

# 2023 Summer Scientific Forum Program Book

**aaps Summer  
Scientific  
Forum**

**JUL  
10-13 | 2023**

**RENAISSANCE MINNEAPOLIS  
HOTEL, THE DEPOT  
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**#aapsforum**



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# Welcome to the Summer Scientific Forum

The AAPS Summer Scientific Forum makes AAPS the premier scientific convener of the pharmaceutical industry featuring breadth, depth, and quality science. Attend this meeting for deep dive into the latest bioanalysis or pharmaceutical analysis science and seize the opportunity to cross-connect with other scientists in shared high-level sessions focused on key regulatory issues facing these scientific areas.

The event's symposia will be complemented by the Rapid Fire presentations and partner engagements AAPS conference attendees prefer. Networking events will bring together industry scientists, academicians, and regulators from across these disciplines.

## Scientific Programming Committee

Boris Gorovits, Ph.D. Sana Biotechnology (Chair)

Sachin Lohani, Ph.D., Merck (Vice Chair)

Allison Radwick, Ph.D., USP (DEI Representative)

### Bioanalytical Track

Vibha Jawa, Ph.D. Bristol-Myers Squibb (Chair)

Amanda Hays, Ph.D. BioAgilytix (Vice Chair)

Stephanie Cape, Labcorp (Past Chair)

Fumin Li, Ph.D., Biollege Consulting

Yan Ni, Ph.D., Passage Bio

Brad Roadcap, Merck

Yi Wen, Ph.D., Eli Lilly and Company

### Pharmaceutical Analysis Track

Tim Graul, Ph.D., Pfizer (Chair)

Maria Cruanes, Ph.D., Organon (Vice Chair)

Stefanie Rentfrow, Ph.D., Perrigo (Past Chair)

Nina Cauchon, Ph.D., Amgen Inc

Landon Greene, Ph.D., Vertex Pharmaceuticals

Maya Lipert, Ph.D., AbbVie

Eric Munson, Ph.D., Purdue University

## AAPS Disclaimer

All scientific presentations at AAPS-sponsored events must adhere to the highest standards of scientific ethics, including acknowledgements or references to sources (both scientific and financial), and the absence of promotional content or endorsement of commercial products. Any conflict of interest must be disclosed prior to the meeting. Authors and speakers are responsible for the content and ideas stated in their oral and written presentations. AAPS is not responsible for, nor do we endorse, the material published in any final program materials or any oral or written statements made by presenters at this meeting.

## Handouts

All available handouts are posted on the [workshop webpage](#) through a password-protected PDF. Please enter password **Summer23** to access the files. Speakers' handouts will remain online for registered attendees until **October 15, 2023**.



## Bioanalytical Program Themes

### Theme 1: Old Platform, New Tricks

**Keywords:** LC-MS, LBA, Gyros, Biomarkers, ADCs, novel modalities, cell therapy, gene therapy, ADA Isotyping

Drug therapies have continued to evolve and so have the bioanalytical strategies used to characterize them. Some of these bioanalytical questions are answered with unconventional use of legacy technology platforms, that have been around for decades. This theme will provide an opportunity to share strategies of how legacy technology platforms are being utilized to answer unique bioanalytical questions.

### Theme 2: Emerging Platforms and New Challenges

**Keywords:** critical reagents for novel modalities, microsampling advancements, ddPCR, HRMS, innate immunity, expamers, bioanalytical strategies

The advent of novel next generation modalities like cell and gene-based therapies has led to development of non-conventional assay platforms to assess PK of such therapeutics. Instead of detecting proteins through conventional LBA based approach, the gene expression-based molecular assays and cellular kinetics using flow-based assessments have been employed. Similarly, immunogenicity assessments have evolved from traditional humoral anti-drug antibody measurements to requiring cellular immune response assessments to be performed using low volumes of samples and high throughput proteomics-based measurements. The challenge of obtaining high integrity whole blood sample from terminally ill and pediatric populations has also led to evolution in sampling techniques.

### Theme 3: Risk Assessment of Next Generation Biologics

**Keywords:** risk assessment, regulatory guidance, learnings from previous biologics

The risk assessment process identifies risks from early to late stage of development. Stages span from discovery to early process development, non-clinical safety/toxicology and clinical development. For recombinant proteins and monoclonal antibodies, these risks have been characterized and delineated and tools and assay platforms to identify and mitigate such risks have been qualified for application. For next generation biologics with more complexity which include multidomain constructs, fusion proteins, cell and gene therapy-based products, the risk factors identified are unique and diverse as they are not only related to the sequence and structure of the intended therapeutic but can also be contributed by the vehicles, formulations and delivery approaches. Hence, novel tools and assays would be required to perform such risk assessments. An understanding of potential risks can then enable a robust and streamlined bioanalytical strategy in clinic. The bioanalytical assessments may require novel platforms and may need to be customized to address risks that could not be mitigated in preclinical development.



## Pharmaceutical Analysis Program Themes

### **Theme 1: Lab of the Future**

**Keywords:** artificial intelligence, advances in modeling, sustainability, miniaturization

Laboratory science is evolving. Advances in robotics and computers are making it possible for scientists to delegate some of their work to machines and algorithms. Advances in analytical technologies have enabled the characterization of smaller samples, in-situ, and in nondestructive and greener ways. Advances in manufacturing require some labs to be located in production areas. This session will discuss some elements of the modern analytical lab, designed to meet the needs of future (and already current) ways of working in pharmaceutical research and manufacture.

### **Theme 2: Analytical Changes in Developing Novel Modalities**

**Keywords:** biologics, conjugates, cell therapies, novel synthetic modalities

The traditional approach to analytical characterization of pharmaceuticals is undergoing a paradigm shift. Now analytical chemists must deliver on the therapeutic opportunity offered by the evolving nature of drug modalities. This session will focus on recent advances in analytical method development and testing of novel biologic modalities like protein/mAB conjugates, cell-therapies, and novel synthetic modalities like macrocyclic peptides, mRNA, lipids.

### **Theme 3: Clinically Relevant Specifications**

**Keywords:** dissolution testing, long-acting injectables, implants, PBPK models, harmonized global control strategies

Clinically relevant specifications have been defined as test procedures and acceptance criteria that identify and reject/accept drug product batches that are likely to perform inadequately/adequately in the indicated patient population (Rik Lostritto, FDA, PQRI Conference on Evolving Product Quality, 2014). This session will focus on opportunities to align and harmonize product attributes, analytical procedure requirements and specifications with the delivery of patient medicines that are safe and efficacious.

#### **Theme 4: Advanced and Continuous Manufacturing**

**Keywords:** control strategies, drug substance continuous manufacturing, biologics continuous manufacturing, PAT, regulatory assessment

Developing and implementing advanced manufacturing processes is critical for maintaining the supply of safe medicines with complex technology while having the potential to manage manufacturing cost. This session will focus on analytical strategies to support the development of advanced processes such as continuously manufactured active pharmaceutical ingredients and biologic products.

#### **Theme 5: Life Cycle Management of Analytical Procedures – Regulatory Implications**

**Keywords:** analytical procedure development, post-approval change management, ICH Q12, ICH Q14, performance monitoring, global regulatory guidelines

Better methods produce better data to support better decision-making. This session will discuss the challenges and opportunities for managing analytical methods throughout the product life cycle, including enhanced development as well as post-approval activities such as performance monitoring, continuous improvement and change management. Relevant guidelines that provide a science- and risk- based regulatory framework for change management of analytical procedures such as ICH Q12 and ICH Q14 will be discussed, and the USP <1220> chapter concepts will also be incorporated in the discussion.

## Sponsors



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As of June 23, 2023





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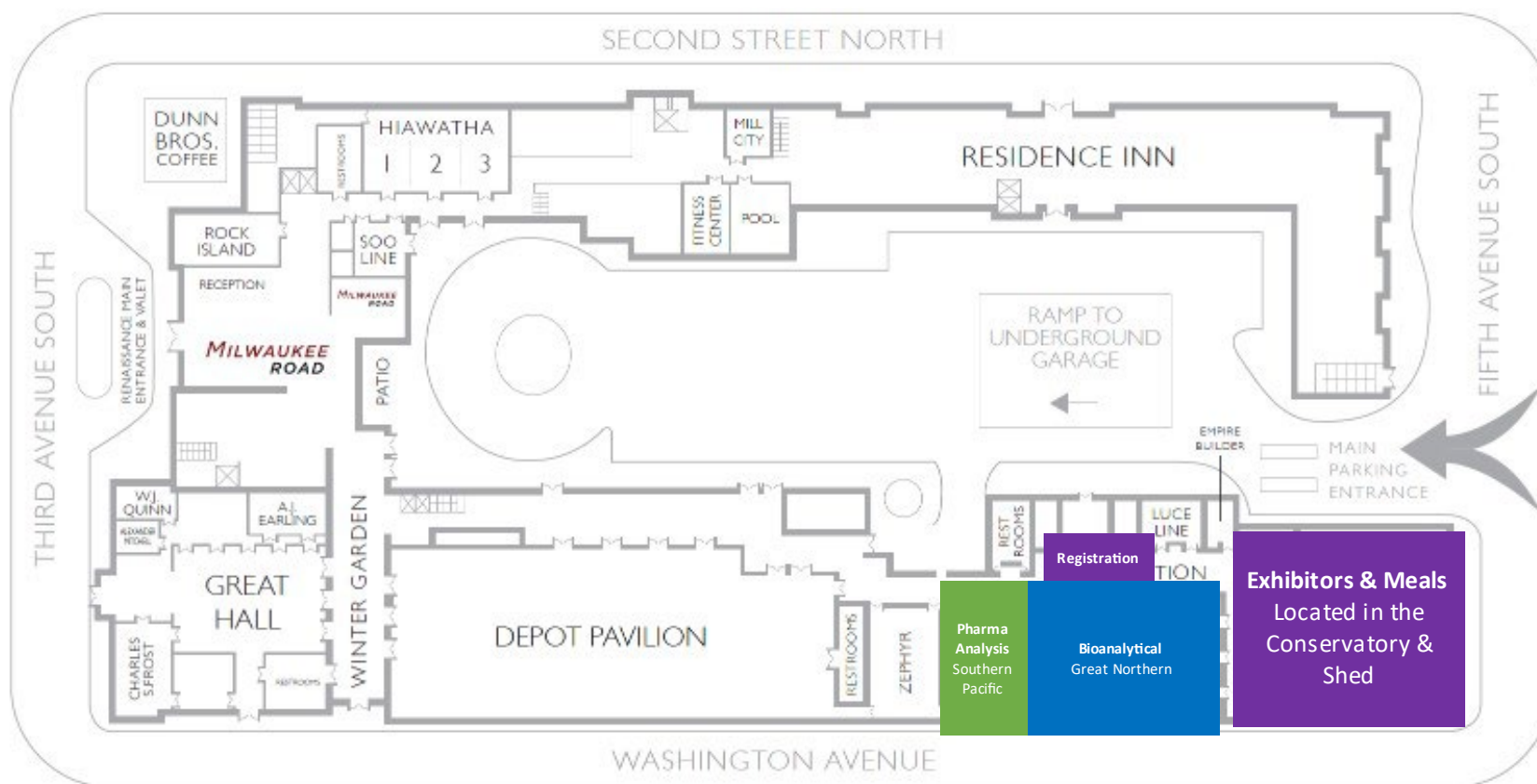




## Facility Information



All sessions for the 2023 Summer Scientific Forum will take place at the Renaissance Minneapolis Hotel, The Depot.





Renaissance Minneapolis Hotel, The Depot  
225 3rd Avenue S  
Minneapolis, MN 5540







## 2023 Summer Scientific Forum Agenda





All events will take place at the Renaissance Minneapolis, The Depot unless otherwise noted

MONDAY, JULY 10, 2023		
2:00 pm – 8:00 pm	Registration Open <a href="#">Great Northern Pre-Function</a>	
3:00 pm – 6:00 pm	Exhibitor Move-In <a href="#">The Conservatory</a>	
6:00 pm – 8:00 pm	Welcome Reception <a href="#">The Conservatory</a>	
TUESDAY, JULY 11, 2023		
7:00 am – 5:00 pm	Registration Open <a href="#">Great Northern Pre-Function</a>	
7:00 am – 8:00 am	Continental Breakfast <a href="#">The Conservatory</a>	
8:00 am – 10:00 am	 <b>Track 1: Bioanalytical <a href="#">Great Northern</a></b> <b>Morning Plenary: Old Platform, New Tricks Part 1</b>  8:00 am: Welcome and Introductions (Moderator: Vibha Jawa, Ph.D., FAAPS, Bristol Myers Squibb)  8:05 am: Enzyme Analysis by LC-MS/MS (Matthew Schultz, Ph.D., Mayo Clinic)  8:45 am: LCMA; Distinguish Endogenous vs Drug Product (Ines Santos, Ph.D., Bristol Myers Squibb)  9:20 am: Transgene Expression - LCMS (Jason M. Walsh, Ph.D., Pfizer Inc.)	 <b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b> <b>Morning Plenary: Lab of the Future</b>  8:00 am: Welcome and Introductions (Moderator: Maria T. Cruanes, Ph.D., Organon)  8:05 am: Industry-academia Collaborations to Build the 'Lab of the Future' for Pharmaceutical Analysis (Chris Welch, Ph.D., Indiana Consortium for Analytical Science & Engineering)  8:45 am: Data Integrity Considerations for the Lab of the Future (Meg Gallwitz, The Henrici Group)  9:20 am: Pharmaceutical Applications of Compact Capillary Liquid Chromatography (James P. Grinias, Ph.D., Rowan University)
10:00 am – 10:30 am	Coffee Break <a href="#">The Conservatory</a>	

10:30 am – 11:30 am	 <b>Track 1: Bioanalytical <a href="#">Great Northern</a></b> <b>Morning Plenary: Old Platform, New Tricks Part 1 (continued)</b>  10:30 am: Mass Spectrometry Provides Insights into ADC Drug Development: Case Studies in PK, ADME, and Biotransformations (Violet Lee, Ph.D., Genentech)  11:00 am: Use of LCMS for ADA Isotyping (Li Sun, Ph.D., Merck & Co., Inc.)	 <b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b> <b>Morning Plenary: Lab of the Future (continued)</b>  10:30 am: Greening Pharmaceutical Analysis: Reducing Waste Stream from a Common Test (Adam Socia, Ph.D., Organon)  11:00 am: AI and Automation in the CRO Lab (Sawani Talekar, Ph.D., Crystal Pharmatech)
11:30 am – 12:00 pm	<b>Thought Leadership Presentation <a href="#">Great Northern</a></b>  Challenges and Strategies in Developing Hybrid LCMS Methods for Proteins (Ben Nie, Ph.D., BioAgilytix Labs, LLC) <b>Sponsored by: <a href="#">BioAgilytix</a></b>	<b>Thought Leadership Presentation <a href="#">Southern Pacific</a></b>  Analysis and Removal of Procoagulant Contaminants from Your Plasma-derived Therapy (Matt Whelihan, Ph.D., Prolytix) <b>Sponsored by: <a href="#">Prolytix</a></b>
12:00 pm – 12:30pm	<b>Thought Leadership Presentation <a href="#">Great Northern</a></b>  Setting the First Human Dose: Minimizing Variables Across Species (Shane Needham, Ph.D., Velocity Labs LLC) <b>Sponsored by: <a href="#">Velocity Labs</a></b>	<b>Thought Leadership Presentation <a href="#">Southern Pacific</a></b>  Applying Bioinformatics/AI in Mining Public Data to Boost the Lab of the Future (Rohita Sinha, Ph.D., Eurofins Viracor) <b>Sponsored by: <a href="#">Eurofins BioPharma Services</a></b>
12:30 pm – 1:30 pm	Networking Lunch <a href="#">The Conservatory</a>	
1:30 pm – 3:00 pm	 <b>Track 1: Bioanalytical <a href="#">Great Northern</a></b> <b>Afternoon Plenary: Old Platform, New Tricks Part 2</b>  1:30 pm: Welcome (Moderator: Amanda L. Hays, Ph.D., BioAgilytix Labs, LLC)  1:35 pm: Increasing Complexity in Single-cell Analysis: Challenges and Opportunities for High Parameter Flow Cytometry in Clinical Trials (Enrique Gomez Alcaide, Ph.D., Roche)	 <b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b> <b>Afternoon Plenary: Analytical Tools to Enable Continuous Manufacturing</b>  1:30 pm: Welcome (Moderator: Eric J. Munson, Ph.D., FAAPS, Purdue University)  1:35 pm: API Continuous Manufacturing (Bradley A. Grenier, AbbVie Inc.)







	<p>2:00 pm: Bioanalysis of Novel Protein Modalities (Alexander Kozhich, Ph.D., Bristol Myers Squibb)</p> <p>2:25 pm: Application of Mass Spectrometry in Uncovering New Biology of Therapeutic Targets (Eugene Zhen, Ph.D., Eli Lilly &amp; Company)</p>	<p>2:00 pm: High-speed Quality Inspection During Tablet Production by Embedded PAT (Marten Klukkert, Ph.D., Fette Compacting)</p> <p>2:25 pm: FDA Perspective (David Acevedo, Ph.D., U.S. Food and Drug Administration)</p>
3:00 pm – 3:30 pm	Coffee Break <b>The Conservatory</b>	
3:30 pm – 4:00 pm	<p><b>Thought Leadership Presentation Great Northern</b></p> <p>Choosing HRMS vs. LBA for Bioanalysis (Adriane Spytka, Q2 Solutions)</p> <p><b>Sponsored by: Q2 Solutions</b></p>	
3:30 pm – 4:15 pm	<p> <b>Track 2: Pharmaceutical Analysis Rapid Fires Southern Pacific</b></p> <p>Moderator: Tim Gaul, Ph.D., Pfizer Inc.</p> <p>3:30 pm: A Modular Automation Approach to High-throughput Drug Profiling (Kenneth Gleason, AbbVie Inc.)</p> <p>3:45 pm: Predictive Dissolution of Nanoparticle Formulations (Akif E. Türelı, Ph.D., MyBiotech GmbH)</p> <p>4:00 pm: Internet of Things in the Laboratory (George Cokenakes, Ph.D., Gnosko Bio)</p>	
4:00 pm – 5:00 pm	<p> <b>Track 1: Bioanalytical Rapid Fires Great Northern</b></p> <p>Moderator: Ines Santos, Ph.D., Bristol Myers Squibb</p> <p>4:00 pm: Development of Pharmacodynamic Assay to Measure Intracellular Response Biomarkers Using Peripheral Blood Mononuclear Cells: Paths and Pitfalls (Eric Cruz, Ph.D., Celerion)</p> <p>4:15 pm: Single PK Method for Active, Mask, and Prodrug Using LC/MS (Emily Werth, Ph.D., Boehringer Ingelheim)</p> <p>4:30 pm: Ultra-sensitive Immuno-capture PCR Demonstrates Rapid Plasma Clearance and Minimal Shedding of Intact AAV5 Vector Capsids (Krystal Sandza, BioMarin Pharmaceutical, Inc.)</p> <p>4:45 pm: Computational Prediction of Biotherapeutic Immunogenicity Risk (Patrick Wu, MD, Ph.D., Genentech)</p>	
6:15 pm – 8:30 pm	Evening Reception <b>Union Rooftop (731 Hennepin Ave, Minneapolis, MN 55403)</b>	

WEDNESDAY, JULY 12, 2023		
7:00 am – 5:00 pm	Registration Open <a href="#">Great Northern Pre-Function</a>	
7:00 am – 8:00 am	Continental Breakfast <a href="#">The Conservatory</a>	
8:00 am – 10:00 am	 <p><b>Track 1: Bioanalytical <a href="#">Great Northern</a></b>  <b>Morning Plenary: Emerging Platforms, New Challenges Part 1</b></p> <p>8:00 am: Welcome (Moderator: Fumin Li, Ph.D., Biollege LLC)</p> <p>8:05 am: Immune Monitoring Biomarker Strategies for Gene Therapies (Kristen Kahle, Ph.D., Spark Therapeutics)</p> <p>8:30 am: Capillary vs Venous Blood Draws - Which Analyte Is Compromised (Iris (Huizhi) Xie, Merck &amp; Co., Inc.)</p> <p>8:55 am: HRMS in Regulated Bioanalysis – Ace in the Hole or Jack of All Trades (Barry R. Jones, Ph.D., Crinetics Pharmaceuticals)</p> <p>9:20 am: Considerations in Selecting Quantitative vs. Digital PCR Platforms for Bioanalysis (Russell K. Soon, Jr., BioMarin Pharmaceutical Inc.)</p>	 <p><b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b>  <b>Morning Plenary: Analytical Challenges in Developing Novel Modalities</b></p> <p>8:00 am: Welcome (Moderator: Maya P. Lipert, Ph.D., AbbVie Inc.)</p> <p>8:05 am: Approach to AAV GTx Potency Strategy in the Context of a Comprehensive Control Strategy (Savita Sankar, Ph.D., Pfizer Inc.)</p> <p>8:40 am: Technical and Strategic Considerations for Enabling Co-Formulated Biologics: Venturing Beyond Standard IgGs at Narrow Ratios (Joseph Valente, Ph.D., Bristol Myers Squibb)</p> <p>9:20 am: ADC/Drug Linker Structure/Conjugation Site Effect on Phys Chem (Brittney Mills, Ph.D., AbbVie Inc.)</p>
10:00 am – 10:30 am	Coffee Break <a href="#">The Conservatory</a>	
10:30 am – 11:30 am	 <p><b>Track 1: Bioanalytical <a href="#">Great Northern</a></b>  <b>Morning Plenary: Emerging Platforms, New Challenges Part 1 (continued)</b></p> <p>10:30 am: Application of Blood Microsampling in Cynomolgus Monkey and Demonstration of Equivalent mAB PK Parameters Compared to Conventional Sampling (Ying Wang, Ph.D., Pfizer Inc.)</p>	 <p><b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b>  <b>Morning Plenary: Analytical Challenges in Developing Novel Modalities (continued)</b></p> <p>10:30 am: Novel Modalities/oligonucleotides (Claus Rentel, Ph.D., Ionis Pharmaceuticals)</p> <p>11:00 am: Novel Synthetic Modalities Oligos, Lipids (Mirlinda Biba, Ph.D., Merck &amp; Co., Inc.)</p>

	10:55 am: Microsampling/patient-centric Sampling - Bioanalytically Focused (Melanie Anderson, Merck and Co, Inc.)	11:30 am: Q&A
11:30 am – 12:00 pm	<b>Thought Leadership Presentation Great Northern</b> Accelerating Immunogenicity Analysis From IgG- to AAV-based Therapies (Manny Lozano, Gyros Protein Technologies) <b>Sponsored by: Gyros</b>	
12:00 pm – 1:30 pm	Networking Lunch <b>The Conservatory</b>	
1:30 pm – 3:00 pm	 <b>Track 1: Bioanalytical Great Northern</b> <b>Afternoon Plenary: Emerging Platforms, New Challenges Part 2</b>  1:30 pm: Welcome (Brad Roadcap, Merck & Co., Inc.)  1:35 pm: Establishing FVIII Activity as a Reliable Predictor of Hemostatic Efficacy Following AAV5 Gene Therapy in Hemophilia A (Christian Vettermann, Ph.D., BioMarin Pharmaceutical, Inc.)  2:00 pm: Sample Logistics and Analytical Considerations for Development of a Cellular Immunogenicity Assays for CART Therapies (Kevin Lang, Ph.D., PPD)  2:25 pm: Q&A	 <b>Track 2: Pharmaceutical Analysis Southern Pacific</b> <b>Afternoon Plenary: Clinically Relevant Specifications</b>  1:30 pm: Welcome (Moderator: Sachin Lohani, Ph.D., Merck & Co., Inc.)  1:35 pm: Use of PBPK Models for Disso Specs/post Approval Changes (Tycho Heimbach, Ph.D., Merck & Co., Inc.)  2:05 pm: Biologics View on Clinically Relevant Specs (Marisa Joubert, Ph.D., Amgen)  2:30 pm: Regulatory View on Clinically Relevant Specs (Jayda Siggers, Ph.D., Biologic and Radiopharmaceutical Drugs Directorate (BRDD) Health Canada)
3:00 pm – 3:30 pm	Coffee Break <b>The Conservatory</b>	
3:30 pm – 4:30 pm	 <b>Track 1: Bioanalytical Rapid Fires Great Northern</b> Moderator: Amanda L. Hays, Ph.D., BioAgilytix Labs, LLC  3:30 pm: Harnessing Nanoflow LC-MS to Maximize Sensitivity for Analysis of Bio-therapeutics in a High-throughput	 <b>Track 2: Pharmaceutical Analysis Rapid Fires Southern Pacific</b>  Moderator: Landon Greene, Ph.D., Vertex Pharmaceuticals

	<p>Bioanalytical Laboratory (Nicholas Saichek, Ph.D., Labcorp Drug Development)</p> <p>3:45 pm: Advances in At-home Microsampling Kits for Liquid Blood Collections (Greg J. Sommer, Ph.D., Labcorp)</p> <p>4:00 pm: Streamlined Biomarker Assay Qualification in a Rare Matrix on the Ella Platform (Jennifer A. Getz, Ph.D., Genentech)</p> <p>4:15 pm: Streamlining Immunogenicity Assay Development with Binding Measurements (Krisna Duong-Ly, Ph.D., Merck &amp; Co., Inc.)</p>	<p>3:30 pm: Enabling Clinically Appropriate Degradation Product Limits Through Analytical Characterization of API Epimerization (Nathan Contrella, Ph.D, Merck Research Laboratories)</p> <p>3:45 pm: Evaluation of Various Spectroscopic Procedures to Calculate Free Thiol Content in Biotherapeutics (Nicole Irene Halaszynski, Ph.D., Merck &amp; Co., Inc.)</p> <p>4:00 pm: Overcoming Sterilization Challenges with Highly Viscous Pharmaceutical Formulations: Derisking from Development to the Clinic (Mohannad Kadhum, Ph.D., Lifecore Biomedical)</p> <p>4:15 pm: Structural Fingerprinting for Biologic Risk Assessment: Correlating High Resolution NMR to a Functional Outcome (Robert Brinson, Ph.D., National Institute of Standards and Technology)</p>
4:30 pm – 6:00 pm	Closing Reception <a href="#">The Conservatory</a>	
6:00 pm – 7:00 pm	Exhibit Hall Move-Out <a href="#">The Conservatory</a>	



THURSDAY, JULY 13, 2023			
7:00 am – 11:00 am	Registration Open <a href="#">Great Northern Pre-Function</a>		
7:00 am – 8:00 am	Continental Breakfast <a href="#">The Conservatory</a>		
8:00 am – 10:30 am	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;">  <p><b>Track 1-Bioanalytical <a href="#">Great Northern</a></b>  <b>Morning Plenary: Risk Assessment of Next Generation Biologics</b></p> <p>8:00 am: Welcome (Boris Gorovits, Ph.D., Sana Biotechnology)</p> <p>8:05 am: Differential Immune Responses to Deamidated Adeno-associated Virus Vector (Ronit Mazor, Ph.D., U.S. Food and Drug Administration)</p> <p>8:30 am: Immunogenicity Safety Monitoring for Systemic Administration of AAV Vected Gene Therapies (Brian Long, Ph.D., BioMarin Pharmaceutical Inc.)</p> <p>8:55 am: ICH M10 - CRO Experience (Beth Hyer, Labcorp)</p> <p>9:20 am: Pharma’s Experience on Implementing M10 (Christopher A. James, Ph.D., Amgen Research)</p> <p>9:55 am: ICH Process: Challenges and Opportunities for Global Harmonization (Tina S. Morris, Ph.D., American Association of Pharmaceutical Scientists)</p> </td> <td style="width: 50%; vertical-align: top;">  <p><b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b>  <b>Morning Plenary: Life Cycle Management of Analytical Procedures</b></p> <p>8:00 am: Welcome (Moderator: Nina S. Cauchon, Ph.D., Amgen)</p> <p>8:05 am: Q12 Experiences (Hasmukh B. Patel, Ph.D., U.S. Food and Drug Administration)</p> <p>8:30 am: Lifecycle Management of Analytical Procedures – an Example of Pharmaceutical Counter Ion Analysis (Qinggang Wang, Ph.D., Bristol Myers Squibb)</p> <p>9:00 am: ICH Q14: An Enabler for Analytical Procedure Lifecycle Which Ensures Robustness of Analytical Methods During a Drug’s Lifetime (Bryan C. Castle, Ph.D., Eli Lilly &amp; Company)</p> <p>9:30 am: Post- approval Analytical Method Performance Monitoring: A Case Study (Maria T. Cruanes, Ph.D., Organon)</p> <p>10:00 am: Panel Discussion with above speakers and Jayda Siggers, Ph.D., Biologic and Radiopharmaceutical Drugs Directorate (BRDD) Health Canada</p> </td> </tr> </table>	 <p><b>Track 1-Bioanalytical <a href="#">Great Northern</a></b>  <b>Morning Plenary: Risk Assessment of Next Generation Biologics</b></p> <p>8:00 am: Welcome (Boris Gorovits, Ph.D., Sana Biotechnology)</p> <p>8:05 am: Differential Immune Responses to Deamidated Adeno-associated Virus Vector (Ronit Mazor, Ph.D., U.S. Food and Drug Administration)</p> <p>8:30 am: Immunogenicity Safety Monitoring for Systemic Administration of AAV Vected Gene Therapies (Brian Long, Ph.D., BioMarin Pharmaceutical Inc.)</p> <p>8:55 am: ICH M10 - CRO Experience (Beth Hyer, Labcorp)</p> <p>9:20 am: Pharma’s Experience on Implementing M10 (Christopher A. James, Ph.D., Amgen Research)</p> <p>9:55 am: ICH Process: Challenges and Opportunities for Global Harmonization (Tina S. Morris, Ph.D., American Association of Pharmaceutical Scientists)</p>	 <p><b>Track 2: Pharmaceutical Analysis <a href="#">Southern Pacific</a></b>  <b>Morning Plenary: Life Cycle Management of Analytical Procedures</b></p> <p>8:00 am: Welcome (Moderator: Nina S. Cauchon, Ph.D., Amgen)</p> <p>8:05 am: Q12 Experiences (Hasmukh B. Patel, Ph.D., U.S. Food and Drug Administration)</p> <p>8:30 am: Lifecycle Management of Analytical Procedures – an Example of Pharmaceutical Counter Ion Analysis (Qinggang Wang, Ph.D., Bristol Myers Squibb)</p> <p>9:00 am: ICH Q14: An Enabler for Analytical Procedure Lifecycle Which Ensures Robustness of Analytical Methods During a Drug’s Lifetime (Bryan C. Castle, Ph.D., Eli Lilly &amp; Company)</p> <p>9:30 am: Post- approval Analytical Method Performance Monitoring: A Case Study (Maria T. Cruanes, Ph.D., Organon)</p> <p>10:00 am: Panel Discussion with above speakers and Jayda Siggers, Ph.D., Biologic and Radiopharmaceutical Drugs Directorate (BRDD) Health Canada</p>
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10:30 am – 11:00 am	Coffee Break <a href="#">The Conservatory</a>		
11:00 am – 11:30 am	<p><b>Closing Session: Moderator Read Out <a href="#">Great Northern</a></b></p> <p>Sachin Lohani, Ph.D., Merck &amp; Co., Inc.  Nina S. Cauchon, Ph.D., Amgen  Vibha Jawa, Ph.D., FAAPS, Bristol Myers Squibb</p>		

# Bioanalytical Speaker Abstracts and Biographies

Session: Morning Plenary: Old Platform, New Tricks Part 1

## **Morning Plenary: Old Platform, New Tricks Part 1**

### **Moderator: Vibha Jawa, Ph.D., FAAPS, Bristol Myers Squibb**

Dr. Vibha Jawa is an Executive Director in Clinical-Pharmacology/Pharmacometrics Disposition/Bioanalysis organization at Bristol Myers Squibb. She leads biotherapeutic and cell /gene therapy bioanalytical (BA), DMPK and immunogenicity, and provides strategic and scientific oversight for the Bristol Myers Squibb developmental portfolio. She has led Predictive/Clinical Immunogenicity at Merck (4yrs) and discovery to development for biotherapeutics at Amgen (14yrs).

Her 20+ years of experience in diverse fields of biologics, vaccine development, and gene therapy has led to successful support of 20 + IND, BLA, and MAA filings. She has 75+ peer-reviewed publications and serves as a Reviewer and Section Editor for *The AAPS Journal*, *Frontiers Immunol* and *J. Pharm Sci* as well as an active member of multiple scientific societies and consortiums (IQ, SC space Consortium and EIP) . Within AAPS, she is Track Chair of the Summer Scientific Forum Meeting, Chair of the CGTP Bioanalysis/Biomarker Working Group, SCmember of the TPI Community, past chair of the Immunogenicity Risk Assessment and Mitigation Community and leads the IQ Consortium for Cell/Viral/Gene therapies. In 2022 she was recognized as an AAPS Fellow. She enjoys volunteering as a board member for the state youth orchestra and mentoring high school students on STEM related projects in her free time.

Session: Morning Plenary: Old Platform, New Tricks Part 1

**Enzyme Analysis by LC-MS/MS**

No description available.

**Speaker: Matthew Schultz, Ph.D., Mayo Clinic**

No biography available.

## **LCMA; Distinguish Endogenous vs Drug Product**

Characterizing glycoproteins and understanding the impact of glycosylation in the pharmacokinetics (PK) and pharmacodynamics (PD) properties is critical to determining the exposure and efficacy of these drug candidates. ELISA methods only allow the determination of an average PK for glycosylated therapeutic proteins, however, these are composed of different glycoforms that contribute differently to the PK. LC-MS/MS is a great complementary technique, well equipped for the quantitation of individual glycoforms, that enables the assessment of their respective PK properties. This talk will focus on the development of a hybrid LBA-LC-MS/MS method for glycan-resolved PK monitoring of different manufacturing lots of a therapeutic fusion protein.

Learning Objectives:

- Understand the impact of glycosylation on the pharmacokinetics of therapeutic proteins
- Learn how to use and implement LC-MS/MS for glycan profiling of therapeutic proteins and quantification of glycopeptides
- Explore the use of LC-MS/MS to assess the glycan-resolved PK of therapeutic proteins

### **Speaker: Ines Santos, Ph.D., Bristol Myers Squibb**

Ines Santos is a Senior Scientist in the Clinical Pharmacology, Pharmacometrics, Disposition & Bioanalysis group at Bristol Myers Squibb. She is responsible for the development of LC-MS/MS methods (for small molecule drugs and therapeutic proteins) to characterize pharmacokinetic/toxicokinetic properties of development programs. Before joining Bristol Myers Squibb, Ines worked at AstraZeneca where she was responsible for the development of purification methods for discovery compounds. She received her Ph.D. in biotechnology (analytical chemistry) from the Portuguese Catholic University where she developed automated and miniaturized analytical methods for environmental monitoring.

## **Transgene Expression - LCMS**

Anti-peptide antibodies are a bedrock standard for measuring transgene protein expression using surrogate peptide analysis for quantitation. However, generating these reagents can be costly and time consuming. This presentation demonstrates that anti-peptide antibody-free workflows allow for more rapid data generation without sacrificing assay quality. Utilizing reagent free workflows also allows for the flexibility to switch peptides quickly as needed for species-specific analysis.

Learning Objectives:

- Understand reagent (anti-peptide antibody)-free nano flow LCMS workflows targeting proteins
- Explore the pros and cons of reagent-free workflows
- Understand that quality, quantitative data can be generated much faster without time consuming reagent campaigns

### **Speaker: Jason M. Walsh, Ph.D., Pfizer Inc.**

Jason Walsh, Ph.D., is a Senior Scientist at Pfizer working in Biomedicine Design (BMD) in the Biomarkers and Biomeasures LCMS group. He received his Ph.D. from Northeastern University's Department of Chemistry and Chemical Biology in 2013. After a brief industry postdoc, he moved on to manage day-to-day operations, including assay development, at the Antioxidants Research Laboratory at Tufts University's Jean Mayer USDA Human Nutrition Center on Aging. In December 2016, he came to Pfizer as a contract scientist developing various immunoaffinity LC-MS based solutions that support PD' measurements for various programs and "drug bound to target" assays. In his current role, he primarily focuses on gene therapy assays that measure protein product. To this end, he participates not only in assay refinement, but also importantly in the development of the groups regulated LC-MS assay capabilities for the execution of study samples for Pfizer's portfolio support.

## **Mass Spectrometry Provides Insights into ADC Drug Development: Case Studies in PK, ADME, and Biotransformations**

No description available.

### **Speaker: Violet Lee, Ph.D., Genentech**

Dr. M. Violet Lee obtained her M.S in chemistry from the University of Illinois at Urbana-Champaign studying ribosomally and non-ribosomally synthesized natural products. She went on to obtain her Ph.D. in chemistry from the University of Wisconsin-Madison, studying osmotic stress through systems biology approach of combining quantitative proteomics (protein and PTMs) and transcriptomics. In 2013, she joined the BioAnalytical Sciences Department at Genentech supporting projects ranging from late-stage research through clinical development of antibody-drug conjugates (ADCs) and novel large molecule modalities in oncology and ophthalmology. Her group is responsible for developing and implementing immunoaffinity mass spec-based PK assays, characterizing ADC ADME and quantifying associated catabolites, as well as assessing potential immunogenicity of biotherapeutics. She specializes in bioanalytical chemistry with expertise in protein and PTM characterization and quantitation, small and large molecule quantitative mass spectrometry, systems-biology, and ADC and biotherapeutic PK assays and catabolism.

## Use of LCMS for ADA Isotyping

Immunogenicity risk assessment is an integral part of biologics development, with ligand binding assays (LBA) being the gold standard for measuring anti-drug antibody (ADA) responses. However, the LBA approach often faces the challenges of interferences from circulating drug and/or endogenous soluble targets. Liquid chromatography – mass spectrometry (LCMS) is an indispensable tool in bioanalysis of small molecules and biologics, offering sensitivity, selectivity and flexibility to multiplex. This presentation will focus on the emerging application of LCMS to immunogenicity assessment via ADA isotyping, and its potential to improve ADA assay drug tolerance and selectivity. A case study of IgE ADA isotyping for a monoclonal antibody drug, MK-A, will be discussed. The workflow employed immunoprecipitation (IP), tryptic digestion followed by LCMS measurement of the surrogate peptides representative of the drug or IgE ADA. Results from two assay formats, direct and indirect, suggested feasibility to achieve sensitive ADA measurements with high drug tolerance. Future work for utilizing LCMS to supplement ADA characterization will be discussed.

### Learning Objectives:

- Develop an in-depth understanding of hybrid LCMS workflow employing immunoprecipitation, trypsin digestion followed by LCMS analysis of surrogate peptides unique to the analytes of interest, and its applications in ADA semi-quantitation and isotyping
- Dive deeply into a case study of IgE ADA isotyping by LCMS for a Merck monoclonal antibody compound, and learn the design of direct and indirect assay formats and key considerations in method development
- Gain insights on the challenges and future directions of LCMS as a supplementary and orthogonal tool to the traditional LBA approach for measuring ADA responses

### Speaker: Li Sun, Ph.D., Merck & Co., Inc.

Li Sun is a Principal Scientist in the PCD Bioanalytics Department at Merck & Co., Inc. Li received her B.S. degree in chemistry from University of Science and Technology of China (Hefei, China), M.S. and her Ph.D. in analytical chemistry from Rensselaer Polytechnic Institute (Troy, New York). At Merck, Li's area of focus is bioanalysis for small molecules and biotherapeutics. Her experience spanned preclinical and clinical development across multiple therapeutic areas, method development and validation, sample testing, reporting and regulatory submissions. Currently, Li is a clinical bioanalysis PI supporting LC-MS and immunoassay studies. She also serves on cross-functional teams within Merck to provide oversight of BA strategies



## **Challenges and Strategies in Developing Hybrid LCMS Methods for Proteins**

Affinity capture followed by enzymatic digestion is the general workflow for large molecule LCMS bioanalysis. This presentation covers the challenges encountered when developing LCMS methods for protein therapeutics and biomarkers, as well as strategies to overcome such challenges. The presentation will focus on immunocapture condition optimization, signature peptide selection, digestion designs to obtain suitable signature peptides for quantification, and stable isotope-labeled internal standard selection.

Learning Objectives:

- Understand the principles of hybrid LCMS methods for large molecule bioanalysis
- Design affinity capture and enzymatic digestion workflows for large molecule LCMS bioanalysis
- Discuss the challenges and strategies in different steps and aspects of large molecule hybrid LCMS methods

### **Thought Leader: Ben Nie, Ph.D., BioAgilytix Labs, LLC**

Ben Nie is Scientist III at BioAgilytix San Diego leading the Large Molecule LC/MS group. He obtained his Ph.D. in pharmaceutical science from Auburn University in 2017. He has more than ten years of experience in LC/MS-based bioanalysis for both large and small molecules and has published 20+ research papers in peer-reviewed journals. His research interest focus on the application of LC/MS technologies to novel therapeutics.

## **Setting the First Human Dose: Minimizing Variables Across Species**

Setting the first in human (FIH) dose via allometric scaling is an industry accepted practice. Developing and validating methods for different species using consistent methodology with emphasis on minimizing variables, yields data sets that contribute to more predictive allometric scaling. We will share best practices in workflow optimization and examine the impact to pharmacometric evaluations to predicting doses for FIH studies.

Learning Objectives:

- Best practices for consistent method development – setting chromatographic and detection parameters
- How to standardize validation plans to be context appropriate yet consistent
- Concepts related to allometric scaling and interspecies PK correlations

### **Thought Leader: Shane Needham, Ph.D., Velocity Labs, LLC**

Shane Needham graduated from Washington State University with a BS in Chemistry and from the University of Rhode Island with a Ph.D. in Chemistry. Dr. Needham's first career opportunity was working in the bioanalytical group using high performance liquid chromatography and mass spectrometry at Pfizer in Groton, CT. Dr. Needham has more than 30 years-experience in LC-MS bioanalysis. He is known as a resident expert in bioanalysis and has over 200 publications in the area. Dr. Needham is a serial entrepreneur, owning six businesses including founding and owning two global laboratories in contract research for the pharmaceutical industry. His businesses have been listed as the fastest growing company by INC 5000 in 2014 and start-up of the year in 2022 (Velocity Labs). Under his direction, his labs have led the industry in microsampling bioanalysis, microflow LC-MS/MS, animal health bioanalysis, and small and large molecule (ADC's, biomarkers, Oligonucleotides, mAbs, et. al.) bioanalysis. Shane is also a motivational speaker, wrestling coach, national champion bodybuilder, state champion powerlifter, life coach, and Ted Talk speaker. Shane has four children and considers them his biggest accomplishment.

## **Afternoon Plenary: Old Platform, New Tricks Part 2**

### **Moderator: Amanda L. Hays, Ph.D., BioAgilytix Labs, LLC**

Amanda Hays, Ph.D., Scientific Officer, offers more than a decade of lab experience in multiple fields, including pharmacology, drug metabolism, immunoassays, immunogenicity, biomarkers, flow cytometry, and qPCR. She has particular expertise leading programs through all stages in the drug development process. In her current role, she serves as a Scientific Officer and provides global scientific leadership and technical guidance at BioAgilytix. She is the Chair of the AAPS biomarkers and precision medicine community and the AAPS qPCR Working Group, among other volunteer leadership positions. She earned her Ph.D. in pharmacology from the University of Kansas Medical Center in Kansas City (Kansas).

## **Increasing Complexity in Single-cell Analysis: Challenges and Opportunities for High Parameter Flow Cytometry in Clinical Trials**

Flow cytometry technology has evolved over the last years, providing new technical advances like the full spectral flow technology that allows determination of up to 40 fluorescent parameters. The advantages of the spectral flow technology have shortened time for the transition from research to clinical trial settings, increased the potential for drug development, improvement of biomarker strategies, and the discovery of new biomarkers. Full spectral flow cytometry technology implies new challenges not only on assay development but also at the operational and logistical level at CROs. The huge amount of data generated from complex assays (>1000 reportables) has disclosed another challenge like the data analysis, showing traditional approaches (manual gating) as not suitable anymore. New mathematical tools like unsupervised algorithms have emerged as powerful tools to help in data analysis but also to identify new populations that otherwise would remain hidden when applying traditional techniques.

### Learning Objectives:

- Introduce Flow cytometry in the context of Clinical trials
- Workflows for implementation of validated flow cytometry assay in clinical programs
- High parameter flow cytometry and its application in clinical trials
- Handling data management and data analysis of high parameter flow cytometry assays. Challenges
- Examples of how validated High parameter flow cytometry assays support clinical programs

### **Speaker: Enrique Gomez Alcaide, Ph.D., Roche**

Dr. Enrique Gomez Alcaide obtained his Ph.D. in 2010 in the Department of Pharmacology and Therapeutics at the University of Malaga, Spain, based on his work on the metabolising capacity of the skin and the role of dendritic cells in the induction of drug allergic reactions in patient with epilepsy using work developed at the University Hospital of Malaga.

During his postdoctoral training, he was an active member of several European networking groups of EAACI, including EuroBAT and ENDA.

Since 2015, he works on translational studies in oncology, immunology, and infectious diseases at F. Hoffmann-La Roche. Since 2022, he has been a Strategy Area Leader for Cellular and Functional Biomarkers area within PS at pRED. He supports therapeutic drug development on different disease areas and contributes to the development of innovative assays and strategies that ensure the implementation of cellular and functional marker strategies and resources across all pRED programs.

## **Bioanalysis of Novel Protein Modalities**

No description available.

### **Speaker: Alexander Kozhich, Ph.D., Bristol Myers Squibb**

Alex Kozhich has over 20 years of experience in the pharmaceutical industry. For the past 12 years, he has worked at Bristol Myers Squibb, and currently is a Scientific Director with the responsibility of providing exploratory bioanalytical support to large molecule discovery and development projects. Previously, he was an early discovery scientist at MedImmune. He has authored over 100 papers and/or poster presentations as primary or co-author and presented at scientific conferences across the United States. His research interests include bioanalytical methods for biomolecules, peptide and protein biochemistry, and immunology. Alex received his Ph.D. in organic chemistry from Shemyakin Institute of Bioorganic Chemistry and completed postdoctoral training in immunology at the National Institutes of Health.

## **Application of Mass Spectrometry in Uncovering New Biology of Therapeutic Targets**

Mass spectrometry is a powerful analytical tool that is widely used in the pharmaceutical industry for a variety of applications, such as drug discovery, drug development, quality control, and pharmacokinetic studies. The early phase of drug development involves identification a specific molecular target that is involved in a disease or condition.

Apolipoprotein A5 (ApoA5) is a protein that plays a role in the regulation of triglyceride (TG) levels in the bloodstream. ApoA5 was discovered 20 years ago, and mutations in the APOA5 gene have been associated with elevated levels of triglycerides in the bloodstream, which is a risk factor for cardiovascular disease. However, its mechanism in lower TG remained unclear. This presentation shows how mass spectrometry was used initially to identify that ApoA5 can bind to angiopoietin-like protein (ANGPTL)3/8 complex in human serum. Functional studies showed that the binding of ApoA5 to ANGPTL3/8 complex impaired the ability of ANGPTL3/8 complex to inhibit LPL, resulting in lower TG level. This discovery was a breakthrough in understanding of how ApoA5 lowers TG, and it might create potential novel opportunities for treating hyperlipidemia.

### Learning Objectives:

- Understand the application of mass spectrometry in uncovering new biology of therapeutic targets
- Understand the mechanism of triglycerides metabolism
- Understand the mechanism of ApoA5 on LPL activity

### **Speaker: Eugene Zhen, Ph.D., Eli Lilly & Company**

Eugene Zhen, Ph.D., has experience in applying mass spectrometry and proteomics techniques in quantitative and qualitative biological analysis, including biomarker discovery, protein characterization and quantification, and protein-protein interaction studies. He also has experience in the biology of triglyceride metabolism.

## Choosing HRMS vs. LBA for Bioanalysis

There is an increase in the complexity of drug modalities along with the need for more sensitive methods. Immunoassays, while often chosen as the first platform to utilize for assessing pharmacokinetics of biologics, are entirely dependent on critical reagents. Multi-dimensional low-flow chromatography coupled to high resolution mass spectrometry can be advantageous for instances where a high degree of sensitivity or greater selectivity is required, or when higher quality critical reagents are not available.

Learning Objectives:

- When to choose LCMS over LBA for bioanalysis considering the availability of critical reagents and the need for sensitivity and selectivity
- Understanding the advantages of multi-dimensional LC/HRMS in the context of regulated bioanalysis
- Takeaways from case studies showing the advantages of LCMS over LBA where greater sensitivity or selectivity was needed

### Thought Leader: Adriane Spytko, Q2 Solutions

Adriane Spytko has 15 years of experience in regulated bioanalysis spanning both the immunoassay and LCMS disciplines. She has developed and validated hundreds of quantitative immunoassays and brings these scientific and regulatory perspectives to our hybrid IA-LC/MS methods.

Throughout her career, she has managed multiple scientific departments and bioanalytical operations that give her experience from many viewpoints. She currently has oversight of the Wet Lab Sample Preparation Scientists and Instrumentation Scientists/Project Leader Team in the LCMS Biologics Production Group at Q2 Solutions.



## **Bioanalytical Rapid Fires 1**

### **Rapid Fire Moderator: Ines Santos, Ph.D., Bristol Myers Squibb**

Ines Santos is a Senior Scientist in the Clinical Pharmacology, Pharmacometrics, Disposition & Bioanalysis group at Bristol Myers Squibb. She is responsible for the development of LC-MS/MS methods (for small molecule drugs and therapeutic proteins) to characterize pharmacokinetic/toxicokinetic properties of development programs. Before joining Bristol Myers Squibb, Ines worked at AstraZeneca where she was responsible for the development of purification methods for discovery compounds. She received her Ph.D. in biotechnology (analytical chemistry) from the Portuguese Catholic University where she developed automated and miniaturized analytical methods for environmental monitoring.

## **Development of Pharmacodynamic Assay to Measure Intracellular Response Biomarkers Using Peripheral Blood Mononuclear Cells: Paths and Pitfalls**

Over the past decade, momentum for novel drug modalities, with new and unique mechanisms of action, have reached unprecedentedly high levels. Consequently, strategies to adapt to the corresponding challenges associated with bioanalytical pharmacodynamic (PD) investigations have become increasingly more complex and difficult. Peripheral blood mononuclear cells (PBMCs) are tremendously valuable assets for evaluating the biological effects of drug candidates within a clinical research setting. However, the logistic and operational challenges associated with PBMC collection and processing, subsequent incorporation into a cell based assay capable of detecting an intracellular response biomarker, and compensating for the inherent variability of utilizing a cell-based matrix are meaningful obstacles to successfully utilizing PBMCs in the context of clinical research investigation with novel drug modalities.

Utilizing SepMate™ PBMC Isolation Tubes and MSD's QuickPlex® SQ 120 Imager, we have developed a sandwich electrochemiluminescence immunoassay (ECLIA) for the parallel measurement of total tubulin and acetyl tubulin as a drug response biomarker. Results: Although there was no change in total tubulin in ex vivo stimulated PBMCs, a statistically significant increase in tubulin acetylation was observed by ECLIA compared to mock treated samples. Conclusion: A number of key considerations are critical to successfully overcoming the challenges associated with the design, implementation, and execution of PBMC based bioassays as the increasingly complex arena of drug modalities continues to expand. This study aims to caution against certain pitfalls and highlight the proactive measures that may be incorporated to maximize assay development efforts.

Learning Objectives:

- Efficiently design, implement, and execute PMBC based pharmacodynamic bioassay.

**Rapid Fire Presenter: Eric Cruz, Ph.D., Celerion**

No biography available.

## Single PK Method for Active, Mask, and Prodrug Using LC/MS

Drug measurements in toxicological studies to profile the pharmacokinetic distribution of large molecules is necessary for pre-clinical characterization of new drug candidates for safety and efficacy assessment. This presentation describes an immunocapture-LC/MS methodology for simultaneous detection of prodrug, mask, and active drug levels for BI-X in mouse plasma and cynomolgus plasma/serum. Previous ELISA-based efforts to quantify prodrug and active levels were subjected to interference of prodrug in the active assay due to limited capability to differentiate the long form and active form of BI-X. Leveraging the cleavage site in the drug sequence, this mass spectrometry-based approach has the capability to selectively isolate peptides specific to each form (prodrug, active, and mask) and build MRM assays for each, all from the same starting material. Through the combination of capture reagents selected during immunocapture and selection of tryptic and Glu-C peptides unique to the mask and active forms, this strategy eliminates prodrug interference in active drug measurements allowing for reduced sample requirements and capable of gaining a PK profile on all three forms of BI-X.

### Learning Objectives:

- Describe the fundamental methodology behind immunocapture-LC/MS methods for PK
- Understand how to strategically select quantitation peptides for IC-LC/MS PK methods
- Appreciate the need to multiplex drug measurements while eliminating interference through unconventional sample prep for an LC/MS-based method

### Rapid Fire Presenter: Emily Werth, Ph.D., Boehringer Ingelheim

Emily Werth, Ph.D. is a Principal Scientist at Boehringer Ingelheim. She is a group leader in regulated bioanalytical PK assay development for large molecule and new modality programs and serves as the DMPK project rep on numerous programs in development. Her lab focus is on developing and validating immunocapture-based mass spectrometry (IC-LC/MS/MS) methods for pre-clinical and clinical PK. Prior to joining Boehringer Ingelheim, she received a Ph.D. in analytical chemistry in 2018 from UNC Chapel Hill before joining Columbia University as a postdoc in the Biological Sciences Department. She has contributed on target engagement biomarker, PK, CQA, and ocular tissue biodistribution work packages for drugs across the development landscape in the Boehringer Ingelheim pipeline.

## **Ultra-sensitive Immuno-capture PCR Demonstrates Rapid Plasma Clearance and Minimal Shedding of Intact AAV5 Vector Capsids**

Adeno-associated virus (AAV)-based gene therapy vectors are replication-incompetent and thus pose minimal risk for horizontal transmission or release into the environment. In studies with AAV5-FVIII-SQ (valoctocogene roxaparvovec), an investigational gene therapy for hemophilia A, residual vector DNA was detectable in blood, secretata, and excreta, but it remained unclear how long structurally intact AAV5 vector capsids were present. Since a comprehensive assessment of vector shedding is required by regulatory agencies, a company developed a new method (termed iqPCR) that utilizes capsid-directed immunocapture followed by qPCR amplification of encapsidated DNA. The limit of detection for AAV5 vector capsids was  $1.17E+04$  and  $2.33E+04$  vg/mL in plasma and semen, respectively. Acceptable precision, accuracy, selectivity, and specificity were verified; up to  $1.00E+09$  vg/mL non-encapsidated vector DNA showed no interference. Anti-AAV5 antibody plasma concentrations above 141 ng/mL decreased AAV5 capsid quantification, suggesting that iqPCR mainly detects free capsids and not those complexed with antibodies. In a clinical study, AAV5-FVIII-SQ capsids were found in plasma and semen but became undetectable within nine weeks after dose administration. Hence, iqPCR monitors the presence and shedding kinetics of intact vector capsids following AAV gene therapy and informs the potential risk for horizontal transmission.

### **Learning Objectives:**

- Consider immuno-capture qPCR (iqPCR) method to monitor the biodistribution and shedding kinetics of intact AAV5-FVIII-SQ vector capsids, instead of vector DNA fragments with the conventional PCR method, following gene therapy.

### **Rapid Fire Presenter: Krystal Sandza, BioMarin Pharmaceutical, Inc.**

Technical Scientist in Research & Early Development (RED) 14 years at BioMarin in BioAnalytics (4 years with CRO prior) Assay development, validation and transfer of primary, secondary, and exploratory endpoints for Roctavian (AAV5-FVIII-SQ), pre-IND to market First authored publication described herein, 3 other paper contributions, 5 posters Experience developing clinical and non-clinical ADA assays to AAV5, AAV8, and AAV9 Contact: Krystal Sandza, Technical Scientist 1 BioMarin Pharmaceuticals, Inc. Email: [ksandza@bmrn.com](mailto:ksandza@bmrn.com) LinkedIn: <https://www.linkedin.com/in/krystal-sandza-99a8082b/>

## **Computational Prediction of Biotherapeutic Immunogenicity Risk**

When a biotherapeutic is administered into a patient's body, it may promote unwanted immune responses, leading to the generation of anti-drug antibodies (ADAs). These ADAs may reduce the biotherapeutic's efficacy or cause adverse reactions in patients. Thus, minimizing the risk of immunogenicity is essential to the development of effective and safe biotherapeutics. Multiple in vitro methods have been developed to assess the risk of immune cell response following biotherapeutic exposure, but these methods can be expensive, low throughput, complex, and time-consuming. In contrast, these limitations can potentially be overcome with computational models. Here, we developed and evaluated a novel computational model to predict immunogenicity risk. Findings from this work may improve the ability of drug developers to select low immunogenic biotherapeutic candidates for clinical testing.

### Learning Objectives:

- Gain knowledge about the development and evaluation of a novel computational model for predicting immunogenicity risk
- Understand a computational model's potential impact on improving drug development by enabling the selection of low immunogenic biotherapeutic candidates for clinical trials

### **Rapid Fire Presenter: Patrick Wu, MD., Ph.D., Genentech**

Patrick Wu, MD, Ph.D., is a Senior Scientist at Genentech, where he is part of a team that uses computational and experimental biology to predict the immunogenicity risk of protein therapeutics. Prior to joining Genentech, he was a student in Vanderbilt University's NIH-funded Medical Scientist Training Program. He completed his Ph.D. in biomedical informatics in the laboratory of Dr. Wei-Qi Wei, where he developed methods leveraging electronic health record and multi-omics data to identify potential drug-drug interactions and to generate drug repurposing hypotheses.

## **Morning Plenary: Emerging Platforms, New Challenges Part 1**

### **Moderator: Fumin Li, Ph.D., Biollege LLC**

Fumin obtained his Ph.D. in analytical chemistry from Iowa State University (ISU) in 2004. From 2004 to 2006, he was a postdoctoral fellow at Pacific Northwest National Laboratory (PNNL). He has more than 16 years of technical and scientific operation experience in two leading CROs, i.e., LabCorp (formerly Covance) and PPD (now part of Thermo Fisher Scientific), focusing on LC-MS-based quantitative bioanalysis. He provides scientific oversight for method development/transfer and validation for hundreds of LC-MS/MS methods to support regulated bioanalysis of small molecules, peptides, oligonucleotides, biotherapeutics, and biomarkers for IND, NDA, and ANDA filings. Fumin is the founder of Biollege LLC, providing consultation in LC-MS based bioanalysis to biotechnology and pharmaceutical companies. He is active in the bioanalysis community, volunteering for the American Association of Pharmaceutical Scientists (AAPS) and Applied Pharmaceutical Analysis (APA). He serves as Vice Chair for the AAPS Bioanalytical Chromatographic Focus Group (BFG) and an organizing committee member for the AAPS Summer Science Forum (SSF). He is a Teaching Faculty I at the University of Wisconsin Madison in the Applied Drug Development Master's Program in the School of Pharmacy and has authored 40 peer-reviewed manuscripts, 63 scientific posters/podium presentations, and four book chapters.

## **Immune Monitoring Biomarker Strategies for Gene Therapies**

No description available.

### **Speaker: Kristen Kahle, Ph.D., Spark Therapeutics**

Kristen Kahle, Ph.D., is the Immunomonitoring Lead at Spark Therapeutics, a company committed to challenging the inevitability of genetic disease by discovering, developing, and delivering novel gene therapies. In this role, Dr. Kahle is responsible for overseeing the analysis of T-cell responses in clinical and preclinical studies and research activities related to expanding our knowledge of immune responses and their management in AAV-based gene therapeutic applications. Prior to this position, Dr. Kahle was the Director of Research and Development at Invisible Sentinel, providing rapid microbial diagnostic tools for multiple industries including food safety and craft beverage quality. Dr. Kahle was formally a Project Manager at Integral Molecular, where she led a team investigating B-cell epitopes and the mechanisms of antibody protection for Dengue, Hepatitis C, and Chikungunya viruses. Kristen received her B.S. in Biochemistry and her M.S. in Biotechnology from Pennsylvania State University. After working as a research associate at Thomas Jefferson University studying hematopoietic stem cells, Kristen earned her Ph.D. in molecular pharmacology and structural biology at the school. Her graduate research focused on investigating the kinetics of HIV-1 deactivation and implications for fusion inhibitor design and the acquisition of viral resistance.



## Capillary vs Venous Blood Draws - Which Analyte Is Compromised

Historically, venous blood has been collected for therapeutic drug monitoring, and plasma was considered as a gold standard matrix to measure drug concentration. Recent technical advancement in microsampling devices have offered opportunities for patient-centric, at-home sampling; capillary blood collection was widely adopted to reduce collection volumes and decrease the pain associated with collection. However, the device use, the differences of capillary and conventional venous blood in bioanalytical and pharmacokinetic (PK) analysis have to be taken into account for reliable data. In this presentation, we will discuss the current capillary blood collection devices, cases studies showing the considerations of capillary sample assay, and clinical implementation strategies.

Learning Objectives:

- Recognize the differences of the capillary blood and venous blood and their potential impact in PK assays
- Troubleshoot common BA issues related to capillary blood sampling
- Implement effective logistic planning and execution to ensure sample quality

### Speaker: Iris (Huizhi) Xie, Merck & Co., Inc.

Iris (Huizhi) Xie is Principle Scientist in the Regulated Bioanalytics (BA) Group within the Preclinical Development (PCD) division in MRL with over twenty years of experience in the biopharmaceutical and bioanalytical fields

Xie has actively participated the Merck microsampling work group to evaluate and implement microsampling devices and methods in preclinical and clinical regulated studies and has been involved in the PCD automation team and oversees efforts in implementing Hamilton automation for high throughput clinical bioanalysis

## **HRMS in Regulated Bioanalysis – Ace in the Hole or Jack of All Trades**

High-Resolution Mass Spectrometry (HRMS) has been shown to deliver a selectivity advantage that can solve bioanalytical challenges where the resolution limits of triple quadrupole instruments are met. While examples of this selectivity advantage are highlighted in the literature and from the podium, this is likely because the examples represent special circumstances. The majority of routine bioanalysis by LCMS does not require high-resolution mass analyzers. Whereas triple quadrupole mass spectrometers are the gold standard in regulated bioanalysis by mass spectrometry, HRMS tends to constitute a specialty niche in the fleet, reserved for solving challenges they are specially designed to address. High-resolution mass spectrometers are thus under-utilized for quantitation, and analysts are under-practiced in the nuances of instrument operation in this space. However, HRMS systems can be used for routine bioanalytical work in much the same way as triple quadrupole instruments.

### **Learning Objectives:**

- Understand the capabilities of high-resolution mass spectrometry in quantitative regulated bioanalysis.
- Explore the nuances of HRMS application to quantitation that makes it different from the operation of triple quadrupole mass spectrometers.
- Contrast the advantages and disadvantages of HRMS compared to triple quadrupole MS
- Better evaluate the ideal composition of platforms in your bioanalytical mass spectrometer laboratory

### **Speaker: Barry R. Jones, Ph.D., Crinetics Pharmaceuticals**

As the Associate Director Biomarker/Bioanalysis, Barry Jones leads the biomarker and PK measurement strategy for Crinetics Pharmaceuticals (California, USA) in clinical studies supporting their drug development pipeline for rare endocrine diseases. After receiving his Ph.D. in physical chemistry from Binghamton University (New York, USA), he managed the University's Mass Spectrometry Core facility for proteomic research until joining Q<sup>2</sup> Solutions (then Advion Biosciences) in 2007. He then led the large molecule LC-MS team at Q<sup>2</sup> Solutions (NY, USA) prior to starting his current role at Crinetics in 2022. He is particularly interested in the application of hybrid immunoaffinity-LC-MS, high-resolution mass spectrometry, and low-flow chromatography techniques to drive sensitivity and selectivity of high-throughput, regulated bioanalytical methods, as well as the scientific challenges and validation strategies for LC-MS biomarker assays supporting drug development.

## **Considerations in Selecting Quantitative vs. Digital PCR Platforms for Bioanalysis**

Quantitative Polymerase Chain Reaction (qPCR) and Digital PCR (dPCR) are the two main technology platforms for PCR-based bioanalytical methods to support cell, gene, and oligo-based therapeutic modalities. With increased use of these modalities, there is greater need for regulatory guidance and industry consensus in the selection and application of qPCR or dPCR to support bioanalysis in drug development.

qPCR and dPCR differ in measurement principle, so understanding the key characteristics of each technology and how they support the assay's context-of-use should underlie platform selection when developing and validating bioanalytical PCR methods.

This presentation will review key platform differences, discuss considerations when choosing one PCR platform over another, and highlight examples of strategic application of each platform.

Learning Objectives:

- Understand the breadth of PCR use in regulated bioanalysis and recognize the lack of regulatory guidance and industry consensus.
- Understand the fundamental characteristics of qPCR and dPCR.
- Consider recommendations for the strategic selection of one platform over the other, based on the assay context of use.

**Speaker: Russell K. Soon, Jr., BioMarin Pharmaceutical, Inc.**

Russell K. Soon Jr. - Technical Scientist in Bioanalytical Sciences at BioMarin Pharmaceutical Inc. Following academic research at UCSF early in my career, I have worked at BioMarin since 2014 in the Bioanalytical Sciences department of Research and Early Development. I have supported a number of modalities ranging from enzyme replacement therapy to gene therapies. I have developed, qualified, and validated bioanalytical assays supporting pharmacokinetic, immunogenicity, and biomarker assessments. I have focused most recently on the development and validation of bioanalytical PCR assays, particularly digital PCR assays.

## **Application of Blood Microsampling in Cynomolgus Monkey and Demonstration of Equivalent mAB PK Parameters Compared to Conventional Sampling**

This presentation provides a brief review for the rationale for promoting microsampling in large animals enables biotherapeutic drug development in non-clinical space. The presentation also covers the challenges/uncertainties; the holistic strategy to address the challenges with a resulting action plan to execute strategies in a multi-disciplinary working environment; results from the study and the exciting conclusions from data-driven approaches, which demonstrate suitability of microsampling in monkeys and comparability of PK parameters with samples from both conventional sampling and microsampling. The presentation concludes with a look at how to move forward from this point.

### Learning Objectives:

- The mindset of keeping end goal in mind when strategized such complex studies: goal setting and alignments
- The holistic approaches derived by science and operational excellences: carefully instituted animal study design, BA strategy, and PK data analysis, as well as compliance to GLP principles
- The highlights of microsampling approaches and animal handling (complex design to compare the devices for sampling and the location of blood collection on monkeys)
- The highlights of an all-in-one bioanalytical assay-enabled PK sample analysis using different matrix types, which is vital to the data-driven conclusions and mindsets adaptable to other BA applications
- Recommendations to the industry

### **Speaker: Ying Wang, Ph.D., Pfizer Inc.**

Ying Wang is an Associate Research Fellow and Group Lead at Bioanalytical Group of BioMedicine Design (BMD) of Pfizer Inc. Before that, she had worked at several CROs for more than 16 years with increasing responsibility in leading bioanalytical groups focused on supporting large molecule drug development. Before joining Pfizer, she worked as associate director at inVentiv Health Clinical Inc (now Syneos Health) for several years. She is an active member of AAAPS and is a reviewer for several key scientific journals. In addition, she has volunteered on abstract screening committee for annual AAPS conferences as well as presented at AAPS Conferences. She received her Ph.D. from McGill University with Thesis Research on the Mechanism of Multiple Drug Resistance in Cancer Cells, and then pursued her post-doctoral research in biological chemistry at UCLA with her research focused on the Signal Transduction of Ras-GTPase mediated cell transformation.

## **Microsampling/Patient-centric Sampling - Bioanalytically Focused**

The COVID-19 pandemic saw a dramatic increase in the need for decentralized clinical trial approaches to ensure clinical research could continue despite quarantine and travel restrictions. A piece of this involved implementation of patient-centric sampling for remote blood collection. Patient-centric sampling has significant value in drug development, beyond the pandemic, to reduce patient burden, enable decentralized clinical trials, and build robust data sets. This session discusses PK, PD, and safety data applications with an emphasis on bioanalytical considerations for usage of PCS and micro sampling technology. Additionally, patient feedback for patient-centric sampling will be shared.

### Learning Objectives:

- Define the value of patient-centric sampling approaches to reduce patient burden and build robust data sets in clinical research
- Understand the current state for patient-centric sampling applications in drug development
- Highlight different case studies for patient-centric sampling/microsampling applications for PK, biomarkers, and safety panels
- Discuss patient feedback on novel blood collection technology and remote sampling

### **Speaker: Melanie Anderson, Merck & Co., Inc.**

Melanie Anderson is a principal scientist at Merck, Sharp, and Dohme (NJ, USA) with over 20 years' experience in clinical development. In her current role, she evaluates and implements patient centric sampling approaches for drug level quantitation and biomarker testing in clinical research. She recently co- led a cross-functional team at Merck working to operationalize decentralized clinical trial technology. She currently co-chairs the PCSIG working group on diagnostics and co-chairs the CPLG/TALG IQ Patient Centric Sampling Group which published an editorial entitled "Will patient-centric sampling become the norm for clinical trials after COVID-19?" in *Nature Medicine* in November 2020. She received her B.A. in chemistry from Hastings College (Nebraska, USA), and an M.S. in chemistry from Lehigh University (Pennsylvania, USA).

## **Accelerating Immunogenicity Analysis From IgG- to AAV-based Therapies**

Development of assays to assess pre-existing immunity or immunogenicity in response to biotherapeutic treatment faces the challenges of time, sensitivity, drug tolerance, and robustness. New tools to accelerate anti-drug antibody (ADA) assay development across modalities are needed that address these requirements. In this talk, adaptations of Gyrolab automated microfluidic platform assays for applications of preclinical ADA screening to clinical immunogenicity assessment of IgG and AAV-based therapies are presented.

### Learning Objectives:

- Understand the unique requirements of immunogenicity assessment for different development phases and for IgG and AAV-based therapies
- Learn how microfluidic CD-based immunoassays are utilized for ADA analysis
- Understand how ADA assays for IgG and AAV-based therapies are accomplished on the Gyrolab platform in preclinical and clinical settings

### **Thought Leader: Manny Lozano, Gyros Protein Technologies**

Manny Lozano is currently a Field Application Scientist at Gyros Protein Technologies recently joining in February 2023. He was previously a Senior Scientist at B2S Life Sciences (Franklin, Indiana) leading the assay development for multiple biopharmaceutical clients. Prior to B2S, he was a Gyrolab customer as a Senior Scientist in ADME-PK/PD at Lilly Research Labs, Eli Lilly & Company (Corporate Center, Indianapolis, IN). The highlight of his Lilly career was implementing two Gyrolab xPands for routine use just prior to his retirement from Lilly in 2021. He has 27 years of immunoassay experience and looks forward to helping his Gyrolab customers streamline their immunoassay workflows.

Session: Afternoon Plenary: Emerging Platforms, New Challenges Part 2

**Afternoon Plenary: Emerging Platforms, New Challenges Part 2**

**Moderator: Brad Roadcap, Merck & Co., Inc.**

No biography available.

## **Establishing FVIII Activity as a Reliable Predictor of Hemostatic Efficacy Following AAV5 Gene Therapy in Hemophilia A**

Unexpected FVIII assay discrepancies have been observed with AAV gene therapies in hemophilia A. This complicates efficacy evaluations, using FVIII activity as a surrogate biomarker endpoint. Investigations will be presented, explaining how discrepant FVIII measurements arise and how they correlate with clinical benefit.

### Learning Objectives:

- Understand how FVIII activity assay discrepancies arise following AAV gene therapy
- Appreciate the type of investigations expected by regulatory agencies
- Discuss the logic sponsors may apply to rationally choose one assessment as a surrogate endpoint in clinical trials
- Learn about new ways how to correlate surrogate endpoint measurement with clinical benefit for hemophilia A gene therapies
- Plan similar bioanalytical investigations for other AAV gene therapies

### **Speaker: Christian Vettermann, Ph.D., BioMarin Pharmaceutical, Inc.**

Christian Vettermann, Ph.D., Principal Scientist, BioMarin, has overseen translational science strategies and bioanalytical method development for biologics and new modalities, including the first approved AAV gene therapy in hemophilia A. Over the past two decades, he has held various positions in academia and the pharmaceutical industry, focusing on immunology research, immunogenicity assessments, and clinical biomarker development



## **Sample Logistics and Analytical Considerations for Development of a Cellular Immunogenicity Assays for CART Therapies**

Learn about the challenges in the development of ELISpot methods to measure cellular immunogenicity of CART Therapies, including the best practices and white papers and guidance documents for method validations.

### **Learning Objectives:**

- Upon completion, participants will be able to understand ELISpot assays and how they can be used to assess cellular immunogenicity of CART therapies
- Upon completion, participants will be able to understand the method development challenges for CART cell immunogenicity assays.
- Upon completion, participants will be able to understand the validation requirements for ELISpot methods

### **Speaker: Kevin Lang, Ph.D., PPD, part of Thermo Fisher Scientific**

Kevin Lang Ph.D., is an immunologist who serves as a senior research scientist for the flow cytometry department within the PPD clinical research business of Thermo Fisher Scientific. In this role, he provides scientific expertise with a focus on multiparametric flow cytometry development, validation and production clinical studies. He joined the business in 2018 with training in immunology, cancer immunotherapy, and flow cytometry.

## **Bioanalytical Rapid Fires 2**

### **Rapid Fire Moderator: Amanda L. Hays, Ph.D., BioAgilytix Labs, LLC**

Amanda Hays, Ph.D., Scientific Officer, offers more than a decade of lab experience in multiple fields, including pharmacology, drug metabolism, immunoassays, immunogenicity, biomarkers, flow cytometry, and qPCR. She has particular expertise leading programs through all stages in the drug development process. In her current role, she serves as a Scientific Officer and provides global scientific leadership and technical guidance at BioAgilytix. She is the Chair of the AAPS biomarkers and precision medicine community and the AAPS qPCR working group, among other volunteer leadership positions. She earned her Ph.D. in pharmacology from the University of Kansas Medical Center in Kansas City (Kansas, USA)

## **Harnessing Nanoflow LC-MS to Maximize Sensitivity for Analysis of Biotherapeutics in a High-throughput Bioanalytical Laboratory**

New technologies are required to support the bioanalysis pipeline of increasingly complex biotherapeutics. Ligand binding assays (LBA) are widely used for bioanalysis of biotherapeutics due to the ease of use, high throughput, and high sensitivity (low pg/mL detection limits). LBAs have a few limitations including dependence on critical reagents, inability to differentiate isoforms/post-translation modifications, and susceptibility to interference. Liquid chromatography-mass spectrometry (LC-MS) addresses many of these limitations and has increasingly become used as an alternative to support bioanalysis. However, in some cases LC-MS is unable to achieve sufficient sensitivity; typically, the threshold for quantitation is limited to low ng/mL levels.

This presentation examines the state-of-the-art instrumentation solutions of the Evosep One nanoLC in combination with the Sciex 7500 triple quadrupole mass spectrometer to maximize sensitivity of LC-MS workflows. In addition, a case study comparing traditional workflows (standard flow LC-MS and Sciex 6500+ triple quadrupoles) to the new instruments, which saw significant sensitivity gains greater than 100X will be presented. This case study evaluates the advantages and drawbacks of the new instruments as well as the practical considerations involved when incorporating them into a high throughput bioanalytical laboratory.

### Learning Objectives:

- Understand the different considerations necessary for optimizing nanoflow vs standard flow LC-MS workflows
- Understand the practical considerations associated with implementing new technology in a GLP laboratory and know how to better prepare for technical evaluations in the future
- Determine if NanoflowLC is right for their lab to maximize sensitivity of macromolecule workflows

### **Rapid Fire Presenter: Nicholas Saichek, Ph.D., Labcorp Drug Development**

Nicholas Saichek is currently a Senior Manager of BioA Development and Innovation at Labcorp Drug Development in Madison, WI. His role consists of leading a bioanalytical team responsible for the development/validation of sensitive, robust LC-MS assays for large and small molecule pharmaceuticals in biological matrices to meet GLP requirements. With over thirteen years of direct bioanalytical experience in my current and previous roles, he has become a Subject Matter Expert (SME) in LC-MS, MALDI-TOF, GC-MS, and Metabolomics evidenced by the authoring several scientific papers while staying up to date on trends and innovation in the field. In his free time he enjoys doing anything outdoors, including soccer, climbing, hiking, and kayaking.

## **Advances in At-home Microsampling Kits for Liquid Blood Collections**

Decentralized clinical trials are increasingly shifting toward at-home self-collection models to improve patient recruitment, retention, and experience. Clinical tests requiring liquid blood, serum, or plasma specimens present numerous logistical challenges for patient-centric sampling. Laboratories and trial sponsors must ensure that patients can easily collect a sufficient sample volume and expeditiously transport the specimen to a centralized laboratory without degradation. This Rapid Fire talk will present Labcorp's recent development and validation of at-home collection kits comprising capillary blood collection devices paired with a compact centrifuge device (the Labcorp TrueSpin) and a refrigerated transport device (the Labcorp TrueTherm). The presentation will emphasize new analyte categories amenable to patient-centric sampling and roadmaps toward integration into decentralized clinical trials.

### Learning Objectives:

- Understand patient-centric sampling offerings for liquid blood specimens in decentralized clinical trials.
- Assess analyte categories compatible with patient self-collections.
- Describe the various logistical challenges that must be overcome to integrate at-home microsampling models.

### **Rapid Fire Presenter: Greg J. Sommer, Ph.D., Labcorp**

Greg Sommer, Ph.D. serves as an R&D Director and the Scientific Discipline Director for Alternative Sample Collections at Labcorp, overseeing the design, validation, and deployment of new decentralized liquid microsample collection technologies. He joined Labcorp in 2021 following Labcorp's acquisition of Sandstone Diagnostics, Inc.—a consumer healthcare and diagnostics technology company he co-founded in 2012. He received his Ph.D. in mechanical engineering from the University of Michigan in 2008, and previously served as a Staff Scientist in Biodefense Technologies at Sandia National Laboratories from 2008-2012.

### **Streamlined Biomarker Assay Qualification in a Rare Matrix on the Ella Platform**

Drug developers increasingly need to measure pharmacodynamic (PD) biomarkers close to the site of action, which presents inherent bioanalytical challenges when the PD site contains limited matrix volume or is difficult to sample. To address these challenges, a streamlined strategy for the qualification of a biomarker assay to support a Phase 1 trial for an ophthalmic drug candidate was designed. The approach balanced characterizing the performance attributes of the assay, while reducing the required number (to three) and volume of samples. The new streamlined strategy was applied to a biomarker immunoassay measuring four cytokines concurrently in aqueous humor on the microfluidic-based Ella platform. All assay parameters met the predefined performance criteria and the data from this evaluation provided proof of feasibility of the approach, as well as evidence of the clinical utility of the chosen biomarkers.

#### Learning Objectives:

- Demonstrate the utility of a streamlined biomarker assay qualification strategy that can overcome the challenges a bioanalytical scientist usually faces when testing biomarkers in rare matrices

#### **Rapid Fire Presenter: Jennifer A. Getz, Ph.D., Genentech**

Jennifer Getz is a Senior Principal Scientist in the Bioanalytical Sciences Department at Genentech. She leads the bioanalytical team for multiple cancer immunotherapy projects covering bioanalytical strategy, assay development, and immunogenicity analysis. Her research interests include a deeper understanding of comparability across immunogenicity assays and anti-drug antibody characterization. Over the past decade, she has developed a broad range of assays at several companies, ranging from a tiny biotech start-up to a large biopharmaceutical company. She earned a B.S. from Pennsylvania State University and Ph.D. from University of California, Santa Barbara, with both degrees in chemical engineering. She enjoys volunteering as a mentor to high school students (with iMentor) and has recently developed an affinity for open water swimming.

## **Streamlining Immunogenicity Assay Development with Binding Measurements**

A key hurdle in establishing immunogenicity assays is the identification of suitable positive control (PC) reagents. PC reagents are used to develop, validate, and monitor the assay throughout a program's lifetime. To inform PC selection, a surface plasmon resonance (SPR) characterization scheme was developed. SPR is routinely employed in drug discovery to characterize potential preclinical candidates.

In this characterization scheme, SPR was used to determine the on rates, off rates, and affinities of drug/PC candidate pairs. Since optimal PC performance is associated with slower off rates, we used off rates to reduce the number of PC candidates. SPR was then applied to the identification of buffer conditions for dissociating the drug/PC interaction, a procedure often required to achieve drug tolerance. This characterization scheme can be applied prospectively to accelerate assay development for various drug modalities.

### **Learning Objectives:**

- Describe the impact of positive control reagent selection on the sensitivity and drug tolerance of an immunogenicity assay.
- Describe the relevance of SPR parameters (on rate, off rate, equilibrium dissociation constant) to binding events in ligand binding assays used to assess immunogenicity.
- Describe an SPR-based approach for identification of conditions for improvement of drug tolerance.

### **Rapid Fire Presenter: Krisna Duong-Ly, Ph.D., Merck & Co., Inc.**

Dr. Krisna Duong-Ly, Ph.D., is currently an Associate Principal Scientist at Merck in the Regulated Bioanalytics group. In this role, she conducts critical reagent characterization in support of pharmacokinetic and immunogenicity assay development. She also provides scientific oversight of critical reagent generation for several biologics and vaccine programs. Prior to joining Merck, she developed extensive experience in the fields of protein biochemistry and assay development. She received a Ph.D. in molecular biophysics from the Johns Hopkins School of Medicine where she developed expression and purification methods for difficult-to-express proteins and determined several high-resolution X-ray crystal structures. Afterwards, she completed a postdoctoral fellowship at the Fox Chase Cancer Center where she applied her training in structural biology to studying kinase inhibitor selectivity and a kinase-regulated macromolecular complex involved in nucleotide metabolism. She then then transitioned to supporting early discovery programs at Janssen R&D where she conducted high-throughput biochemical, cell-based, and biophysical characterization assays.

## **Morning Plenary: Risk Assessment of Next Generation Biologics**

### **Moderator: Boris Gorovits, Ph.D., Sana Biotechnology**

Boris Gorovits is a VP, In Vitro Pharmacology and Bioanalysis at Sana Biotechnology. He earned a Ph.D. in enzymology from the Moscow State University, and later completed postdoctoral research studies in protein biophysics at the Medical Center, University of Texas at San Antonio. His industry experience includes working at Regeneron, Wyeth, and Pfizer, focusing primarily on bioanalytical support and immunogenicity of various modalities of biotherapeutics, support of discovery and regulated non-clinical and clinical studies. While at Pfizer, He co-chaired the company-wide Immunogenicity Expert Working Group. Recently, he has been involved in support of gene and cell therapy modalities. At Sana, he leads investigations focused on understanding PKPD of lentiviral vector-based and CAR-T therapies, in vitro, and bioanalytical studies required in support of IND applications and clinical studies. He is actively involved in industry conversations focusing on PK and immunogenicity assessments of various modalities, including gene therapy and CAR-T.

## **Differential Immune Responses to Deamidated Adeno-associated Virus Vector**

No description available.

### **Speaker: Ronit Mazor, Ph.D., U.S. Food and Drug Administration**

Ronit Mazor is a principal investigator in the Gene Transfer and Immunogenicity Branch, Division of Cellular and Gene Therapies in the Office of Tissues and Advanced Therapies (OTAT) at the U.S. FDA. This role includes regulatory science.

She performed her graduate research studies in the National Institute of Health International Graduate Partnership Program, with a Ph.D. from Tel Aviv University and did her Post-doctoral training at the National Cancer Institute in Bethesda, working on the immunogenicity of therapeutic proteins for cancer therapy.

After a few years in Medimmune/AstraZeneca, Ronit joined CBER and established a lab studying the interaction between the immune system and gene therapy viral vectors, as well as CMC regulatory science.



## **Immunogenicity Safety Monitoring for Systemic Administration of AAV Vectored Gene Therapies**

This presentation describes immunogenicity safety monitoring for AAV-vectored gene therapies that are systemically administered. Attendees will come away with an understanding that AAVs represent a complex drug design with multiple components that may impact immunogenicity, patient-, and drug-specific factors affecting immunogenicity and clarity on immunogenicity considerations for clinical monitoring following dose administration.

### Learning Objectives:

- An understanding of the complex drug design of AAV vectored gene therapies
- Patient-specific factors affecting immunogenicity
- Drug-specific factors affecting immunogenicity
- Recommendations for immunogenicity safety monitoring in clinical trials and for commercial products

### **Speaker: Brian Long, Ph.D., BioMarin Pharmaceutical, Inc.**

Brian Long is an Associate Director in Translational Sciences and Immunogenicity Assessment at BioMarin Pharmaceutical, a biotechnology company focused on developing first-in-class and best-in-class therapeutics that provide meaningful advances to patients who live with serious and life-threatening rare genetic diseases. He provides immunologic expertise to drug programs across developmental stages and develops immunogenicity and safety strategies for novel biologic therapeutics, most recently focusing on AAV mediated gene therapies. He received his Ph.D. in microbiology and immunology from The University of North Carolina, Chapel Hill, and pursued post-doctoral training at The Gladstone Institutes of Virology and Immunology, and the University of California, San Francisco, where he investigated the role of innate immunity in HIV disease pathogenesis.

Following his post-doctoral training, he continued as a Research Scientist in the Division of Experimental Medicine at UCSF where he worked on the development and standardization of humanized mouse models for the evaluation of HIV immunology, therapeutics and drug discovery. He joined BioMarin in June of 2014 and has over 20 years of experience in immunology and infectious disease, autoimmunity, cell signaling, cancer biology and drug development.

Session: Morning Plenary: Risk Assessment of Next Generation Biologics

**ICH M10 - CRO Experience**

No description available.

**Speaker: Elizabeth Hyer, Labcorp**

No biography available.

## **Pharma's Experience on Implementing M10**

This presentation will describe the updates required and approach taken to implementation of the ICH M10 Bioanalytical Validation and Study Sample Analysis guidance from a pharma company perspective. Amgen's approach to supporting drug development with in-house and outsourced bioanalysis will be described together with the SOPs for LC-MS and LBA bioanalysis that required updating. Amgen's approach was to conduct a thorough GAP analysis of SOPs and related processes, followed by revision of the SOPs when required, and, finally, a review of active bioanalytical methods for possible updates. Emphasis will be given to specific updates that were required, items that generated significant discussion, and considerations to align language in SOPs with new guidance. A brief description of interaction with partner CRO on the M10 guidance will also be provided.

### Learning Objectives:

- Gain insights into a pharma companies approach to implementation of ICH M10 guidance
- Understand differences in perspectives between a pharma company and a CRO organization
- Learn about specific topics within the ICH M10 guidance that generated significant discussion for implementation in a pharma company

### **Speaker: Christopher A. James, Ph.D., Amgen Research**

Christopher A James, Ph.D., is Director of LC-MS Bioanalysis in the Translational Safety & Bioanalytical Sciences Dept, Amgen Research, Thousand Oaks, California, USA. He received his Ph.D. from London University, working on the bioanalysis and pharmacokinetics of oncology drugs. In his current role, he leads the LC-MS bioanalytical group at Amgen which develops LC-MS bioanalytical methods for small molecule, peptide, and large molecule drugs to support discovery, GLP, and early clinical studies. Throughout his career, he has been extensively involved with all aspects of bioanalysis including sample preparation, automation, LC-MS/MS, microsampling, and patient-centric sampling, and method validation and implementation of regulatory guidances. He has held leadership positions in a number of innovator companies working in the United Kingdom, Italy and United States. He has authored or coauthored over 40 publications and five book chapters on bioanalytical topics.

## **ICH Process: Challenges and Opportunities for Global Harmonization**

Since its inception in 1990, The International Council for Harmonisation (ICH), formerly the International Conference on Harmonisation (ICH), has had a transformational impact on the dialog between regulators and industry on global pharmaceutical regulations. We will take a look at the evolution of ICH process, its work products, as well as challenges and opportunities for the future: with the rapid evolution of the global pharmaceutical development landscape, how can a growing ICH organization assure that cornerstone pharmaceutical guidance in the areas of Quality, Safety, Efficacy as well as Multidisciplinary issues stay current, relevant, and meaningful to implement?

### **Learning Objectives:**

- Review ICH history and evolution
- Understand the current ICH scope and process
- Review current state, as well as future challenges for global harmonization

### **Speaker: Tina S. Morris, Ph.D., American Association of Pharmaceutical Scientists**

Dr. Morris is the Executive Director of the American Association of Pharmaceutical Scientists (AAPS). She leads the staff team that supports all operational aspects of the Association and works with the AAPS Board of Directors and other Volunteer Leadership Committees on the strategic and direction-setting activities that guide the work of the scientific society. Prior to that, she was Vice President of Scientific and Regulatory Affairs at the Parenteral Drug Association (PDA). Until 2018, Dr. Morris held several scientific senior leadership positions at the United States Pharmacopeia (USP), including as the Global Head of Biologics and Senior Vice President of Compendial Science. Before joining USP in 2003, Dr. Morris worked in the biopharmaceutical industry, with an expertise focus on analytical development and product characterization. She completed her postdoctoral research at the National Institutes of Health. She holds a Ph.D. in molecular virology from the Medical University of Lübeck, Germany, and a master's degree in biology from the Carl von Ossietzky University of Oldenburg, Germany.

# Pharmaceutical Analysis Speaker Abstracts and Biographies

Session: Morning Plenary: Lab of the Future

## **Morning Plenary: Lab of the Future**

### **Moderator: Maria T Cruanes, Ph.D., Organon**

Maria Teresa Cruaños is a founding member and Director of Analytical Sciences at Organon and in Spring House, Pennsylvania. She holds an analytical chemistry degree from Universidad Nacional del Litoral in Santa Fe, Argentina, and a Ph.D. in analytical/physical chemistry from the University of Illinois at Urbana-Champaign. She has dedicated her career to development, launch, and manufacture of pharmaceutical products, spanning the preclinical through tech transfer and quality control spaces. She worked for 18 years with Merck Research Labs in West Point, Pennsylvania and six years with Merck at the Las Piedras Operations site, in Puerto Rico. Currently, since 2021, she and her group provide analytical support to Organon's labs across the world, enabling a diverse portfolio of new and in-line products including Women's Health medicines. She is an active member of AAPS as founder and past-chair of the QbD and Product Performance focus group, contributing member to the In-Vitro Release and Dissolution Technology community, the Manufacturing and Analytical Characterization sub-track leader of the 2022 PharmSci 360 organizing committee and vice chair of the AAPS 2023 Summer Scientific Forum.

### **Industry-academia Collaborations to Build the 'Lab of the Future' for Pharmaceutical Analysis**

This presentation will highlight recent trends in industry-university collaborative research aimed at the development of new and improved research technologies that address current gaps, needs and opportunities of interest to industry scientists. Several vignettes highlighting recent research from the NSF Center for Bioanalytic Metrology (CBM) will be presented. The CBM is an NSF Industry-University Cooperative Research Center at Purdue University, Indiana University, and the University of Notre Dame, with industry partners from Abbvie, Agilent, Corteva Agriscience, Eli Lilly, Evonik, Exxon-Mobil, Genentech, Indiana Bioscience Research Institute, Merck, Moderna, Pfizer, Proctor & Gamble, Sartorius, and Takeda.

#### Learning Objectives:

- Understand the benefits of industry-academic collaboration on new enabling technologies
- Understand the advantages of precompetitive multiparty collaborations between industries and academia vs. conventional 1:1 industry-academic collaborations
- Understand the advantages of carrying out collaborative research between industry and academia within the framework of the NSF Industry-University Cooperative Research Center program
- Develop an understanding of the advantages of industry membership in the NSF Center for Bioanalytic Metrology
- Develop an appreciation for some of the recent research results coming from the NSF Center for Bioanalytic Metrology

#### **Speaker: Chris Welch, Ph.D., Indiana Consortium for Analytical Science & Engineering**

Christopher J. Welch is the Executive Director of the Indiana Consortium for Analytical Sciences and Engineering (ICASE), a joint venture between Purdue, Notre Dame and Indiana University. He is cofounder of Welch Innovation, LLC, an independent research and consulting firm and serves as a member of the Scientific Advisory Board for Snapdragon Chemistry, Inc and Novilytic. He has worked in a variety of fields within the chemical industry, including discovery synthesis of agrochemicals (Velsicol-Sandoz); development of reagents for improved immunodiagnostic assays (Abbott Laboratories); development and commercialization of chromatographic stationary phases, reagents, and enantioselective catalysts in a small chemical business (Regis Technologies) invention; and application of new purification, analysis and high throughput experimentation technologies for pharmaceutical process research (Merck & Co.), and is a Science Advisor for the U.S. FDA. He has more than 300 scientific publications and patents and is a fellow of the ACS and AAAS, along with receiving several awards, including the 2015 Chirality Medal.

## **Data Integrity Considerations for the Lab of the Future**

This presentation covers the increasing digitalization of laboratories and the ever-increasing use of data to expedite research and business decisions. It includes the history of data integrity requirements and the applicability and limitations of a “compliance only” control strategy. Additionally, core principles of data governance, and data provenance will be examined, including data integrity compliance as an output of true data governance.

### Learning Objectives:

- History of Data Integrity
- Core Principles of Data Governance
- Data Provenance

### **Speaker: Meg Gallwitz, The Henrici Group**

Meg Gallwitz is the Vice President of the Henrici Group and leads the quality and compliance division. She has 30 years of experience in pharma and biotech, building upon her background as an analytical chemist to serve across a broad range of manufacturing, quality, and compliance roles and initiatives. She has special expertise in data governance and data integrity with extensive experience in data integrity risk assessments, remediation, investigations, training, and the design and implementation of corporate data governance programs. Her longstanding work in the field has led to her passion for enabling the utility of reliable and integrated data to improve compliance and business outcomes.

## **Pharmaceutical Applications of Compact Capillary Liquid Chromatography**

The use of portable and compact instrumentation has expanded the possibilities of integrating capillary-scale LC techniques into realms typically dominated by analytical-scale methodology. Low-volume detector flow cells and UV-LED light sources allow for improvements in absorbance detection for columns with internal diameters in the 0.1 – 0.3 mm range. Considerations for column selection (in terms of length, internal diameter, particle size, and particle morphology) include pressure limits (both column and instrument), required efficiency for a given separation, and the balance between operating flow rate and the maximum volume that can be delivered from the pumping system in a single method. This presentation will discuss employment of compact capillary LC instrumentation in a wide variety of application areas. The analysis of pharmaceutical compounds has focused on QA/QC methodology (including impurity monitoring) and strategies for on-line reaction monitoring using compact LC-MS instrumentation. A miniaturized LC platform has also been coupled directly to high resolution MS instrumentation for the characterization of therapeutic monoclonal antibodies.

### **Learning Objectives:**

- Understand the design of new compact capillary-scale liquid chromatography instrumentation
- Compare detection techniques employed in compact, capillary liquid chromatography
- Identify pharmaceutical analytical challenges that can be solved using compact, capillary liquid chromatography

### **Speaker: James P. Grinias, Ph.D., Rowan University**

James Grinias, Ph.D., is currently an Associate Professor in the Department of Chemistry & Biochemistry at Rowan University. His research interests include improving the throughput and efficiency of chromatographic separations and the miniaturization of chemical measurement techniques. He has received a number of awards for his work to date, including the Csaba Horváth Young Scientist Award, a National Science Foundation CAREER grant, the 2021 American Chemical Society Satinder Ahuja Young Investigator in Separation Science Award, and the 2022 LCGC Emerging Leader in Chromatography Award.



## **Greening Pharmaceutical Analysis: Reducing Waste Stream from a Common Test**

Dissolution testing is a critical enabler for formulation process development as well as determination of product quality at release and on stability for solid oral dosage forms. In the pharmaceutical industry worldwide, this type of test is performed in the range of millions annually.

This presentation examines an improved chromatographic protocol combining the utilization of smaller internal diameter (i.d.) columns, superficially porous column technology, injection cycle time for gradient re-equilibration, system dwell volume understanding, and basic separation concepts for optimization as a greener and faster, yet robust way to conduct dissolution testing.

Comparing this approach to standard analysis using a conventional approach, this methodology provides 70–80% reduction in solvent consumption and waste generation, as well as run times with equivalent accuracy, precision, and robustness.

Feasibility of this approach was demonstrated by applying it to multiple drug products and those head-to-head comparisons showed that dissolution profiles and overall variability are comparable to those obtained by the conventional chromatographic approaches.

### Learning Objectives:

- Where possible, for HPLC-based dissolution (and content uniformity) testing, use small internal diameter columns of 2.1mm i.d and 50mm length to "green" their chromatography.
- Where possible, for HPLC-based dissolution (and Content Uniformity) testing, minimize wasted chromatographic space between  $t_0$  and analyte ( $k' \sim 2$ ) and after final analyte elution to "green" their chromatography.
- Where possible, for HPLC-based dissolution (and Content Uniformity) testing, implement these learnings at the earliest point possible in drug product development to promote the greatest savings.

### **Speaker: Adam Socia, Ph.D., Organon**

Adam Socia is a Principle Scientist at Organon. He currently provides analytical support for Organon Manufacturing and Supply. Previously, he worked with different therapeutics prior to joining Organon, including oligonucleotides, peptides, vaccines, and small molecule analytical development while at Merck Research Laboratories in West Point, Pennsylvania. He received his Ph.D. in analytical chemistry from Drexel University under Professor Joe Foley, and also has a degree in biology from Sacred Heart University. He has 11 publications, three patents, and has previously presented at Pittcon, AAPS, ACS, HPLC, CFDV, and other symposia.

### **AI and Automation in the CRO Lab**

Integrating modeling and AI assisted predictions with lab-based experiments to enhance R&D efficiency and throughput.

Learning Objectives:

- Crystal form prediction can support early phase of drug development, widening the net with efficiency.
- Use of AI based simulations can predict solubility and co-crystal formation potential.
- Use of modeling to assist formulation development and expedite the lengthy process of de-risking.

### **Speaker: Sawani Talekar, Ph.D., Crystal Pharmatech**

Sawani Talekar Ph.D., is a Senior Scientist II at Crystal Pharmatech. She has 5+ years of experience in pre-formulation and formulation development of pharmaceuticals. Her prior industrial experience includes working as a formulation scientist at Celgene and GSK. She received her Ph.D. degree in Pharmaceutical Sciences from Long Island University, NY.

## **Analysis and Removal of Procoagulant Contaminants from Your Plasma-derived Therapy**

Procoagulant contaminants are a major contributor to hemostatic risk in plasma-derived protein therapeutics. Thorough analysis and removal of these contaminants is an essential part of process development and maturation. A combined approach of HRMS and specific bioanalytical methods are required to verify removal of these contaminants from the product stream and to ensure product safety.

Learning Objectives:

- Define the potential procoagulant contaminants in a plasma-derived therapeutic and how they contribute to hemostatic risk
- Understand the different bioanalytical techniques used in the identification of procoagulant contaminants in plasma-derived therapeutics
- Outline a strategy for companies to assess their plasma-derived drug product stream and eliminate hemostatic risk in their drug product formulation

### **Thought Leader: Matt Whelihan, Ph.D., Prolytix**

Dr. Matt Whelihan is biopharmaceutical industry scientist with 20 years of experience in analytical assay design and purification/process development of plasma-based protein therapeutics. He earned his Ph.D. in biochemistry from the University of Vermont where he gained expertise in blood coagulation and protein therapeutics. Currently, he is an Associate Principal Scientist at Prolytix where he leads a team of scientists that help solve some of the biopharma industry's biggest challenges all the way from drug discovery to release.

## Applying Bioinformatics/AI in Mining Public Data to Boost the Lab of the Future

In the era of the data-driven science, leveraging publicly available biological data is the key to boost the future R&D activities (i.e. the “Lab of the Future”). The design of Covid-2 specific primers and their validation against novel Covid-2 variants is relevant enough to emphasize the impact pooling global data (Covid-2 genomic sequences). With the advent of omics platforms, producing genetic and epigenetic data (DNA sequence, gene-expression, methylation etc.), it’s imperative to develop capabilities to retrieve, process, and analyze big data (size range GBs-TBs), harmonize the data sourced from different labs (batch & platform effect correction), and apply classical and deep machine learning algorithms to discover novel biological patterns.

One of such omics data type is the cell-free DNA (cfDNA) sequencing data. The blood cfDNA, a mix of free-floating fragmented DNA originated from multiple tissues, carries the tissue specific genetic and epigenetic information. Deconvoluting the proportion of each tissue type in the cfDNA mix is essential to monitor the progression of diseases such Cancer and solid organ transplant rejection. This presentation looks at an algorithm (applying Quadratic programming) for deconvoluting the fraction of 39 cell types in the cfDNA mix, using the position specific methylation signal. A successful evaluation algorithm required methylation data with known proportions of multiple cell-types. Another new algorithm simulates methylation-based biological mixtures data and thoroughly tests the deconvolution algorithm using simulated and real cfDNA methylation data. The algorithm described above (biological mixture deconvolution) finds an additional application to compute the tumor fraction in the cell-free DNA data, helping early detection and monitoring tumor management. We conclude that the AI and Bioinformatics techniques would keep boosting the idea of the “Lab of the Future” and help solve multiple complex biological problems.

Learning Objectives:

- How big-data or more data points are helping AI algorithms.
- Challenges associated with handling public-data.
- Solving biological mixture models
- DNA methylation patterns to locate the Tissue of origin of DNA fragments

Planning future AI model development **Thought Leader: Rohita Sinha, Ph.D., Eurofins Viracor**

Rohita Sinha joined Viracor Eurofins in 2018 as a Senior Scientist, with the primary focus on developing novel computational protocols for a range of diagnostic assays to detect and monitor infectious disease and solid organ transplant rejection. Prior to joining Viracor Eurofins, He was a Research Asst. Professor at University of Nebraska, Lincoln where he extensively worked on application of next-generation sequencing to understand the complexity of the gut microbiota. He is co-founder of a Bioinformatics startup (Metagenome Analytics, LLC), with the core business of developing computational methods to detect and subtype food pathogens. He received his Ph.D. in bioinformatics from the University of Kansas, Lawrence, in 2011.

## **Afternoon Plenary: Analytical Tools to Enable Continuous Manufacturing**

### **Moderator: Eric J. Munson, Ph.D., FAAPS, Purdue University**

Eric Munson is currently the Dane O. Kildsig Chair and Head of the Department of Industrial and Physical Pharmacy at Purdue University. He received his B.A. degree from Augustana College in Sioux Falls, South Dakota, in 1987. After studying one year in Munich, Germany, on a Fulbright Fellowship, he received his Ph.D. in 1993 from Texas A&M University, and was a postdoctoral fellow at the University of California, Berkeley in 1994. He was in the Chemistry Department at the University of Minnesota before moving in 2001 to the Pharmaceutical Chemistry Department at the University of Kansas. Then, in 2010, he moved to the Pharmaceutical Sciences Department at the University of Kentucky where he was the Patrick DeLuca Endowed Professor in Pharmaceutical Technology.

In 2018 he moved to Purdue University to become the Dane O. Kildsig Chair and Head of the Industrial and Physical Pharmacy Department. His research program is focused on the characterization of pharmaceutical solids using a variety of analytical techniques, with an emphasis on solid-state NMR spectroscopy. He is a coinventor on three patents and has published more than 110 research papers, reviews, and book chapters.

Session: Afternoon Plenary: Analytical Tools to Enable Continuous Manufacturing

**API Continuous Manufacturing**

No description available.

**Speaker: Bradley A. Grenier, AbbVie Inc.**

No biography available.

Session: Afternoon Plenary: Analytical Tools to Enable Continuous Manufacturing

**High-speed Quality Inspection During Tablet Production by Embedded PAT**

No description available.

**Speaker: Marten Klukkert, Ph.D., Fette Compacting**

No biography available.

## **FDA Perspective**

This presentation will provide an overview of PAT tools role in the continuous manufacturing of pharmaceuticals from a regulatory perspective. The speaker will introduce advance manufacturing technologies such as continuous manufacturing and relevant regulatory guidance's with focus on PAT aspects. Finally, the speaker will offer some points to consider regarding the use of PAT tools to support continuous manufacturing and discuss a case study.

### Learning Objectives:

- Understand the vision for pharmaceutical manufacturing and product quality
- Discuss different advance manufacturing technologies and PAT tools
- Understand the role of PAT tools in Continuous Manufacturing per ICH Q13
- Explore the development and verification of a PAT method from a research case study

### **Speaker: David Acevedo, Ph.D., U.S. Food and Drug Administration**

Dr. David Acevedo is currently a senior chemistry reviewer in the Office of Pharmaceutical Quality at FDA where he performs manufacturing and facilities assessments for different type of dosage forms (e.g., solid oral, sterile and non-sterile liquids). He has been working for the Agency for almost seven years. He received his B.S. in chemical engineering from the University of Puerto Rico at Mayaguez in 2012. He completed his Ph.D. at Purdue University in chemical engineering in 2017. His expertise is in the area of continuous manufacturing, process analytical technologies development and validation, and process modeling and control. He has authored several publications ranging from development of PAT methods for crystallization, blending, and roller compaction processes, and modeling and control of continuous crystallization systems.



## **Pharmaceutical Analysis Rapid Fires 1**

### **Moderator: Tim Graul, Ph.D., Pfizer Inc.**

Timothy W. Graul is a Director in the Global CMC Advisory Office within Pfizer at the Groton, Connecticut site. He received his B.S. in chemistry at James Madison University, and then a Ph.D. in Analytical Chemistry at The Florida State University. After completing his studies, he joined Pfizer Analytical R&D and supported the development of drug product formulations and drug substance synthetic routes. He has been fortunate to have contributed to the successful approval of life-changing products. During his time at Pfizer, he has been recognized as a leader in quality-by-design for analytical methods. He has collaborated on publications that have been at the forefront of industry in this area. He has been appointed as the PhRMA Deputy Topic lead on the ICH Q2/Q14 Expert Working Group and is looking forward to the implementation of a revised Q2 Guideline and the new guideline, Q14. He is also engaged in industry efforts for global harmonization in the submission and acceptance of process and product control strategies.

He has been a member of industry groups, including Land O' Lakes Pharmaceutical Analysis Conference Planning Committee and AAPS Summer Scientific Forum Scientific Programming Committee since 2010 (and was awarded the Mel Weinswig Award for his contributions to the conference), IQ groups such as Analytical Leadership, AQB, Dissolution, Control Strategy Harmonization Metrics, and Worldwide Specification Harmonization, and ISPE.

## **A Modular Automation Approach to High-throughput Drug Profiling**

High-throughput physicochemical profiling is commonly employed in the pharmaceutical industry to shorten development time by testing large numbers of pharmaceutical compounds quickly and efficiently. High-throughput profiling assays typically rely on automation to characterize large numbers of compounds with minimal manual intervention. There is a vast array of tools available to automate high-throughput profiling assays; from highly sophisticated end-to-end platforms (Unchained Labs, Tecan, Hamilton) to simple solutions such as multi-channel pipettes and manual 96 well pipettes, with a range of technologies in between.

Here, a modular approach to automation applied to medium and high throughput solubility assays is presented. By automating unit operations in favor of an end-to-end approach, simple technological solutions that are inexpensive, easy to program, and easy to operate can be chosen. Development of these high throughput workflows leveraged home-grown and commercially available technology including ChemBeads solid dispensing technology, an Opentrons OT2 liquid handler, a Thermo Multidrop Combi pipettor, and a Waters Positive Pressure 96 filtration system. Adoption of these technologies resulted in 30-40% time savings, improved linearity of linear regression curves, and resulted in a reduction in operator frustration associated with manual, repetitive actions.

### Learning Objectives:

- Understand the benefits and limitations of modular approaches to automating high throughput physicochemical profiling (specifically solubility.)
- Become aware of various methods for measuring solubility of pharmaceutical compounds in medium and high throughput modes.
- Understand how ChemBeads, an Opentrons OT2 liquid handler, a Thermo Multidrop Combi pipettor, and a Waters Positive Pressure filtration system can automate specific unit operations associated with solubility

### **Rapid Fire Presenter: Kenneth Gleason, AbbVie Inc.**

Kenneth Gleason, B.S. Chemistry, Principal Research Scientist, AbbVie. Pharmaceutical scientist with 21 years experience in pharmaceuticals, preformulation, physicochemical characterization of small molecules and high throughput assay development. Supported preformulation activities for several clinical candidates. Developed several high throughput solubility assays to enable rapid screening of small molecules for rank ordering, formulation development, dose predictions and developability assessments. Led a team of six performing centralized physicochemical profiling of small molecules advancing to clinic, developing and preparing formulations for screening PK studies, and development/scale-up of enabling formulations (ASDs, nanosuspensions) in support of preclinical safety studies.

## **Predictive Dissolution of Nanoparticle Formulations**

Dissolution studies is one of the most important methods to characterize the expected in-vivo bioavailability under in-vitro conditions. Thus, an efficient dissolution method is needed during nanoparticle development process to facilitate the selection of lead formulations with an expected higher bioavailability. The separation of dissolved and undissolved drug is one of the most important common part of all dissolution studies. In the case of nanoparticles, the nanoparticle is considered as undissolved substance and needs to be separated from the dissolution media. Current dissolution methodologies suffer from the inefficient separation of nanoparticles from the dissolution medium independent from the equipment used for the dissolution studies. The novel Nanodis setup enables the use of conventional USP II dissolution set-up coupled with tangential flow filters to separate the nanoparticles from undissolved drug at all sampling time points. Quantification of only the dissolved nanoparticles facilitates the prediction of real in-vivo performance of developed nanoparticle formulations.

Learning Objectives:

- Understand the fundamentals of nanoparticle dissolution testing
- Evaluate the performance of conventional dissolution testing and its drawbacks
- Identify the right methodology for nanoparticle dissolution testing

### **Rapid Fire Presenter: Akif E Türeli, Ph.D., MyBiotech GmbH**

Emre Türeli, PhD, is Chief Scientific Officer of MyBiotech GmbH. After completing his bachelor's degree in Pharmacy at Hacettepe University, Ankara, he got his PhD degree from Johannes Gutenberg University in Mainz, Pharmaceutical technology and Biopharmacy. He has more than 15 years of research and development, as well as executive management experience in the pharmaceutical industry. His expertise is on drug delivery systems, nanoparticle development and production method development in pharmaceutical industrial environment with strong focus on technology transfer and GMP production of novel drug delivery systems and nanoparticles.

## **Internet of Things in the Laboratory**

Even with the advances in analytical technologies, the interconnectedness of laboratory systems still lags behind factories using industry 4.0/Internet of Things (IoT) software. A prime example is a preformulation lab using high throughput screening and robotics, but taking manual inventory of required chemical and reagents on excel. This presentation showcases some IoT devices and methods utilizing RFID that turn the physical world into a cloud-based digital twin to allow for continual monitoring of laboratory equipment and inventory.

### Learning Objectives:

- Describe the three main types of RFID and define industry 4.0 and IoT.
- Determine the most appropriate type of RFID tag for common laboratory applications.
- Evaluate the usefulness of inventory management via RFID in his or her laboratory setting.

### **Rapid Fire Presenter: George Cokenakes, Ph.D., Gnosko Bio**

George Cokenakes, Ph.D. spent the first 10 years of his career at the bench using his training in pharmaceutical development to design and scale up unique oral solid dose products and processes. From there, after many twists and turns including laboratory leadership positions, a cross-country move and clinical trials management, George is now the Chief Scientific Officer at Gnosko Bio. He uses creative thinking daily both to help automate sample and inventory management to streamline lab processes and to keep track of his 2-year-old daughter and three dogs.

## **Morning Plenary: Analytical Challenges in Developing Novel Modalities**

### **Moderator: Maya Lipert, Ph.D., AbbVie Inc.**

Maya P. Lipert is a Principal Scientist in the Molecular Profiling and Drug Delivery within Small Molecule CMC Development at AbbVie where she leads a group responsible for high-throughput physicochemical profiling assays to support discovery projects. Prior AbbVie experience includes API solid form evaluation, selection, and derisking activities on discovery and early development teams across modalities and routes of administration. Previously, she worked for five years at Merck & Co., Inc. in Pharmaceutical Sciences, focusing on improving the quality of drug candidates based on a thorough understanding of physicochemical properties as they relate to clinical developability and development of early clinical formulations. She earned her Ph.D. from the University of Michigan in 2015, where she studied the influence of drug-solubilizing agents on pharmaceutical cocrystals.

### **Approach to AAV GTx Potency Strategy in the Context of a Comprehensive Control Strategy**

Recombinant adeno-associated virus (rAAV) has become a major modality for gene therapy programs in development. The complex mechanisms of action of these therapies require creative approaches to assess product potency. Potency assay(s) are but one part of a holistic control strategy that includes several elements working together to ensure product quality. Scientific justification based on project-specific case studies will be presented to support that expression assays are suitable for demonstrating control of product potency for CMC purposes. In addition, correlation data for assays within the potency matrix for select rAAV therapies will be presented to further highlighting that an in vitro activity assay is not value added.

#### **Speaker: Savita Sankar, Ph.D., Pfizer Inc.**

Savita Sankar is a Senior Principal Scientist & Group Leader at Pfizer Inc. in St. Louis, Missouri. She has been working at Pfizer for six years and my work is focused on AAV-gene therapies, particularly, on developing, qualifying, and validating, cell-based potency assays for gene therapies. Prior to working at Pfizer, Savita obtained her PhD from the University of Utah in Salt Lake City in the field of Molecular and Cellular Biology and did post-doctoral research work at Harvard Medical School in Boston where she worked on mechanisms of drug resistance in tumors, and, at Washington University in St. Louis where she worked on mechanistic differences in gene regulation between normal brain development and in brain tumors.

## **Technical and Strategic Considerations for Enabling Co-Formulated Biologics: Venturing Beyond Standard IgGs at Narrow Ratios**

Articulation of optimal control strategies is a formidable challenge for emerging therapeutic modalities since requisite decisions must be made with little to no precedent. For instance, a limiting factor in this process is often not the availability of adequate technologies, but rather the strategic selection and application of the most appropriate ones. It's an example of "building the plane during flight." In this presentation, learn how this very situation is unfolding with respect to co-formulated biologics. Relevant case studies will come from recently published literature and publicly available information on clinical trials.

### Learning Objectives:

- Understand the technical challenges associated with analysis and characterization of co-formulated biologics
- Understand strategic inputs for designing control strategies for co-formulated biologics
- Compare and reflect on relevant examples of co-formulated biologics based on recently published literature examples

### **Speaker: Joseph Valente, Ph.D., Bristol Myers Squibb**

Joseph Valente is an Associate Scientific Director in the Sterile Products division of Bristol Myers Squibb. He earned a B.S. in chemistry from Western Washington University and a Ph.D. in analytical and physical chemistry from Colorado State University. His doctoral work focused on measuring protein-protein interactions in pharmaceutically relevant conditions and included an internship with Genencor where he extended his research to industrial enzymes. After completing his graduate studies, he joined Novartis where he worked as a scientist in Pharmaceutical and Analytical Development with a focus on peptides formulated for oral delivery. He is a subject matter expert for analytical and biophysical characterization of protein-based formulations, and he is passionate about pursuing scientific leadership, talent development, and supporting the next generation of scientists.

## **ADC/Drug Linker Structure/Conjugation Site Effect on Phys Chem**

Antibody-drug conjugates (ADCs) are often coined the “Magic Bullet” as they can enable the targeted delivery of a small-molecule that is too potent to be administered as a single agent. But, ADCs must be appropriately designed such that they exhibit an optimal stability profile, in addition to the desired therapeutic effect. Developability assessments are conducted to give a go or no-go decision surrounding molecule advancement as different drug-to-antibody ratios (DARs), conjugation-site strategies, or payloads are evaluated. Due to the distinct properties of each payload and parental antibody, each ADC needs to be evaluated on a case-by-case basis. The resulting large number of candidates or formulations and limited amount of material requires utilization of high-throughput biophysical techniques during early screening studies. Establishing a correlation between early-stage screening results and longer-term storage stability studies is critical for successful implementation of these tools in identifying the best candidate for advancement.

### Learning Objectives:

- Define elements used in antibody drug conjugate design such as conjugation-site strategies and drug-to-antibody ratio
- List molecular attributes that are affected by conjugation of a small molecule drug to an antibody
- Describe how the properties of both the small molecule payload and antibody contribute to the overall stability of an ADC
- Explain the types of assays that are used in developability assessments of ADCs
- Understand the predictive nature of high-throughput screening assays to storage stability studies

### **Speaker: Brittney Mills, Ph.D., AbbVie Inc.**

Brittney Mills, Ph.D., is a Principal Research Scientist within the Biologics CMC Drug Product Development group at AbbVie. She received her Ph.D. in chemistry in 2014 from the University of Kansas, followed by a Postdoctoral Fellowship, also at the University of Kansas. During this time, she gained experience in antibody characterization and formulation development using traditional biophysical methods, as well as HDX-MS.

In 2015, she joined AbbVie and focused on the development of assays for investigating the amorphous solubility of small molecules and the effect of formulation on intestinal absorption. She transitioned back to the characterization of biologic modalities in 2016, primarily focusing on preformulation developability assessments of antibody-drug conjugates to support candidate advancement and selection through the Discovery milestones. In this role, she was responsible for defining key assays to be used in candidate screening and implementing acceptance criteria used to confirm a molecule’s suitability for advancement into development. In addition to now leading the preformulation team at the Lake County site, she is also responsible for supporting first-in-human and late-stage drug product development activities, which includes both formulation development and technical transfer activities to clinical and commercial manufacturing sites.



## **Novel Modalities/Oligonucleotides**

An overview of notable analytical methods used for characterization of oligonucleotide therapeutics will be presented, including determination of assay, purity and impurity profile, measuring deamination, failure sequence analysis, resolution of positional isomers of impurities, analysis of Rp/Sp diastereoisomeric composition, and 2D-HPLC MS and online MS in process development.

Learning Objectives:

- Comprehend some of the fundamental issues encountered with chromatographic and mass spectrometric analyses of therapeutic oligonucleotides
- Learn about a method combining HPLC and mass spectrometry for QC of oligonucleotides
- Explore techniques for characterization of therapeutic oligonucleotides in regard to detection of positional isomers of impurities, measurement of deaminated degradation products, and confirmation of their diastereoisomeric composition

### **Speaker: Claus Rentel, Ph.D., Ionis Pharmaceuticals**

Dr. Rentel is currently Vice President, Analytical Development and Quality Control at Ionis Pharmaceuticals, Inc., Carlsbad, California. Prior to joining Ionis in 2001, he worked in Quality Control and Special Analytics at CarboGen in Switzerland. He received his Ph.D. (summa cum laude) from the University of Tuebingen, Germany.

Dr. Rentel has 20 years of experience in quality control. He has extensive expertise in the CMC development of oligonucleotide therapeutics and is an expert in mass spectrometric techniques. He has been responsible for IND filings of more than 60 oligonucleotides and participated in the NDA filings for KYNAMRO® (mipomersen), SPINRAZATM (nusinersen), WAYLIVRA® (volanesorsen), and TEGSEDITM (inotersen).

### **Novel Synthetic Modalities Oligos, Lipids**

No description available.

#### **Speaker: Mirlinda Biba, Ph.D., Merck & Co., Inc.**

Mirlinda Biba is a Senior Principal Scientist in the Analytical Research & Development at Merck & Co., Inc. in Rahway, New Jersey. She received her B.A. in chemistry from Rutgers University-Newark, an M.S. in chemistry from Stevens Institute of Technology, and a Ph.D. in analytical chemistry from Drexel University in Philadelphia, Pennsylvania, under the direction of Professor Joe Foley and Dr. Chris Welch from Merck. Her research studies focused on the analysis and separation of short RNA oligonucleotides by different liquid chromatography methods. She joined Merck in 2001 and has worked at various analytical roles focusing on analysis and purification of small molecules and biologics. She is currently supporting analytical development of novel modalities, such as oligonucleotides, peptides, and antibody drug conjugates. Her work has resulted in over 40 publications and numerous presentations at different conferences.

## **Afternoon Plenary: Clinically Relevant Specifications**

### **Moderator: Sachin Lohani, Ph.D., Merck & Co., Inc.**

Sachin Lohani, Ph.D. is currently serving as Director Analytical Research & Development, Merck Research Laboratories. His group supports analytical characterization of drug substance and drug product from early development to commercialization. Sachin received his Ph.D. in pharmaceuticals from the University of Minnesota. He started his professional career in 2006 at Merck and held positions with increasing responsibilities within various organizations in MRL. In 2014, he joined FDA's Office of Pharmaceutical Science as a CMC reviewer and then served as a Policy Analyst/Acting Branch Chief in the Office of Policy in Pharmaceutical quality.

After his tenure at FDA, he joined Jansen Pharmaceuticals (Johnson & Johnson), where he established the group responsible for conducting developability assessment of discovery compounds at the Spring House, Pennsylvania site. Prior to his current role, he served as director of pharmaceutical development at Celgene, where he was responsible for leading cross-functional pharmaceutical development teams responsible for meeting CMC milestones from Phase 1 through registration.

## **Use of PBPK Models for Disso Specs/post Approval Changes**

Physiologically based biopharmaceutics models (PBBM) are evolving tools which can be used throughout drug product development. PBBM focuses on the generation of mechanistic understanding of how drug product quality attributes interact with physiology to influence the in vivo drug performance. The application of PBBM is not only important in the development of drug products but can also be a key component for regulatory approval of, e.g., clinically relevant specifications and continued quality assurance throughout the product life cycle.

This presentation will cover PBBM/PBPK background and the latest drug product applications, along with the latest literature and novel MSD case studies.

Topics covered will be PBBM Background: history and the latest applications; PBBM applications during clinical development and marketing application; case studies in establishing PBBM Models; challenges and considerations in the development of biorelevant/biopredictive inputs such as solubility, dissolution, permeability, etc., for PBBM model development; and the use of PBPK to anticipate/remediate drug-drug interactions with acid reducing agents (ARAs).

Learning Objectives:

- Become familiar with PBBM/PBPK applications in Drug Development
- Become familiar with PBBM applications to support drug product quality and specification settings
- Learn about recent PBBM Case studies

### **Speaker: Tycho Heimbach, Ph.D., Merck & Co., Inc.**

Dr. Tycho Heimbach is a Senior Principal Scientist at MSD in the Biologics Development and Biopharmaceutics Group which is part of the Sterile and Specialty Products Group. There, he serves as a biopharmaceutics and PBBM/PBPK expert in oral and long-acting injectable drug development, which includes establishing the bioequivalence safe space of new drug candidates. Prior to this, he was Director in DMPK at Novartis where he led a global PBPK modeling group and served as PBPK and biopharmaceutics expert and implemented PBPK/PBBM for oncology drugs.

He served as cochair on the for PBPK Modeling and the PBPK Renal and Hepatic impairment Working Group and the PBBM Working Group for the Innovation and Quality in Pharmaceutical Development (IQ) consortium. He is currently serving as the MSD representative on the PBBM Innovation & Quality (IQ) Consortium Working Group.

Dr. Heimbach has been a speaker at 50 national and international conferences and has authored/coauthored ~65 peer-reviewed publications in ADME, PBPK, and formulation sciences and was recognized as an AAPS Fellow in 2021.

## **Biologics View on Clinically Relevant Specs**

Biological relevance tools are essential to gain knowledge about attribute impact which can be used to inform clinically relevant specifications. A new data science method called the Clinical Impact of Attributes (CIA) approach will be shared that uses clinical trial information to justify clinically safe specifications. CIA analyzes clinical studies to determine if any correlations exist between attribute levels exposed in patients and the development of adverse events. Several case studies will be shown.

### Learning Objectives:

- Appreciate the need for clinically relevant specifications to drive drug product manufacturing
- Understand the CIA data science method
- Discuss case studies using CIA to justify proposed specifications
- Identify future opportunities to apply clinically relevant data and knowledge

### **Speaker: Marisa Joubert, Ph.D., Amgen**

Marisa Joubert is a Scientific Director and Group Leader of the Attribute Impact Group in the department of Process Development at Amgen Inc (Thousand Oaks, California). She has been at Amgen since 2008 as a pharmaceutical scientist in drug product development. Her group evaluates the impact of biotherapeutic attributes on the safety and efficacy of drug products. She is the team lead of a multidepartment cross-functional working group that assesses the risk of immunogenicity of key product quality attributes. Prior to joining Amgen, she was a Senior Researcher at the Council for Scientific and Industrial Research in Pretoria, South Africa, where she evaluated novel therapeutic agents for treating HIV-1. She received her Ph.D. in 2006 from the University of California, Los Angeles, in biochemistry and molecular biology.

## Regulatory View on Clinically Relevant Specs

Traditionally, specifications are set as a final check that the biologic drug product is representative of the marketing authorization and are intended to ensure that a product is safe and efficacious when used as labeled. Often, setting specifications are primarily based on manufacturing experience from a limited number of batches at the time of the marketing application. This approach may not wholly represent the true safety and efficacy of the product and creates a challenge for both industry and regulators in defining and authorizing appropriate specifications that support the product lifecycle and supply to patients.

Establishing acceptance criteria based on manufacturing experience may result in limits that are narrow and lead to unnecessary batch rejection. In contrast, establishing acceptance criteria based on statistical analysis of a limited number of batches may result in limits that are broad and lead to inappropriate lot release.

Comprehensive approaches are needed to define the most appropriate specifications. One such approach has been coined clinically relevant (or patient-centric). Clinically relevant specifications have been defined as a set of criteria and acceptance ranges to which drug products should conform to deliver the therapeutic benefit indicated in the label. The resultant specifications often extend beyond the manufacturing experience. From a regulatory perspective, the setting of specifications should consider all available data to ensure that decisions regarding the suitability of the product appropriately includes the line between rejecting lots that are likely to perform as expected and releasing lots that fail to meet the expectations. The justification should be supported by additional sources of data such as structure-function data, in vitro data, platform experience, or prior knowledge. The presentation will focus on the regulatory experience and expectations when setting biologic product specifications that exceed the manufacturing experience at the time of the market application.

### Learning Objectives:

- Define the regulatory understanding of clinically relevant approaches to setting biologic drug specifications
- Describe the regulatory experience, to date, of assessing clinically relevant approaches to setting biologic drug product specifications
- Understand the regulatory expectations when using a clinically relevant approaches to setting biologic product specifications

### Speaker: Jayda Siggers, Ph.D., Health Canada

Jayda Siggers is a Senior Scientific Evaluator in the Biotherapeutics Quality Divisions (BQD) of the Centre for Blood, Blood Products and Biotherapeutics (CBBB), at the Biologics and Radiopharmaceutical Drugs Directorate (BRDD) of Health Canada. She leads the quality review of pre- and post-market drug submissions for biologic therapies. She earned an M.S. in toxicology from the University of Saskatchewan (Canada), a Ph.D. in immunology from the University of Copenhagen (Denmark) and completed a post-doctoral fellowship in the department of Biochemistry, Microbiology, and Immunology at the University of Ottawa (Canada). Recently, she represented Health Canada on the WHO drafting group for WHO Guidelines for the Production and Quality control of Monoclonal Antibodies and Related Products Intended for Medicinal Use. She is currently Co-Chair of a draft Parenteral Drug Association (PDA) standard titled Analytical Method Qualification/Validation for Biologics and leads an internal working group for ICH Q2/Q14. In her spare time, you will find her chasing her family down mountains and up hills on one of her bikes.

## **Pharmaceutical Analysis Rapid Fires 2**

### **Moderator: Landon Greene, Ph.D., Vertex Pharmaceuticals**

Landon Greene, Ph.D., is currently serving as Senior Director Analytical Development at Vertex Pharmaceuticals. His group supports analytical CMC activities for clinical drug development, for serious and rare diseases, covering multiple drug modalities. Previously, he worked for 20 years at Esperion Therapeutics, Catalent Pharma Solutions, Bristol-Myers Squibb, and Pfizer in various roles, primarily analytical, supporting CMC activities in preclinical through commercial phases. He earned a B.S. in chemistry /B.S.E in chemical engineering from the University of Michigan and a Ph.D. in biochemistry from Rutgers University. As a volunteer, he previously served on the Eastern Analytical Symposium Executive Committee and the North Jersey Chromatography Group Organizing Committee for over ten years. Additionally, he has served as the Chair of both the North Jersey Chromatography Group and the ACS North Jersey Local Section. Currently, he is serving on the Scientific Programming Committee for the AAPS Summer Scientific Forum.

## **Enabling Clinically Appropriate Degradation Product Limits Through Analytical Characterization of API Epimerization**

Clinically relevant degradation product specifications ensure appropriate drug product control while increasing flexibility but may be difficult to assign in the early development space. This work describes the application of fundamental analytical understanding to enable this approach for a developmental API which was found to epimerize in solution and in solid oral formulations, including suspensions developed for early clinical use. Detailed characterization established that epimerization was accelerated by increasing pH, temperature, and buffer concentration, and proceeded to an equilibrium API:epimer ratio of 1.7:1.

Computational modeling was consistent with the observed ratio. This thorough understanding was applied to ensure robust analytical sample preparation, which was particularly important for preclinical PK samples requiring stabilization prior to analysis. Preclinical results established high in vivo conversion to the epimer, quantitation of which allowed the epimer to be qualified per ICH guidelines, enabling control limits, and development targets to be set at clinically appropriate levels.

### Learning Objectives:

- Develop improved understanding of the impact of analytical characterization in other areas of development, including safety assessment.

### **Rapid Fire Presenter: Nathan Contrella, Ph.D., Merck Research Laboratories**

Nathan Contrella, Ph.D., is a Principal Scientist in the Small Molecule Analytical Research and Development group at Merck & Co., Inc. Prior to joining Merck in 2015, he received his doctorate in the area of inorganic chemistry from The University of Chicago. While at Merck, he has worked across the clinical and commercial development spaces, supervising teams of analytical scientists and partnering with formulation groups to drive the development and analytical strategy of oral and parenteral products across indications including oncology, infectious disease, and hematology. In addition to supporting Merck's development pipeline, he has been involved in a number of initiatives to train and upskill new hires and colleagues on HPLC and statistics, improve laboratory safety and efficiency, and restructure and optimize standard operating procedures and business processes.



## **Evaluation of Various Spectroscopic Procedures to Calculate Free Thiol Content in Biotherapeutics**

Many biologic modalities contain multiple inter- and intra-chain disulfide linkages that are critical to their structure, stability, and biological activity. Thus, the detection of free thiols in protein-based therapeutics is essential as it provides insight into the stability and heterogeneity of the molecule, as well as the availability of cysteines to participate in other conjugation reactions. There is a broad range of free thiol spectroscopic methods available, ranging from the well-known Ellman's assay to commercially available kits using proprietary reagents. This presentation compares available free thiol spectroscopic assays based on the analytical target profile (ATP) principle by evaluating the method performance and business drivers. Specifically, the presenter assesses if chosen methods can determine free thiol content accurately and precisely, and evaluate this against economic factors (i.e., high throughput, cost, use of proprietary reagents). A broad range of biological modalities were used in this investigation, including monoclonal antibodies (mAbs), fusion proteins, antibody drug conjugates (ADCs), and coformulated mAbs. Commercially available kits from Invitrogen®, Cayman®, and Abcam® were assessed, along with methods using either Ellman's reagent or a thiol-reactive coumarin. The investigation found that many of the commercially available kits provide values that are much lower than anticipated, whereas the Ellman's assay and utilization of a thiol-reactive coumarin provide results that agree well with values determined by mass spectrometry. Benefits and drawbacks of each method from an analytical life cycle management and business perspective are discussed. This work aims to elucidate the accuracy of available spectroscopic free thiol calculation methods, and in doing so to establish a phase appropriate, modality-agnostic platform method for free thiol determination that is easy to implement and provides accurate results.

### Learning Objectives:

- Measure free thiol content for biologic modalities quickly and accurately using spectroscopic methods.
- Know which commercially available kits are viable options for measuring free thiol content in protein-based pharmaceuticals.
- Evaluate spectroscopic assays for free thiol determination based on ATP requirements, method performance, and business drivers.

### **Rapid Fire Presenter: Nicole Irene Halaszynski, Ph.D., Merck & Co., Inc.**

Nicole Halaszynski, Ph.D., is a Senior Scientist at Merck within the Biologics Analytical Research & Development (B-AR&D) department. She recently obtained her Ph.D. in Summer 2022 from the University of Delaware in materials science and engineering, and began her career at Merck shortly after. Her research interests include a) the development of an efficient, user-friendly free thiol quantification method, b) improvement upon liquid chromatography methods for PS-80 quantification, and c) observations of stability trends for mAbs.

## **Overcoming Sterilization Challenges with Highly Viscous Pharmaceutical Formulations: derisking from Development to the Clinic**

Sterilizing injectable pharmaceutical products is essential for patient safety and is typically achieved using either terminal sterilization methods such as e-beam, gamma radiation, dry heat, autoclave, or filter sterilization and aseptic filling. In the case of highly viscous formulations, terminal sterilization is often avoided as it can inadvertently change product attributes. Using commercially available 0.2um sterile filters for viscous formulations remain limited due to significant challenges dictated by the filter design and operating ranges which leads to low throughput, significant holdup, and concentration variation due to material retained by the filter. In this presentation, high pressure sterile filtration (HPSF) is presented as a method to successfully sterilize viscous formulations without compromise of patient safety or product quality. A validated HPSF system that adheres to PDA and ASTM sterile filtration guidance was utilized. This system has been used to filter biopolymer solutions and biologics used as medical devices and active pharmaceutical ingredients (API). Recently, the application of HPSF has expanded to other highly viscous solutions with viscosity upward of 300,000 cps. Formulations of biopolymer sodium hyaluronate (NaHy) with molecular weights ranging from 900 up to 2,000 kDa with concentrations as high as 20 mg/mL were examined. When comparing the filtration yield of a 10mg/mL NaHy solution with 900kDa molecular weight on a capsule filter at the maximum operating pressure (60 psi) to a HPSF with nearly equivalent filtration surface area of 200cm<sup>2</sup>, the flux with HPSF was found to be three orders of magnitude higher. Additionally, HPSF did not result in concentration changes between unfiltered and filtered solution in contrast to low pressure filtration where 25% drop in concentration was observed. Similarly, a 20 mg/mL NaHy solution (300,000 cps) was successfully filtered at 800 psi, but was mainly unfilterable at low pressure of 45 and 95 psi. Furthermore, no concentration changes were observed using the HPSF system. In summary, sterile filtration of highly viscous pharmaceutical formulations using HPSF system can have clear advantages in terms of higher throughput, higher flux, and reproducibility in terms of concentration, and lower material holdup which can be beneficial when handling costly formulations. High pressure sterile filtration can fast track development effort and accelerate bringing early phase formulations into the clinic.

### Learning Objectives:

- Learn about new opportunities to explore alternative routes for sterilizing viscous pharmaceutical formulation and assess potential impact to established analytical techniques.
- Learn about sterile filtration filter validation per ASTM and PDA guidance.
- Avoid product efficacy risks involved with terminal sterilization.

### **Rapid Fire Presenter: Mohannad Kadhum, Ph.D., Lifecore Biomedical**

Mohannad J. Kadhum, PhD is a principal process development engineer at Lifecore Biomedical. His experience with pharmaceutical development ranges from clinical to commercial products. He is a CMC-certified professional with 14 years of R&D experience focused on biopolymers, surfactants, and nanoparticles for wide range of applications. He also has experience with tech transfer and scale up of processes.

## **Structural Fingerprinting for Biologic Risk Assessment: Correlating High Resolution NMR to a Functional Outcome**

The clinical efficacy and safety of all protein-based drug substances (e.g., mAbs, bispecifics, etc.) rely on the integrity of the higher order structure during all phases of clinical development. While high resolution 2D-NMR fingerprinting is becoming more established for biopharmaceutical applications, there remains the question of how much spectral deviation needs to occur to effect a functional outcome. The present case study employs a pharmaceutically relevant forced degradation method, chemical oxidation, and demonstrates how high-field 2D-NMR fingerprinting, coupled with other analytical assays, including a functional assay, can be implemented in combination to evaluate a model therapeutic, NISTmAb. The complementary measurement outputs demonstrate the utility of statistically combining NMR with other analytical tools to extract meaningful structural changes in mAbs that are functionally relevant. General application of this approach to all major protein-based therapeutic modalities will allow rigorous assessment of quality attributes to mitigate risk.

### Learning Objectives:

- Observe how the 2D-NMR spectral deviations can be directly correlated to loss of binding affinity.
- Appreciate the chemometric methods to reduce the multivariate NMR information into a simple 'yes/no' read-out.
- Comprehend that the 2D-NMR fingerprinting method can be applied to many therapeutic modalities such as siRNA, peptides, bispecifics, and mAbs.

**Rapid Fire Presenter: Robert G. Brinson, PhD, National Institute of Standards and Technology**

No biography available.

## **Morning Plenary: Life Cycle Management of Analytical Procedures – Regulatory Implications**

### **Moderator: Nina S. Cauchon, Ph.D., Amgen**

Nina S. Cauchon, Ph.D., works at Amgen Inc. in Thousand Oaks, California, and leads advocacy and external engagement activities for Regulatory Affairs - CMC. She has led strategy development for early phase to commercial programs, including both small molecules and biologics, and prior to that she managed a group doing analytical development within Pharmaceuticals/Process Development. She holds a Ph.D. in medicinal chemistry from the School of Pharmacy at Purdue University. She sits on the ICH Q2(R2)/Q14 Expert Working Group for Analytical Procedure Development and Validation, is the past chair of the AAPS CMC Community, and is also active in ISPE (International Board of Directors, Regulatory Steering Council), CASSS (Associate Director), IQ, DIA, and PQRI. She is a member of the PhRMA GQM. Her areas of interest are: regulatory challenges for innovative modalities and emerging technologies, CMC aspects of expedited review pathways, regulatory harmonization, and science- and risk-based approaches to regulations. In addition to numerous technical publications, her regulatory publications include review articles in the *Journal of Pharmaceutical Sciences* on regulatory challenges for new technologies and structured content management in regulatory submissions, and two cover articles for the *AAPS Newsmagazine*.

## **Q12 Experiences**

Presentation will cover FDA experience with the established conditions, including analytical procedures, including the FDA pilot on established conditions, types of submissions received, assessment of established conditions, issues related to identifying established conditions, non-established conditions and Product Lifecycle Management (PLCM). It will also examine engagement with FDA prior to and during the assessment of the submissions for the established conditions and points to consider when submitting established conditions submissions.

Learning Objectives:

- FDA perspective on established conditions and ICH Q12
- FDA assessment of established conditions submissions, including analytical procedures
- Points to consider when submitting established conditions applications
- Engagement with FDA prior to and during assessment of the applications

### **Speaker: Hasmukh B. Patel, Ph.D., U.S. Food and Drug Administration**

Dr. Hasmukh Patel is the Division Director in the Division of Post-Marketing Activities 1 (for NDAs) in the Office of Lifecycle Drug Products (OLDP), Office of Pharmaceutical Quality (OPQ), CDER. He has been with FDA for more than 20 years.

He has extensive technical, regulatory and managerial experience. His work experience includes review of Investigational New Drug Applications (INDs), New Drug Applications (NDAs) and NDA supplements for a wide variety of dosage forms and drug products. He has also served on various technical committees at CDER. Currently, he is a member of the Emerging Technology Team (ETT), Established Conditions Coordinating Committee (ECCC), OPQ Nitrosamine Technical Working Group, and CDER Task Force – Drug Nitrosamine. He is also involved in drafting various policies and procedures in OPQ. He has several years of industrial research and development experience in the area of natural products and organic synthesis and academic experience in the development of radiopharmaceuticals for medical imaging.

He received a Ph.D. in organic chemistry from the University of Georgia, Athens, Georgia and an M.Sc. in chemistry from the Indian Institute of Technology, Mumbai, India.

## **Lifecycle Management of Analytical Procedures – an Example of Pharmaceutical Counter Ion Analysis**

To ensure product quality and patient safety, analytical procedures are required to measure critical quality attributes (CQAs) of drug substance and drug product. Lifecycle management of analytical procedures has been proposed in recently published regulatory guidance such as ICH Q12, Q14 (step 2) and USP general chapter <1220>. This lifecycle management approach is built upon analytical quality-by-design (QbD), and some key elements include analytical target profile (ATP), integrated quality risk assessment, systematic evaluations on both ranges and interactions of critical parameters, a well-defined analytical control strategy, analytical procedure validation, and a well-justified lifecycle change management plan. Implementation of the lifecycle management approach can help to improve analytical procedure robustness, facilitate continuous improvement and analytical innovation, and reduce maintenance effort across the analytical procedure lifecycle.

The lifecycle management approach is applicable to all types of analytical procedures. While a few examples have been included in the Annex of ICH Q14 (step 2), there is a need to generate more examples to cover different types of analytical procedures. This presentation describes an example of lifecycle management of analytical procedures for pharmaceutical counterion analysis, where an analytical procedure was required for the determination of non-stoichiometric ammonium counterion in an amorphous small molecule drug substance. The example was constructed following the framework described in the Annex of ICH Q14 (step 2) and will be discussed in detail. Justifications of established conditions (ECs) and a few examples of analytical procedure change management will also be discussed.

### Learning Objectives:

- This presentation provides an example of lifecycle management of an analytical procedure which is relatively simple and less complex
- Stimulate discussion on how to identify established conditions and develop post approval change management plan based on science and risk-based principles
- Gain a better understanding on lifecycle management of analytical procedures as proposed in ICH Q14 (step 2)

### **Speaker: Qinggang Wang, Ph.D., Bristol Myers Squibb**

Qinggang Wang, Ph.D., is currently a Scientific Director in Chemical Process Development in Bristol-Myers Squibb Company. He received his B.S. in chemistry and Ph. D. in analytical chemistry from Tsinghua University, Beijing, China, and joined BMS in 2003. His work has been focused on CMC analytical supports for various projects within BMS portfolio, including small molecules, synthetic peptides and oligonucleotides.

## **ICH Q14: An Enabler for Analytical Procedure Lifecycle Which Ensures Robustness of Analytical Methods During a Drug's Lifetime**

One goal for analytical procedures that support a drug is the ability to ensure that the method is fit for purpose and consistently delivers its intended control. Many new drugs are developed on accelerated timelines. In some cases, clinical studies are combined, and an investigational drug may go from first in human studies to commercial approval in just a few years. In these cases, the time allotted for CMC development is significantly reduced, and there may not be enough time/experience with analytical methods to define robust long-term method conditions. This increases the risk of the need for post approval changes to analytical methods. Several principles within the developing ICH Q14 draft guidance may enable faster method changes to advance method robustness and/or efficiency within the required regulatory control framework. A specific example will be shared to demonstrate how the principles of Q14 may be applied to enable lifecycle changes and hence improve method robustness which has the overall benefit of ensuring drug supply continuity.

### **Speaker: Bryan C. Castle, Ph.D., Eli Lilly & Company**

Bryan Castle, Ph.D., is an Associate Vice President in Eli Lilly & Company's Synthetic Molecule Design and Development organization. He has been part of the Lilly team for over twenty-five years and has held many different roles in drug substance and drug product analytical development. He is a technical leader in analytical chemistry and is currently engaged in driving the analytical strategy for small molecule commercialization portfolio. He is passionate about people development and efficiency tools, which include excellence in chromatographic separations, automation, and enabling of scientists through better handling of laboratory data. External to Lilly, he is engaged in ICH Q2(R2) and Q14 activities by leading a team at ISPE-PQLI.

### **Post-approval Analytical Method Performance Monitoring: A Case Study**

No description available.

#### **Speaker: Maria T Cruanes, Ph.D., Organon**

Maria Teresa Cruaños is a founding member and Director of Analytical Sciences at Organon and in Spring House, Pennsylvania. She holds an Analytical Chemistry Degree from Universidad Nacional del Litoral in Santa Fe, Argentina, and a Ph.D. in Analytical/Physical Chemistry from the University of Illinois at Urbana-Champaign. She has dedicated her career to development, launch, and manufacture of pharmaceutical products, spanning the preclinical through tech transfer and quality control spaces. She worked for 18 years with Merck Research Labs in West Point, Pennsylvania and six years with Merck at the Las Piedras Operations site, in Puerto Rico. Currently, since 2021, she and her group provide analytical support to Organon's labs across the world, enabling a diverse portfolio of new and in-line products including Women's Health medicines. She is an active member of AAPS as founder and past-chair of the QbD and Product Performance focus group, contributing member to the In-Vitro Release and Dissolution Technology community, the Manufacturing and Analytical Characterization sub-track leader of the 2022 PharmSci 360 organizing committee and vice chair of the AAPS 2023 Summer Scientific Forum.



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**Description:** Gyros Protein Technologies is the leader of automated nanoliter-scale immunoassays for biologics in discovery, preclinical and clinical development. Gyrolab open platforms for bioanalysis provide the flexibility, efficiency and productivity using a compact disc (CD) affinity-flow format with results in minutes, throughput, minimal interference and broader ranges for higher quality data.

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**Description:** Velocity Labs, LLC is a bioanalytical contract research organization (CRO) focused on LC-MS to serve our biotech, biopharma, and pharmaceutical partners. Our lab has more than 100 years of experience and is entirely employee owned.

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### **Challenges and Strategies in Developing Hybrid LCMS Methods for Proteins**

Presented by: Ben Nie, Ph.D.

Tuesday, July 11

11:30 AM – 12:00 PM CT

Affinity capture followed by enzymatic digestion is the general workflow for large molecule LCMS bioanalysis. In this presentation, we will discuss the challenges we have encountered when developing LCMS methods for protein therapeutics and biomarkers, as well as strategies to overcome such challenges. The presentation will focus on immunocapture condition optimization, signature peptide selection, digestion designs to obtain suitable signature peptides for quantification, and stable isotope-labeled internal standard selection.

#### Learning Objectives

- Upon completion, participants will be able to understand the principles of hybrid LCMS methods for large molecule bioanalysis.
- Upon completion, participants will be able to design affinity capture and enzymatic digestion workflows for large molecule LCMS bioanalysis.
- Upon completion, participants will be able to discuss the challenges and strategies in different steps and aspects of large molecule hybrid LCMS methods.

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## **Applying Bioinformatics/AI in Mining Public Data to Boost the Lab of the Future**

Presented by: Rohita Sinha, Ph.D., Eurofins Viracor

Tuesday, July 11

12:00 PM – 12:30 PM CT

In the era of the data-driven science, leveraging publicly available biological data is the key to boost the future R&D activities (i.e., the “Lab of the Future”). The design of Covid-2 specific primers and their validation against novel Covid-2 variants is relevant enough to emphasize the impact pooling global data (Covid-2 genomic sequences). With the advent of omics platforms, producing genetic and epigenetic data (DNA sequence, gene-expression, methylation etc.), it’s imperative to develop capabilities to retrieve, process and analyze the big data (size range GBs-TBs), harmonize the data sourced from different labs (batch & platform effect correction), and apply classical and deep machine learning algorithms to discover novel biological patterns.

One of such omics data type is the cell-free DNA (cfDNA) sequencing data. The blood cfDNA, a mix of free- floating fragmented DNA originated from multiple tissues, carries the tissue specific genetic and epigenetic information. Deconvoluting the proportion of each tissue type in the cfDNA mix is essential to monitor the progression of diseases such as cancer and solid organ transplant rejection. We developed an algorithm (applying quadratic programming) to deconvolute the fraction of 39 cell types in the cfDNA mix, using the position specific methylation signal. A successful evaluation our algorithm required methylation data with known proportions of multiple cell-types. We have developed another new algorithm to simulate the methylation based biological mixtures data and thoroughly tested our deconvolution algorithm using our simulated and real cfDNA methylation data. It’s undeniable that healthcare and pharma R&D is driven by our ability to apply the known and develop new ML algorithms. The algorithm described above (biological mixture deconvolution) finds an additional application to compute the tumor fraction in the cell-free DNA data, helping early detection and monitoring tumor management. We conclude that the AI and Bioinformatics techniques would keep boosting the idea of the “Lab of the Future” and help solve multiple complex biological problems.

Learning Objectives:

- Complexities of harmonizing public databases
- Biological mixture models
- Bioinformatics methods to handle data-harmonization and ML algorithms to solve biological mixture-models

**Gyros Protein Technologies**

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**Phone Number:** (908) 755-0011

**Website:** <https://www.gyrosproteintechnologies.com/>

**Description:** Gyros Protein Technologies is the leader of automated nanoliter-scale immunoassays for biologics in discovery, preclinical and clinical development. Gyrolab open platforms for bioanalysis provide the flexibility, efficiency, and productivity using a compact disc (CD) affinity-flow format with results in minutes, throughput, minimal interference, and broader ranges for higher quality data.

**Accelerating Immunogenicity Analysis From IgG- to AAV-based Therapies**

Presented by: Manny Lozano

Wednesday, July 12, 2023

11:30 AM – 12:00 PM

Development of assays to assess pre-existing immunity or immunogenicity in response to biotherapeutic treatment faces challenges of time, sensitivity, drug tolerance, and robustness. New tools to accelerate anti-drug antibody (ADA) assay development across modalities are needed that address these requirements. In this talk, adaptations of an automated microfluidic platform assay for applications of preclinical ADA screening to clinical immunogenicity assessment of IgG and AAV-based therapies are presented.

**Learning Objectives**

- Understand the unique requirements of immunogenicity assessment for different development phases and for IgG and AAV-based therapies.
- Learn how microfluidic CD-based immunoassays are utilized for ADA analysis.
- Understand how ADA assays for IgG and AAV-based therapies are accomplished on the Gyrolab platform in preclinical and clinical settings.

**Prolytix**

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**Description:** Prolytix has 30+ years of experience in identifying and solving protein chemistry challenges. With our comprehensive analytical and bioanalytical services, host cell protein expertise, and our thoughtful, integrated approach, we support large molecule drug development from discovery through release. We'll put our problem-solving skills to work to find a solution that helps bring safe, effective therapies to market quickly and effectively. When it's time to choose a partner for your next biotherapeutic project, there's only one place to go.

**Analysis and Removal of Procoagulant Contaminants from Your Plasma-Derived Therapy**

Presented by: Matt Whelihan, Ph.D.

Tuesday, July 11, 2023

11:30 AM – 12:00 PM

Procoagulant contaminants are a major contributor to hemostatic risk in plasma-derived protein therapeutics. Thorough analysis and removal of these contaminants is an essential part of process development and maturation. A combined approach of HRMS and specific bioanalytical methods are required to verify removal of these contaminants from the product stream and to ensure product safety.

**Learning Objectives:**

- To define the potential procoagulant contaminants in a plasma-derived therapeutic and how they contribute to hemostatic risk.
- To understand the different bioanalytical techniques used in the identification of procoagulant contaminants in plasma-derived therapeutics.
- To outline a strategy for companies to assess their plasma-derived drug product stream and eliminate hemostatic risk in their drug product formulation.

**Q2 Solutions**

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**Phone Number:** (919) 998-7000

**Website:** [www.q2labsolutions.com](http://www.q2labsolutions.com)

**Description:** Q<sup>2</sup> Solutions, a wholly owned subsidiary and laboratory division of IQVIA, is a leading global clinical trial laboratory services organization providing comprehensive testing, project management, supply chain, biorepository and specimen management, and clinical trial sample and consent tracking solutions.

**Choosing HRMS vs. LBA for Bioanalysis**

Presented by: Adriane Spytka, BS

Tuesday, July 11, 2023

3:30 PM – 4:00 PM

There is an increase in the complexity of drug modalities along with the need for more sensitive methods. Immunoassays, while often chosen as the first platform to utilize for assessing pharmacokinetics of biologics, are entirely dependent on critical reagents. Multidimensional low-flow chromatography coupled to high resolution mass spectrometry can be advantageous for instances where a high degree of sensitivity or greater selectivity is required, or when higher quality critical reagents are not available.

**Learning Objectives**

- When to choose LCMS over LBA for bioanalysis, considering the availability of critical reagents and the need for sensitivity and selectivity.
- Understanding the advantages of multi-dimensional LC/HRMS in the context of regulated bioanalysis.
- Takeaways from case studies showing the advantages of LCMS over LBA where greater sensitivity or selectivity was needed.

**Velocity Labs**

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**Description:** Velocity Labs, LLC is a bioanalytical contract research organization (CRO) focused on LC-MS to serve our biotech, biopharma, and pharmaceutical partners. Our lab has more than 100 years of experience and is entirely employee owned.

**Setting the First Human Dose: Minimizing Variables Across Species**

Presented by: Shane Needham, Ph.D.

Tuesday, July 11, 2023

12:00 PM – 12:30 PM

Setting the first in human (FIH) dose via allometric scaling is an industry accepted practice. Developing and validating methods for different species using consistent methodology with emphasis on minimizing variables, yields data sets that contribute to more predictive allometric scaling. We will share best practices in workflow optimization and examine the impact to pharmacometric evaluations to predicting doses for FIH studies.

**Learning Objectives**

- Best practices for consistent method development – setting chromatographic and detection parameters.
- How to standardize validation plans to be context appropriate yet consistent.
- Concepts related to allometric scaling and interspecies PK correlations.