

Unifying Mechanisms of Neurological Disorders: Scientific, Translational, and Clinical Implications

PROGRAM

Sunday Afternoon 6 June 2010 2:00 PM – 2:20 PM

Opening

SESSION I: OPENING, WELCOME AND ACKNOWLEDGEMENTS

Conference Co-Chairs:

Joan M. Cranmer, Kenneth R. Reuhl, Jason R. Richardson

2:00 – 2:20 PM

Opening and Welcome!

Acknowledgements

Introductions

Sunday Afternoon 6 June 2010 2:20 PM – 5:30 PM

Symposium

SESSION II: DIETARY EXPOSURE TO METHYL MERCURY FROM FISH CONSUMPTION: NEW FINDINGS FROM THE SEYCHELLES CHILD DEVELOPMENT STUDY

Session Chair: Philip W. Davidson

Theme and Rationale: The Seychelles Child Development Study (SCDS) is a longitudinal evaluation of prenatal exposure to MeHg from fish consumption. The study began in the mid 1980s and has followed several cohorts of subjects whose mothers consumed a diet high in fish during pregnancy. The subjects themselves also habitually consume a diet high in fish. Initial results indicated that prenatal MeHg exposure was associated with “beneficial” outcomes on specific cognitive domains such as psychomotor performance and discrimination learning. Subsequent studies indicated that prenatal MeHg exposure effects may be modified by simultaneous exposure to long-chain polyunsaturated fatty acids (LCPUFA) which are also present in fish. The net effect of combined exposure to LCPUFA and MeHg on the developing fetal brain appears beneficial for specific neurocognitive and behavioral outcomes. Analyses that include postnatal MeHg exposure have revealed a different pattern of results with possible adverse effects on cognitive functions including impulsivity/response inhibition and social behaviors. These endpoints were not associated with prenatal exposure to MeHg. Additional studies that include exposure to Hg vapor from dental amalgams and selenium, which is present in high concentrations in fish, do not change these effects. Nutrients in fish appear to modify the adverse effects of

co-exposure to MeHg in a manner that is related to the time of exposure. The differential risks and benefits of fish consumption with co-exposure to LCPUFA and both prenatal and postnatal MeHg appear to be much more complex than currently understood and the toxicant-nutrient interplay opens a new line of scientific inquiry of substantial public health relevance.

Topics and Speakers:

2:20 – 2:45 PM

Associations between Prenatal and Postnatal MeHg and Neurocognitive and Behavioral Endpoints at 17 Years of Age in the Seychelles Child Development Study

Deborah A. Cory-Slechta, *University of Rochester School of Medicine*

2:45 – 3:10 PM

Selenium Status and its Relation to Child Development in the Seychelles Child Development Nutrition Study

Gary J. Myers, *University of Rochester School of Medicine*

3:10 – 3:35 PM

Beneficial Benchmark Concentrations for Ω -3 Long Chain Poly-Unsaturated Fatty Acids (LCPUFAs) Obtained from the Seychelles Child Development Nutrition Study

Edwin vanWijngaarden, *University of Rochester School of Medicine*

3:35 – 3:50 PM Break

3:50 – 4:15 PM

Stable Isotope Estimates of Mercury Burden from Dental Amalgam

Gene Watson, *University of Rochester School of Medicine*

4:15 – 4:35 PM

Dietary Determinants of Maternal Long-Chain Polyunsaturated Fatty Acid Status in the Seychelles Child Development Nutrition Study

J.J. Strain, *University of Ulster*

4:35 – 4:50 PM

Methylmercury Irreversibly Inhibits Selenoenzymes

Nicholas Ralston, *University of North Dakota Energy & Environmental Research Center*

4:50 – 5:30 PM

Discussants:

- Michael Aschner, *Vanderbilt University*
- Philip Davidson, *University of Rochester School of Medicine*

Sunday Evening 6 June 2010 6:30 PM – 9:30 PM

*Sunday Evening, June 6th
6:30 PM – 9:30 PM*

*Hosted Welcoming Reception
and Dinner Buffet
(No-Host Bar)*

Monday Morning 7 June 2010 8:30 AM – 9:00 AM

**OPENING OF PLENARY SESSIONS: OVERVIEW
AND RATIONALE FOR THE THEME**

Conference Co-Chairs: **Kenneth Reuhl
Jason Richardson**

8:30 – 9:00 AM

**Overview: Unifying Mechanisms of Neurological
Disorders: Scientific, Translational, and Clinical
Implications**

Jason R. Richardson and Kenneth R. Reuhl
*Environmental and Occupational Health Sciences Institute,
UMDNJ and Rutgers University*

Monday Morning 7 June 2010 9:00 AM – 12:00 PM

Plenary Session

**SESSION III: MITOCHONDRIAL DYSFUNCTION
IN NEUROLOGICAL DISEASE**

Session Chair: **Cindy Lawler**
Co-Chair: **Flint Beal**

Theme and Rationale: Emerging evidence has linked alteration of mitochondrial function to a variety of neurological disorders. Some of these alterations arise from mitochondrial DNA mutation. However, exposure to environmental toxicants that target the mitochondria directly or indirectly have been linked to disease etiology. This session seeks to bring together clinicians, basic researchers, and those involved in translational research to evaluate the etiology and pathogenesis of neurological diseases using mitochondrial dysfunction as a unifying feature. The session will provide a state of the art overview of what is currently known about mitochondrial dysfunction in neurological disease and continue with speakers performing cutting edge research on mitochondrial function and the interaction of genetic and environmental factors in mitochondrial dysfunction. Finally, we will end with clinical observations and a discussion on how the information discussed can be used to develop translational research aimed at clinical interventions.

Topics and Speakers:

9:00 – 9:30 AM

**Introduction and State of the Art Overview:
Mitochondrial Dysfunction**

J. Timothy Greenamyre, University of Pittsburgh Medical Center

9:30 – 10:00 AM

MEF2 as an Indicator of Mitochondrial Oxidative Stress
Zixu Mao, Emory University

10:00 – 10:20 AM **Break**

10:20 – 10:50 AM

**Mitochondrial Dysfunction in an APP/PS1 Mouse Model
of Alzheimer's Disease**

Rosemary Schuh, University of Maryland School of Medicine

10:50 – 11:20 AM

**Clinical Observations and Translational Opportunities for
Targeting Mitochondrial Dysfunction in Neurological
Disease**

Flint Beal, Weill Cornell Medical College

11:20 – 12:00 Noon

Panel Discussion and Research Recommendations

Moderators:

- *Tim Greenamyre, University of Pittsburgh Medical Center*
- *Cindy Lawler, NIEHS/NIH*

12:00 Noon – 1:30 PM Break for Lunch on Your Own

Monday Afternoon 7 June 2010 1:30 PM – 5:15 PM

Platform Session

SESSION IV: METALS AND SELECTED TOPICS

Session Chair: **Michael Aschner**
Co-Chairs: **Didima de Groot
Laura Raymond**

1:30 – 1:55 PM

Novel Mechanisms of Manganese Transport

Michael Aschner, Vanderbilt University Medical Center

1:55 – 2:20 PM

**Functional MRI Findings in Welders Exposed to
Manganese**

Yangho Kim, Ulsan University College of Medicines, South Korea

2:20 – 2:35 PM

Pre-Doctoral Competition

High-Throughput Assay to Assess Manganese Transport Kinetics in a Striatal Cell Model of Huntington's Disease
Gunnar Kwakye, *Vanderbilt University Medical Center*

2:35 – 3:00 PM

Prenatal Methylmercury Exposure Induces in Rats Structural Brain Deficits at Weaning and Functional Impairment at Adult Age
Didima de Groot, *TNO Quality of Life, Zeist, The Netherlands*

3:00 – 3:15 PM

Pre-Doctoral Competition

Single Postnatal Methylmercury (MeHg) Exposure Initiates Acute Stem Cell Death in Hippocampus Leading to Subsequent Neuronal Deficits and Learning Impairment.
Katie Sokolowski, *Rutgers and RWJMS*

3:15 – 3:30 PM **Break**

3:30 – 3:55 PM

Selenium Prevents and Reverses Mercury Toxicity
Laura Raymond, *University of North Dakota Energy & Environmental Research Center*

3:55 – 4:20 PM

The Effect of Aluminum Chloride on Cognitive Ability and Related Protein in apoE Knock Out Mice
Qiao Niu, *Shanxi Medical University, P.R. China*

4:20 – 4:35 PM

Post-Doctoral Competition

The Effect of Aluminum Chloride on Cognitive Ability of APP/PS1 Double Transgenic Mice and Expression of mGluR1
Qin-Li Zhang, *Shanxi Medical University, P.R. China*

4:35 – 4:50 PM

Post-Doctoral Competition

Arsenic Inhibits Neurite Outgrowth by Inhibiting LKB1-AMPK Signaling Pathway.
Xin Wang, *University of Kentucky*

4:50 – 5:15 PM

In Vitro Neurotoxic Potential of Afghanistan Sand Extract
Palur Gunasekar, *Naval Health Research Center Detachment/Environmental Health Effects Laboratory, WPAFB*

5:15 PM – 7:00 PM **Break for Dinner on Your Own**

7:00 PM: Return for Poster Session and Dessert

Monday Evening 7 June 2010 7:00 PM – 9:30 PM

Dessert Bar & No-Host Bar

SESSION V: POSTER SESSION

Session Co-Chairs: **Kent Anger
Richard Seegal
Dongren Yang**

Poster abstracts are numbered from P-58 to P-100 and are listed on pages 8 – 12 of this Program and pages 27-47 of the Abstract Book.

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! Posters may be put up as early as 9:00 AM on Sunday and should remain up for the conference duration for maximum exposure.

STUDENT AWARD COMPETITION

Co-Chairs: **Anumantha Kanthasamy
Isaac Pessah**

The Student Award Competition is divided into two groups: one for post-doctoral and one for pre-doctoral competition. Awards will consist of a cash prize, plaque or certificate, plus a one year subscription to the international journal *NeuroToxicology*. A winner(s) will be chosen from each group. Competing students are asked 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 in competition for the Student Awards must be presented from poster. Judging will be done during this time.

**Judging will be done between 7:15 PM and 8:30 PM.
Students please stand by your poster during this time.**

GROUP I: POST-DOCTORAL COMPETITION

Chair: Anumantha Kanthasamy

Post-Doctoral Award Committees

Sub-Group A

Michael Aschner, *Chair*
 Aaron Bowman
 Cindy Lawler

Sub-Group B

Anumantha Kanthasamy, *Chair*
 Amy Manning-Bog
 Richard Seegal

Post-Doctoral Trainees

- | | | |
|---------------------|----------------|-------------------|
| 1. Diptiman Bose | <i>Mentor:</i> | Isaac N Pessah |
| 2. Muhammad Hossain | <i>Mentor:</i> | Jason Richardson |
| 3. Kyong Ho Kim | <i>Mentor:</i> | Isaac N Pessah |
| 4. Judit Marsillach | <i>Mentor:</i> | Clement E Furlong |
| 5. April Neal | <i>Mentor:</i> | William Atchison |
| 6. Tamara Tal | <i>Mentor:</i> | Robert L Tanguay |
| 7. Xin Wang | <i>Mentor:</i> | Xianglin Shi |
| 8. Linnzi Wright | <i>Mentor:</i> | Carey Pope |
| 9. Qin-Li Zhang | <i>Mentor:</i> | Qiao Niu |

GROUP II: PRE-DOCTORAL COMPETITION

Chair: Isaac Pessah

Pre-Doctoral Student Award Committees

Sub-Group A

Deborah Cory-Slechta, *Chair*
 Toshio Narahashi
 Rosemary Schuh

Sub-Group B

Isaac Pessah, *Chair*
 Freya Kamel
 Merle Paule

Pre-Doctoral Students

- | | | |
|---------------------|-----------------|--------------------------------------|
| 1. Aaron Bradford | <i>Mentor:</i> | William Atchison |
| 2. Matthew Harris | <i>Mentor:</i> | Rosemarie Bowler |
| 3. Pardeep Kumar | <i>Mentors:</i> | Najma Zaheer Baquer
and R.K. Kale |
| 4. Gunnar Kwakye | <i>Mentor:</i> | Aaron Bowman |
| 5. Jason Magby | <i>Mentor:</i> | Jason Richardson |
| 6. Caroline Ritchie | <i>Mentor:</i> | Phillip J Thomas |
| 7. Katie Sokolowski | <i>Mentor:</i> | Emanuel DiCicco-Bloom |
| 8. Chunjuan Song | <i>Mentor:</i> | Anumantha Kanthasamy |
| 9. Daniel Swett | <i>Mentor:</i> | Douglas A Currie |

Tuesday Morning 8 June 2010 8:30 AM – 12:00 Noon

Plenary Session

SESSION VI: PROTEIN AGGREGATION AND MISFOLDING IN NEUROLOGICAL DISEASE

Session Chair: Kenneth Reuhl
Co-Chair: Peter Spencer

Theme and Rationale: Several neurological diseases including Alzheimer's, Parkinson's, and Creutzfeldt-Jakob disease share common features involving aggregation and deposition of misfolded proteins. However, there is currently controversy as to whether this process is a cause or consequence of the disease process. This session will bring together experts in neuropathology, clinical medicine, and basic researchers to evaluate the role of protein aggregation and misfolding in neurological disease and what information that can be gleaned from examining common mechanisms affecting these pathways. Finally, we will end with clinical observations and a discussion on how the information discussed can be used to develop translational research aimed at clinical interventions.

Topics and Speakers:

8:30 – 9:00 AM

Introduction and State of the Art Overview: Protein Aggregation

Kenneth Reuhl, *UMDNJ & Rutgers*
 Peter Spencer, *Oregon Health Sciences University, Center for Global Health*

9:00 – 9:30 AM

Alpha-Synuclein, LRRK2 and Environmental Factors in the Pathogenesis of Parkinson Disease and Related Neurodegenerative Disorders

Benoit Giasson, *University of Pennsylvania*

9:30 – 9:50 AM

Does Early-Life Genotoxin Exposure Trigger Prototypical Neurodegenerative Disease by Inducing Persistent Genomic Dysregulation? Querying DNA Repair-Deficient Mice

Peter Spencer, *Oregon Health Sciences University*

9:50 – 10:10 AM

Does Early-Life Genotoxin Exposure Trigger Prototypical Neurodegenerative Disease by Inducing Persistent Genomic Dysregulation? Querying Human Tau Overexpressing Mice

Glen Kisby, *Oregon Health Sciences University, CROET*

10:10 – 10:30 AM **Break**

10:30 – 11:00 AM

Role of Metals in Prion Protein Upregulation and Aggregation

Anumantha Kanthasamy, *Iowa State University*

11:00 – 11:20 AM

Contributions of Glycolipid-Protein Interactions to Neuronal Vulnerability in Neurodegenerative Disease Models

Amy Manning-Bog, *SRI International*

11:20 – 12:00 Noon

Panel Discussion and Research Recommendations

Moderators:

- Benoit Giasson, *University of Pennsylvania*
- Kenneth Reuhl, *Environmental and Occupational Health Sciences Institute, UMDNJ & Rutgers University*
- Peter Spencer, *Oregon Health Sciences University, Center for Global Health*

12:00 Noon – 1:30 PM Break for Lunch on Your Own

Tuesday Afternoon 8 June 2010 1:30 PM – 4:30 PM

Platform Session

SESSION VII: PESTICIDES AND SELECTED TOPICS

Session Chair: **Brenda Eskenazi**

Co-Chair: **Charles Timchalk**

1:30 – 1:55 PM

PON1, Organophosphate Exposure, and Neurodevelopment in Toddlers Living in an Agricultural Community: The Chamacos Study

Brenda Eskenazi, *Center for Children's Environmental Health Research, University of California, Berkeley*

1:55 – 2:20 PM

PON1 Polymorphisms, Organophosphate (OP) Exposure, and Parkinson's Disease (PD)

Freya Kamel, *National Institute of Environmental Health Sciences/NIH*

2:20 – 2:45 PM

Potential Dosimetry Implications from Localized Brain Metabolism of Organophosphorus Insecticides in the Preweanling Rat

Charles Timchalk, *Pacific Northwest National Laboratory*

2:45 – 3:10 PM

Pesticide Exposure and Neurobehavioral Performance in Adolescent Pesticide Applicators

Diane Rohlman, *CROET, OHSU*

3:10 – 3:25 PM Break

3:25 – 3:40 PM

Post-Doctoral Competition

Biomarkers of Organophosphorus (OP) Exposures in Humans

Judit Marsillach, *University of Washington*

3:40 – 4:05 PM

Can Comparisons of Age-Related Milestones Help Equate Maturation in Experimental Species to Human Development?

Barbara Clancy, *University of Central Arkansas*

4:05 – 4:30 PM

A Neurological Assessment of a Community With Ground Water Exposure To Perchloroethylene

Jonathan Rutchik, *Neurology, Environmental and Occupational Medicine and UCSF Division of Occupational Medicine.*

4:30 PM – 6:30 PM Free Time

Tuesday Evening 8 June 2010 6:30 PM – 9:30 PM

*Tuesday Evening, June 8th
Marriott Grand Ballroom*

*6:30 PM – 7:00 PM
Cocktails
(No-Host Bar)*

*7:00 PM – 9:30 PM
Hosted Awards Banquet*

*Presentation of
Pre-Doctoral & Post-Doctoral Poster Awards
and Travel Awards*

Recognition of Sponsors

Wednesday Morning 9 June 2010 8:30 AM – 12:00 Noon

Plenary Session

SESSION VIII: EMERGING AREAS OF RESEARCH: EPIGENETIC MECHANISMS IN NEURODEVELOPMENTAL DISORDERS

Session Chair: **Jason R. Richardson**

Co-Chair: **M. Daniele Fallin**

Theme and Rationale: Although genetic factors have long been a primary focus in neurodevelopmental disorders, exhaustive candidate gene studies and genome-wide

association studies have not identified single genes that account for more than a small proportion of the disease burden in a variety of disorders. Emerging evidence suggests that epigenetic alterations resulting from environmental exposures during critical periods of development may play a significant role in neurodevelopmental disorders. This brainstorming session is designed to assess the current state of knowledge in this emerging area and identify new opportunities and research directions to assess the role of epigenetic alterations in neurological disease. Discussion will focus on the potential for epigenetic alterations to provide insight into disease pathogenesis and ultimately, therapeutic intervention.

Topics and Speakers:

8:30 – 9:00 AM

Introduction and State of the Art Overview: Epigenetics
 Helmut Zarbl, *Environmental and Occupational Health Sciences Institute, UMDNJ and Rutgers University*

9:00 – 9:30 AM

Genetic Epidemiology and Epigenetics in Neurological Disorders
 M. Daniele Fallin, *Johns Hopkins School of Public Health*

9:30 – 10:00 AM

Epigenetics in Neurodevelopmental Disorders and Neurotoxicology
 Jason R. Richardson, *Environmental and Occupational Health Sciences Institute, UMDNJ and Rutgers University*

10:00 – 10:20 AM **Break**

10:20 – 10:50 AM

Pre-Doctoral Competition
Environmental Neurotoxic Pesticide Induced Histone Acetylation and its Role in Epigenetic Mechanisms of Neurodegeneration
 Chunjuan Song, *Iowa State University*

10:50 – 11:20 AM

Early Childhood Lead Exposure Alters the DNA Methylation Pattern in Children
 Douglas M. Ruden, *Wayne State University*

11:20 – 12:00 Noon

Panel Discussion/Brainstorming

Moderators:

- M. Daniele Fallin
- Jason Richardson

12:00 Noon – 1:30 PM **Break for Lunch on Your Own**

Wednesday Afternoon 9 June 2010 1:30 PM – 5:30 PM

Symposium

SESSION IX: NEUROTOXIC EFFECTS OF ENVIRONMENTAL EXPOSURE TO MANGANESE IN CHILDREN AND ADULTS

Session Chair: **Donna Mergler, University of Quebec at Montreal, Canada**

Co-Chair: **Roberto Lucchini, University of Brescia, Italy**

Theme and Rationale: Since Couper first identified manganese intoxication in 1837, there have been hundreds of reports of neurologic disorders and neurobehavioral deficits due to high levels of occupational exposure to manganese. Since manganese is an essential element and subject to homeostatic control, there has been little concern about possible neurotoxic effects of environmental exposure through air and water. Recent studies with children and adults living in the vicinity of manganese mines and processing plants and with children exposed to manganese through drinking water, suggest that environmental manganese exposure is associated with loss of nervous system function. This is an emerging field and many questions still need to be answered: What are the effects throughout the lifespan? What is the contribution of *in utero* exposure? What is the most adequate biomarker of exposure? Are current guidelines protective for health? In this session, researchers from several countries present their studies on environmental exposure to manganese.

1:30 – 2:00 PM

Neurobehavioral Effects of Inhaled Manganese in Italian Adolescents
 Roberto Lucchini, *University of Brescia, Italy*

2:00 – 2:30 PM

Elevated Manganese Affects Mothers' and Children's Cognition.
 Jose Antonio Menezes Filho, *Universidade Federal da Bahia, Brazil*

2:30 – 3:00 PM

Effects of Environmental Exposure to Manganese on Motor Function of Children in Mexico
 Horacio Riojas Rodriguez, *Instituto Nacional de Salud Publica, Mexico*

3:00 – 3:20 PM **Break**

3:20 – 3:50 PM

Methodological Aspects of an Epidemiologic Study of Adults Living Near a Manganese Point Source
 Rosemarie Bowler, *San Francisco State University*

3:50 – 4:05 PM

Relationships Between Mood and Neuropsychological Performance in Adults with Environmental Exposure to Manganese

Matthew Harris, *San Francisco State University*

4:05 – 4:35 PM

Intellectual Impairment in School-Age Children with Long-Term Exposure to Manganese in Drinking Water

Maryse Bouchard, *CINBIOSE, Université du Québec à Montréal, Canada*

4:35 – 5:05 PM

Birth Cohort Study GESTE: Can Cord Blood Biomarkers Tell Us How Low Dose Neurotoxic Metals Affect the Foetal Brain? First Data on Prolactin and Monoamine Oxidase.

Nadia Abdelouahab, *University of Quebec at Montreal, Canada*

5:05 – 5:30 PM

Panel Discussion

Wednesday Evening 9 June 2010

Free Evening

Walk across the Parkway to Waterfront Park and enjoy the unique Annual Portland Rose Festival/Waterfront Village.

Nestled between Portland's bustling downtown business district and the scenic Willamette River covering the length of the Governor Tom McCall Waterfront Park, the Waterfront Village provides a park-load of whimsical kids adventures, hysterical vaudevillian acts, festive bands, and thousands of smiling families each day. This magical world of wonder also features a mysterious ancient temple, live exotic animals (including lions and tigers but no bears, oh no) and the region's best family-friendly carnival. So the Waterfront Village really is Portland's Place to Play for all who are young at heart. Come tour our ancient temple that is being transported from lands lost in time.

<http://www.rosefestival.org/events/waterfrontvillage/>

Thursday Morning 10 June 2010 8:30 AM – 12:00 Noon

Keynote "Anchor Talks"

SESSION X: HOT TOPIC KEYNOTES: CHANNELOPATHIES

Session Chair: **Timothy Shafer**

Co-Chair: **April Neal**

Theme and Rationale: Ion channels are the most basic elements of neuronal function and are key players in the proper function of the nervous system. In order to conduct these functions, channel proteins must exhibit proper structure, localization, and expression. Dysregulation of any of these processes may contribute to pathophysiology and result in what generally are known as channelopathies. The vast majority of research on channelopathies has focused on organ systems such as the heart, with recent focus starting to explore the role of channelopathies in neurological disorders such as epilepsy, chronic pain, and migraine. With this emerging area of research, most of the focus has been on the role of genetic alterations in channel proteins. However, a variety of environmental toxicants target ion channels, which suggests the potential for environmental exposures to contribute to neurological disease associated with alterations in ion channels. This workshop will bring together experts in ion channel structure and function, toxicologists studying environmental toxicant interactions with ion channels, and experts in clinical medicine and translational research to define the state of the science of channelopathies and the potential role of environmental exposures in channelopathies. This session will present an overview of effects of chemicals on ion channels, background about different channelopathy models, and explore the possibility that individuals with channelopathies may or may not be more sensitive to effects of chemicals.

Topics and Speakers:

8:30 – 9:00 AM

Introduction and State of the Art Overview: Channelopathies

Timothy Shafer, *US Environmental Protection Agency*

Do Ion Channelopathies Constitute a Gene X Environment Interaction for Environmental Neurotoxicants?

Timothy Shafer, *US Environmental Protection Agency*

9:00 – 9:30 AM

Overview of Environmental Toxicants Affecting Ion Channel Function

Toshio Narahashi, *Northwestern University*

9:30 – 10:00 AM

Calcium Channels as Targets of Environmental Toxicants and Neurological Disease

William Atchison, *Michigan State University*

10:00 – 10:20 AM **Break**

10:20 – 10:50 AM

Ryanodine Receptor Channelopathies Are Triggered by Environmental Cues

Isaac Pessah, *University of California, Davis*

10:50 – 11:10 AM

Post-Doctoral Competition

Allethrin Differentially Modulates Voltage-Gated Calcium Channel Subtypes in Rat PC12 Cells

April P. Neal, *Michigan State University*

11:10 – 11:30 AM

Pre-Doctoral Competition

Deltamethrin Exposure Results in Calpain/Proteasomal Dependent Down-Regulation of Voltage Gated Sodium Channel Expression

Jason P. Magby, *Rutgers University and University of Medicine and Dentistry of New Jersey*

11:30 – 12:00 Noon

Panel Discussion

Moderators:

- Isaac Pessah
- William Atchison

12:00 Noon – 1:30 PM **Break for Lunch on Your Own**

Thursday Afternoon 10 June 2010 1:30 PM – 3:15 PM

Keynote “Anchor Talks”

SESSION XI: HOT TOPIC KEYNOTES: GENDER DIFFERENCES IN NEUROLOGICAL DISORDERS

Session Chair: **Bernard Weiss**

Co-Chair: **Richard Seegal**

Theme and Rationale: The IOM report, Does Sex Matter (2001) emphasized the need for examining differences between male and female responses in the research enterprise because of wide gaps between males and females in disease patterns and in response to therapeutic practices and drugs. This platform session is designed to exemplify both current knowledge of sex differences in environmental chemical vulnerability and to propose insight into the relationship between the environmental exposures, gender, and the development of neurological dysfunction that may lead to a number of neurological diseases or disorders. Platform presentations will include basic, clinical, and translational research aimed at highlighting the integral role of gender in neuronal function and disease disparities and how environmental exposures interact with gender to alter risk of neuronal dysfunction.

Topics and Speakers:

1:30 – 2:00 PM

Introduction and State of the Art Overview: Gender Differences in Neurological Disorders and Response to Environmental Exposures

Deborah Cory-Slechta, *University of Rochester School of Medicine and Dentistry*

2:00 – 2:30 PM

Sexually Dimorphic Effects of PCBs: From Development to Neurodegeneration

Richard Seegal, *New York State Department of Health*

2:30 – 3:00 PM

Same Sex, No Sex, and Unaware Sex in Neurotoxicology

Bernard Weiss, *University of Rochester School of Medicine and Dentistry*

3:00 – 3:15 PM

Discussion

Moderators:

- Bernard Weiss
- Richard Seegal

3:15 – 3:30 PM **Break**

Thursday Afternoon 10 June 2010 3:30 PM – 5:00 PM

Roundtable Discussion

SESSION XII: UNIFYING MECHANISMS OF NEUROLOGICAL DISORDERS: SCIENTIFIC, TRANSLATIONAL, AND CLINICAL IMPLICATIONS: SUMMARY AND RECOMMENDATIONS

Moderators of the Roundtable:

Conference Co-Chairs:

- Jason R. Richardson
- Kenneth Reuhl

Roundtable Discussants

- Flint Beal
- M. Daniele Fallin
- Benoit Giasson
- Timothy Greenamyre
- Cindy Lawler
- Isaac Pessah
- Timothy Shafer
- Peter Spencer
- Helmut Zarbl

Q&A

Thursday Afternoon 10 June 2010 5:00 PM

Closing

CLOSING OF THE CONFERENCE

Conference Co-Chairs:

Joan M. Cranmer, Kenneth R. Reuhl, Jason R. Richardson

The following papers are presented in

SESSION V: POSTER SESSION

Monday Evening, June 7, 2010

7:00 – 9:30 PM

STUDENT AWARD COMPETITION

Judging will be done between 7:15 PM – 8:30 PM

Students please stand by your poster during this time.

MECHANISTIC APPROACHES TO METAL NEUROTOXICITY

P-58

SELENIUM FROM OCEAN FISH PREVENTS MERCURY TOXICITY. CR Ralston and NVC Ralston. *University of North Dakota Energy & Environmental Research Center, 15 North 23rd Street, Grand Forks ND, 58202 USA*

P-59

Pre-Doctoral Poster Award Competition

METHYLMERCURY-ASSOCIATED FLUO4 FLUORESCENCE IS REDUCED BY THE GABAA AGONIST MUSCIMOL IN NEONATAL RAT CEREBELLAR SLICES. AB Bradford^{1,2} and WD Atchison^{2,3}. ¹*Department of Biochemistry/Molecular Biology,* ²*Center for Integrative Toxicology and* ³*Department of Pharmacology/Toxicology, Michigan State University, East Lansing, MI, USA.*

P-60 (Also presented from Platform in Session IV)

Post-Doctoral Poster & Travel Award Competition

ARSENIC INHIBITS NEURITE OUTGROWTH BY INHIBITING LKB1-AMPK SIGNALING PATHWAY. Xin Wang¹, Dan Meng², Qingshan Chang¹, Jingju Pan¹, Zhuo Zhang¹, Gang Chen³, Zunji Ke², Jia Luo³, and Xianglin Shi^{1*}. ¹*Graduate Center for Toxicology, University of Kentucky, Lexington, KY 40536 USA* ²*Key Laboratory of Nutrition and Metabolism Institute, Institute for Nutritional Sciences, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, 200031, P.R. China* ³*Department of Internal Medicine, University of Kentucky, Lexington, KY 40536 USA*

P-61 (Also presented from Platform in Session IV #20)

Post-Doctoral Poster & Travel Award Competition

THE EFFECT OF ALUMINUM CHLORIDE ON COGNITIVE ABILITY OF APP/PS1 DOUBLE TRANSGENIC MICE AND EXPRESSION OF mGluR1. ZHANG Qin-Li¹, JIAO Xia¹, Ji Xiu-liang¹, Ce Zhang² and NIU Qiao^{*1}. *Ministry of Education Key Laboratory,* ¹*Department of Occupational Health, Shanxi Medical University, Taiyuan 030001 P.R. China;* *Ministry of Education Key Laboratory,* ²*Department of Physiology, Shanxi Medical University, Taiyuan 030001 P.R. China*

*Corresponding author

P-62

Pre-Doctoral Poster & Travel Award Competition

ARSENITE INHIBITS NEURITE GROWTH THROUGH MODULATION OF THE ACTIN CYTOSKELETON. DJ Swett^{1,3} and DA Currie^{1,2}. ¹*Maine Center for Toxicology and Environmental Health,* and ²*Biology Department, University of Southern Maine, Portland, Maine, USA;* ³*Department of Molecular and Biomedical Sciences, University of Maine, Orono, Maine, USA.*

P-63

LOW LEVEL LEAD EXPOSURE AND INFLAMMATORY CYTOKINES IN THE BRAINS OF C57BL/6 MICE. M Cervantes, RX Armijos and C Sobin. *Department of Public Health Sciences, the University of Texas at El Paso, El Paso, Texas*

METALS IN HUMAN POPULATIONS

P-64 (Also presented from Platform in Session IX #45)

Pre-Doctoral Poster & Travel Award Competition

RELATIONSHIPS BETWEEN MOOD AND NEUROPSYCHOLOGICAL PERFORMANCE IN ADULTS WITH ENVIRONMENTAL EXPOSURE TO MANGANESE. Harris, M¹.; Bowler, R². ¹*Alliant International University, San Francisco, CA;* ²*San Francisco State University*

P-65

OCCUPATIONAL DIFFERENCE IN MEMORY PERFORMANCE. Hage, D., Leary B., Bowler, R. *San Francisco State University*

P-66

THE INFLUENCE OF DIETARY CONSUMPTION AND IRON STORES ON MANGANESE IN BLOOD. R Rasalan and R Bowler. *San Francisco State University, San Francisco, CA, USA*

P-67

MERCURY IN FISH: WHAT'S A SAFE LEVEL? SG Gilbert. *Institute of Neurotoxicology & Neurological Disorders, Seattle, WA, USA*

P-68

RELATIONSHIPS BETWEEN OBESITY, MANGANESE, AND HEALTH IN ADULTS WITH ENVIRONMENTAL EXPOSURE TO MANGANESE.

Wilson, K¹; Gocheva, V²; Bowler, R². ¹Alliant International University, ²San Francisco State University

P-69

RELATIONSHIP BETWEEN LOW-LEVEL LEAD EXPOSURE AND PHYSICAL GROWTH IN CHILDREN OF EL PASO TEXAS. Alma Ortega, MD and Christina Sobin, PhD. *Laboratory of Neurocognitive Genetics and Developmental Neurocognition, Psychology Department, University of Texas at El Paso, US*

P-70

THE POSSIBLE PROTECTIVE EFFECTS OF ACTIVE BILINGUALISM IN CHILDREN EXPOSED TO LOW LEVEL LEAD, AS MEASURED BY THE SIMON TASK. Marisela Gutierrez and Christina Sobin. *Department of Psychology, University of Texas at El Paso, El Paso, Texas, US.*

INSECTICIDE NEUROTOXICITY: MECHANISMS AND POPULATIONS

P-71

ORGANOPHOSPHATE (OP) PESTICIDES INDUCE OXIDATIVE STRESS AND OXIDATIVE DNA DAMAGE IN HUMAN SH-SY5Y NEUROBLASTOMA CELLS. Juan F. Muniz¹, Linda A. McCauley², and Glen E. Kisby³ ¹University of Pennsylvania-School of Nursing, Philadelphia PA 19104-6096, USA; ²Emory University, Atlanta, GA; ³Center of Research on Occupational & Environmental Toxicology (CROET), Oregon Health & Science University, Portland, OR 97239, USA

P-72 (Also presented from Platform in Session IV #54)

Pre-Doctoral Poster & Travel Award Competition

DELTAMETHRIN EXPOSURE RESULTS IN CALPAIN/PROTEASOMAL DEPENDENT DOWN-REGULATION OF VOLTAGE GATED SODIUM CHANNEL EXPRESSION. Jason P. Magby^{1,2}, Jason R. Richardson^{1,2}

¹Environmental and Occupational Health Sciences Institute and Department of Environmental and Occupational

Medicine, Robert Wood Johnson Medical School. ²Joint Graduate Program in Toxicology, Rutgers University, University of Medicine and Dentistry of New Jersey

P-73 (Also presented from Platform in Session X #53)

Post-Doctoral Poster & Travel Award Competition

ALLETHRIN DIFFERENTIALLY MODULATES VOLTAGE-GATED CALCIUM CHANNEL SUBTYPES IN RAT PC12

CELLS. April P. Neal, Yuan Yukun, and William D. Atchison. *Department of Pharmacology & Toxicology, Michigan State University, East Lansing, MI USA*

P-74

Post-Doctoral Poster & Travel Award Competition

N-ISOPROPYLACRYLAMIDE INCREASES ACETYLCHOLINE RELEASE IN RAT STRIATAL SLICES. LKM Wright, J Liu and

CN Pope. *Department of Physiological Sciences, Center for Veterinary Health Sciences, Oklahoma State University, Stillwater, OK, USA*

P-75

Post-Doctoral Poster & Travel Award Competition

MECHANISM OF PYRETHROID PESTICIDE-INDUCED APOPTOSIS: ROLE OF THE ER STRESS PATHWAY AND CALPAIN ACTIVATION. M. M. Hossain and J. R.

Richardson. *Department of Environmental and Occupational Medicine, Environmental and Occupational Health Sciences Institute, Robert Wood Johnson Medical School, Piscataway, NJ 08854, USA.*

P-76

CHLORPYRIFOS DISRUPTS NEUROLIGIN-MEDIATED SYNAPSE FORMATION. Dongren Yang and Pamela Lein.

Department of Molecular Biosciences, School of Veterinary Medicine, University of California, Davis, CA, 95616, USA

P-77

CHANGES IN THE ACTIVITY OF SEROTONERGIC NEURONS FOLLOWING ACUTE EXPOSURE TO ORGANOPHOSPHATE PESTICIDES. R Dodds, PG Blain & SJ Judge.

The Medical Toxicology Centre, Wolfson Unit, Newcastle University, Newcastle upon Tyne, UK.

P-78

COMPOUNDS-SPECIFIC EFFECTS OF MUTATIONS AT V787 IN DII-S6 OF NAV1.4 SODIUM CHANNELS ON INHIBITION BY SODIUM CHANNEL BLOCKER INSECTICIDES (SCBIS). R.T. von Stein and D.M. Soderlund.

Department of Entomology, Cornell University, Geneva, NY, USA.

P-79

NEUROBEHAVIORAL EVALUATION OF CHILDREN LIVING IN AN AGRICULTURAL COMMUNITY. DS Rohlman, E Hohn, T Moomey, A Kirk, S Huszar. *Center for Research on Occupational and Environmental Toxicology, Oregon Health & Science University, Portland, OR 97239.*

P-80 (Also presented from Platform in Session VII #33)
Post-Doctoral Poster & Travel Award Competition

BIOMARKERS OF ORGANOPHOSPHORUS (OP) EXPOSURES IN HUMANS. J Marsillach^{1,2}, RJ Richter^{1,2}, JH Kim³, RC Stevens^{1,2}, MJ MacCoss², D Tomazela², SM Suzuki^{1,2}, LM Schopfer⁴, O Lockridge⁴, CE Furlong^{1,2}. *Univ. of Washington, Departments of ¹Medicine (Div. Medical Genetics), ²Genome Sciences, ³Anesthesiology, Seattle, WA, ⁴University of Nebraska Medical Center, Omaha, NE*

P-81 (Also presented from Platform in Session VIII #39)
Pre-Doctoral Poster & Travel Award Competition

ENVIRONMENTAL NEUROTOXIC PESTICIDE INDUCED HISTONE ACETYLATION AND ITS ROLE IN EPIGENETIC MECHANISMS OF NEURODEGENERATION. Song C, Kanthasamy A, Anantharam V, Sun F, Kanthasamy AG. *Iowa Center for Advanced Neurotoxicology, Department of Biomedical Sciences, Iowa State University, Ames, IA 50011, USA.*

MODELING NEUROLOGICAL DISORDERS

P-82

Pre-Doctoral Poster Award Competition

MECHANISM OF PRODUCTION OF SPECIFIC ALPHASYNUCLEIN C-TERMINAL TRUNCATIONS AND IMPLICATIONS TO DISEASE. Caroline M. Ritchie¹, Karen A. Lewis¹, Yang Su^{2,3}, Olina Jou^{2,3}, Charles L. White III^{2,3}, Kimmo J. Hatanpaa^{2,3}, George N. DeMartino¹, Philip J. Thomas¹. *Departments of Physiology¹, Pathology², and the Alzheimer's Disease Center³, University of Texas Southwestern School of Medicine, Dallas, TX, USA*

P-83 (Also presented from Platform in Session IV #15)
Pre-Doctoral Poster & Travel Award Competition

HIGH-THROUGHPUT ASSAY TO ASSESS MANGANESE TRANSPORT KINETICS IN A STRIATAL CELL MODEL OF HUNTINGTON'S DISEASE. GF Kwakye, D Li, AB Bowman. *Dept. of Neurology, Vanderbilt Kennedy Center. Vanderbilt University Medical Center. Nashville, TN, USA.*

P-84

EFFECT OF CHRONIC MPTP ADMINISTRATION ON GLYCOLYSIS AND TCA CYCLE PATHWAYS IN MOUSE MODEL OF PARKINSON'S DISEASE. Bakary J Sonko¹, Tom Schmitt¹, Laszlo Boros³, Sumit Sakar², Ali Syed² and Richard Beger¹. ¹*Division of Systems Biology, NCTR, FDA, Jefferson, AR USA;* ²*Division of Neurotoxicology, NCTR, FDA, Jefferson, AR USA;* ³*SIDMAP LLC. 2990 S. Sepulveda Blvd, Los Angeles, CA, USA.*

P-85

RESVERATROL PROTECTS AGAINST MPP+ AND METHAMPHETAMINE NEUROTOXICITY BY MODULATING THE PKC δ APOPTOTIC SIGNALING PATHWAY AND MICROGLIAL ACTIVATION. K. Kanthasamy*, R. Gordon, C. Hogan, V. Anantharam, A.G. Kanthasamy, and A. Kanthasamy, *Parkinson's Disorder Research Laboratory, Dept. of Biomedical Sciences, Iowa State University, Ames, IA 50011-1250*

P-86

USING A BIOMARKER OF OXIDATIVE STRESS TO DETERMINE SYNERGISTIC INTERACTIONS BETWEEN IRON AND PARAQUAT. T. Brown, F. Cardozo-Pelaez. *Center for Environmental Health Sciences. Department of Biomedical and Pharmaceutical Sciences, The University of Montana, Missoula, Montana, USA*

DEVELOPMENTAL NEUROTOXICITY

P-87 (Also presented from Platform in Session IV #17)
Pre-Doctoral Poster & Travel Award Competition

SINGLE POSTNATAL METHYLMERCURY (MEHG) EXPOSURE INITIATES ACUTE STEM CELL DEATH IN HIPPOCAMPUS LEADING TO SUBSEQUENT NEURONAL DEFICITS AND LEARNING IMPAIRMENT. K. Sokolowski^{1,2} Kelsey Robinson¹ and E. DiCicco-Bloom^{1,2} *Joint Graduate Program in Toxicology, Rutgers¹; Neurosci & Cell Biol, RWJMS, Piscataway, NJ²*

P-88

Post-Doctoral Poster & Travel Award Competition

MICROMANAGING BRAIN DEVELOPMENT AND FUNCTION: ETHANOL-INDUCED NEUROBEHAVIORAL TOXICITY IN ZEBRAFISH. TL Tal, JA Franzosa, KS Saili, and RL Tanguay. *Department of Environmental and Molecular Toxicology, Oregon State University, Corvallis, Oregon, USA*

P-89

EARLY POSTNATAL ANESTHESIA AND LONG LASTING COGNITIVE DEFICITS IN RHESUS MONKEYS. M. G. Paule¹, M. Li¹, X. Zou¹, C. Hotchkiss², J.P. Hanig³, T.A. Patterson, W. Slikker, Jr.¹ and C. Wang¹. ¹*Division of Neurotoxicology, National Center for Toxicological Research, FDA*, ²*Bionetics Corporation, Jefferson, AR*, and ³*Center for Drug Evaluation and Research, FDA, Rockville, MD*

P-90

AGE-DEPENDENT CHANGES IN THE NIGROSTRIATAL SYSTEM AND MOTOR BEHAVIOR IN MICE DEFICIENT IN THE DNA REPAIR ENZYME M.Y., Sanchez-Contreras, L.L., Bolyard, J.A., Lyda and F. Cardozo-Pelaez. *Center for Environmental Health Sciences. Department of Biomedical and Pharmaceutical Sciences, The University of Montana, Missoula, Montana, USA*

P-91

IN RATS, REPROGRAMMING OF EARLY DIET MAY REDUCE THE THRESHOLD OF REACTIVITY TO TOXICITY. D. de Groot¹, C. de Esch², J. van Esterik², H. Hendriks³, A. Wolterbeek². *1. Research & Development, TNO Quality of Life, Zeist, The Netherlands; 2. Toxicology & Applied Pharmacology, TNO Quality of Life, Zeist, The Netherlands; 3. Physiological Sciences, TNO Quality of Life, Zeist, The Netherlands*

P-92 (Also presented from Platform in Session IV #16)

PRENATAL METHYLMERCURY EXPOSURE INDUCES IN RATS STRUCTURAL BRAIN DEFICITS AT WEANING AND FUNCTIONAL IMPAIRMENT AT ADULT AGE. D. de Groot¹, M. Radonjic¹, M. Bogaard¹, N. Cappaert³, R. Dierckx², F. Kuper¹, R. Nederlof¹, M. Verwei¹, B. Voet¹, E. de Vries², A. van Waarde², W. Wadman³, A. Wolterbeek¹, R. Stierum¹. ¹*TNO Quality of Life, Zeist, The Netherlands*; ²*University Medical Center Groningen, PET Center Groningen, The Netherlands*; ³*University of Amsterdam, the Netherlands*

ENDOCRINE SYSTEMS AND RECEPTOR ACTIVATION

P-93

Pre-Doctoral Poster & Travel Award Competition
NEUROPROTECTIVE EFFECTS OF ESTRADIOL ON ALTERED AGE RELATED NEURONAL MARKERS IN AGING FEMALE RATS. Pardeep Kumar, R.K. Kale, S.M.Cowsik and N. Z. Baquer. *School of Life Sciences, Jawaharlal Nehru University, New Delhi-110067, India*

P-94

Post-Doctoral Poster & Travel Award Competition
PARA-SUBSTITUTION IS A KEY DETERMINANT OF BROMINATED DIPHENYL ETHER ACTIVITY TOWARD RYANODINE RECEPTORS KH Kim, DD Bose, J Riehl, IT Padilla, CD Barnhart, PJ Lein, and IN Pessah. *Department of Molecular Biosciences, The School of Veterinary Medicine, University of California, Davis. USA*

P-95

EFFECTS OF DIBP ON BEHAVIOR OF LEARNING AND MEMORY IN THE MALE MOUSE. Ma Ning, Student, and Xu Hai-bin, Advisor. *National Institute of Nutrition and Food Safety, China CDC, Beijing, china*

P-96

Post-Doctoral Poster & Travel Award Competition
NANOMOLAR NON-COPLANAR PCB 95 INCREASES SPONTANEOUS SYNCHRONIZED Ca²⁺ OSCILLATIONS AND DENDRITIC GROWTH IN PRIMARY HIPPOCAMPAL NEURONS. DD Bose, D Yang, ES Kaplan, PJ Lein and IN Pessah. *Department of Veterinary Molecular Biosciences, University of California, Davis, CA, USA.*

RISK IDENTIFICATION

P-97

THE WORLD LIBRARY OF TOXICOLOGY (WLT): A GLOBAL COMMUNITY OF TOXICOLOGISTS SERVING PUBLIC HEALTH. SG Gilbert¹, P Wexler², EM Faustman³, and N Thorp¹. ¹*Institute for Neurotoxicology and Neurological Disorders, Seattle, WA, USA.* ²*National Library of Medicine, Bethesda, MD, USA.* ³*University of Washington, Seattle, WA, USA.*

P-98

EXAMINING THE RELATIONSHIP OF SELF-REPORTED DIAGNOSED ILLNESSES AND MEDICATION USE. Warren, M.J.; Bowler, R.; Kim, Y.; Booty, A. ¹ *San Francisco State University* ²*University of Ulsan College of Medicine* ³*University of California San Francisco*

P-99

IDENTIFICATION OF TOXICITY PER DNA ADDUCTS FOLLOWED BY TREATMENT WITH PHOSPHOLIPID EMULSION. Kane PC, Speight MO, Bieber K, Pouria S, McLaren-Howard J, Milz M. *NeuroLipid Research Foundation, 45 Reese Road, Millville, NJ 08332 USA*

P-100

HYPOXIA HAZARDS FROM SULFUR DIOXIDE DERIVED FROM SHRIMP DIP. MF Cranmer, PhD, CIH, ATS and BW Rodgers, MS. *Department of Environmental and Occupational Health, College of Public Health, University of Arkansas for Medical Sciences.*