - 15 Sept 2005 9 AM – 3:30 PM**

**8:45 AM Board Buses**

**9:00 AM Buses Depart for EPA**

**Post-Conference Tours of CIIT Centers for Health Research and the US Environmental Protection Agency Laboratories**

**9:00 AM**

**Buses to EPA**

**Tour EPA Laboratories ~ Organized by Ginger Moser**

**11:30 AM Lunch in EPA Cafeteria**

**12:30 PM**

**Buses to CIIT**

**CIIT Demonstrations and Tours ~ Organized by David Dorman**

- P-73**  
**AUTISM AND ENVIRONMENTAL GENOMICS.** MR Herbert\*, JP Russo, S Yang, J Roohi, M Blaxill, SG Kahler, L McCoy, DA Ziegler, E Hatchwell. \*CMA & Pediatric Neurology, Massachusetts General Hospital, Harvard Medical School, Charlestown MA, USA.
- P-74**  
**A NEW DEVELOPMENTAL NEUROTOXICITY STUDY FOCUSING ON THE FETAL BRAIN: EVALUATION OF A RAT AUTISM MODEL INDUCED BY VALPROATE AND THALIDOMIDE.** T.Ogawa<sup>1</sup>, M.Kuwagata<sup>2</sup>, S.Shioda<sup>1</sup>. <sup>1</sup>Department of Anatomy, Showa University School of Medicine, Tokyo, Japan and <sup>2</sup>Hatano Research Institute, FDSC, Kanagawa, Japan.
- P-75**  
**CULTURED LYMPHOCYTES FROM AUTISTIC PATIENTS AND NON-AUTISTIC SIBLINGS UPREGULATE HEAT SHOCK PROTEIN RNA IN RESPONSE TO THIMEROSAL CHALLENGE.** SJ Walker. Department of Physiology and Pharmacology, Wake Forest University School of Medicine, Winston-Salem, North Carolina, USA.
- P-76** *Post-Doctoral Student (Group 1)*  
**A DIRECT COMPARISON OF ALGORITHM-BASED AND LITERATURE-BASED SYSTEMS BIOLOGY APPROACHES: APPLICATIONS IN NEURODEVELOPMENT.** Julia M. Gohlke, Fredrick M. Parham, Christopher J. Portier. Environmental Systems Biology Group, Laboratory of Molecular Toxicology, National Institute of Environmental Health Sciences, RTP, NC, USA.
- P-77** *Post-Doctoral Student (Group 1)*  
**EVALUATING THE NMDA-GLUTAMATE RECEPTOR AS A SITE OF ACTION FOR TOLUENE USING PATTERN ELICITED VISUAL EVOKED POTENTIALS.** AS Bale<sup>1</sup>, QT Krantz<sup>2</sup>, PJ Bushnell<sup>1</sup>, TJ Shafer<sup>1</sup> and WK Boyes<sup>1</sup>. <sup>1</sup>Neurotoxicology Division and <sup>2</sup>Experimental Toxicology Division, US Environmental Protection Agency, Research Triangle Park, NC
- P-78**  
**RX FOR PREVENTION: PEDIATRIC ENVIRONMENTAL HEALTH TOOLKIT PILOT STUDY FINDINGS.** Kathleen Schuler, MHP, Environmental Scientist, Institute for Agriculture and Trade Policy, 2105 First Av. S, Minneapolis, MN, USA.
- P-79** *Post-Doctoral Student (Group 1)*
- APPLICATION OF MAGNETIC RESONANCE IMAGING IN DEVELOPMENTAL NEUROTOXICITY TESTING: A PILOT STUDY.** K. Johnson<sup>1</sup>, L. Ryan<sup>2</sup>, J. Davis<sup>3</sup>, A. Elmore<sup>3</sup>, B. Guenther<sup>2</sup>, J. Marcus<sup>1</sup> and R. Maronpot<sup>1</sup>. <sup>1</sup>Laboratory of Experimental Pathology, National Institute of Environmental Health Sciences/NIH/DHHS, RTP, NC, USA, <sup>2</sup>MRPath, Inc., Durham, NC, USA, <sup>3</sup>Integrated Laboratory Systems, Inc., RTP, NC, USA.
- P-80** *Post-Doctoral Student (Group 1)*  
**THE INFLUENCE OF ENVIRONMENTAL FACTORS ON CRITICAL PERIOD PLASTICITY IN RATS AUDITORY CORTEX - IMPLICATIONS FOR DEVELOPMENTAL DISORDERS?** Tal Kenet<sup>1</sup>, Isaac Pessah<sup>2</sup> and Michael Merzenich<sup>1</sup>. <sup>1</sup>University of California, San Francisco, CA, USA; <sup>2</sup>University of California, Davis, CA, USA.
- P-81**  
**A STUDY OF LEAD LEVELS IN BREAST FED INFANTS AND THEIR MOTHERS.** M. M. Ahmed, D. A. Salem\*, Zeinab, M. Mohie-El-Din and Asmaa, S. G. Mohamed \* Department of Toxicology and Forensic Medicine, Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt ([diefysalem57@yahoo.com](mailto:diefysalem57@yahoo.com)). Department of Pediatric, Assiut University Hospital, Faculty of Medicine, Assiut Univ., Assiut, Egypt.
- P-82** *Post-Doctoral Student (Group 1)*  
**EFFECTS OF METHYLMERCURY ON MITOCHONDRIAL FUNCTION, REACTIVE OXYGEN SPECIES FORMATION AND CYTOSOLIC CALCIUM LEVELS IN STRIATAL SYNAPTOSOMES FROM RAT.** A. Dreiem<sup>1</sup>, R. F. Seegal<sup>1,2</sup>. <sup>1</sup>New York State Department of Health, Wadsworth Center, Albany, NY, USA. <sup>2</sup>School of Public Health, University at Albany, Albany, NY, USA.
- P-83**  
**BENCHMARK CONCENTRATIONS FOR METHYL MERCURY OBTAINED FROM THE 9-YEAR FOLLOW-UP OF THE SEYCHELLES CHILD DEVELOPMENT STUDY.** E van Wijngaarden, C Beck, PW Davidson, and GJ Myers. Departments of Community and Preventive Medicine (EVW), Biostatistics and Computational Biology (CB), and Pediatrics (PWD, GJM) and Neurology (GJM), University of Rochester School of Medicine and Dentistry, Rochester, New York, United States.
- P-84** *Post-Doctoral Student (Group 1)*
- INCREASED SENSITIVITY TO PENTOBARBITAL ON THE BEHAVIOR OF RATS EXPOSED TO METHYLMERCURY AND SELENIUM.** W.D. Donlin, Ph.D. and M.C. Newland, Ph.D. <sup>†</sup> Department of Psychiatry & Behavioral Sciences, Johns Hopkins School of Medicine, Baltimore, MD, USA. <sup>†</sup>Department of Psychology, Auburn University, Auburn, AL, USA.
- P-85**  
**A NEW DEVELOPMENTAL NEUROTOXICITY STUDY FOCUSING ON THE FETAL BRAIN: EVALUATION OF A RAT AUTISM MODEL INDUCED BY VALPROATE AND THALIDOMIDE.** T.Ogawa<sup>1</sup>, M.Kuwagata<sup>2</sup>, S.Shioda<sup>1</sup>. <sup>1</sup>Department of Anatomy, Showa University School of Medicine, Tokyo, Japan and <sup>2</sup>Hatano Research Institute, FDSC, Kanagawa, Japan.
- P-86** *Post-Doctoral Student (Group 1)*  
**CHLORPYRIFOS AFFECTS NEURONAL CELL REPLICATION AND PHENOTYPIC OUTCOMES.** RR Jameson, FJ Seidler, D Qiao and TA Slotkin, Dept. of Pharmacology & Cancer Biology, Integrated Toxicology Program, Duke Univ. Med. Ctr., Durham NC, USA.
- P-87**  
**USE OF ANIMAL TOXICITY DATA TO PREDICT ACUTE EFFECTS OF ORGANIC SOLVENTS ON PUBLIC HEALTH.** PJ Bushnell, VA Benignus, WK Boyes, TJ Shafer and AS Bale. Neurotoxicology Division, NHEERL, U.S. Environmental Protection Agency, Research Triangle Park, NC, USA.
- P-88** *Post-Doctoral Student (Group 1)*  
**CUMULATIVE RISK OF PYRETHROIDS: RELATIVE POTENCIES FOR ACUTE EFFECTS ON MOTOR FUNCTION IN RATS.** M. J. Wolansky<sup>1</sup>, C. Gennings<sup>2</sup> and K. M. Crofton<sup>3</sup>. <sup>1</sup>National Research Council, Research Triangle Park (RTP), NC; <sup>2</sup> Department of Biostatistics, Virginia Commonwealth University, Richmond, VA, USA; <sup>3</sup>Neurotoxicology Division, National Health and Environmental Effects Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, RTP, NC, USA.
- P-89** *Post-Doctoral Student (Group 1)*  
**HYDROGEN SULFIDE EXPOSURE REDUCES THE INTRACELLULAR BUFFERING CAPACITY OF RAT NASAL OLFACTORY EPITHELIAL CELLS.** E. S. Roberts, V. A. Wong, B. E. McManus, and D. C. Dorman. CIIT

Centers for Health Research, Research Triangle Park, NC, USA.

**P-90**  
**DEVELOPMENTAL NEUROTOXICITY OF METHYLMERCURY AND METHYLAZOXYMETHANOL: BODY WEIGHT, MOTOR ACTIVITY AND BRAIN DAMAGE COMBINED.** \*Didima de Groot<sup>1</sup>, Marja Moerkens<sup>1</sup>, Renate Janskin<sup>1</sup>, Marlies Otto<sup>1</sup>, Linda van de Horst<sup>1</sup>, Marga Bos-Kuijpers<sup>1</sup>, Ine Waalkens<sup>1</sup>, James O'Callaghan<sup>2</sup>, Hans-Jorgen Gundersen<sup>3</sup>, Wolfgang Kaufmann<sup>4</sup>, Jan Lammers<sup>1</sup>, Bente Pakkenberg<sup>5</sup>. <sup>1</sup>TNO Quality of Life, Zeist, NL; <sup>2</sup>NIOSH, Morgantown, USA; <sup>3</sup>University of Aarhus, DK; <sup>4</sup>BASF, Ludwigshafen, FRG; <sup>5</sup>Research Laboratory for Stereology & Neuroscience, Copenhagen, DK

**P-91** Pre-Doctoral Student (Group 2)  
**DEVELOPMENTAL EXPOSURE TO METHYLMERCURY AND N-3 FATTY ACIDS: PERFORMANCE ON SPATIAL AND VISUAL DISCRIMINATION REVERSAL TASKS IN ADULT AND AGED RATS.** JJ Day<sup>1</sup>, EM Paletz<sup>2</sup>, MC Craig-Schmidt<sup>3</sup>, & MC Newland<sup>4</sup>. <sup>1</sup>Department of Psychology, University of North Carolina at Chapel Hill, Chapel Hill, NC. <sup>2</sup>Department of Psychiatry, University of Wisconsin at Madison, Madison, WI, USA. <sup>3</sup>Nutrition and Food Science, Auburn University, Auburn, AL, USA. <sup>4</sup>Department of Psychology, Auburn University, Auburn, AL, USA.

**P-92** Pre-Doctoral Student (Group 2)  
**INVOLVEMENT OF THE GABA<sub>A</sub> RECEPTOR IN METHYLMERCURY-INDUCED DISRUPTION OF Ca<sup>2+</sup> HOMEOSTASIS IN CEREBELLAR SLICES.** Jayme D. Mancini and William D. Atchison. Dept. Pharm/Tox and Neurosci. Prgrm. Mich. State Univ., Coll. Osteopathic Med., E. Lansing, MI, USA.

**P-93**  
**HPLC-BASED METHOD FOR MEASUREMENT OF COPPER IN BIOLOGICAL SAMPLES.** V. Amarnath, Kalyani Amarnath, Holly Valentine, and William Valentine. Department of Pathology, Vanderbilt University Medical Center, Nashville, TN 37232 USA.

**P-94** Pre-Doctoral Student (Group 2)  
**SPATIAL DISCRIMINATION IN RATS CONTINUALLY EXPOSED TO SELENIUM AND GESTATIONALLY EXPOSED TO METHYLMERCURY.** Erin F. Pesek, Miranda Reed, and M. C. Newland, Ph.D. Department of Psychology, Auburn University, Alabama, U.S.A.

**P-95** Pre-Doctoral Student (Group 2)  
**EFFECTS OF METHYLMERCURY ON THE CRITICAL FUSION FREQUENCY OF RATS.** John C. Heath MS, M.C., Newland PhD. Department of Psychology, Auburn University, Alabama, USA.

**P-96**  
**TOXIC EFFECTS OF METHYLMERCURY IN YOUNG DROSOPHILA ARE AMELIORATED BY THE EXPRESSION OF ALZHEIMER'S BETA-AMYLOID PEPTIDES.** T Gangi<sup>1</sup>, A Halladay<sup>2</sup>, K Reuhl<sup>2</sup>, M Konsolaki<sup>1</sup>. Rutgers, The State University of New Jersey, Departments of <sup>1</sup>Genetics and <sup>2</sup>Pharmacology & Toxicology, Piscataway, NJ, USA.

**P-97** Pre-Doctoral Student (Group 2)  
**MOTOR FUNCTION AND TISSUE LEVELS IN DAMS CHRONICALLY EXPOSED TO METHYLMERCURY AND SELENIUM.** Miranda N. Reed and M.C. Newland. Auburn University, Behavioral Toxicology Lab., Auburn, AL, USA.

**P-98** Pre-Doctoral Student (Group 2)  
**BEHAVIORAL EFFECTS OF COCAINE & DESIPRAMINE FOR RATS GESTATIONALLY EXPOSED TO METHYLMERCURY AND SELENIUM.** Miranda N. Reed & M.C. Newland. Auburn University, Behavioral Toxicology Lab., Auburn, AL, USA.

**P-99**  
**USE OF MAGNETIC RESONANCE IMAGING (MRI) TO DETERMINE BRAIN MANGANESE DEPOSITION IN MALE SPRAGUE-DAWLEY RATS.** VA Fitsanakis<sup>1</sup>, N Zhang<sup>2</sup>, KM Erikson<sup>3</sup>, JC Gore<sup>2</sup> and M Aschner<sup>1,4</sup>. <sup>1</sup>Department of Pediatrics, Vanderbilt University School of Medicine, Nashville, TN, USA. <sup>2</sup>Vanderbilt University Institute of Imaging Science, Vanderbilt University Medical Center, Nashville, TN, USA. <sup>3</sup>Department of Nutrition, University of North Carolina—Greensboro, Greensboro North Carolina, USA. <sup>4</sup>Department of Pharmacology and the Kennedy Center, Vanderbilt University Medical Center, Nashville, TN, USA.

**P-100** Pre-Doctoral Student (Group 2)  
**ANTIOXIDANT PROTECTION AGAINST MeHg-INDUCED NEUROTOXICITY IN VIVO AND IN VITRO.** M. Polunas<sup>1,2</sup>, A.K. Halladay<sup>1,2</sup>, G.C. Wagner<sup>1,3</sup> and K.R. Reuhl<sup>1,2</sup>,

Joint Graduate Program in Toxicology<sup>1</sup>, Department of Pharmacology and Toxicology<sup>2</sup>, and Department of Psychology<sup>3</sup>, Rutgers University, Piscataway, NJ, USA.

**P-101** Pre-Doctoral Student (Group 2)  
**EFFECT OF PRION PROTEINS ON MANGANESE-INDUCED OXIDATIVE INSULT AND MITOCHONDRIAL DYSFUNCTION.** Christopher Choi, Vellareddy Anantharam, Arthi Kanthasamy and Anumantha Kanthasamy, Department of Biomedical Sciences, College of Veterinary Medicine, Iowa State University, Ames, IA, USA.

**P-102**  
**METHYL MERCURY (MeHg) EXPOSURE ALTERS NEUROGENESIS SELECTIVELY IN THE NEONATAL RAT HIPPOCAMPUS.** A Falluel-Morel<sup>1</sup>, X Zhou<sup>1</sup>, A Litterman<sup>1</sup>, KR Reuhl<sup>2</sup> and E DiCicco-Bloom<sup>1</sup>. <sup>1</sup>Department of Neuroscience and Cell Biology, Robert Wood Johnson Medical School – UMDNJ, Piscataway, NJ, USA. <sup>2</sup> Department of Toxicology and Pharmacology, Rutgers, Piscataway, NJ, USA.

**P-103** Pre-Doctoral Student (Group 2)  
**TIME COURSE OF METHYLMERCURY BLOCK OF GABA<sub>A</sub> RECEPTOR CURRENTS IS NOT CHANGED BY FLUMAZENIL IN RAT CORTICAL CELLS IN CULTURE.** C. Herden, Y. Yuan, and W.D. Atchison. Neuroscience Program and Department of Pharmacology & Toxicology, Michigan State University, East Lansing, MI, USA.

**P-104** Pre-Doctoral Student (Group 2)  
**CELLULAR REPOPULATION OF THE MURINE HIPPOCAMPUS FOLLOWING TRIMETHYLTIN INJURY.** BC Weig, HE Lowndes, KR Reuhl. Department of Pharmacology and Toxicology, and Joint Graduate Program in Toxicology, Rutgers University and University of Medicine and Dentistry of New Jersey, USA.

**P-105**  
**MICROGLIA ACTIVATION AND FATE FOLLOWING TMT-INDUCED NEURODEGENERATION IN THE MOUSE HIPPOCAMPUS.** C.A. McPherson, R.N. Wine, C.L. d'Hellencourt and G.J. Harry. NIEHS, NIH, DHHS, Laboratory of Neurobiology, Research Triangle Park, NC, USA.

**P-106** Pre-Doctoral Student (Group 2)  
**METHYLMERCURIC CHLORIDE AND PSYCHOGENIC STRESSORS DIFFERENTIALLY ACTIVATE c-FOS EXPRESSION IN THE MURINE BRAIN.** Joel F. Cooper and Alexander W. Kusnecov. Joint

Graduate Program in Toxicology, Rutgers University/ UMDNJ, Piscataway, New Jersey, USA.

**P-107** Pre-Doctoral Student (Group 2)  
**BACKGROUND LEVELS OF HEAVY METALS ON FETAL GROWTH AND NEONATAL NEURODEVELOPMENT.** HC Wu,<sup>1</sup> YH Hwang,<sup>1</sup> SF Jeng,<sup>2</sup> WS Hsieh,<sup>3</sup> HF Liao,<sup>2</sup> YN Su,<sup>3</sup> FC Su,<sup>1</sup> and PC Chen.<sup>1</sup> <sup>1</sup>National Taiwan University College of Public Health; <sup>2</sup>National Taiwan University College of Medicine; <sup>3</sup>National Taiwan University Hospital, Taipei, Taiwan.

**P-108** Pre-Doctoral Student (Group 3)  
**EXPLORING THE RISK OF CHLORPYRIFOS ON FETAL GROWTH AND NEONATAL NEURODEVELOPMENT.** CJ Hsieh,<sup>1</sup> HP Li,<sup>2</sup> WS Hsieh,<sup>3</sup> SF Jeng,<sup>4</sup> HF Liao,<sup>4</sup> YN Su,<sup>3</sup> SN Yu,<sup>1</sup> and PC Chen.<sup>1</sup> <sup>1</sup>National Taiwan University College of Public Health; <sup>2</sup>Taiwan Agricultural Chemicals and Toxic Substances Research Institute; <sup>3</sup>National Taiwan University Hospital; <sup>4</sup>National Taiwan University College of Medicine, Taiwan

**P-109** Pre-Doctoral Student (Group 3)  
**RYANODINE RECEPTOR TYPE 1 (RYR1) POSSESSING MALIGNANT HYPERTHERMIA MUTATION R615C EXHIBITS HEIGHTENED SENSITIVITY TO DYSREGULATION BY NONCOPLANAR PCB 95.** Tram-Anh N. Ta and Isaac N. Pessah. VM: Molecular Biosciences and UC Davis Center for Children's Environmental Health and Disease Prevention, University of California, Davis, CA

**P-110** Pre-Doctoral Student (Group 3)  
**AROCLOR 1254 MAY INDUCE LONG-TERM ALTERATIONS IN CENTRAL VASOPRESSIN RELEASE BY INHIBITING NITRIC OXIDE SYNTHESIS WITHIN THE SUPRAOPTIC NUCLEUS.** C.G. Coburn<sup>1</sup>, B. Hou, L. Lin, C. Cheatham, E.R. Gillard, O. Loson, D. Prodon and M.C. Curras-Collazo<sup>2</sup> <sup>1</sup>Environmental Toxicology Program and <sup>2</sup>Department of Cell Biology & Neuroscience, University of California at Riverside, Riverside, California, USA.

**P-111**  
**SEXUALLY DIMORPHIC GENE EXPRESSION PATTERNS IN THE DEVELOPING MOUSE EMBRYONIC BRAINS EXPOSED TO 2,3,7,8-TETRACHLORODIBENZO-*p*-DIOXIN.** Y Kagami<sup>1</sup>, T Mitsui<sup>2</sup>, and S Maeda<sup>2</sup>. <sup>1</sup> Ecogenomics, Inc., Fukuoka, Japan. <sup>2</sup> Department of Biochemistry, University of Yamanashi, Yamanashi, Japan.

**P-112** Pre-Doctoral Student (Group 3)

**MANCOZEB AND MANEB NEUROTOXICITY IN MESENCEPHALIC CELLS: POSSIBLE RISK FACTOR FOR PARKINSONISM.** LM Domico<sup>1</sup>, GD Zeevalk<sup>2</sup>, B Buckley<sup>3</sup>, B Winnik<sup>3</sup>, MJ Thiruchelvam<sup>1</sup>, KR Cooper<sup>1</sup>. <sup>1</sup>Joint Graduate Program in Toxicology, Rutgers, The State University of New Jersey, Piscataway, NJ, USA. <sup>2</sup>Neurology Department, University of Medicine and Dentistry of New Jersey, Piscataway, NJ, USA. <sup>3</sup>Environmental and Occupational Health Sciences Institute, Rutgers/UMDNJ, Piscataway, NJ, USA.

**P-113** Pre-Doctoral Student (Group 3)  
**CONCENTRATION DEPENDENT ACCUMULATION OF [<sup>3</sup>H]-DELTAMETHRIN IN XENOPUS LAEVIS OOCYTES.** J. A. Watkins<sup>1</sup>, C. A. Meacham<sup>2</sup>, A. S. Bale<sup>2</sup>, K. M. Crofton<sup>2</sup>, T. J. Shafer<sup>2</sup> <sup>1</sup>North Carolina State University, Raleigh, NC, USA. <sup>2</sup>Neurotoxicology Div., NHEERL, ORD, U.S. EPA, Res. Tri. Park, NC, USA.

**P-114** Pre-Doctoral Student (Group 3)  
**DELTAMETHRIN INDUCED ALTERATIONS IN THE TRANSCRIPTION OF CALCIUM RESPONSIVE AND IMMEDIATE EARLY GENES IN VIVO.** J A Harrill<sup>1</sup>, K M Crofton<sup>2</sup>. <sup>1</sup> Curriculum in Toxicology, University of North Carolina, Chapel Hill, NC, USA; <sup>2</sup> Neurotoxicology Division, NHEERL, ORD, USEPA, RTP, NC, USA.

**P-115**  
**ADULT AND JUVENILE RAT SODIUM CHANNEL (NAV1.2 AND NAV1.3) SENSITIVITY TO THE PYRETHROID INSECTICIDE DELTAMETHRIN.** C.A.Meacham<sup>1</sup>, P.D. Brodfuehrer<sup>2</sup>; A.S.Bale<sup>1</sup>; J.Watkins<sup>3</sup>; K.M.Crofton<sup>1</sup>; and T.J.Shafer<sup>1</sup> <sup>1</sup>Neurotoxicology Div., NHEERL, ORD, U.S. EPA, Res. Tri. Park, NC, USA. <sup>2</sup> Biol. Dept., Bryn Mawr Col., Bryn Mawr, PA, USA. <sup>3</sup> North Carolina State University, Raleigh, NC, USA.

**P-116** Pre-Doctoral Student (Group 3)  
**POLYCHLORINATED BIPHENYLS EXERT SELECTIVE EFFECTS ON WHITE MATTER COMPOSITION IN A MANNER INCONSISTENT WITH HYPOTHYROIDISM.** David S. Sharlin and R. Thomas Zoeller. Morrill Science Center/Biology Department, University of Massachusetts at Amherst, USA.

**P-117** Pre-Doctoral Student (Group 3)

**AGE-RELATED DIFFERENCES OF ACETYLCHOLINESTER-ASE INHIBITION FROM TWELVE ORGANOPHOSPHATE INSECTICIDES.** Edward C. Meek, Howard Chambers, Alper Coban, Benjamin E. Hurley, Jay Pittman, Kristin R. White, and Janice E. Chambers. Center for Environmental Health Sciences, College of Veterinary Medicine, Mississippi State, MS, USA.

**P-118** Pre-Doctoral Student (Group 3)  
**MATERNAL DDT CONCENTRATIONS AND SEX RATIO OF OFFSPRING.** TA Jusko<sup>1</sup>, PA Shaw<sup>2</sup>, TA Greenfield<sup>3</sup>, MJ Charles<sup>4</sup>, and I Hertz-Picciotto<sup>3</sup>. Department of Epidemiology<sup>1</sup> and Biostatistics<sup>2</sup>, University of Washington, Seattle, WA, USA; Division of Epidemiology<sup>3</sup> and Department of Environmental Toxicology<sup>4</sup>, University of California-Davis, Davis, CA, USA.

**P-119** Pre-Doctoral Student (Group 3)  
**EXPOSURE TO MIXTURES OF ENDOSULFAN AND ZINEB INDUCES APOPTOTIC CELL DEATH IN NEURONAL CELLS (SH-SY5Y), IN VITRO.** Z Jia<sup>1</sup> and HP Misra<sup>1, 2</sup>. <sup>1</sup>Virginia-Maryland Regional College of Veterinary Medicine, Virginia Tech, Blacksburg, VA; <sup>2</sup>Edward Via Virginia College of Osteopathic Medicine, Blacksburg, VA USA.

**P-120**  
**ALTERED GENE EXPRESSION AND GROWTH RESTRICTION IN FETAL BRAIN FOLLOWING EXPOSURE TO THE WATER DISINFECTANT BYPRODUCT (DBP); CHLOROACETONITRILE (CAN).** A E Ahmed, S Jacob, T Wood, and H Fouad. Dept of Pathology and Molecular Genomics Facility, University of Texas Medical Branch, Galveston, TX, USA.

**P-121** Pre-Doctoral Student (Group 4)  
**DEVELOPMENTAL EFFECTS OF ETHANOL IN THE JAPANESE MEDAKA FISH (*Oryzias latipes*): WINDOWS OF VULNERABILITY.** S. Oxendine<sup>1,2</sup>, D.E. Hinton<sup>3</sup>, J. Cowden<sup>1</sup>, and S. Padilla<sup>1</sup>. Neurotox. Div., U.S. EPA, RTP, NC, USA; <sup>2</sup>Curr. in Toxicol., UNC-CH, Chapel Hill, and <sup>3</sup>Nicholas School of the Environ., Duke Univ., Durham, NC, USA.

**P-122** Pre-Doctoral Student (Group 4)  
**INDUCTION OF C-FOS AND BEHAVIORAL ASSESSMENT IN C57BL/6J AFTER TREATMENT WITH CUPRIZONE** Urbach D., Kusnecov A.W. Joint Graduate Program in Toxicology, Rutgers University and University of Medicine and Dentistry of New Jersey, Piscataway, New Jersey, USA.

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**BEHAVIORAL EFFECTS OF DIRECT EXPOSURE OF CNS TO HYPER-IL-6 IN THE PERINATAL CD-1 MOUSE.** S.H. Brunssen<sup>1\*</sup>, S.S. Moy<sup>1</sup>, G.J. Harry<sup>2</sup>. <sup>1</sup>University of North Carolina, Chapel Hill, NC, USA; <sup>2</sup>NIEHS, NIH, DHHS, RTP, NC, USA.

P-124 Pre-Doctoral Student (Group4)

**POTENTIATING EFFECT OF THE K<sup>+</sup><sub>ATP</sub> CHANNEL BLOCKER GLIBENCLAMIDE ON THE NEUROTOXICITY OF MITOCHONDRIAL COMPLEX I INHIBITORS.** J. Kou and JR Bloomquist. Neurotoxicology Laboratory, Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, U.S.A.

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**THE NEW APPROACH FOR THE EFFECTS OF THE TOXIC CHEMICAL EXPOSURE ON THE PROLIFERATION OF EMBRYONIC STEM CELLS IN THE DEVELOPMENTAL NEUROTOXICITY STUDY.** M. Kuwagata, T Ogawa and S. Shioda Department of Anatomy I, Showa University School of Medicine, Tokyo, Japan.

P-126 Pre-Doctoral Student (Group4)

**HUMAN ALPHA-7 NICOTINIC ACETYLCHOLINE RECEPTORS EXPRESSED IN XENOPUS OOCYTES ARE INHIBITED BY TRICHLOROETHYLENE (TCE).** R. Giddings<sup>1</sup>, CA Meacham<sup>2</sup>, AS Bale<sup>2</sup>, PJ Bushnell<sup>2</sup>, and TJ Shafer<sup>2</sup>. 1. Curriculum in Toxicology, University of North Carolina, Chapel Hill, NC, USA. 2. Neurotoxicology Division, NHEERL, ORD, US EPA, RTP, NC, USA.

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**CYTOKINE RECEPTOR EXPRESSION AND GLIAL CONTACT FOLLOWING ACUTE HIPPOCAMPAL INJURY.** Robert N. Wine<sup>1</sup>, Christian Lefebvre d'Hellencourt<sup>2</sup>, Christopher A. McPherson<sup>1</sup>, and G. Jean Harry<sup>1</sup>. <sup>1</sup>Laboratory of Neurobiology, NIEHS, NIH, DHHS, Research Triangle Park, NC, USA. <sup>2</sup>Universite de La Reunion, Reunion-France-DOM.

P-128 Pre-Doctoral Student (Group4)

**ANIMAL MODEL OF AUTISM USING *En2*<sup>-/-</sup> MICE.** MA Cheh<sup>1</sup>, JH Millonig<sup>2</sup>, E Jacobsen<sup>3</sup>, X Ming<sup>4</sup>, and GC Wagner<sup>1,3\*</sup>, Departments of Neuroscience<sup>1</sup> and Psychology<sup>3</sup>, Rutgers University, New Brunswick, NJ, USA; Center for Advanced Biotechnology and Medicine<sup>2</sup>, UMDNJ-Robert Wood Johnson Medical School,

Piscataway, NJ, USA; Department of Neurosciences<sup>4</sup>, UMDNJ-New Jersey Medical School, Newark, NJ, USA.

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**THE EFFECTS OF LIPOPOLYSACCHARIDE INJECTION ON BAX AND BCL2, REGULATORS OF APOPTOSIS, IN NEURAL TISSUE OF NEWBORN MICE.** David F Sorrentino, MD<sup>1</sup> and Alexander Kusnecov, PhD<sup>2</sup>. UMDNJ, New Brunswick, NJ, United States, 08901 and <sup>2</sup> Psychology, Rutgers University, Piscataway, NJ, United States.

P-130 Pre-Doctoral Student (Group4)

**PROTEASOMAL INHIBITOR MG-132 INDUCES DOPAMINERGIC DEGENERATION IN CELL CULTURE AND ANIMAL MODELS.** Faneng Sun, Calivarathan Latchoumycandane, Danhui Zhang, Vellareddy Anantharam, Arthi Kanthasamy and Anumantha Kanthasamy. Parkinson's Disorder Research Laboratory, Dept. of Biomedical Sciences, Iowa State University, USA.

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**HYPERTENSIVE AND TACHYCARDIC RESPONSES TO ORAL TOLUENE IN THE RAT.** Gordon, C.J., Oshiro, W., Samsam, T., Becker, P., Mack, C., and P. Bushnell. Neurotoxicology Division, National Health Effects and Environmental Research Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, U.S.A.

P-132 Pre-Doctoral Student (Group4)

**ASSOCIATION OF CELL CYCLE REGULATORY PROTEINS WITH CELL CYCLE EXIT AND DIFFERENTIATION IN MOUSE EMBRYONIC MIDBRAIN NEURONAL PRECURSOR CELLS.** EJ Gribble, S Hong, XZ Yu, and EM Faustman. Department of Environmental and Occupational Health Sciences, University of Washington, Seattle, WA, USA.

P-133 Pre-Doctoral Student (Group4)

**RISKS ASSOCIATED WITH ATTENTION DEFICIT DISORDERS: ARE PARENTS OF CHILDREN WITH AD/HD MORE SUSCEPTIBLE TO ENVIRONMENTAL EXPOSURES THAN CONTROLS?** LP Heilbrun, CS Miller, and JL Perkins. Department of Family and Community

Medicine, University of Texas School of Medicine, San Antonio, Texas, USA

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**THE GAP BETWEEN NEUROTOXICOLOGY AND PUBLIC POLICY: CASE STUDIES OF ENVIRONMENTAL TOXINS AND NEURODEVELOPMENTAL DISORDERS.** Roger D. Masters, Dartmouth College, Hanover, NH, USA.