Monday, September 19

08:00-08:30 Welcome

08:30-09:30 Keynote Plenary: Safety Pharmacology across the Globe: Vision of Past, Present, and Future
Jean-Pierre Valentin, PhD, HDR, ERT, CBiol, FSBiol, FRCPath, DSP, UCB Pharma SA, Braine-l’Alleud, Belgium

The field of safety pharmacology emerged from concerns over significant gaps in the safety data that existed at the time, putting clinical trial subjects and patients at risk of pharmacodynamic toxicity. From this beginning, the field has evolved, but the risks remain of assuring the safety of novel new targeted therapies over a lifetime of treatment of complex diseases. In addition to the clinical challenges, the field of safety pharmacology has emerged in a period where business models, regulatory landscape for risk tolerance and societal challenges have evolved and molded how the field is practiced in the current day. Despite all of those challenges, safety pharmacology has demonstrated its positive impact on drug discovery and development by contributing to identification and elimination of hazards, and assessment, management, and mitigation of risks. Projecting the challenges of today into the near and long term future so that the field of safety pharmacology can be positioned for next 10 to 20 years, beyond a period where most of us will be around to influence that future, is what we would like to achieve. How do we project that future, what is the roadmap to advise future generations of safety pharmacologists, what principles can we share with them today that will be relevant for tomorrow? Let us consider these together and lay out a vision and path taking into account the past and present to model the future of safety pharmacology.

09:30-10:00 Break

Track A: Translational Cardiovascular Safety Pharmacology
Co-Chairs: Robert J. Austin-LaFrance, Groton, CT, United States, Abby C. Collier, PhD, The University of British Columbia, Vancouver, BC, Canada, and Harushige Ozaki, Takeda Pharmaceutical Company Limited, Fujisawa, Kanagawa, Japan

In sum, the goal of all preclinical safety testing is the accurate and complete identification of effects resulting from administration of a test compound. The more accurate and complete the information, the better we are able to predict the risk associated with administration in humans. This session will examine current methods of evaluating the translational accuracy of various cardiovascular test systems, introduce emerging paradigms, and discuss their application in developing clinical risk profiles. Presentations will include consideration of various test platforms and their separate and combined contributions to a predictability index.

10:00-10:30 In Vitro Assays to Address and Predict Drug-Induced Effects on Contractility and Cardiomyocyte Damage
Amy Pointon, AstraZeneca, Macclesfield, United Kingdom

10:30-11:00 Translational Biomarkers of Cardiovascular Injury and Dysfunction
Michael C. Boyle, DVM, PhD, DACVP, DABT, Amgen, Inc., Thousand Oaks, CA, United States
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| 11:00-11:30  | Cardio-Functional Assessment of Effects of Tanezumab, Nerve Growth Factor Antibody, on Sympathetic Function: A Novel Translational Approach  
Siddhartha Bhatt, PhD, Pfizer, Inc., Groton, CT, United States |
| 11:30-12:00  | TBD                                                                     |

**Track B: Clinical Relevance of Receptor Pharmacology**

**Co-Chairs:**  
Emaneul Escher, PhD, Institute of Pharmacology of Sherbrooke, Université de Sherbrooke, Sherbrooke, QC, Canada,  
Laszlo A. Urban, MD, PhD, Novartis Institutes for BioMedical Research, Cambridge, MA, United States,  
and Masaki Honda, PhD, Chugai Pharmaceutical Co., Ltd., Gotemba, Shizuoka, Japan

Advances in science related to the GPCR target family provided a wealth of drugs during the past decades. Better understanding of the structure of GPCRs and their function in physiological systems provides the pharmaceutical industry novel strategy and tools to develop more refined SAR-driven drug design, alternatives to the common approach to screen the receptors at their inactive state and consider more predictive models with high clinical relevance. This session will provide a variety of state-of-the-art scientific contributions ranging from ligand-based physiological classification of GPCRs to connections between receptor heterogeneity and clinical outcome. Speakers will address the translational value of their research with a particular accent on safety aspects.

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| 10:00-10:30  | Structural and Spatiotemporal Determinants of G Protein-Coupled Receptor Functional Selectivity: Implication of Ligand-Biased Signaling for Drug Discovery  
Michel Bouvier, PhD, Institute for Research in Immunology and Cancer, Université de Montréal, Montréal, QC, Canada |
| 10:30-11:00  | Mas-Related G Protein-Coupled Receptors Have a Critical Role in Mast Cell Control of Pseudoallergic Reactions  
Marianna Kulka, PhD, National Institute for Nanotechnology, Edmonton, AB, Canada |
| 11:00-11:30  | Structure-Based Discovery of Novel GPCR Ligands with New Biology  
Brian K. Shoichet, PhD, University of California, San Francisco, CA, United States |
| 11:30-12:00  | Bitter Taste Receptors on Airway Smooth Muscle: New Therapeutic Targets and Evidence for a Previously Unrecognized Chemosensory System  
Stephen B. Liggett, MD, University of South Florida, Tampa, FL, United States |
| 12:00-13:00  | Lunch Break, Networking, Exhibits                                           |
| 12:30-13:30  | CSPT Rapid Fire Poster Presentations  
*Please plan to eat lunch in the exhibit hall from 12:00-12:30*  
These rapid fire poster presentations are selected from CSPT Posters and are 3-5 minutes each with additional poster viewing time/judging afterwards from 13:30-14:30. |
13:00-14:00 Posters, Networking, Exhibits

14:00-15:15 SPS Oral Communications #1: Isolated Organs, Disease Models, and In Silico Models Optimization
14:00-15:15 SPS Oral Communications #2: Ion Channels

15:15-15:45 Break, Exhibits, Poster Presentations, Poster Judging

Track A: Advances in Technologies—In Vitro and In Silico Models
Co-Chairs: Najah Abi Gerges, PhD, AnaBios Corporation, San Diego, CA, United States, Gerhard Multhaup, Dr rer Nat, McGill University, Montreal, QC, Canada, and Takashi Yoshinaga, PhD, Eisai Co., Ltd., Tsukuba, Japan

This session will provide insight into the latest knowledge and development in the fields of cardiac safety science and biomaging. Experts will give three presentations on the in silico identification of drug-induced pro-arrhythmia, moving towards in silico drug trials in safety pharmacology and characterization of physiologically relevant 3D cardiac micro-tissues for drug safety testing, as well as a presentation focusing on the state-of-the-art imaging of live cells employing newly developed fluorogenic probes. We aim to show that these scientific innovations and developments could be of benefit for reducing attrition in drug development.

15:45-16:15 An In Silico ECG Database of Drug Effects for Proarrhythmic Risk Assessment by Heart Simulator
Jun-ichi Okada, PhD, The University of Tokyo, Chiba, Japan

16:15-16:45 Towards In Silico Drug Trials in Safety Pharmacology
Blanca Rodriguez, PhD, University of Oxford, Oxford, United Kingdom

16:45-17:15 Human-Induced Pluripotent Stem Cell-Derived Cardiomyocytes (hiPS-CMs) in 2D vs 3D for Drug-Induced Cardiac Risks: 20 Reference Drugs Using Ca²⁺ Transient Assay
Hua Rong Lu, PhD, Janssen Pharmaceutica NV, Beerse, Belgium

17:15-17:45 Development of Fluorogenic Antioxidants to Monitor Reactive Oxygen Species in Live Cells
Gonzalo Cosa, PhD, McGill University, Montréal, QC, Canada

Track B: Practical Pharmacology
Co-Chairs: George K. Dresser, MD, PhD, FRCPC, University of Western Ontario, London, ON, Canada, and Bruce H. Morimoto, PhD, Celerion, Inc., Redwood City, CA, United States

The Practical Pharmacology session will highlight the clinical application of pharmacology and toxicology principles in the provision of health care to patients. We will be presenting clinical cases that highlight issues related to providing optimal therapeutics and toxicological care.
15:45-16:00 Pharmacokinetics As a Practical Tool for Individualized Patient Dosing
P. Timothy Pollak, MD, PhD, FRCPC, University of Calgary, Calgary, AB, Canada

16:00-16:15 Pharmacokinetics As a Critical Factor Influencing Safe and Effective Drug Delivery
P. Timothy Pollak, MD, PhD, FRCPC, University of Calgary, Calgary, AB, Canada

16:15-16:45 Of Mice and Men: Translational PET Imaging to Define Dose Occupancy
Lisa A. Wells, PhD, Imanova, London, United Kingdom

16:45-17:15 The Cardiovascular Evaluation of BMN 111—A Novel C-Type Natriuretic Peptide for Achondroplasia: A Case Study
Lorraine Sullivan, PhD, DABT, BioMarin Pharmaceutical, Inc., Novato, CA, United States

17:15-17:45 Personalized/Pharmacogenomics of Oncology Therapy
Wendy Teft, PhD, University of Western Ontario, London, ON, Canada, and Richard B. Kim, MD, FRCPC, Western University, London, ON, Canada

Tuesday, September 20

08:30-09:30 Keynote Plenary: Using Big Data and Little Data to Understand Variable Drug Actions
Dan M. Roden, MD, Vanderbilt University, Nashville, TN, United States

Initial studies to define mechanisms underlying variable response to drug therapy—the fundamental goal of the discipline of Clinical Pharmacology—focused on outlier patients or small study groups, i.e., “Little Data.” As the discipline turned increasingly to identify the genomic basis for variable drug actions, increasingly large datasets have been studied with and drug phenotypes coming from large networks or electronic health records (EHRs), i.e., “Big Data.” These large resources, in turn, have provided the starting point for new discovery in genome science and in pharmacogenomics. This talk will describe some of these advances, and how there is an emerging focus back to individual subjects both in discovery as well as in recent efforts to use DNA datasets coupled to EHRs to implement pharmacogenomics.

09:30-10:00 Break

Track A: Translational Central Nervous System and Respiratory Safety Pharmacology
Co-Chairs: Simon Authier, DVM, MSc, MBA, PhD, DSP, CiToxLab, Laval, QC, Canada, Donald W. Miller, PhD, University of Manitoba, Winnipeg, MB, Canada, and Yuko Sekino, PhD, National Institute of Health Sciences, Tokyo, Japan

On the one hand, safety pharmacology is actively expanding with significant progress with in vitro drug safety screening models. On the other end of the spectrum, safety pharmacology aims to predict clinical trial outcome and clinical data can be used to validate non-clinical drug safety screening tools. This session will explore central nervous system (CNS) and respiratory safety pharmacology models across the full spectrum from single cell assays
to clinical concordance. Highlighting weaknesses of older safety testing paradigms but also exploring completely new methods to improve drug safety evaluations, the session will challenge safety pharmacology boundaries and open new horizons. CNS drug safety assays are typically under-represented in the in vitro arena and the session will present cutting edge applications in this emerging field.

10:00-10:30  **Immunohistochemical Assay for Central Nervous System Synaptic Dysfunction Using Cultured Neurons**  
Tomoaki Shirao, MD, PhD, Gunma University Graduate School of Medicine, Maebashi, Japan

10:30-11:00  **Microglia and Neuroinflammation as Therapeutic Targets in Drug Development for Central Nervous System Disorders**  
Tiina M. Kauppinen, PhD, University of Manitoba, Winnipeg, MB, Canada

11:00-11:30  **Apneic Events—A Proposed New Target for Respiratory Safety Pharmacology**  
Dennis J. Murphy, PhD, DABT, DSP, Consultant, Chester Springs, PA, United States

11:30-12:00  **Assessing the Predictive Value of the Rodent Neurofunctional Assessment for Commonly Reported Adverse Events in Phase I Clinical Trials**  
Samuel Jackson, PhD, National Centre for the Replacement, Refinement and Reduction of Animals in Research, London, United Kingdom

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**Track B: State-of-the-Art Methods in Pharmacology**  
Co-Chairs:  **Brad Urquhart,** PhD, Western University, London, ON, Canada,  **Maxim Soloviev,** MD, PhD, DSP, Incyte Corporation, Wilmington, DE, United States, and  **Junko Kurokawa,** PhD, Tokyo Medical and Dental University, Medical Research Institute, Bunkyo-ku, Tokyo, Japan

This session will focus on the description and application of state-of-the-art methods and techniques in pharmacology as they apply to drug safety and efficacy. Session topics include pharmacometabolomics, mass spectrometry based imaging, and organ-on-a-chip, and will include not only “state-of-the-art technologies” but also “state-of-the-art thinking about data.” Pharmacometabolomics is the study of the metabolites in a system and how they affect drug efficacy and toxicity. This technique has been adapted as a new form of precision medicine in terms personalizing drug therapy. Recent advances in mass spectrometry have enabled mass spectrometry-based imaging of organs or even entire preclinical animals. This powerful technique can aid in visualizing drug, metabolites, or proteins to specific organelles within an organ. Microchips lined with human cells recapitulate the architecture of major organs such as the heart, kidney, liver, intestine, lungs, etc. These organs-on-chips can be used to assess the safety and efficacy of drugs. Non-standard approaches to data collection and interpretation will be discussed.

10:00-10:30  **Human Microphysiological Systems at the Frontiers of Drug Discovery**  
Anthony Bahinski, PhD, MBA, FAHA, GlaxoSmithKline, King of Prussia, PA, United States

10:30-11:00  **Next-Generation Molecular Histology: High Performance Mass Spectrometry for Metabolite, Lipid, and Protein Imaging**  
Jeffery Spraggins, PhD, Vanderbilt University, Nashville, TN, United States
11:00-11:30  Pharmacometabolomics  
David Wishart, PhD, University of Alberta, Edmonton, AB, Canada

11:30-12:00  Comprehensive Prediction Method for Adverse Drug Reaction by Using System Pharmacology  
Hiroshi Suzuki, PhD, University of Tokyo Hospital, Hongo, Bunkyo-ku, Tokyo, Japan

12:00-13:00  Lunch Break, Networking, Exhibits

13:00-14:00  Exhibits and Poster Presentations

Paediatric and Fetal Clinical Pharmacology Session  
Co-Chairs: Colin Ross, PhD, The University of British Columbia, Vancouver, BC, Canada, and Michael Rieder, MD, PhD, Western University, London, ON, Canada

The inclusion of children in clinical trials is increasingly important, notably in that many drug regulatory agencies now require a paediatric plan during the process of drug approval. There are many challenges to studies in children as well as to drug discovery in children and the place of precision medicine in child health care. This symposium will address key issues in paediatric therapeutics related to drug discovery, regulation, and implementation of precision medicine for children.

13:30-14:00  Precision Medicine in Childhood Asthma  
Anke-Hilse Maitland-van der Zee, PhD, Utrecht University, Utrecht, Netherlands

14:00-14:30  Pharmacogenomics of Adverse Drug Reactions and Re-purposing of Drugs to Prevent ADRs  
Colin Ross, PhD, The University of British Columbia, Vancouver, BC, Canada

14:30-15:00  Early Phase Drug Studies in Children: Challenges and Opportunities  
Michael Rieder, MD, PhD, Western University, London, ON, Canada

14:00-15:15  SPS Oral Communications #3: Behavioral Pharmacology/Central Nervous System
14:00-15:15  SPS Oral Communications #4: hiPS-Cardiomyocytes in Safety Pharmacology

15:15-15:45  Break, Exhibits, Poster Presentations

Track A: Translational Biomarkers: Bridging the Gap  
Co-Chairs: Mary Jeanne Kallman, PhD, DSP, Kallman Preclinical Consulting, Greenfield, IN, United States, Thomas K.H. Chang, PhD, The University of British Columbia, Vancouver, BC, Canada, and Katsuyoshi Chiba, PhD, Daiichi Sankyo Co., Ltd., Tokyo, Japan
This symposium will focus on recent advances in the use of biomarkers to support safety evaluations. Biomarker efforts for the central nervous system, cardiovascular, respiratory, and renal functioning will be discussed. Early data from the ILSI/HESI Subcommittee on Translational Biomarkers of Neurotoxicity collaborative project to characterize the potential markers of neurotoxicity in biological fluids for several known neurotoxins will be shared. The rationale for the protocol for the collaborative study will be described. Additional presentations on cardiovascular, renal, and respiratory biomarker development will complement the neurotoxicity discussion. Participants from different global locations will contribute to the audience’s understanding of difficulties in identifying biomarkers and the importance of biomarkers in the future regulatory and scientific environment.

15:45-16:15 Brief History of the ILSI/HESI Subcommittee on Translational Biomarkers of Neurotoxicity and an Early Report of the Collaborative Biomarker Project
Syed Imam, PhD, NCTR/FDA, Jefferson, AR, United States, University of Texas Health Science Center, San Antonio, TX, United States, and University of Arkansas for Medical Sciences, Little Rock, AR, United States

16:15-16:45 Glial Fibrillary Acidic Protein (GFAP) and Related Astroglial Proteins as Biomarkers of Neurotoxicity
James O’Callaghan, PhD, CDC/NIOSH/HELD, Morgantown, WV, United States

16:45-17:15 Framework for Integrated Cardiovascular Risk Assessment: Utilization of Cardiac Biomarkers
Katsuyoshi Chiba, PhD, Daiichi Sankyo Co., Ltd., Tokyo, Japan

17:15-17:45 Clinical Interstitial Pneumonia-Related Respiratory Biomarkers
Don Sin, MD, MPH, The University of British Columbia and Centre for Heart Lung Innovation, St. Paul’s Hospital, Vancouver, BC, Canada

17:45-18:15 Safety Risk Assessment and Mechanism-Based Drug-Induced Kidney Injury Biomarkers
André da Costa, PhD, UCB Biopharma Sprl, Braine L’Alleud, Belgium

Track B: CSPT Trainee Oral Presentations
Chair: Shinya Ito, MD, FRCPC, Hospital for Sick Children, University of Toronto, Toronto, ON, Canada

15:45-16:00 Genetic Variation in SLC16A5 Confers Protection from Cisplatin-Induced Ototoxicity in Adult Testicular Cancer Patients
Britt Drogemoller

16:00-16:15 Multifactorial Prediction of Anthracycline-Induced Cardiotoxicity in Childhood Cancer: 10 Years of Active Surveillance and Pharmacogenomics Studies at the Canadian Pharmacogenomics Network for Drug Safety
Folefac Aminkeng

16:15-16:30 Characterization of the Gut Microbiota, Metabolomics, and Drug Metabolism over Chronic Kidney Disease Progression
Emily D. Hartjes
Pharmacogenomic Prediction of Cisplatin-Induced Nephrotoxicity in Patients Treated for Childhood Cancer
Mara Medeiros

16:45-17:00 Genome-wide Scan Identifies Association between an Interferon Regulatory Factor Variant and Interferon-beta Induced Liver Injury in Multiple Sclerosis Patients
Kaarina Kowalec

17:00-17:15 Elucidating the Impact of Genetic Variation in Bile Acid Transporters on Bile Acid Signaling and Xenobiotic Transport
Laura Russell

Wednesday, September 21

08:00-09:45 CSPT Annual General Meeting
08:00-09:00 CSPT General Meeting
09:00-09:30 CSPT Piafsky Young Investigator Presentation
09:30-09:45 CSPT Awards Ceremony

08:30-09:45 SPS Annual General Meeting and Awards Presentation/Ceremony
08:30-09:15 SPS Annual Members Meeting and Awards Ceremony
09:15-09:45 SPS Distinguished Service Award Presentation

09:45-10:00 Break

Plenary: Global Regulatory Climate for Safety Pharmacology
Co-Chairs: Bruce C. Carleton, PharmD, The University of British Columbia, Division of Translational Therapeutics, Vancouver, BC, Canada, Carrie G. Markgraf, MD, PhD, Merck, Kenilworth, NJ, United States, and Shin-ichi Sekizawa, PhD, DVM, Pharmaceuticals and Medical Devices Agency, Chiyoda-ku, Tokyo, Japan

Increasingly, safety pharmacology is undertaken in a global regulatory climate. While S7A guides the overall aims of safety pharmacology, new topics arise as the science and drug development advance. This session will present the similarities and—importantly—differences between Health Canada, PMDA, and FDA policies and guidances on a range of topics critical to the successful use of safety pharmacology data in support of clinical testing. The revision to S7B, progressive licensing, the CiPA and JICSA initiatives, the recent CNS AEs in a French Phase 1 trial, and use of the British health database AMED will be discussed by regulators and safety pharmacologists.

10:00-10:30 Comparing Similarities and Differences in Global Safety Pharmacology Regulatory Practices
Frederick J. Sannajust, PharmD, PhD, Merck & Co., West Point, PA, United States

10:30-11:00 Developments in the Canadian Framework for Adaptive Life-Cycle Regulation of Pharmaceuticals and Biologic Products
David Lee, BA, JD, Health Canada, Ottawa, ON, Canada

11:00-11:30  Electrophysiology Studies of iPSC-derived Cardiomyocytes as a Surrogate of QT Prolongation
             Yasunari Kanda, PhD, National Institute of Health Sciences, Tokyo, Japan

11:30-12:00  Panel Discussion

12:00-12:30  Presidents’ Summary

12:30  Meeting Adjourned