

NTX XXII: TWENTY-SECOND INTERNATIONAL NEUROTOXICOLOGY CONFERENCE

Sunday Afternoon 11 Sept 2005 1:30 PM – Town Meeting

Main Lobby of Sheraton Hotel

1:00 PM Registration Opens

All persons attending the 22nd International Neurotoxicology Conference are enthusiastically invited to participate in the NIEHS Town Meeting. (See separate flyer in Packet)

Empire Ballroom

1:30 PM OPEN NIEHS TOWN MEETING

1:30 – 1:40 PM

Opening and Overview of Town Meeting

Dr. Joan Cranmer

Chair, 22nd International Neurotoxicology Conference

1:40 – 3:00 PM

ENVIRONMENT AND NEURODEVELOPMENTAL DISORDERS OVER THE LIFESPAN

1:40 – 1:55 PM

Environment and Neurodevelopmental Disorders: Implications over the Lifespan

Dr. Jean Harry ~ NIEHS

Dr. Cynthia Bearer ~ Case Western Reserve University

1:55 – 2:05 PM

Environment and Children's Disorders (e.g., Autism)

Dr. Martha Herbert

Massachusetts General Hospital & Harvard Medical School

2:05 – 2:15 PM

Adult Disease and the Environment

Dr. Don Schmechel ~ Duke University

2:15 – 3:00 PM **Q&A: Open Dialogue with the Public**

3:00 – 3:15 PM **Refreshment & Snack Break**

3:15 – 4:00 PM

KEYNOTE ADDRESS & OPEN DIALOGUE

Dr. David A. Schwartz ~ Director

National Institute of Environmental Health Sciences/NIH

4:00 – 5:30 PM

LOCAL ISSUES & OPEN DIALOGUE

Moderator: Anthony Wilson

ABC-11 News Anchor/Reporter

Environmental Justice

Dr. Yolanda Anderson ~ NC Central University

Farm Workers, Children & Pesticides

Dr. Tom Arcury ~ Wake Forest University School of Medicine

Lead Mapping

Dr. Marie Lynn Miranda ~ Duke University

PCBs

Dr. Luanne Williams ~ NC State Health Department

Hog Farms & Health

Gary Grant ~ Concerned Citizens of Tillery

Sunday Evening 11 Sept 2005 5:30 PM – 8:30 PM

Empire Ballroom

5:30 PM . . .
Meet, Greet & Eat!

*Complimentary Refreshments and Dinner Buffet
(Cash Bar)*

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

*Joint Session: Town Meeting Continues and Conference Opens.
The evening Public Forum is part of the Town Meeting as well as the opening session of the Conference.*

6:30 – 6:40 PM

SESSION I. WELCOME & OPEN CONFERENCE

Conference Chair: Joan M. Cranmer, PhD

6:40 – 8:30 PM

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

6:40 – 6:55 PM

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

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

6:55 – 7:10 PM

Autism, Genes and the Environment

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

7:10 – 7:25 PM

Specific Policies Related to Regulating and Reducing Neurotoxicants

J. Peterson Myers, PhD ~ Environmental Health Sciences

7:25 – 7:40 PM **Discussion**

7:40 – 8:15 PM

Panel Presentations on what various Learning & Developmental Disabilities (LDD) groups are doing on environmental health

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

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

8:15 – 8:30 PM **Discussion**

NTX XXII: TWENTY-SECOND INTERNATIONAL NEUROTOXICOLOGY CONFERENCE

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

Auditorium

Symposium

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

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

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, PhD ~ EPA-NCCT

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 *Refreshment Break*

10:45 – 11:15 AM

Panel Discussion of Kinetic Modeling

Panel Discussants: Above speakers plus:

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

Bob Sonawane, PhD ~ EPA-NCEA

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

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

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

Empire Ballroom

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

*Session III-B is sponsored by the
National Institute of Environmental Health Sciences (NIEHS)*

9:00 – 9:15 AM

Introduction: Immune-Mediated Responses during Development

G. Jean Harry, PhD ~ NIEHS-NIH

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 ~ University of North Carolina – Chapel Hill

10:15 – 10:30 AM *Refreshment 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 Univ 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

12:30 – 12:45 PM

Introduction: Environmental Perturbations of the Immune System: Implications for Autism and other Neurodevelopmental Disorders

Cindy Lawler, PhD ~ NIEHS-NIH

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

NTX XXII: TWENTY-SECOND INTERNATIONAL NEUROTOXICOLOGY CONFERENCE

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

Empire Ballroom

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 Neurotoxicants 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 Univ 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 PM – 5:00 PM

Auditorium

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

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 *Refreshment 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 PM – 9:00 PM

Empire Ballroom

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

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

NTX XXII: TWENTY-SECOND INTERNATIONAL NEUROTOXICOLOGY CONFERENCE

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

Auditorium

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

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 EACs 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 ~ *Univ of Rochester School of Medicine & Dentistry*

8:50 – 9:00 PM

Discussion, Session Summary and Research Needs

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

Empire Ballroom

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

8:30 – 8:35 AM

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

10:20 – 10:50 AM

Murine Models of Social Behavior: Gene Toxicant Interactions
Robert F. Berman, PhD ~ *Univ 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 PM – 3:45 PM

Empire Ballroom

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 *Refreshment Break*

2:20 – 2:45 PM

From Antiquity to the 21st Century: The Past, Present and Future of Lead Toxicity
Herbert L. Needleman, MD ~ *University 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 Session V 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.

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

Empire Ballroom

3:45 – 5:45 PM

SESSION VII: GENERAL POSTER SESSION

Papers presented from Poster are listed on pages 9 - 12.

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.) 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 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	<i>Mentor:</i> Timothy J. Shafer, Ph.D.
Wendy Donlin	<i>Mentor:</i> M. Christopher Newland, Ph.D.
Anne Dreiem	<i>Mentor:</i> Richard Seegal, Ph.D.
Julia Gohlke	<i>Mentor:</i> Christopher J Portier, Ph.D.
Ruth Jameson	<i>Mentor:</i> Ted Slotkin, Ph.D.
Kennita Johnson	<i>Mentor:</i> Robert Maronpot, Ph.D.
Tal Kenet	<i>Mentor:</i> Michael Merzenich, Ph.D.
Elizabeth Roberts	<i>Mentor:</i> David Dorman, D.V.M., Ph.D.
Marcelo J. Wolansky	<i>Mentor:</i> 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	<i>Mentor:</i> Anumantha G. Kanthasamy, PhD
Joel F. Cooper	<i>Mentor:</i> Alexander Kusnecov, PhD
Jeremy J. Day	<i>Mentor:</i> M. Christopher Newland, PhD
John C. Heath	<i>Mentor:</i> M. Christopher Newland, PhD
Christina J. Herden	<i>Mentor:</i> William D. Atchison, PhD
Jayne D. Mancini	<i>Mentor:</i> William D. Atchison, PhD
Erin F. Pesek	<i>Mentor:</i> M. Christopher Newland, PhD
Miranda Reed	<i>Mentor:</i> M. Christopher Newland, PhD
M.A. Polunas	<i>Mentor:</i> Kenneth Reuhl, PhD
Feng-Chiao Su	<i>Mentor:</i> Pau-Chung Chen, M.D., PhD
Blair C. Weig	<i>Mentor:</i> Kenneth Reuhl, PhD

GROUP 3: NEUROTOXICITY OF PESTICIDES AND PCBs

Group 3: Pre-Doctoral 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	<i>Mentor:</i> Margarita C. Curras-Collazo, Ph.D.
Lisa M. Domica	<i>Mentor:</i> Keith R. Cooper, Ph.D., Gail Zeevalk, Ph.D. (co-advisor)
Josh A. Harrill	<i>Mentor:</i> Kevin Crofton, Ph.D.
Chia-Jung Hsieh	<i>Mentor:</i> Pau-Chung Chen, M.D., Ph.D.
Zhenquan Jia	<i>Mentor:</i> Hara Misra, B.V.Sc., M.S., Ph.D.
Todd A. Jusko	<i>Mentor:</i> Irv Hertz-Picciotto, Ph.D.
Edward C. Meek	<i>Mentor:</i> Janice E. Chambers, Ph.D.
David S. Sharlin	<i>Mentor:</i> R. Thomas Zoeller, Ph.D.
Tram-Anh N. Ta	<i>Mentor:</i> Isaac N. Pessah, Ph.D.
Jennifer Watkins	<i>Mentor:</i> 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	<i>Mentor:</i> Margarita C. Curras-Collazo, Ph.D.
Robert Giddings	<i>Mentor:</i> Timothy J. Shafer, Ph.D.
Elizabeth Gribble	<i>Mentor:</i> Elaine Faustman, Ph.D.
Lynne Parsons Heilbrun	<i>Mentor:</i> Claudia S. Miller, M.D., M.S.
Jinghong Kou	<i>Mentor:</i> Jeffrey R. Bloomquist, Ph.D.
Sharon Oxendine	<i>Mentor:</i> Stephanie Padilla, Ph.D.
Faneng Sun	<i>Mentor:</i> Anumantha G. Kanthasamy, Ph.D.
Daniella Urbach	<i>Mentor:</i> Alexander Kusnecov, Ph.D.

Tuesday Evening 13 Sept 2005 5:45 PM – 10:00 PM

Crystal Coast Ballroom, Pool, Patio

Conference Social Evening

5:45 – 6:30 PM

Poolside Cocktails (Cash Bar)

6:30 – 10:00 PM

North Carolina Pig Pickin'

Presentation of Student Awards

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

Auditorium

Symposium

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

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

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 Centers for Health Research*

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 Refreshment 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 Workshop is limited to 50 registered observers in addition to the 20 invited experts on the panel. Pre-registration is required and attendance will be on a “first-come” basis. Lunch and in-room coffee will be provided for the 20 panelists who will work through lunch. Observers will have Coffee breaks in the Empire Ballroom and lunch on their own.

Royal

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.

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

- Study Design:
- Measurement Tool:
- Exposure Assessment:
- Participant Selection:
- Confounders:
- Reporting:
- Research Needs and Recommendation:

topics include:

Expert Panel of Participants:

Robert W. Amler, MD ~ *New York Medical College*

Stanley Barone, Jr., PhD ~ *NCEA/ORD, ND, US EPA*

Aysenil Belger, PhD ~ *UNC at Chapel Hill*

Cheston M. Berlin, Jr., MD (Steering Committee)
Milton S. Hershey Medical Center

Christopher Cox, PhD ~ *Johns Hopkins University*

Harry Frank, PhD ~ *The University of Michigan*

Michael Goodman, MD, MPH ~ *Emory University School of Public Health*

Jean Harry, PhD ~ *National Institute of Environmental Health Sciences/NIH*

Stephen R. Hooper, PhD ~ *University of North Carolina School of Medicine*

Roger Ladda, MD, Workshop Chair
Pennsylvania State University College of Medicine

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

Paul H. Lipkin, M.D. ~ *The Johns Hopkins Univ School of Medicine*

Lewis P. Lipsitt, PhD ~ *Brown University*

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

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

Gary Myers, MD ~ *University of Rochester Medical Center*

Larry L. Needham, PhD ~ *Centers for Disease Control and Prevention*

Theodore D. Wachs, PhD ~ *Purdue University*

Janice W. Yager, PhD, MPH (Steering Committee)
Electric Power Research Institute

NTX XXII: TWENTY-SECOND INTERNATIONAL NEUROTOXICOLOGY CONFERENCE

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

Empire Ballroom

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

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

9:15 – 9:35 AM

Effects of Binary or Ternary Mixtures of Organophosphates on Esterases *in Vitro*

Janice E Chambers, PhD ~ Mississippi State University

9:35 – 9:55 AM

***In Vitro* Models for Assessing Neurotoxicity of Mixtures**

Evelyn Tiffany-Castiglioni, PhD ~ Texas A&M University

9:55 – 10:15 AM *Refreshment 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

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

Auditorium

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

MN²⁺ Interference with CA²⁺ 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 *Refreshment 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 PM – 4:00 PM

Empire Ballroom

Platform Session

SESSION X: ENVIRONMENTAL TOXICANTS AND DISEASES

Co-Chairs: Toshio Narahashi, PhD
Prasada Kodavanti, PhD

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 & 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 *Refreshment 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 γ) 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

PAPERS PRESENTED IN POSTER SESSION VII

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.Ogawa¹, M.Kuwagata², S.Shioda¹. ¹Department of Anatomy, Showa University School of Medicine, Tokyo, Japan and ²Hatano 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 Bale¹, QT Krantz², PJ Bushnell¹, TJ Shafer¹ and WK Boyes¹. ¹Neurotoxicology Division and ²Experimental Toxicology Division, US Environmental Protection Agency, Research Triangle Park, NC

P-78

RX FOR PREVENTION: PEDIATRIC ENVIRONMENTAL HEALTH TOOLKIT PILOT STUDY FINDINGS. Kathleen Schuler, MPH, 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. Johnson¹, L. Ryan², J. Davis³, A. Elmore³, B. Guenther², J. Marcus¹ and R. Maronpot¹. ¹Laboratory of Experimental Pathology, National Institute of Environmental Health Sciences/NIH/DHHS, RTP, NC, USA, ²MRPath, Inc., Durham, NC, ³Integrated 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 Kenet¹, Isaac Pessah² and Michael Merzenich¹. ¹University of California, San Francisco, CA, USA; ²University 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). 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. Dreiem¹, R. F. Seegal^{1,2}. ¹New York State Department of Health, Wadsworth Center, Albany, NY, USA. ²School 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.[†] Department of Psychiatry & Behavioral Sciences, Johns Hopkins School of Medicine, Baltimore, MD, USA. [†]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.Ogawa¹, M.Kuwagata², S.Shioda¹. ¹Department of Anatomy, Showa University School of Medicine, Tokyo, Japan and ²Hatano 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. Wolansky¹, C. Gennings² and K. M. Crofton³. ¹National Research Council, Research Triangle Park (RTP), NC; ²Department of Biostatistics, Virginia Commonwealth University, Richmond, VA, USA; ³Neurotoxicology 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 Groot¹, Marja Moerkens¹, Renate Janskin¹, Marlies Otto¹, Linda van de Horst¹, Marga Bos-Kuijpers¹, Ine Waalkens¹, James O'Callaghan², Hans-Jorgen Gundersen³, Wolfgang Kaufmann⁴, Jan Lammers¹, Bente Pakkenberg⁵. ¹TNO Quality of Life, Zeist, NL; ²NIOSH, Morgantown, USA; ³University of Aarhus, DK; ⁴BASF, Ludwigshafen, FRG; ⁵Research 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 Day¹, EM Paletz², MC Craig-Schmidt³, & MC Newland⁴. ¹Department of Psychology, University of North Carolina at Chapel Hill, Chapel Hill, NC. ²Department of Psychiatry, University of Wisconsin at Madison, Madison, WI, USA. ³Nutrition and Food Science, Auburn University, Auburn, AL, USA. ⁴Department of Psychology, Auburn University, Auburn, AL, USA.

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Pre-Doctoral Student (Group 2)

INVOLVEMENT OF THE GABA_A RECEPTOR IN METHYLMERCURY-INDUCED DISRUPTION OF Ca²⁺ HOMEOSTASIS IN CEREBELLAR SLICES. Jayne D. Mancini and William D. Atchison. Dept. Pharm/Tox and Neurosci. Program. 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 Gangi¹, A Halladay², K Reuhl², M Konsolaki¹. Rutgers, The State University of New Jersey, Departments of ¹Genetics and ²Pharmacology & 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 Fitsanakis¹, N Zhang², KM Erikson³, JC Gore² and M Aschner^{1, 4}. ¹Department of Pediatrics, Vanderbilt University School of Medicine, Nashville, TN, USA. ²Vanderbilt University Institute of Imaging Science, Vanderbilt University Medical Center, Nashville, TN, USA. ³Department of Nutrition, University of North Carolina—Greensboro, Greensboro North Carolina, USA. ⁴Department 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^{1,2}, A.K. Halladay^{1,2}, G.C. Wagner^{1,3} and K.R. Reuhl^{1,2}, Joint Graduate Program in Toxicology¹, Department of Pharmacology and Toxicology², and Department of Psychology³, 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-Morel¹, X Zhou¹, A Litterman¹, KR Reuhl² and E DiCicco-Bloom¹. ¹Department of Neuroscience and Cell Biology, Robert Wood Johnson Medical School – UMDNJ, Piscataway, NJ, USA. ²Department of Toxicology and Pharmacology, Rutgers, Piscataway, NJ, USA.

P-103 *Pre-Doctoral Student (Group 2)*
TIME COURSE OF METHYLMERCURY BLOCK OF GABA_A 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,¹ YH Hwang,¹ SF Jeng,² WS Hsieh,³ HF Liao,² YN Su,³ FC Su,¹ and PC Chen.¹ ¹National Taiwan University College of Public Health; ²National Taiwan University College of Medicine; ³National 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,¹ HP Li,² WS Hsieh,³ SF Jeng,⁴ HF Liao,⁴ YN Su,³ SN Yu,¹ and PC Chen.¹ ¹National Taiwan University College of Public Health; ²Taiwan Agricultural Chemicals and Toxic Substances Research Institute; ³National Taiwan University Hospital; ⁴National 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,¹ B. Hou, L. Lin, C. Cheatham, E.R. Gillard, O. Loson, D. Prodon and M.C. Curras-Collazo² ¹Environmental Toxicology Program and ²Department of Cell Biology & Neuroscience, University of California at Riverside, Riverside, CA, 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,¹ T Mitsui², and S Maeda². ¹ Ecogenomics, Inc., Fukuoka, Japan. ² 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,¹ GD Zeevalk², B Buckley³, B Winnik³, MJ Thiruchelvam¹, KR Cooper¹. ¹Joint Graduate Program in Toxicology, Rutgers, The State University of New Jersey, Piscataway, NJ, USA. ²Neurology Department, University of Medicine and Dentistry of New Jersey, Piscataway, NJ, USA. ³Environmental and Occupational Health Sciences Institute, Rutgers/UMDNJ, Piscataway, NJ, USA.

P-113 *Pre-Doctoral Student (Group 3)*
CONCENTRATION DEPENDENT ACCUMULATION OF [³H]-DELTAMETHRIN IN XENOPUS LAEVIS OOCYTES. J. A. Watkins,¹ C. A. Meacham², A. S. Bale², K. M. Crofton², T. J. Shafer² ¹North Carolina State University, Raleigh, NC, USA. ²Neurotoxicology Div., NHEERL, ORD, USEPA, RTP, 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,¹ K M Crofton². ¹Curriculum in Toxicology, University of North Carolina, Chapel Hill, NC, USA; ²Neurotoxicology Division, NHEERL, ORD, USEPA, RTP, NC, USA.

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ADULT AND JUVENILE RAT SODIUM CHANNEL (NAV1.2 AND NAV1.3) SENSITIVITY TO THE PYRETHROID INSECTICIDE DELTAMETHRIN. C.A.Meacham,¹ P.D. Brodfuehrer²; A.S.Bale¹; J.Watkins³; K.M.Crofton¹; and T.J.Shafer¹ ¹Neurotoxicology Div., NHEERL, ORD, U.S. EPA, Res. Tri. Park, NC, USA. ² Biol. Dept., Bryn Mawr Col., Bryn Mawr, PA, USA. ³ 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,¹ PA Shaw², TA Greenfield³, MJ Charles⁴, and I Hertz-Picciotto³. *Department of Epidemiology¹ and Biostatistics², University of Washington, Seattle, WA, USA; Division of Epidemiology³ and Department of Environmental Toxicology⁴, University of California-Davis, Davis, CA, USA.*

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Pre-Doctoral Student (Group 3)

EXPOSURE TO MIXTURES OF ENDOSULFAN AND ZINEB INDUCES APOPTOTIC CELL DEATH IN NEURONAL CELLS (SH-SY5Y), IN VITRO. Z Jia¹ and HP Misra^{1, 2}. ¹Virginia-Maryland Regional College of Veterinary Medicine, Virginia Tech, Blacksburg, VA; ²Edward 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^{1,2}, D.E. Hinton³, J. Cowden¹, and S. Padilla¹. *Neurotox. Div., U.S. EPA, RTP, NC, USA, ²Curr. in Toxicol., UNC-CH, Chapel Hill, and ³Nicholas School of the Environ., Duke Univ., Durham, NC, USA.*

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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.*

P-123

BEHAVIORAL EFFECTS OF DIRECT EXPOSURE OF CNS TO HYPER-IL-6 IN THE PERINATAL CD-1 MOUSE. S.H. Brunssen^{1*}, S.S. Moy¹, G.J. Harry². ¹University of North Carolina, Chapel Hill, NC, USA; ²NIEHS, NIH, DHHS, RTP, NC, USA.

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Pre-

Doctoral Student (Group 4)

POTENTIATING EFFECT OF THE K⁺_{ATP} 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.*

P-125

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.*

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Pre-Doctoral Student (Group 4)

HUMAN ALPHA-7 NICOTINIC ACETYLCHOLINE RECEPTORS EXPRESSED IN XENOPUS OOCYTES ARE INHIBITED BY TRICHLOROETHYLENE (TCE). R Giddings¹, CA Meacham², AS Bale², PJ Bushnell², and TJ Shafer². ¹Curriculum in Toxicology, University of North Carolina, Chapel Hill, NC, USA. ²Neurotoxicology Division, NHEERL, ORD, US EPA, RTP, NC, USA.

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CYTOKINE RECEPTOR EXPRESSION AND GLIAL CONTACT FOLLOWING ACUTE HIPPOCAMPAL INJURY. Robert N. Wine¹, Christian Lefebvre d'Hellencourt², Christopher A. McPherson¹, and G. Jean Harry¹. ¹Laboratory of Neurobiology, NIEHS, NIH, DHHS, Research Triangle Park, NC, USA. ²Universite de La Reunion, Reunion-France-DOM.

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Pre-Doctoral Student (Group 4)

ANIMAL MODEL OF AUTISM USING *En2*^{-/-} MICE. MA Cheh¹, JH Millonig², E Jacobsen³, X Ming⁴, and GC Wagner^{1,3*}, *Departments of Neuroscience¹ and Psychology³, Rutgers University, New Brunswick, NJ, USA; Center for Advanced Biotechnology and Medicine², UMDNJ-Robert Wood Johnson Medical School, Piscataway, NJ, USA; Department of Neurosciences⁴, UMDNJ-New Jersey Medical School, Newark, NJ, USA.*

P-129

THE EFFECTS OF LIPOPOLYSACCHARIDE INJECTION ON BAX AND BCL2, REGULATORS OF APOPTOSIS, IN NEURAL TISSUE OF NEWBORN MICE. David F Sorrentino, MD¹ and Alexander Kusnecov, PhD². *UMDNJ, New Brunswick, NJ, United States, 08901 and ²Psychology, Rutgers University, Piscataway, NJ, USA.*

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Pre-Doctoral Student (Group 4)

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.*

P-131

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, NC, U.S.A.*

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Pre-Doctoral Student (Group 4)

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.*

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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.*