

Scientific Program Overview

Sunday, March 11

CE Target Areas

Drug Metabolism

Xenobiotic metabolism (e.g., metabolic enzymes and drug transporters) is central to chemical disposition, and this field has made considerable advances in recent years. The application of advanced *in silico* technologies to more accurately predict compound fate, the incorporation of systems biology and 'omics approaches to understand the impact of chemicals in an organism, and the identification of new gene product families that contribute to drug disposition may be presented.

Noncoding RNAs and Their Role in Biology and Toxicology

Small, medium, and long noncoding RNAs have been identified in many species including humans. Their functions are still not fully understood, but they are becoming increasingly recognized as important factors in physiology, xenobiotic sensitivity, and disease. This target area encourages presentations that will provide in-depth instruction on noncoding RNAs, including what they are and how they function, their effects on xenobiotic sensitivity and disposition, their importance in disease risks and phenotypes, and their relevance to toxicological research.

7:00 AM–7:45 AM

SUNRISE CONTINUING EDUCATION COURSE

1. Alternative *In Vitro* Toxicology Testing for the 21st Century

8:15 AM–12:00 Noon

MORNING CONTINUING EDUCATION COURSES

2. Applications of Biomarkers in the Assessment of Health and Disease
3. Basic Embryology and Developmental Toxicity Testing
4. Cutaneous Toxicity: *In Vitro* Methods for Toxicity and Safety Evaluation
5. Frontiers and Applications in Predictive Toxicology: *In Silico* Methods for Risk Assessment, Toxicology, and Metabolism
6. Overview and Application of the WHO/IPCS Harmonized Guidance for Immunotoxicity Risk Assessment for Chemicals
7. Stem Cells in Toxicology

1:15 PM–5:00 PM

AFTERNOON CONTINUING EDUCATION COURSES

8. Concepts of Green Chemistry and Its Role in the Identification and Design of Safer Chemicals and Products
9. Innate Immunity and Its Relevance to Toxicology
10. MicroRNAs in Biology and Toxicology
11. Regulatory Sciences: Preclinical Drug Development from Small Molecules to Biologics
12. Specialized Techniques for Dose-Response Assessment and Risk Assessment of Chemical Mixtures
13. The Use of Physiologically-Based Pharmacokinetic Modeling to Inform Early Life Sensitivity to Chemical Toxicity

THEMATIC APPROACH

Aberrant Gene Expression in Toxicity and Disease—Epigenetics and microRNAs

Over the past decade, considerable effort has been expended in demonstrating that gene expression is altered in disease states and following exposure to pharmaceuticals and environmental agents. In many cases, the endpoint of interest has been mRNA levels; however, to more fully understand the etiology of disease, especially the timing and the role of toxicity in pathogenesis, it may be important to investigate the mechanisms that govern mRNA expression. Increasing evidence suggests that microRNAs may play a significant role in determining expression patterns, frequently in a highly temporal and tissue-dependent manner. Furthermore, epigenetic variables such as DNA methylation and histone modifications can influence gene expression in an inheritable fashion.

Characterizing Toxic Modes of Action and Pathways to Toxicity

Toxicants induce their effects via interactions with biological targets, triggering a cascade of key events that culminate in adverse health conditions. In keeping with contemporary, post-genome concepts, identification and integration of mechanisms of chemically-induced biological activity to develop more predictive models of *in vivo* biological response are being accomplished by using *in vitro* biochemical and cell-based assays.

Clinical Toxicology from Bedside to the Bench and Back

The overarching aim of clinical toxicology is to provide direction and insight from the clinical setting to drive discoveries in the research laboratory that will have meaningful consequences for the individual patient. Insights from the emergency department or the intensive care unit, for the acutely ill patient, as well as other clinical situations such as poison centers and occupational and environmental medical toxicology clinics, can provide direction for additional and complementary fundamental and translational studies.

Influence of Global Climate Change on Environmental Health Issues

It is expected that climate change will have potentially adverse effects on human health through several mechanisms such as extreme weather events, water level rises, malnutrition increase, ecosystem services impact, and spread of disease. For toxicologists, it will be important to study and predict the nature of adverse effects and the types of pollutant that will have their health effects altered by climate change and the magnitude of those alterations in order to minimize adverse public health effects. Temperature increases may synergize air pollution-mediated increases in deaths due to respiratory and cardiovascular effects. The effect of temperature increases on susceptibility to air and water pollution is a poorly understood area of concern, as are the impacts on ecosystems.

Regulatory Science: Bridging the Gap between Discovery and Product Availability

Recent breakthroughs in science and technology have the potential to transform our ability to prevent, diagnose, and treat disease. These developments will result in moving treatment strategies towards approaches that are tailored or personalized to individual patients, thus maximizing the benefit of treatments while decreasing their safety risks. Green chemistry initiatives are promoting the development of sound scientific screening strategies to support the design of better performing chemical products and manufacturing processes that minimize the use and generation of hazardous substances and pose lower risks to humans and the environment. Together, these approaches show how regulatory science is providing the pathway for better chemistries and products by developing new tools, standards, and approaches to assess safety, efficacy, and performance.

Monday, March 12

8:00 AM–9:00 AM

PLENARY OPENING LECTURE

Systems Medicine, Systems Toxicology, Transformational Technologies and the Revolution from Reactive to Proactive (P4) Medicine

Lecturer: Leroy Hood, Institute of Systems Biology

9:15 AM–12:00 Noon

SYMPOSIUM SESSIONS

- Dietary Supplement Adulteration and Impact on Human Health
- DNA Damage Responses and Repair
- The Thick and Thin of Nuclear Receptors and Nrf2 in Diabetes and Obesity
- Toxicological Considerations of Epigenetic Targets in Product Development

WORKSHOP SESSIONS

- Alternative Approaches to the Safety Assessment of Natural Ingredients and Extracts in Cosmetics
- High-Throughput *In Vitro* Toxicity Testing: A Midcourse Assessment of Predictive Accuracy for *In Vivo* Endpoints and Use in Decision-Making
- The Epididymis—The Forgotten Target of Toxicants
- Therapeutic Immunomodulation and Cancer Risk: Science, Risk Assessment, and Risk Communication

PLATFORM SESSIONS

- Biological Modeling: Addressing Disease States, Defining Age Differences, and Evaluating Uncertainty
- Hypersensitivity Methods
- Mechanisms of Carcinogenesis
- Nanotoxicology: Nanogold or Nanosilver

9:30 AM–12:30 PM

POSTER SESSIONS

- Cardiovascular Toxicity I
- Data Integration and Decision Support Systems
- Epidemiology: Assessments and Approaches
- Fukushima Radiation Toxicity and Global Toxicology Issues
- Inhalants and Cardiopulmonary: Particulates and Chemical Agents
- Liver
- Medical Devices
- Nanotoxicology: Environmental Toxicology, Zebrafish, and Nanoparticles
- Receptors and Toxicity
- Risk Assessment: Case-specific Characterizations
- Risk Assessment: New Applications and Analyses
- Safety Evaluation: Non-pharmaceuticals
- Toxicity of Mixtures

12:10 PM–1:30 PM

INFORMATIONAL SESSIONS

- Global Health and Environmental Impacts of E-Waste Recycling
- NIEHS Centers for Nanotechnology Health Implications Research: Building the Scientific Foundation for Evaluating Public Health Impacts of Engineered Nanomaterials

12:30 PM–1:20 PM

MERIT AWARD LECTURE

Lecturer: Curtis D. Klaassen, University of Kansas Medical Center

1:00 PM–4:30 PM

POSTER SESSIONS

- Alternatives to Mammalian Models II
- Biological Modeling: Predictive PBPK Dosimetry Structures and Pharmacokinetic Data
- Biomarkers of Organ Damage by Drugs and Xenobiotics
- Children's Health and Juvenile Toxicity
- Computational Toxicology: Sequences, Systems, and Strategies
- Developmental Basis of Adult Disease
- DNA Damage and Repair
- Hypersensitivity and Autoimmunity
- Inflammation: Biochemical/Molecular Mechanisms
- Inflammation in Disease
- Liver and Model Systems
- Nanotoxicology: Nanoparticles I
- Pharmaceuticals
- Skin Toxicology

2:00 PM–4:45 PM

SYMPOSIUM SESSIONS

- 21st Century Validation Strategies—One Size No Longer Fits All
- Breast Cancer As a Multifactorial Disease: Interaction of Genetics, Life Stage, and the Environment
- Evaluation of Ocular Safety in the Development of New Drugs
- Molecular Basis for Prevention of Cardiotoxicity
- Nanoparticles for Drug Delivery: Interactions with the Immune System
- Toxic Cell Death: Signaling Pathways, Cross-Talk, and High-Throughput Analysis

WORKSHOP SESSION

- Concepts Critical to the Next Generation of Human Health and Ecological Risk Assessment

REGIONAL INTEREST SESSION

- Bridging the Green Chemistry Gap between Product Discovery and Availability

PLATFORM SESSIONS

- Ecotoxicology and Sentinel Animals
- Exposure Assessment: Biological and Probabilistic Approaches to Monitoring, Modeling, and Predictions
- Inhalants and Cardiopulmonary: Pollutants and Irritants

4:30 PM–5:50 PM

SOT/EUROTOX DEBATE

Comparative Hazards: Chemicals in the Environment Are the Largest Risk to Human Health

Tuesday, March 13

7:00 AM–7:50 AM

LEADING EDGE IN BASIC SCIENCE AWARD LECTURE

Lecturer: Myung-Haing Cho, Seoul National University

8:00 AM–9:00 AM

KEYNOTE MEDICAL RESEARCH COUNCIL (MRC) LECTURE

Role of microRNAs in Control of Gene Expression in Human Physiology and Pathology

Lecturer: Witold Filipowicz, Friedrich Miescher Institute for Biomedical Research

9:00 AM–11:45 AM

SYMPOSIUM SESSIONS

- An Intelligent Reproductive and Developmental Testing Paradigm for the 21st Century
- Cross-Species Analysis of Toxicogenomics Data: Approaches for Assessing Differences in Sensitivity and Conservation of Mode of Action
- Development of Biosimilar Products: Overview of Standards and Regulations
- The Role of Danger Signals in the Development of Chemical Sensitization by Environmental and Occupational Agents

WORKSHOP SESSIONS

- Assessing the Bioavailability and Risk from Metal-Contaminated Soils and Dusts
- State of the Science and the Future for the Predictive Power of *In Vitro* and *In Vivo* Models for Nanomaterials Toxicity Testing
- Sufficient Similarity of Whole Representative Mixtures or a Relative Potency Factor Approach: Polycyclic Aromatic Hydrocarbons As a Case Study

REGIONAL INTEREST SESSION

- What's the Buzz: Bee Health and California's Agricultural Industry

PLATFORM SESSIONS

- Acetaminophen Toxicity: Mechanistic and Translational Aspects
- Cardiovascular Toxicity of Nanoparticles
- Emerging Methodologies for Genotoxicity Assessment

Scientific Program Overview (continued)

9:00 AM–12:30 PM

POSTER SESSIONS

- Disease Prevention and Clinical and Translational Toxicology
- Ecotoxicology
- Epigenetics
- Food Safety and Nutrition II
- Inhalants and Cardiopulmonary: Chemical Agents
- Kidney
- Nanotoxicology: Nanoparticles II
- Neurodegenerative Disease
- Neurotoxicity: General
- Neurotoxicity: Metals
- 'Omics in Toxicology
- Oxidative Injury
- Pharmaceutical Safety Assessment: Methods and Mechanisms
- Toxicology Education and Policy

9:30 AM–4:30 PM

RESEARCH FUNDING SESSION

Research Funding Resource Room

12:00 Noon–1:20 PM

ROUNDTABLE SESSIONS

- Evolving the EPA Endocrine Disruptor Screening Program: From Using High-Throughput Screening Assays for Prioritization to Reducing Reliance on Whole Animal Tests
- Improving Chemical Safety Assessment through Harmonization: Why, How, and When?
- Testing of Nanomaterials for Genotoxicity: Necessity or Waste of Time?

12:00 Noon–1:30 PM

RESEARCH FUNDING SESSION

Brown Bag Luncheon

12:30 PM–1:20 PM

DISTINGUISHED TOXICOLOGY SCHOLAR AWARD LECTURE

Environmental Chemicals: From Biochemical and Molecular Toxicology to Education and Outreach
Lecturer: Ernest Hodgson, North Carolina State University

1:00 PM–4:30 PM

POSTER SESSIONS

- Alternatives to Mammalian Models for Dermal Toxicity
- Alternatives to Mammalian Models for Ocular Toxicity Testing
- Arsenic Toxicology
- Biotransformation/Cytochrome P450
- Cardiovascular Toxicity II
- Chemical and Biological Weapons: Agents and Countermeasures
- Exposure Characterization: New Analytical Sampling Methods, Biomonitoring, and Assessment Applications
- Immunotoxicity: Evaluation
- Immunotoxicity: Mechanisms
- Immunotoxicity: Methods
- Nanotoxicology: Nanoparticles III
- Pesticide: Exposure and Hazard Assessment
- Pesticide: Toxicology
- Pharmacogenomics/Genetic Polymorphisms

1:30 PM–4:15 PM

SYMPOSIUM SESSIONS

- Circulating microRNAs: A New Class of Biomarkers for Tissue-Specific Toxicity
- *In Vitro* and *In Vivo* Alternative Models of Developmental Toxicity of Pharmaceutical Compounds

WORKSHOP SESSIONS

- Beyond Traditional Monoclonals: New Biologics Formats and Preclinical Challenges
- Biomarkers and Associated Health Consequences of Pesticide Exposures in Hispanic Populations
- How Useful Are Liver *In Vitro* Models for Toxicity and Mode-of-Action Prediction?
- Nonclinical and Clinical Applications of Translational Organ-Based Imaging
- Novel Topics in Environmental Polycyclic Aromatic Hydrocarbon Metabolism Leading to Carcinogenesis

EDUCATION-CAREER DEVELOPMENT SESSION

- Career Alternatives and Transitions: New Challenges and Opportunities in Today's Job Market for Toxicologists

PLATFORM SESSIONS

- Advances in Developmental Neurotoxicity: Stem Cell, High-Throughput, and Alternative Species Approaches
- miRNA As Biomarkers for Organ Damage
- New Insights into the Reproductive and Developmental Toxicity of Bisphenol A
- Risk Assessment Approaches: Data-derived Extrapolations, QSAR, *In Silico* Strategies, and Surrogates

4:30 PM–5:50 PM

EDUCATION-CAREER DEVELOPMENT SESSION

- The Art of Negotiation: A Fundamental Skill for Scientists

4:30 PM–6:00 PM

SOT ANNUAL BUSINESS MEETING

Wednesday, March 14

7:30 AM–8:50 AM

ROUNDTABLE SESSION

- Placing Bisphenol A Risks in a Human Exposure Context: Is Internal Exposure to Bioactive Bisphenol A in Humans Similar to Levels in Affected Rodent Test Species?

7:30 AM–8:50 AM

INFORMATIONAL SESSIONS

- Getting Certified As a Toxicologist: Why, When, Where, and How
- Good Laboratory Practice (GLP) in China

9:00 AM–11:45 AM

SPECIAL SYMPOSIUM

Meet the Directors

SYMPOSIUM SESSIONS

- Epigenetic and miRNA Regulations in Carcinogenesis: Toxicological Implications
- Nonclinical Safety Assessment of Dual-Targeting Biotherapeutics
- The Allergenicity and Immunomodulatory Effect of Food Substances
- The Toxicological Impact of Metals, Crude Oil, and Chemical Dispersants from the Gulf of Mexico Oil Crisis on Human and Wildlife Health

WORKSHOP SESSIONS

- Caught in the Act: Free Radical Detection and Implications in Pathways to Toxicity
- Chelation Therapy: A Focus on the Risks and Benefits
- Cooperative Epidemiology and Toxicology Research: HEI's National Particle Component Toxicity (NPACT) Initiative
- Progress in Developing New Biomarkers of Drug-Induced Liver Injury (DILI): What You Don't Know Can Hurt You

PLATFORM SESSIONS

- Bionformatics: Signature Applications and Network Analyses
- Chemical and Biological Weapons: Agents and Countermeasures
- Nanotoxicology: Carbon Nanotubes and Nanofibers

9:00 AM–12:30 PM

POSTER SESSIONS

- Alternatives to Mammalian Models I
- Cell Death Pathways
- Developmental Neurotoxicity I
- Developmental Toxicity II
- Developmental Toxicology
- Disposition and Pharmacokinetics
- Exposure Assessment: Case-specific Characterizations
- Food Safety and Nutrition I
- Gene Regulation and Signal Transduction
- Genotoxicity Testing
- Molecular Basis of Carcinogenesis
- NrF2
- Regulatory Policy: Procedures and Predictions
- Stem Cell Biology and Toxicology

9:30 AM–4:30 PM

RESEARCH FUNDING SESSION

Research Funding Resource Room

12:00 Noon–1:20 PM

ROUNDTABLE SESSIONS

- Scientific, Regulatory, and Public Perspectives on the Credibility and Use of Alternative Toxicological Test Methods in a Legislative Framework
- The Future of Toxicology Education: Outcomes of the Toxicology Educational Summit

INFORMATIONAL SESSION

- Pregnancy in the Workplace: Managing Occupational Safety for a Unique Subpopulation

12:30 PM–1:20 PM

TRANSLATIONAL IMPACT AWARD LECTURE

Medical Toxicology Evaluations of the 2008 TVA Fly Ash Spill
Lecturer: John G. Benitez, Vanderbilt University Medical Center

1:00 PM–2:00 PM

TOXEXPO TIME

1:00 PM–4:30 PM

POSTER SESSIONS

- Animal Models in Pharmaceutical Toxicology
- Animal Models in Toxicology
- Biomarkers of Environmental Exposure and Toxicity
- Developmental Neurotoxicity: Metals and Pesticides
- Endocrine Toxicity
- Male Reproductive Toxicology
- Metals
- Natural Products
- Neurotoxicity: Pesticides
- Persistent Organic Chemicals
- Pharmaceutical Safety Assessment: Novel Therapeutics and Preclinical Safety Assessment
- Reproductive Toxicology II

1:30 PM–4:15 PM

SYMPOSIUM SESSIONS

- New Visions in Toxicology: Lysosomes—Roles in Disease, Toxicity, and Drug Development
- Off the Beaten Path: Preclinical Approaches to Safety Evaluation of Cells/Gene Therapy, Vaccines, and Adjuvants
- Trivalent Arsenic Metabolites and Arsenic Toxicity

WORKSHOP SESSIONS

- Advancing Food Safety in a Global Marketplace
- Discovering Novel Hypotheses for Mechanisms of Toxicity from High-Content Data Sets
- Muscle Toxicity—Current Challenges in Translatable Biomarkers
- Progenitor and Stem Cells As Targets of Environmental Pollutants
- T-Dependent Antibody Responses in Nonhuman Primates: Challenges and Opportunities

PLATFORM SESSIONS

- Alternatives to Mammalian Models in Skin Sensitization
- Computational Toxicology: Predicting Hepatotoxicity
- Inhalants and Cardiopulmonary: Particulates
- Risk Analysis: New Derivations and Updated Debates

4:30 PM–5:50 PM

INFORMATIONAL SESSIONS

- Evolution and Implementation of Combined Chemical Exposure Methods: International Perspectives
- Proposition 65: Twenty-Five Years of Implementing California's Unique and Far-Reaching Law Regulating Organic and Metallic Carcinogens and Developmental/Reproductive Toxins

EDUCATION-CAREER DEVELOPMENT SESSION

- Refining Your Science Communication Skills

Thursday, March 15

7:30 AM–8:50 AM

ISSUES SESSION

Building for the Future: Strategic Initiatives for the SOT Endowment Fund

8:30 AM–12:00 Noon

POSTER SESSION

- Carcinogenesis

9:00 AM–11:45 AM

SYMPOSIUM SESSIONS

- Advances in Bridging Nonclinical Cardiovascular Data to the Clinic
- Emerging Evidence for Novel Noncholinergic Mechanisms of Organophosphate-Induced Neurotoxicity
- Emerging Mechanistic Targets in Lung Injury Induced by Combustion-Generated Particles
- Realizing the Vision of 21st Century Toxicity Testing: Genetic Approaches to Pathway Analysis

WORKSHOP SESSIONS

- Challenges and Opportunities in Evaluating Protein Allergenicity across Biotechnology Industries
- Chemical Standardization of Botanical Medicines for Safe and Effective Use As Therapeutic Agents