Scientific Program Overview

A page reference follows the session information.

Sunday, March 15

7:00 AM–7:45 AM

CONTINUING EDUCATION SUNRISE MINI-COURSE

1. Topics in Ethics: Conflict of Interest—Real or Imagined?—PBDEs As a Case Study (p76)

8:15 AM–12:00 NOON

CONTINUING EDUCATION MORNING COURSES

2. Free Radicals for Toxicologists—From the Basics to Inflammation and Disease (p77)
3. Characterizing Modes-of-Action and Their Relevance in Assessing Human Health Risks (p77)
4. Evaluation of Toxicity to Male and Female Reproductive Systems: Biology, Study Design, and Data Interpretation (p78)
5. Immunology for Toxicologists (p78)
6. Principles and Applications of Toxicokinetics (p79)
7. Translation of Safety Biomarkers in Drug Discovery and Development (p79)

1:15 PM–5:00 PM

CONTINUING EDUCATION AFTERNOON COURSES

8. Free Radicals for Toxicologists—From the Basics to Inflammation and Disease (p80)
9. Characterizing Variability and Uncertainty with Physiologically-Based Pharmacokinetic Models (p80)
10. Current Approaches in Mixture Risk Assessment (p81)
11. How Similar Is Similar and How Relevant Is Relevant? Considerations in the Design of a Predictive Development Program for Biotherapeutics (p81)
12. New Frontier in Metal Toxicology: Genetic Susceptibility, Early Diagnosis, and Related Biological Indices (p82)
13. Stress As a Confounding Factor in Toxicology Studies (p82)

Thematic Approach

Session titles related to each theme are color coded in the Program overview.

Biomakers—Biomarkers are invaluable tools for investigating and predicting toxic responses, and research from the toxicological sciences has contributed to the identification and validation of biomarkers at the molecular, biochemical, and cellular levels. The contributions of toxicology to biomarker research, as well as new discoveries related to the identification, validation, and utilization of biomarkers to integrate health and disease, will be highlighted in this theme.

Epigenetics—Heritable DNA and chromatin modifications regulate gene expression to direct many important biological processes. Alterations in epigenetic determinants including DNA methylation and histone modifications contribute to the adverse health effect of many toxicants. The importance of epigenetics in health and disease and new technologies for studying epigenetics will be featured in this theme on advances in epigenetic research for the toxicological sciences.

Inflammation and Disease—The inflammatory response contributes to many acute and chronic diseases. Inflammatory mediators such as ROS, cytokines and eicosanoids, and acute-phase proteins such as glucocorticoids, C-reactive protein and serum amyloids, play key roles in this response. Inflammatory mediators also play a role in the adverse response to many drugs and environmental agents. The important role of inflammation and inflammatory mediators in toxic responses and disease will be highlighted in sessions featured in this theme.

Nanotechnology—Nanomaterials are the building blocks for this promising new technology and are now routinely produced and commercialized. These materials are currently being utilized in many diverse areas such as engineering, information technology, and diagnostics. More information is needed on their biology and the potential health impacts of these new products, and sessions highlighted in this theme will explore the potential implication(s) of their use.

Neurodegenerative Diseases—Neurodegenerative diseases caused by loss of cells and/or cellular function in the brain and in dementias and movement disorders are becoming increasingly more common. The role of environmental agents and inflammatory mediators in the development of neurodegenerative disease and elucidation of sequelae from acute toxic exposures to the onset of disease will be highlighted in this theme as important areas of research for the toxicological sciences.

Monday, March 16

8:00 AM–9:00 AM

PLENARY OPENING LECTURE

Signal Transduction Pathway Used by Therapeutic Agents and Drugs of Abuse—*Lecturer: Nobel Laureate Paul Greengard* (p94)

9:15 AM–12:00 NOON

SYMPOSIA SESSIONS

- Eat Well, Breathe Well: Nutritional Determinants of Susceptibility to Airborne Pollutants (p94)
- MicroRNAs in Biology and Toxicology (p95)
- Superantigens, Cytokine Storm, and Toxic Reactions (p95)
- Zinc, Inflammation, and Diabetes (p96)

WORKSHOPS SESSIONS

- Dose Selection and Design Considerations in Safety Studies for Biotherapeutics (p96)
- From Genes to Organs: Advancements in Modeling Biological Systems (p97)
- Strategies to Integrate Systems Biology into *In Vitro* Screening in Early Nonclinical Safety Assessment (p98)

PLATFORM SESSIONS

- Applications in 'Omics Technologies to Problems in Toxicology (p98)
- Immunoregulation and Toxicity (p99)
- Mechanistic Insights for Reproductive Toxicology (p100)

9:30 AM–12:30 PM

POSTER SESSIONS

- Ah Receptor Mediated Signalling (p102)
- Apoptosis: Activators and Regulatory Pathways (p117)
- Cardiovascular Toxicity I (p110)
- Dermal Absorption and Skin Toxicity (p103)
- Information and Education (p120)
- Insights in Endocrine Action and Toxicology (p105)
- Nanotoxicology *In Vivo* (p112)
- Neurotoxicity—Developmental (p107)
- Receptors (p101)
- Redox-Cycling, Reactive Oxygen Species (ROS), and Damage (p118)
- Xenobiotic Biotransformation (p115)

12:10 PM–1:30 PM

ROUNDTABLE SESSIONS

- Devils Lie in the Details: Practices and Problems in Neuropathology—Significance for Neurotoxicology (p121)
- The Use of Engineered Nanomaterials in Food and Food-Related Products: Is This a Concern for Human and Environmental Safety? (p122)

HISTORICAL HIGHLIGHTS SESSION

- A Quarter of a Century (1984–2009) Since the Bhopal Disaster: Lessons Learned (p122)

INFORMATIONAL SESSION

- Peer Review of Toxicology, Exposure, and Risk Data: Ensuring the Best Science (p123)

12:30 PM–1:20 PM

LEADING EDGE IN BASIC SCIENCE AWARD LECTURE

The Structural Pervasiveness of Estrogen Activity—Benefits and Risks from the Eclectic Nature of Ligand Binding by the Estrogen Receptor—*Lecturer: John Katzenellenbogen* (p124)

1:00 PM–4:30 PM

POSTER SESSIONS

- Alternate Tests and Models I (p127)
- Assessment of Chemical Mixtures (p141)
- Biological Modeling (p134)
- Chemical and Biological Weapons (p138)
- Ecotoxicology (p132)
- *In Vitro* Methods, Models, and Mechanisms of Hepatotoxicity (p130)
- Neurotoxicity—Metals (p124)
- Safety Assessment for Non-Pharmaceuticals (p137)
- Toxicology of Kidney (p136)

1:40 PM–4:25 PM

SYMPOSIA SESSIONS

- Aromatase (CYP19) Gene Expression and Function: Current State of Knowledge As a Mode-of-Action for Toxicological Effects (p143)
- Genomic, Non-Genomic, and Epigenetic Mechanisms of Nuclear Hormone Receptor Action (p144)
- *In Vitro* Models of Human Toxicity Pathways (p144)
- Nitrative and Oxidative Stress in Toxicology and Disease (p145)
- Novel Signalling Mechanisms That Regulate Dopaminergic Neuronal Survival or Death: Implications in Parkinson's Disease (p146)
- Regulation of Drug Transporters in Different Disease States and Its Toxicological and Clinical Implications (p146)

WORKSHOP SESSIONS

- Agglomeration *Versus* Dispersion: How Nanoparticle Behavior Affects Exposure and Toxicity *In Vitro, In Vivo,* and in the Real World (p147)

PLATFORM SESSIONS

- Cellular Responses to Chemical Weapons (p148)
- Developmental Basis of Adult Disease (p148)
- Epigenetic Mechanisms of Xenobiotics (p149)
- Mechanisms of Hypersensitivity (p150)
- Mechanisms of PAH and Tobacco Carcinogenesis (p150)

4:30 PM–5:50 PM

SOT/EUROTOX DEBATE

Nanotoxicology—Is It Much Ado About Nothing? (p152)

4:35 PM–5:55 PM

ROUNDTABLE SESSIONS

- Leveraging Nonclinical Disease Models for Early Perspective on Safety and Risk during Drug Discovery (p152)
- Role of Regulatory Cooperative Efforts in Food Protection (p153)
- Weight of Evidence Advancements in Risk Assessment: Conceptual Frameworks and Case Studies Illustrating Fundamentals of Application (p153)

EDUCATION-CAREER DEVELOPMENT SESSION

- Grantsmanship Forum: Tools and Skills Needed to Navigate Toxicology Research Funding (p154)

Tuesday, March 17

7:30 AM–8:50 AM

ROUNDTABLE SESSIONS

- Biomarkers of Cardiac Hypertrophy and Skeletal Muscle Toxicity—Successes and Challenges Related to Their Implementation in Drug Development (p155)
- The Regulatory Frontier: Addressing Products of Nanotechnology (p156)

HISTORICAL HIGHLIGHTS SESSION

- Dioxin, Forty Years of Science: Are We Any Closer to Assessing Potential Risk? (p156)

INFORMATIONAL SESSION

- NIH Genes, Environment, and Health Initiative: Biomarkers and Biosensors for Detecting Response to Environmental Stress (p157)

8:00 AM–8:50 AM

TRANSLATIONAL IMPACT AWARD LECTURE

Keap1 One Eye on the Target—Translating Molecular Toxicology into Cancer Prevention—*Lecturer: Thomas W. Kensler* (p157)

9:00 AM–11:45 AM

SYMPOSIA SESSIONS

- Does Metal Toxicity Play a Role in the Etiology of Alzheimer's Disease? (p158)
- Epigenetic Implications for Toxicology (p158)
- Immunomodulation during Complementary and Alternative Medicine (CAM) Therapy: Risks and Benefits (p159)
- Nanotoxicology and Drug Delivery (p160)

WORKSHOP SESSIONS

- Low-Dose Non-Linearity: What Can Emerging Technologies Tell Us? (p160)
- Maternal Toxicity and Its Impact on Study Design and Data Interpretation (p161)
- Pesticide Mixtures: Experimental Evaluation and Computational Modeling (p161)

PLATFORM SESSIONS

- Advances in Animal and Alternative Models (p162)
- Advances in Biological Modeling (p162)
- Cellular and Biological Sources for Biomarkers (p163)
- Metal-Induced Carcinogenesis (p164)
- Xenobiotic Modulation of Signal Transduction Pathways and Gene Regulation (p164)

9:00 AM–12:30 PM

POSTER SESSIONS

- Biological Actions of Natural Products (p168)
- Cardiovascular Toxicity II (p177)
- Nanotoxicology *In Vitro* (p172)
- Reactive Oxygen Species (ROS) Stimulated Signalling (p179)
- Research in Disposition and Pharmacokinetics (p180)
- Risk Assessment Applications (p170)
- Role of PPAR and COX-2 in Chemical Carcinogenesis (p176)
- Safety Issues Concerning Food Products and Micronutrients (p165)

12:00 NOON–1:20 PM

ROUNDTABLE SESSIONS

- Is There a Future for Animal Models in the Investigation of Idiosyncratic DILI in Humans? (p185)
- National Children's Study: Opportunities and Challenges for Toxicologists (p185)
- Setting a Safe Starting Dose in Initial Clinical Trials with Biotherapeutics: Do I Use the NOAEL or the MABEL? (p186)

EDUCATION-CAREER DEVELOPMENT SESSION

- The Future of Environmental Health Science: Featuring NIEHS-Funded Early Career Investigators (p186)

12:30 PM–1:20 PM

DISTINGUISHED TOXICOLOGY SCHOLAR AWARD LECTURE

Role of Reactive Metabolites, Protein Adducts, Immune System, and Other Susceptibility Factors in Drug-Induced Liver Injury—*Lecturer: Lance R. Pohl* (p187)

1:00 PM–4:30 PM

POSTER SESSIONS

- Bioinformatics and Prediction of Toxicity (p195)
- Epidemiology and Exposure Assessment (p203)
- Functional Genomics in Toxicology (p188)
- Gene Regulation (p191)
- Genotoxicity I (p193)
- Hepatotoxicity of NSAIDS and Acetaminophen (p198)
- Hepatotoxicity: *In Vivo* Studies (p199)
- Pesticide—Toxicity (p201)

1:30 PM–4:15 PM

SYMPOSIA SESSIONS

- Aquatic Species As Sentinels for Human Health: Comparative Toxicology of Metals, Nanoparticles, and PCB's (p206)
- Mammalian Retrotranspositional Elements: Epigenetic Regulation, Species Differences, and Potential Roles As Mediators of Cellular Responses to Toxic Stress (p207)
- The Good, the Bad, and the Ugly of Toxicant-Induced Pulmonary Inflammation (p208)

WORKSHOP SESSIONS

- Improved Safety Biomarkers for Monitoring Kidney Injury (p208)
- Oxidative Stress As a Regulator of Normal Function and Mediator of Toxicant-Induced Damage with Impacts on Reproduction and Development (p209)
- Pesticides and Parkinson's Disease: Implications of New Epidemiology and Exposure Data to Risk Assessment (p210)
- Safety of High-Intensity Sweeteners: Bittersweet Controversy (p210)

PLATFORM SESSIONS

- Advances in Disposition and Pharmacokinetics (p211)
- Advances in Risk Assessment Science (p212)
- Effects of Inhaled Pollutants—Cardiopulmonary Toxicity (p212)
- Mechanisms in Immunotoxicology (p213)
- New Insights in Ecotoxicology (p213)

Wednesday, March 18

7:30 AM–8:50 AM

ROUNDTABLE SESSION

- Characterization and Application of PBPK Models in Risk Assessment (p216)

INFORMATIONAL SESSION

- Novel Translational Safety Biomarkers and Safety First at the FDA (p216)

EDUCATION-CAREER DEVELOPMENT SESSION

- Toxicologists: The Next Generation (p217)

SPECIAL SESSION

U.S. FDA Advisory Panel Appointments (p215)

8:00 AM–8:50 AM

KEYNOTE MEDICAL RESEARCH COUNCIL (MRC) LECTURE

The Ubiquitin Proteolytic System—From Basic Mechanisms through Human Disease and on to Drug Targeting—*Lecturer: Nobel Laureate Aaron Ciechanover* (p217)

9:00 AM–11:45 AM

SYMPOSIA SESSIONS

- From Mechanisms to Biomarkers: Basic and Applied Metabolomics in Toxicology (p218)
- Incorporating 'Omics in the Study of Reproduction and Development (p218)
- Interactomes and Their Application in Toxicology (p219)
- Transcriptional Changes in Immunotoxicology: Transcription Factors, Signal Transduction, and Epigenetics (p219)

WORKSHOP SESSIONS

- Developing Brain: Safety Assessment for Pediatric Use of Pharmaceuticals (p220)
- Toxicology of Unintentional and Intentional Disasters (p220)

REGIONAL INTEREST SESSION

- Biofuels and the Bay: Characterizing Health and Ecosystem Impacts in the Chesapeake (p221)

PLATFORM SESSIONS

- Cardiopulmonary Toxicity of Inhaled Particles and Nanoparticles (p222)
- Endocrine-Toxicant Interactions (p222)
- Hot Topics in Metal-Induced Neurodegeneration (p223)
- Mechanisms of Persistent Organic Compound Toxicity (p224)
- Mechanisms of Pesticide-Induced Toxicity (p224)

9:00 AM–12:30 PM

POSTER SESSIONS

- Advances in Reproductive Toxicology (p228)
- Animal Models II (p226)
- Biomarker Discovery and Detection (p240)
- Biomonitoring and Exposure Assessment (p242)
- Cytoprotective Strategies Against Reactive Oxygen Species (p237)
- Genetic Polymorphisms (p225)
- Hypersensitivity and Autoimmunity (p233)
- Risk Assessment Research (p231)
- Metals—*In Vivo* (p238)
- Parkinson's Disease (p236)

12:00 NOON–1:20 PM

SYMPOSIA SESSION

- Gene-Environment Interactions: Epigenetic Pathways in Chronic Disease Promotion and Progression (p245)

ROUNDTABLE SESSION

- Preclinical Evaluation of Cancer Hazard and Risk of Biopharmaceuticals (p245)

INFORMATIONAL SESSION

- Kinase Inhibitors As Targeted Therapeutics in Inflammation and Oncology—Approaches to Predict and Manage Clinical Toxicities (p246)

SPECIAL SESSION

Meet the Director of NIEHS, *Linda Birnbaum* (p244)

12:30 PM–1:20 PM

MERIT AWARD LECTURE

Chemical Hepatocarcinogenesis—Mechanisms, Pathogenesis, and Thresholds *Lecturer: Gary M. Williams* (p246)

1:00 PM–4:30 PM

POSTER SESSIONS

- Alternate Tests and Models II (p259)
- Chemical Carcinogenesis (p247)
- Developmental Basis of Disease (p250)
- Developmental Toxicology (p252)
- Genotoxicity II (p266)
- Inflammation (p264)
- Immunotoxicology (p253)
- Mechanisms of Chemoprevention in Chemical Carcinogenesis (p249)
- Metals—*In Vitro* (p256)
- Steatosis and Cholestasis in Hepatic Disfunction (p263)
- Stem Cell Biology and Toxicology (p262)

1:30 PM–4:15 PM

SYMPOSIA SESSIONS

- Biomarkers: New Breakthroughs in the World of Air Pollution Studies (p268)
- New Insights into Skin Homeostasis and Carcinogenesis (p268)
- Pulmonary Effects of *In Utero* and Early Postnatal Exposure to Arsenic (p269)
- The Role of Inflammation during Metabolic Liver Disease and Drug-Induced Liver Toxicity: Novel Insights (p270)

WORKSHOP SESSIONS

- Food Allergy—Basic Mechanisms and Applications to Identifying Risks Associated with Plant Incorporated Pesticides and Other Genetically Modified Crops (p270)
- The Impact of Transcript Profiling in Drug Safety Assessment (p271)
- The Road to Personalized Medicine (p271)

PLATFORM SESSIONS

- Bioinformatics and Computational Toxicology (p272)
- Expression and Modulation of Cytochrome P450 (p272)
- Mechanisms in Nanomaterial Toxicology (p273)
- Signal Transduction and Metal-Induced Toxicity (p274)

1:30 PM–2:30 PM

SPECIAL SESSION

Update from the NIH Center for Scientific Review—*Speaker: Antonio Scarpa, NIH CSR* (p268)

4:30 PM–5:50 PM

ROUNDTABLE SESSION

- What Is an Adverse Effect in the Age of 'Omics? (p274)

EDUCATION-CAREER DEVELOPMENT SESSION

- Career Opportunities and Transitions in Toxicology (p275)

Thursday, March 19

7:30 AM–8:50 AM

ROUNDTABLE SESSION

- Phototoxicology: A Passing Fancy or Enduring Concern? (p276)

INFORMATIONAL SESSION

- Lead: Children's Exposures and Current Regulatory Standards (p276)

ISSUES SESSION

National Research Council (NRC) Vision: The 'Vision' for Toxicity Testing in the 21st Century: Promises and Conundrums (p276)

8:30 AM–12:00 NOON

POSTER SESSIONS

- Cardiopulmonary Toxicity (p284)
- Chemical-Induced Neurotoxicity (p288)
- Epigenetics (p277)
- Neurotoxicity—Pesticides (p286)
- New Applications in Animal Models (p290)
- Non-Clinical Safety Testing: Biological and Small Molecule Therapeutics (p280)
- Persistent Organic Compounds (p278)
- Regulations and Policy Implications in Toxicology (p279)
- Signal Transduction: Kinases (p294)
- Toxicology of Carbon Nanotubes (p292)

9:00 AM–11:45 AM

SYMPOSIA SESSION

- Heat Shock Proteins and the Toxicological Response (p295)

WORKSHOP SESSIONS

- Biomarkers for Assessing the Systemic Inflammatory Response Syndrome in Toxicology Studies (p296)
- Is Modulation of the Immune System by Perfluoroalkyl Acids a Human Health Concern? (p296)
- The Molecular Mechanism of Alpha, Beta-Unsaturated Carbonyl Toxicity: Getting in Touch with the Soft Side of Chemistry (p297)