# NTX XVII: CHILDREN'S HEALTH AND THE ENVIRONMENT

## SUNDAY EARLY AFTERNOON  OCT. 17, 1999  1:00 – 2:20 PM

### SESSION I. Opening, Welcome & Overview

**Co-Chairs:** Joan Cranmer, PhD and William Slikker, Jr., PhD

**1:00 PM** Opening the Conference  
Joan Cranmer, PhD  
Conference Chair, University of Arkansas for Medical Sciences

**1:05** Welcome - On Behalf of the Host Institutions  
Betty Lowe, MD ~ Associate Dean for Children's Affairs  
University of Arkansas for Medical Sciences  
Senior Vice President / Medical Director, Arkansas Children's Hospital  
President, American Academy of Pediatrics (1993 – 94)

**1:10** Theme, Rationale and Overview of the Conference: Children’s Health - from Molecule to Community and Back Again  
Joan M. Cranmer, PhD

### SESSION II. Tutorials

**Chair:** William Slikker, Jr., PhD

The objective of this session is to provide scientific background for the more detailed sessions to follow. Tutorials will delineate basic principles of neuroanatomy and neurobiology of the developing organism. An overview of the principles of developmental neurotoxicology will build on this established anatomical/biological scientific base. These basic principles will be translated into specific susceptibilities in children. The tutorials will provide a unifying framework and rationale for the entire conference.

**1:20** Principles of Developmental Neuroanatomy and Neurobiology  
Stanley Barone, PhD ~ US Environmental Protection Agency

**1:40** Principles of Developmental Neurotoxicology  
William Slikker, Jr., PhD ~ National Center for Toxicological Research

**2:00** Specific Unique Susceptibilities of the Fetus, Infant, Child and Adolescent  
Cynthia Bearer, MD, PhD ~ Case Western Reserve University

*Note: In-depth reprints or books of the above tutorials are available in the Exhibit area.*

**2:20** Break and Set-up for Session III

## SUNDAY LATE AFTERNOON  OCT. 17, 1999  2:25 – 6:15PM

### SESSION III. Developmental Neurotoxicity of Lead: A Model Example of an Interdisciplinary Approach

**Co-Chairs:** Deborah Cory-Slechta, PhD & Herbert Needleman, MD

This session is devoted to understanding the behavioral consequences of developmental lead exposure, the advances in understanding neurochemical and biochemical mechanisms of specified behavioral deficits and the long-term adverse consequences of such exposures. Issues such as the period of developmental exposure, reversibility, biphasic effects, and future research directions will be addressed.

**2:25** Introduction and Overview  
Session Co-Chairs

**2:30** Molecular Neurochemical Mechanisms of Pb Exposure  
Jan Suszkiw, PhD ~ University of Cincinnati

**3:00** Molecular Mechanisms of Pb and Synaptic Vesicle Proteins  
Johnathan Pevsner, PhD ~ Kennedy Krieger Research Institute

**3:30** Refreshment Break

**3:45** Glutamatergic Mediation of Plasticity  
Steven Lasley, PhD ~ University of Illinois

**4:15** Dopaminergic and Glutamatergic Basis of Lead-Induced Cognitive Deficits  
Deborah Cory-Slechta, PhD ~ University of Rochester Medical School

**5:45** Open Discussion and Itemization of Research Needs  
Discussion Leaders: Co-Chairs

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### 4:45 Developmental Lead Exposure and Prefrontal Function in Children  
Bruce Lanphear, MD, MPH ~ University of Cincinnati  
Richard Canfield, PhD ~ Cornell University

### 5:15 Developmental Neurotoxicity and its Long-Term Ramifications  
Herbert Needleman, MD ~ University of Pittsburgh

### 5:45 Open Discussion and Itemization of Research Needs  
Discussion Leaders: Co-Chairs

### 6:15 Adjourn for Reception and Buffet Dinner

**6:30 – 9:00 PM**  
Welcoming Reception and Buffet Dinner

### MONDAY MORNING  OCT. 17, 1999  8:15 AM – 12 NOON

**7:45 – 8:15 Continental Breakfast**

### SESSION IV. Mechanisms of Developmental Neurotoxicology: Molecular and Cellular Targets

**Co-Chairs:** Lucio Costa, PhD and Michael Aschner, PhD

In this session we will examine selective mechanisms underlying neuronal and glial injury. Attention will be given to identifying specific models of injury in which fundamental biochemical and cellular mechanisms have been described. Mechanisms of neural patterning, neurotransmitter development, the role of apoptosis, effects of xenobiotics on second messenger signaling pathways and the involvement of oxidative stress in CNS injury will be examined. Where appropriate, inference will be made to the effects of various neurotoxins (e.g., metals, pesticides, therapeutics, endocrine disruptors) on developmental processes, and their sequelae. We also will examine two cellular processes which are central to development, specifically, cellular adhesion and reorganization of the cytoskeleton. Both processes undergo critical modifications during development. Speakers will address how disturbances of these processes can result in structural and functional abnormalities of the nervous system.

**8:15** Introduction and Overview  
Session Co-Chairs

**8:20** LTP, CaM Kinase, Cellular Mechanisms of Learning  
Tomás Guilarte, PhD ~ Johns Hopkins University

**8:45** The Zinc Finger Domain of Proteins is Targeted by Heavy Metals  
Nasser H. Zawia, PhD ~ Meharry College

**9:10** Second Messenger Systems  
Lucio Costa, PhD ~ University of Washington

**9:35** Oxidative Stress, Excitotoxicity and Neurodegeneration  
Mark Mattsson, PhD ~ University of Kentucky

**10:00** Refreshment Break

**10:15** Neuron Interaction: Molecular Targeting by Developmental Neurotoxins  
Michael Aschner, PhD ~ Wake Forest University School of Medicine

**10:40** Neural Cell Adhesion Molecules: Targets for Developmental Neurotoxicants  
Cynthia Bearer, PhD ~ Case Western Reserve University

**11:05** Cyclic Nucleotides, Calmodulin, Calmodulin-Regulated Proteins, Cell Signaling, Cell Death  
To be Invited

**11:35** Open Discussion and Itemization of Research Needs  
Session Chairs

**12:00 PM** Adjourn for Lunch (on Your Own)
SESSION VI. Special Presentation

Chair: Bob Sonawane, PhD

Presentation
“Overview of Newest Federal Child-Health Initiatives”
William Farland, PhD
Director, National Center for Environmental Assessment
Office of Research and Development
US Environmental Protection Agency

Newest Federal and Foundation Child Health Initiatives: Goals, Research Needs and Funding Opportunities.

Personal Interaction: Representatives of many of the Sponsoring Organizations and others will attend the Social Evenings and Poster/Workshop sessions and be available to talk with Participants. Materials: Agencies, Foundations and other NGOs will have representatives and background materials available in the exhibit area during the Poster Session.

5:45 Adjourn for Conference Country Cookout on the Riverfront
SESSION IX: Poster Session and Workshops

Poster Session

Co-Chairs: To Be Invited

Presentation of papers from poster and informal discussion is a highlight of this meeting. Free communications from poster on any topic of neuroscience + toxicology are welcome. All papers presented from poster or platform are invited for publication in the Special Issue of Neurotoxicology devoted to this conference.

4:00 - 6:00 PM

Posters Attended and Discussed

Selection of Student Awardees will be made during this time.

$1000 in cash awards and plaques will be presented on Wednesday.

Poster Presenters: Please mount your poster on Sunday on the poster board with the same number as your abstract. Posters should be up by 12:00 Noon Monday. Please take posters down by 12:30 PM Wednesday.

Workshop A: Pediatric Cognitive/Neurobehavioral Test Batteries

Co-Chairs: Merle Paule, PhD and TBA

4-6 batteries in current use will be set-up for “on-hands” demonstrations. A brief background presentation from the podium will proceed the demos. Detailed write-ups will be included in the Abstract Book. Summaries will be set-up in “poster fashion.

BARS Nonverbal Test for Indigenous Peoples
Kent Anger, PhD or TBA

Complex Brain Function Test (“The Nickel Game”)
Merle Paule, PhD ~ NCTR & UAMS/ACH, Little Rock, AR

Pediatric Environmental Neurobehavioral Test Battery (PENTB)
ATSDR Contractee

The CANTAB Neuropsychological Test Battery (Seychelles)
Deborah Cory-Slechta, PhD and/or Becky Brockel, PhD

Tests of Motor, Sensory-Motor and Sensory Function (Seychelles)
Bernard Weiss, PhD and/or Randy Pittelli

Oswego Developmental Test Battery
Paul Stewart, PhD and/or Tom Darville, PhD

Workshop B: Models of Exposure Assessment in Humans: Cumulative and Aggregate Databases and Toxicokinetic Models

Prenatal, Perinatal, Postnatal and Lifelong Toxicokinetic and Risk Assessment Computer Models will be set-up for hands-on demonstrations.

Workshop C: How to Conduct an FOB

A Video Tape Presentation of How to Conduct a Functional Observational Battery (FOB) will be shown. Scientists familiar with the proper conduct of a FOB will be available to answer questions.

Virginia Moser, PhD ~ US Environmental Protection Agency

SESSION X: Hot New Topics in Developmental Neurotoxicology: Novel and Changing Perspectives

Co-Chairs: William Slikker, Jr., PhD and Kevin Crofton, PhD

Developmental neurotoxicant risk assessment approaches need to be continually updated to meet new regulatory challenges. Examples of scientifically-based decision making will be drawn from the review of new therapeutic agents as well as environmental chemicals. The balancing of benefits and risks will be examined with examples of newly approved therapeutic agents. The novel application of knowledge bases to enhance the predictive capability of risk assessment approaches for endocrine disruptors will also be presented.

New strategies for understanding the mode of action of potential endocrine disrupters and the application of this information to identify classes of agents for further study will be discussed.

8:15 Introduction and Overview

Session Co-Chairs

8:30 Developmental Neurotoxicology of Therapeutics: Survey of Novel Recent Findings

William Slikker, Jr, PhD ~ National Center for Toxicological Research/FDA

8:50 Developmental Neurotoxicity of Endocrine Disruptors: Focus on Estrogens

Bern Schwartz, DVM, PhD ~ National Center for Toxicological Research/FDA

9:10 Developmental Neurotoxicity of Endocrine Disruptors: Focus on Thyroid

Kevin Crofton, PhD ~ US Environmental Protection Agency

9:30 Free Communications ~ selected from submitted abstracts

10:00 Open Discussion and Itemization of Research Needs

Session Co-Chairs

10:15 – 10:30 AM Refreshment Break

SESSION XI: Roundtable: Do the EPA Developmental Neurotoxicity Guidelines Detect Human Developmental Neurotoxicity?

Chair: Hugh Tilson, PhD

The objective of this session is to promote discussion concerning the sensitivity and applicability of EPA’s Developmental Neurotoxicity Testing Guidelines. Questions have been raised about the completeness of the battery to assess the full range of developmental effects seen in humans and the frequency with which the battery has actually been required for testing chemicals by the Agency. The content of the testing battery and the results of a retrospective study to determine the sensitivity of the battery relative to measures of neurotoxicity in adult animals, as well as measures of developmental and reproductive toxicity will be presented. Panel participants will be asked to provide their perspectives concerning the adequacy of the test battery to detect human developmental neurotoxicants. Participants will also be asked for recommendations concerning the addition or deletion of various components of the current test battery.

Presentation

“A Retrospective Analysis of EPA’s Developmental Neurotoxicity Testing Battery”

Sue Makris, PhD
Office of Pesticides, Prevention and Toxic Substances
US Environmental Protection Agency

Panel Discussants:
• Cynthia Bearer, MD, PhD ~ Case Western Reserve University
• Alan Hoberman, PhD ~ Argus/Primedica
• Carole Kimmel, PhD ~ NCEA/ORD/EPA
• Sue Makris, PhD ~ OPPT/ORD/EPA
• John O’Donoghue, PhD ~ Eastman Kodak Company
• Deborah Rice ~ NCEA/ORD/EPA
• David Wallinga, MD ~ Natural Resources Defense Council

SESSION XII: Presentation of Student Awards