Scientific Program Overview

A page reference follows the session information.

Sunday, March 6

CE TARGET AREAS

Course titles related to each theme are color coded in the listing below.

Cardiovascular Toxicology

This topic provides an overview of cardiovascular function at the gross and cellular level. It includes descriptions of cellular biochemistry and the impact of toxicants on system components or functions and presents methods and techniques to measure toxicity.

Epigenetic Mechanisms

This topic describes the field of epigenetic mechanisms and reviews fundamental cellular biochemistry. Roles of epigenetic mechanisms in cellular differentiation, aging, disease, therapeutic gene regulation, and toxicity may be presented.

Systems Biology

This topic describes and demonstrates the systems biology approach to the study of chemical mode of action and toxicity. It describes the interdisciplinary nature of the field and provides examples of how a multi-faceted systems biology approach can yield powerful results that both predict and describe the relationship between chemical exposure and cellular/systemic response.

7:00 AM–7:45 AM

SUNRISE CONTINUING EDUCATION COURSE

1. Biodegradable Materials for Tissue Engineering: Applications and Safety Assessment (p89)

8:15 AM–12:00 NOON

MORNING CONTINUING EDUCATION COURSES

2. Best Practices for Developing, Characterizing, and Applying Physiologically Based Pharmacokinetic Models in Risk Assessment (p89)
3. Current Nonclinical Strategies and Methods for Evaluating Drug-Induced Cardiovascular Toxicity (p90)
4. Dealing with the Data Deluge: A Live Data Discovery and Analysis Course *(Note: Participants are asked to bring their own computer with Internet access)* (p90)
5. Epigenetics in Toxicology: Introduction, Mechanistic Understanding, and Applications in Safety Assessment (p91)
6. Protecting Human Health: Use of Toxicological and Epidemiological Data in Determining Safe Levels for Human Exposure (p91)
7. Drug Hypersensitivity Reactions: Risk Assessment and Management (p92)
8. Toxicology and Risk Assessment of Chemical Mixtures (p92)

1:15 PM–5:00 PM

AFTERNOON CONTINUING EDUCATION COURSES

9. Applications of Computational Systems Biology for Toxicology (p93)
10. Evaluating Toxicity of Engineered Nanomaterials: Issues with Conventional Toxicology Approaches (p93)
11. New Technologies and Approaches in Genetic Toxicology and Their Expanding Role in General Toxicology and Safety Assessment (p94)
12. Practical How-To and Pitfalls Associated with Current Epigenetic Studies (p94)
13. Quantitative *In Vitro* to *In Vivo* Extrapolation: The Essential Element of *In Vitro* Assay-Based Risk Assessment (p95)
14. Stem Cell Utility in Toxicology Screening (p95)
15. The Biology and Toxicology of the Peri- and Post-Natal Development (p96)

THEMATIC APPROACH

Monday–Thursday session titles related to each theme are color coded in the Program *overview.*

Emerging Global Public Health Issues

The global economy raises challenges to protecting human health within the United States for our regulatory agencies. Ultimately, public health issues are no longer just local issues affecting a single country or specific geographic region of the world, but have international health implications. The global public health issues theme has been selected to highlight recent advances in these areas, as well as how this knowledge is impacting regulation and policy.

Environment and Disease

Growing evidence suggest that the environment is a significant factor in the susceptibility and progression of cardiovascular and neurodegenerative diseases and cancer. The environmental influence on disease theme has been selected to highlight recent advances in these areas as well as contrast how this knowledge is impacting regulation and policy.

Global Air Quality and Human Health

It is becoming increasingly apparent that air pollution is not just a local issue, but has international health implications. The goal of this theme is to integrate information on individual susceptibility, disease mechanisms and levels of exposure and to demonstrate how this information can have a significant impact on the development of global air quality policies and regulations.

Integration of Toxicological and Epidemiological Evidence to Understand Human Risk

As novel technologies expand the range of biomarker assessments and the NAS vision for toxicity testing begins to be implemented, the integration of mechanistic laboratory animal testing and *in vitro* systems with human epidemiological data will require new strategies to fully utilize and integrate these data for extending the range of observations and to characterize the exposure-response of human risk. The goal of this theme is to initiate discussion on how new technologies can improve assessment of the dose-response curve and thereby improve human risk assessment from environmental exposures.

Novel Approaches to Preclinical Safety Assessment: Bridging the Gap between Discovery and the Clinic through Translational Toxicology

Toxicology can play a key role in identifying and implementing advances in toxicological mechanisms, safety assessment, and biomarkers when cross-disciplinary efforts are coordinated during the drug development process. The goal of this theme is to highlight advances in toxicology that improve translation from animal models to humans.

Toxicity Testing: State of Science and Strategies to Improve Public Health

In order for Federal regulations to best reflect the current state of the science, toxicity testing paradigms need to adapt to the advances of science. The main challenge inherent in bringing this vision to fruition is to have testing strategies that provide sufficient context for evaluating potential risk. The goal of the toxicity testing theme is to initiate discussion on how toxicity testing could integrate state of the science methodologies and thereby reduce the uncertainties in the interpretation of toxicity-pathway data to humans.

Monday, March 7

8:00 AM–9:00 AM

PLENARY OPENING LECTURE

NIH Vision, *Lecturer: Francis S. Collins, National Institute of Health* (p116)

9:15 AM–12:00 NOON

SYMPOSIUM SESSIONS

- Emerging Issues at the Intersection of Reproductive and Mixtures Toxicology (p116)
- Environmental Oxidative Pollutant-Induced Pulmonary Toxicity (p117)
- High Content Imaging: Applications in Toxicology and Toxicity Testing (p118)
- Ribotoxic Stress: Mechanisms and Models for Human Disease (p118)

WORKSHOP SESSIONS

- Disease Prevention: The Next 50 Years (p119)
- New Approaches for Integrating Toxicological and Epidemiological Data to Better Inform Risk Assessment (p120)

PLATFORM SESSIONS

- Nanotoxicology—Carbon Nanotubes and Carbon Nanoparticles (p120)
- New Insights into Male Reproductive Toxicology (p121)
- Use of Embryonic Stem Cells in Toxicology (p122)

9:30 AM–12:30 PM

POSTER SESSIONS

- Bioinformatic Profiling and Computational Pathway Prediction (p126)
- Carcinogenesis I (p133)
- Cardiovascular Toxicology (p131)
- Cell Signaling and Gene Regulation (p147)
- DNA Replication and Repair (p125)
- Epigenetic Mechanisms (p124)
- Genotoxicity (p142)
- Hypersensitivity: Methods and Mechanisms (p123)
- Inflammatory Mediators in Disease Pathogenesis (p136)
- Metals I (p137)
- Metals II (p139)
- Neurodegenerative Diseases (p129)
- Receptor and Receptor-Mediated Toxicity (p144)

12:10 PM–1:30 PM

ROUNDTABLE SESSION

- Reforming the Toxic Substances Control Act (TSCA): Challenges, Opportunities, and Timing (p151)

INFORMATIONAL SESSION

- The International Cooperation on Alternative Test Methods (ICATM): Translating Science to Provide Improved Public Health Safety Assessment Tools (p152)

EDUCATION-CAREER DEVELOPMENT SESSION

- Social Media and Informatics Essentials for Toxicologists (p152)

12:15 PM–1:05 PM

MERIT AWARD LECTURE

Neurotoxicology Goes Global: Scientific Collaboration and Mentorship, *Lecturer: Michael Aschner* (p153)

1:00 PM–2:00 PM

TOXEXPO™ TIME! (NEW)

1:00 PM–4:30 PM

POSTER SESSIONS

- Acetaminophen Hepatotoxicity (p155)
- Animal Models in Toxicological Research (p160)
- Animal Models in Toxicology (p162)
- Biological Modeling: Computational Approaches, Mixtures, Multiroute and Lifestage Applications (p175)
- Children's Health/Juvenile Toxicology (p168)
- Drug Induced Liver Injury (p153)
- Immunotoxicity: Methods and Evaluation (p171)
- Inhalation and Cardiopulmonary Toxicology (p164)
- Kidney (p178)
- Mechanisms of Immunotoxicity (p172)
- Pharmaceutical Safety Assessment: Therapeutic Agents (p181)
- Risk Assessment: Computational Approaches, Analyses, and Applications (p157)
- Skin (p169)

2:00 PM–4:45 PM

SYMPOSIUM SESSIONS

- Epigenetics, Metals, and Cancer (p184)
- Human Variability in Susceptibility to Environmental Toxicants (p185)
- Toxicological Considerations in the Gulf of Mexico Oil Spill (p185)
- Translational Toxicology: Molecules to Global Health (p186)
- Vascular Developmental Toxicity: Identification, Prioritization, and Application (p186)

WORKSHOP SESSIONS

- Protein Aggregation As a Common Mechanism of Toxicity in Neurodegenerative Diseases (p187)
- Technical Characterization and Dosimetry Challenges Associated with Conducting or Interpreting Nanotoxicity (p187)
- Understanding Structural and Physical Chemical Drivers of Drug Toxicity: Utility and Translatable Value (p188)

PLATFORM SESSIONS

- Advancing Assessment Approaches: Pesticides and Other Key Contaminants (p189)
- Alternative Methods in Developmental Neurotoxicology: Validation and Application (p189)
- Biomarkers of Carcinogenesis (p190)

4:35 PM–5:55 PM

SOT/EUROTOX DEBATE

Biomarkers from Blood and Urine Will Replace Traditional Histopathological Evaluation to Determine Adverse Responses (p191)

Tuesday, March 8

6:30 AM–7:50 AM

ROUNDTABLE SESSIONS

- Current Uses and Understanding of the Tissue Cross Reactivity Assay (p193)
- Risk and Risk Management of Potentially Toxic Compounds Formed by Cooking Food (p193)

INFORMATIONAL SESSION

- Emerging Science for Environmental Health Decisions: Tools, Strategies, and Evidence (p194)

7:00 AM–7:50 AM

LEADING EDGE IN BASIC SCIENCE AWARD LECTURE

Roles of Keap1-Nrf2 in Environmental Response, *Lecturer: Masayuki Yamamoto* (p194)

8:00 AM–9:00 AM

KEYNOTE PLENARY LECTURE

Increasing the Prestige of Regulatory Sciences, *Lecturer: Margaret Hamburg, U.S. FDA* (p195)

9:00 AM–11:45 AM

SYMPOSIUM SESSIONS

- Metabolic Basis of Respiratory Tract Chemical Toxicity (p195)
- Stem Cell Biology and Cell Therapy Approaches to Understanding Cellular Injury and Wound Healing in Dermal, Ocular, and Pulmonary Injury (p196)
- Uncovering the Role of Non-Coding RNAs in Toxicology (p196)

WORKSHOP SESSIONS

- Identification of Chemical Respiratory Allergens: Principles and New Developments (p197)
- Safer Products for a Sustainable World: Linking Chemical Design and Toxicology (p197)
- Using Mode of Action Data to Guide Quantitative Cancer Risk Assessment: A Case Study of Hexavalent Chromium in Drinking Water (p198)

HISTORICAL HIGHLIGHTS SESSION

- 1961 to 2011 and Beyond: The Evolution of Toxicology (p199)

REGIONAL INTEREST SESSION

- Bombs in Our Backyards? Historical Military Activities and Current Public Health Issues in the U.S. Capital Region (p199)

PLATFORM SESSIONS

- Computational Approaches to Address DILI and Hepatoxicity (p200)
- Epigenetic Mechanisms in Development and Disease (p200)
- Gene Regulatory Mechanisms of Carcinogenesis (p201)

9:00 AM–12:30 PM

POSTER SESSIONS

- Ah Receptor in Immune Regulation and Toxicity (p214)
- Alternative Approaches to Animal Testing for Toxicological Research (p204)
- Alternatives to Mammalian Models for Testing (p202)
- Cholestasis, Lipid Homeostasis, and Liver Toxicity (p213)
- Epidemiology and Exposure Evaluations (p220)
- Exposure Assessments and Biomonitoring Applications (p223)
- Hepatotoxicity (p211)
- ImmunoSafety Methods in Non-Rodents (p213)
- Nanotoxicology: Carbon Nanotubes, Carbon Nanoparticles, and Quantum Dots (p218)
- Oxidative Stress and Redox Biology (p225)
- Reproductive Toxicology I (p207)
- Reproductive Toxicology II (p209)
- Stem Cell Toxicology (p216)

12:00 NOON–1:20 PM

ROUNDTABLE SESSION

- Integrating Alternative Test Methods into the Federal Regulatory Framework (p230)

INFORMATIONAL SESSIONS

- Coordinating Global Chemical Safety: The Big Four (p231)
- Livers on a Plate: Next Generation Hepatocyte Models for High-Throughput Screening and Mode of Action Prediction (p231)

12:15 PM–1:05 PM

DISTINGUISHED TOXICOLOGY SCHOLAR AWARD LECTURE

Cloning and Functional Analysis of the Aryl Hydrocarbon Nuclear Translocator (ARNT), *Lecturer: Oliver Hankinson* (p232)

1:00 PM–4:30 PM

POSTER SESSIONS

- Apoptosis/Cell Death (p258)
- Biomarkers of Environmental Exposures (p260)
- Developmental Toxicology (p255)
- Drug Allergy, Pseudoallergy, IDRH, and Autoimmunity (p247)
- Genetic Polymorphisms (p236)
- Medical Devices (p232)
- Metal Neurotoxicity: Methylmercury and General (p237)
- Methods in Biomarker Discovery and Validation (p241)
- Mutagenecity (p240)
- Nanotoxicology (p244)
- Neurotoxicity of Pesticides (p232)
- 'Omics in Toxicology Research (p253)
- Risk Assessment and Regulatory Policy Applications (p249)
- Safety and Risk Assessment: Critical Characterizations for Chemicals and New Concerns (p250)

1:30 PM–4:15 PM

SYMPOSIUM SESSIONS

- Developmental Origins of Adult Disease: The Effects of Low Dose Lead (p263)
- Does the Clock Make the Poison? Influence of the Circadian Clock on Toxicological Mechanisms and Outcomes (p263)
- Macrophages: Regulators of Toxicity and Disease Pathogenesis (p264)
- When Is Exposure Not Exposure? Defining the Dose-Response Region between "Effect" and "Adverse Effect" Implications for Human Health Risk Assessment (p265)

WORKSHOP SESSIONS

- Nonclinical to Clinical Abuse Liability Assessment of Drugs: Current Practices, Challenges, and Impact of Recent Regulatory Guidance (p265)
- Risk Assessment for Proteins Introduced into Genetically Modified Crops (p266)
- The Spectrum of Systems Biology (p267)

PLATFORM SESSIONS

- Application of Zebrafish Models in Toxicology (p267)
- Chemical and Biological Weapons—Sulfur Mustard Effects (p268)
- Nanotoxicology—Nanosilver Particulates (p268)

4:30 PM–6:00 PM

50TH ANNIVERSARY MEMBER CELEBRATION MEETING

Wednesday, March 9

6:30 AM–7:50 AM

HISTORICAL HIGHLIGHTS SESSION

- 50 Years of "the Pill": Risk Reduction and Discovery of Benefits Beyond Contraception (p271)

INFORMATIONAL SESSIONS

- Precision-Cut Tissue Slices Revisited: A Classical Method Meets New Challenges (p271)
- The Application of the Threshold of Toxicological Concern Concept to the Preclinical Safety Assessment of Non-Pharmaceutical Medical Products, Including Medical Devices and Combination Drug-Device Products (p272)

EDUCATION-CAREER DEVELOPMENT SESSION

- From Pilot Grants to High-End Journals: The Science of Writing (p272)

8:00 AM–9:00 AM

KEYNOTE MEDICAL RESEARCH COUNCIL (MRC) LECTURE

Cellular Responses to DNA Damage: New Molecular Insights and New Approaches for Cancer Therapy, *Lecturer: Stephen P. Jackson, University of Cambridge* (p273)

9:00 AM–11:45 AM

SYMPOSIUM SESSIONS

- Autism: Genetic, Epigenetic, and Environmental Factors Influencing Neural Networks (p273)
- Gene-Environment Disease Interactions in Fish Models of Human Disease (p274)
- Mechanisms of Inflammation in Skin Carcinogenesis(p275)
- New Insights into the Nrf2-Keap1 Pathway and Its Impact on Human Disease (p275)

WORKSHOP SESSIONS

- Approaches for Incorporating Non-Chemical Stressors into Cumulative Risk Assessments (p276)
- Extending Pulmonary Toxicity Findings for Nanomaterials (p276)
- Understanding the Implications of Preclinical Seizures for Clinical Drug Development (p277)

PLATFORM SESSION

- QSAR Approaches and Predictive Pathways (p278)

9:00 AM–12:30 PM

POSTER SESSIONS

- Arsenic (p289)
- Chemical and Biological Weapons (p293)
- Metal Neurotoxicity: Manganese and Lead (p302)
- Nanotoxicology: Metal Oxides, Silver, Gold, and Silica Nanoparticle Toxicity (p296)
- Pesticides: General (p299)
- Pharmaceutical Safety Assessment: Novel Methods (p284)
- Phase I and II Biotransformation Enzymes (p280)
- Risk Assessment: Conceptual Constructs and Current Controversies (p287)
- Safety Testing of Pharmaceuticals (p283)
- Toxicology Education: K–12 and Beyond (p282)
- Xenobiotic Biotransformation (p278)

9:30 AM–10:30 AM

MEET THE DIRECTOR

NIEHS Director, *Lecturer: Linda Birnbaum, NIEHS* (p305)

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Name: _____

Contact Telephone: _____

10:45 AM–11:45 AM

MEET THE DIRECTOR

CDC/NIOSH Director, *Lecturer: John Howard, CDC/NIOSH* (p306)

12:00 NOON–1:00 PM

MEET THE DIRECTOR

Eunice Kennedy Shriver National Institute of Child Health & Human Development Director, *Lecturer: Yvonne Maddox, NICHD* (p307)

12:00 NOON–1:20 PM

ROUNDTABLE SESSION

- 'Omics in Toxic Tort (p307)

INFORMATIONAL SESSION

- Current and Changing Perspectives on Mycotoxins and Their Potential Health Risks Worldwide (p307)

12:15 PM–1:05 PM

TRANSLATIONAL IMPACT AWARD LECTURE

Integration of Bioinformatics into Regulatory Decision Making, *Lecturer: Weida Tong* (p308)

1:00 PM–4:30 PM

POSTER SESSIONS

- Aquatic and Ecotoxicology (p325)
- Cellular Effects of Natural Product Extracts (p312)
- Developmental Basis of Adult Disease (p310)
- Endocrine Toxicology (p323)
- Food Safety and Nutrition (p328)
- Mechanisms of Aspiration Injury and Airway Disease (p321)
- Mechanistic Assessments of Chemical Mixtures (p319)
- Nanotoxicology: *In Vitro* and *Ex Vivo* Studies (p308)
- Persistent Organic Compounds (POPs) (p314)
- Pharmacokinetics and Disposition (p316)
- Risk Assessment: Models and Approaches for Inhaled Agents (p318)
- Toxicology of the Gulf Oil Spill (p322)

1:15 PM–2:15 PM

MEET THE DIRECTOR

Center for Scientific Review Director, *Lecturer: Sy Garte, Center for Scientific Review* (p330)

1:30 PM–4:15 PM

SYMPOSIUM SESSIONS

- Autophagy in Toxicology: Essential Process, Adaptive Process, and Disease Process (p331)
- Human Pluripotent Stem Cells and Neural Progenitors As Models of Gene-Environment Interactions in Neurological Disease (p331)
- The Use of Epidemiological Data and PBPK Modeling in a Risk Assessment: Manganese As a Case Study (p332)

WORKSHOP SESSIONS

- Advancing Predictive Ecotoxicology Testing and Environmental Risk Assessment in the 21st Century (p333)
- De-Risking the Potential for Cardiovascular Toxicity of Type-2 Diabetic Drugs: Preclinical and Clinical Strategies (p333)
- Meeting the Challenges of Respiratory Toxicology Testing—In Search of Best Practices (p334)
- Polishing Today's Job Candidate in a Tough Economy (p335)

PLATFORM SESSIONS

- Airborne Particulates and Health Effects (p335)
- Nrf2 and Antioxidant Response Networks (p336)

2:30 PM–3:30 PM

MEET THE DIRECTOR

U.S. FDA Director, *Lecturer: Jesse Goodman, U.S. FDA* (p337)

3:45 PM–4:45 PM

MEET THE DIRECTOR

U.S. EPA Director, *Lecturer: Paul Anastas, U.S. EPA* ***(invited)*** (p337)

4:30 PM–5:50 PM

ROUNDTABLE SESSION

- Assessment of Nanoparticle Exposure in Occupational Settings and in Inhalation Toxicology Studies: Is There a Best Dosemetric to Use? (p337)

INFORMATIONAL SESSIONS

- Progress of the Tox21 Consortium in High-Throughput Bioactivity Profiling of Chemicals (p338)
- Toxicological Considerations of Pharmacotherapy during Pregnancy (p338)

Thursday, March 10

6:30 AM–7:50 AM

ISSUES SESSION

- What It Means to Be Global (p340)

INFORMATIONAL SESSION

- Beyond Science and Decisions: From Problem Formulation to Dose-Response (p340)

EDUCATION-CAREER DEVELOPMENT SESSION

- Bringing Toxicology to the Decision-Makers Table: Opportunities for Science Policy Positions in Washington, D.C. (p341)

8:00 AM–9:00 AM

KEYNOTE PLENARY LECTURE

U.S. EPA Vision, *Lecturer: Lisa Jackson, U.S. EPA* ***(invited)*** (p341)

8:30 AM–12:00 NOON

POSTER SESSIONS

- Alternatives to Animal Models in Toxicology (p341)
- Alternatives to Mammalian Models (p344)
- Carcinogenesis II (p351)
- Developmental Neurotoxicity: General (p348)
- Disease Prevention (p346)

9:00 AM–11:45 AM

SYMPOSIUM SESSIONS

- Developmental Exposure to Environmental Toxicants: From Persistent Toxicities to Diseases (p354)
- Vascular Injury: A Figment of Your Inflammation? (p354)

WORKSHOP SESSIONS

- Are We There Yet? Attrition in the Pharmaceutical Industry and Impactful Strategies for Reducing Failure (p355)
- Autoimmunity *versus* Systemic Hypersensitivity: Commonalities Useful for Immunotoxicity Testing (p355)
- PBPK Model Use in Risk Assessment: Why Being Published Is Not Enough (p356)
- Role of Biomarkers in Assessing Tobacco Harm Reduction: A Toxicological Perspective (p357)

12:00 NOON–3:00 PM

SATELLITE MEETING

Johns Hopkins Center for Alternatives to Animal Testing—Evidence-Based Toxicology (EBT) Collaboration Kick-Off Meeting (p87)