APPLIED BIOMARKER ANALYSIS

The First Annual
Applied Biomarker Analysis Meeting

NOVEMBER 14, 2019

Bristol-Myers Squibb | Cambridge, MA

SPONSORED BY:

BIOCRATES LIFE SCIENCES
The Deep Phenotyping Company

IMMUNOLOGIX LABORATORIES

NEO GENOMICS

Organized by: The Boston Society

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APPLIED BIOMARKER ANALYSIS

2019 ABA SPONSORS

BIOCRATES LIFE SCIENCES
The Deep Phenotyping Company

BIOCRATES provides quantitative metabolomics kits and services. Our kits feature both polar molecules and lipids, and it is possible to quantitate over 600 molecules with our newest kit. We also have specialty kits and services for all of your metabolomics needs. Quantitative metabolomics allows for the development of sums and ratios of metabolites, which expands the potential for discovery of new biomarkers, signatures of health or disease, or probing into a drug's mechanism of action. We feature coverage of important metabolic pathways for many different disease areas, and our newest kit is especially relevant for microbiome research.

IMMUNOLOGIX LABORATORIES

IMMUNOLOGIX LABORATORIES is a science-based GLP and GCP compliant immunoassay laboratory focused solely on ligand binding based bioanalysis. We specialize in Immunogenicity, Neutralizing Antibody (cell based and ligand binding based), PK, and Clinical Biomarker assays in support of preclinical and clinical trials. The Translational Sciences Division provides enhanced experienced resources for technical strategy and implementation of bioanalytical and biomarker assays. Our customer-focused service model allows us to customize project execution for each client in a timely manner. The entire team has many years of CRO and industry experience in development, validation, and application of immunoassay-based methods.

NEO GENOMICS

NEOGENOMICS is an industry-leading cancer diagnostics and pharma services company. We enable advanced oncology patient care leveraging the most extensive diagnostic solid tumor and hematological test menus, sub-specialized pathology, and expertise in biomarker development. We partner closely with our pharma and research clients to meet program objectives and delivery from biomarker discovery through CDx validation and commercialization.

APPLIED BIOMARKER ANALYSIS

ORGANIZERS' WELCOME

Welcome to the 2019 Applied Biomarker Analysis Meeting.

Our organizers have gathered an excellent group of speakers for the first annual ABA meeting. The program is arranged to incorporate extensive audience participation and discussion. We encourage attendees to take full advantage of the opportunity to engage in discussion in order to receive the maximum benefit from the ABA experience.

Thank you for your participation.

ORGANIZING COMMITTEE

Presiding Chairs

Chairs: Dieter Drexler, Bristol-Myers Squibb
Patrick Bennet, PPD Laboratories

Committee Members

Emily Chen, ThermoFisher
Omar Laterza, Merck
John Moriarity, Covance
Hendrick Neubert, Pfizer
Paul Rhyne, Immunologix Labs
Robyn Rourick, Genentech
Russell Weiner, Bill & Melinda Gates Medical Research Institute

The Boston Society

APPLIED BIOMARKER ANALYSIS

ABA 2019 MEETING AGENDA

THURSDAY, NOVEMBER 14

8:00 - 9:00 REGISTRATION

9:00 - 9:05 Conference Opening
Patrick Bennet, PPD Laboratories & Dieter Drexler, Bristol-Myers Squibb

9:05 - 9:10 Welcome to Bristol-Myers Squibb
Michaela Bowden, Bristol-Myers Squibb

PLENARY LECTURE

9:10 - 9:50 *Precision Medicine Hype and Reality from Biomarkers to Wearables*
John Wagner, Foresite Capital

SESSION I: Biomarkers in Early Development

9:50 - 9:55 Session Introduction
Paul Rhyne, Immunologix Labs

9:55 - 10:25 *Parallelism: The Foundation of Biomarker Assay Development and Validation*
Lauren Stevenson, Immunologix

10:25 - 10:55 *Commercial Biomarker Assays: Challenges and Solutions*
Sally Fischer, Genentech

10:55 - 11:15 Break

11:15 - 11:45 *Development Considerations for the Design of Biomarker Assays for Multiple Species*
Greta Wegner, Bio-Techne

11:45 - 12:15 *Paving the Road for Small Molecule Biomarkers of Drug Transporters and CYPs in Clinical Studies: A Bioanalytical Perspective Using LC-HRMS*
Ragu Ramanathan, Pfizer

12:15 - 1:30 Lunch and Networking

1:30 - 2:00 Vendor Talk: Biocrates, NeoGenomics, Immunologix

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SESSION II: Biomarkers in Clinical Development

2:00 - 2:05 Session Introduction
Russell Weiner, Bill & Melinda Gates Medical Research Institute

2:05 - 2:35 *The Role of TB Laboratories in Clinical Trials: Think Globally, Act Locally*
Kelly Stinson, Cultura, Incorporated

2:35 - 3:05 *Defining the Role of Exploratory and Clinical Flow Cytometry Assays in Clinical Trials: A Provider's Perspective*
Nicholas Jones, NeoGenomics

3:05 - 3:25 Break

SESSION III: Biomarkers Outside Regulated Space

3:25 - 3:30 Session Introduction
John Moriarity, Covance

3:30 - 4:00 *The Long and Winding Road: Regulated and Non-Regulated Biomarker Analysis in Support of Drug Development*
Steven Piccoli, GSK

4:00 - 4:30 *Precision Medicine & the Use of Companion Diagnostics*
Tom Turi, Covance

4:30 - 4:35 Plenary Speaker Introduction
Russell Weiner, Bill & Melinda Gates Medical Research Institute

PLENARY LECTURE

4:35 - 5:15 *Discovery and Application of Biomarkers of Therapeutic Response and Resistance in Cancer*
David Liu, DFCI/Harvard Medical School

5:15 - 5:30 Open Discussion

5:30 - 6:30 Evening Reception hosted by The Boston Society

ABSTRACTS

SESSION I: Biomarkers in Early Development

Parallelism: The Foundation of Biomarker Assay Development and Validation

Lauren Stevenson, Immunologix

Parallelism has been a hot topic of discussion at multiple workshops and conferences for over a decade. Despite the multiple forums devoted to this topic, gaps in breadth and depth of conceptual understanding of parallelism amongst professionals across industry, academia and regulatory agencies remain, including a clear understanding of what differentiates parallelism from dilutional linearity. This presentation will clarify these concepts and summarize the foundational role of parallelism assessments in LBA biomarker assay development and validation. Beyond the classical purpose of parallelism, which is to demonstrate that the sample dilution response curve is parallel to the standard calibrator response curve, thereby demonstrating the suitability of the calibrator material, parallelism informs numerous other assay parameters, including: selection of surrogate matrix/assay buffer; establishment of the assay's minimum required dilution (MRD); evaluation of selectivity; and determination of the lower limit of quantification (LLOQ) for the endogenous analyte.

Commercial Biomarker Assays: Challenges and Solutions

Sally Fischer, Genentech

The high rate of drug failure during clinical development has triggered an interest in incorporating measurement of biomarkers in clinical trials to optimize smarter decision-making and investment of resources. Commercial kits can provide a convenient solution for measuring circulating biomarkers to support drug development. However, their suitability should be assessed. a challenge for drug developers is that most commercial kits use different reference standards, surrogate matrix for standard curves, and the vendors' kit evaluation of assay performance seldom includes the disease populations that are of interest for drug development. Therefore, although kits do provide a seemingly simple alternative, the users need to implement additional performance evaluation.

This talk will present case studies from using kits from well-established technologies and their ability to measure biomarkers of interest and discuss the challenges and consideration on using commercial kits and new technologies.

Development Considerations for the Design of Biomarker Assays for Multiple Species

Greta Wegner, Bio-Techne

The development of multi-species assays requires the strategic optimization of antigen and antibody design, diluent formulation, and analytical detection method. The desired reactivity of an assay to be specific for a single species or to detect an analyte across multiple species must be established prior to the initiation of development activities. Analyte homology across species is a determinant on what type of immunogen may be used to generate antibodies as well as which biological components may be included in diluent formulations. In cases of high homology, the serum levels across species may vary significantly impacting assay performance characteristics. When developing across platforms, antibody selection is also dependent on differences in antibody immobilization across material substrates such as plastic microplates, magnetic beads, and glass nano-reactors. The non-specific interactions of multiple antibody pairs present unique challenges to the development of multiplexing assays. In this talk these assay design considerations will be illustrated by examples across multiple analytical formats including Quantikine and DuoSet ELISA, Luminex, and Simple Plex assays.

SESSION II: Biomarkers in Clinical Development

The Role of TB Laboratories in Clinical Trials: Think Globally, Act Locally

Kelly Stinson, Cultura Incorporated

The development of new drugs for tuberculosis is complicated by the lack of concrete biomarkers to measure treatment response. The current standard requires repeat sputum sampling during therapy, a sample that is fraught with challenges in collection, storage, and manipulation. The presentation will focus on the pros and cons of utilizing local laboratories for efficacy analysis in countries where TB is endemic and resources for high-quality clinical trials are often scarce.

Defining the Role of Exploratory and Clinical Flow Cytometry Assays in Clinical Trials: A Provider's Perspective

Nicholas Jones, NeoGenomics

With the rise of clinical, exploratory, and predictive biomarkers in drug development, implementation of flow cytometry assays in clinical trials can generate significant information about novel drug therapies. To this end, important considerations regarding assay development, validation, and deployment must be addressed. This is most critical when testing is performed at multiple sites, local or across the globe. Concise communication is essential between sponsor and provider to ensure, from the beginning, that the assay design and level of validation meets all requirements. This phase should not be taken for granted as it is critical for assay performance to meet clinical or exploratory study objectives. Lack of understanding of intended use of the assay/data could result in failure to meet study goals. This presentation will address various assay requirements for successful implementation.

SESSION III: Biomarkers Outside Regulated Space

The Long and Winding Road: Regulated and Non-Regulated Biomarker Analysis in Support of Drug Development

Steven Piccoli, GSK

The veritable morass of regulations pertaining to human subject testing in both clinical and non-clinical situations leads to problematic choices in determining the optimal pathway for both biomarker assay development and clinical trial data generation whether in support of a diagnostic claim or not. As an additional complication, frequently these needs will change during the course of exploratory to clinical development. With the end goal in mind of providing actionable information to enhance medical care of patients, technologies and testing paradigms must be carefully chosen to allow efficient development while navigating multiple pathways of regulatory oversight. This presentation will focus on the necessary decisions to implement effective choices along the road leading to CLIA/CAP testing in a clinical trial setting.

BIOGRAPHIES

Sally Fischer, PhD, Genentech

Sally joined Genentech as a Research Scientist in 2000. She moved to Development Sciences department in 2003 and is currently a Principal Scientist/Associate Director in the Assay Development and Technology (ADT) group within the Bioanalytical Sciences (BAS) department. Sally and her group are responsible for development of assay strategies and implementation of novel technologies to evaluate the pharmacokinetics (PK), anti-drug antibodies (ADA) as well as biomarkers to support Genentech studies and enable IND, BLA, NDA and related filings. Her group's focus is to provide data that will support development of novel therapeutics in both immunology and neuroscience therapeutic areas in the Genentech development pipeline.

Nicholas Jones, NeoGenomics Laboratories

Nicholas Jones is the Global Flow Lead - Pharma Services for NeoGenomics Laboratories. Active in the field of flow cytometry assay development since 2000, Nick is responsible for establishing a world-class, global flow cytometry offering, servicing the pharmaceutical and biotech industry in support of research, translational and clinical trial studies. In this role, he is responsible for the overall scientific conduct of NeoGenomics Pharma Services global laboratory flow cytometry operations. The Global Flow Lead provides consultation and guidance with clients to design effective and scientifically appropriate validation procedures for customized solutions to support pharma development.

David Liu, MD MPH MS, DFCI/Harvard Medical School

Dr. Liu is a medical oncologist and computational biologist at the Dana-Farber Cancer Institute with affiliations at Harvard Medical School, Brigham and Women's Hospital, and the Broad Institute. He received a BA in Economics and MS in Computer Science at Stanford University and was a software engineer and data analyst at Amazon.com before changing careers and going into medicine, receiving his MD and MPH from Johns Hopkins. He did his residency training at Johns Hopkins Hospital, hematology/medical oncology fellowship at DFCI/Harvard CancerCare, and postdoctoral training in Dr. Eliezer Van Allen's lab. His lab studies tumor evolution and heterogeneity, and Dr. Liu has published and presented on genomic determinants of therapeutic response across multiple tumor types and therapies. He is a recipient of the Damon Runyon Cancer Research Foundation Physician-Scientist Training Grant, Society for Immunotherapy of Cancers Postdoctoral Fellowship Award, NIH K08 career development award, Conquer Cancer Foundation Young Investigator Award, and American Association of Cancer Research Rising Stars award.

Steven Piccoli, PhD, GSK

Dr. Piccoli is a recognized international expert in clinical biomarkers with extensive contributions to in vitro diagnostics (IVD) and clinical chemistry. He joined GSK in 2018 as Head, Clinical Biomarkers, Oncology, and is currently Senior Director in Precision Medicine and Companion Diagnostics. Prior, he has successfully led clinical and analytical teams in the pharmaceutical, biotechnology, and medical/companion diagnostics industries at Novartis, J&J, and BMS, and founded three biotechnology companies including a CLIA regulated CRO to conduct medical device trials and accelerate IVD submissions to the FDA. In addition, he has served on the Medical Devices Panel in Immunology of the FDA (CDRH) and is engaged in public/private partnerships (Critical Path Institute, Predictive Safety Testing Consortium, FNIH, Biomarkers Consortium, Alzheimer's Drug Discovery Foundation, and Bill Gates Catalyst 3), and is senior author of the C-Path white paper to advance and harmonize scientific and regulatory aspects of biomarker qualification for regulatory submissions.

Ragu Ramanathan, PhD, Pfizer

Ragu Ramanathan is a Director of Global Small Molecule Bioanalysis in the Global Bioanalytical Laboratories at Pfizer Inc. (CT, USA). Ragu earned his BS degree in Chemistry from the University of Southern Mississippi (MS, USA) (1988) and a PhD degree in Analytical/Physical Chemistry from the University of Florida (FL, USA) (1994). Ragu's postdoctoral research was performed at Washington University (MO, USA) (1995-1997). Through a research grant from the NIH, at Washington University Mass Spectrometry resources, Ragu expanded his training in mass spectrometry through application to breast cancer research and protein characterization. From this training, Ragu's interest ventured into application of mass spectrometry at several pharmaceutical research and contract research organizations, including Analytical Bio-Chemistry Laboratories (MO, USA), Schering-Plough Research Institute (now Merck; NJ, USA), Warner-Lambert (now Pfizer; MI, USA), Bristol-Myers Squibb (NJ, USA), QPS (DE, USA), and Pfizer, Inc. (CT, USA). Through collaborations and direct contributions, Ragu was fortunate to have published over 65 peer-reviewed research papers and over 12 book chapters in pharmaceutical bioanalysis, drug metabolism, metabolite identification, ion-molecule reactions, high resolution mass spectrometry and clinical biomarkers.

Lauren Stevenson, Imunologix

Lauren is Vice President of Translational Sciences at Immunologix Laboratories where she is leveraging her experience from both small and large biotech/pharma sectors to build a world class team of scientists who will partner directly with clients to provide translational strategies, facilitate regulatory engagements and deliver the assays, datasets and integrated analyses to advance drug development programs. Lauren is a recognized industry-wide thought leader in biomarker development and large molecule bioanalysis and immunogenicity. She brings 20+ years of drug development experience, building and leading scientific teams with expertise in setting bioanalytical and biomarker strategies and developing PK, immunogenicity and biomarker assays in support of therapeutic programs that span multiple modalities and disease indications through all stages of development, from discovery to post-market. Using integrated scientific approaches, Lauren's teams have a strong track record of reliably delivering high caliber science coupled with increased efficiencies that enable them to 'do more with less' and influence industry best practices and regulatory guidance. Externally, Lauren has authored multiple white papers and engages the broader industry and regulatory agencies as an invited speaker and course instructor at multiple conferences and workshops each year. In concert with her scientific role, Lauren is passionate about people development, has received certification as a Strengths coach and is active in mentorship and career development programs.

Kelly W. Stinson, MPH, Cultura, Incorporated

Kelly W. Stinson, MPH, oversees Cultura, Incorporated, LLC, a microbiology consulting company that leverages global laboratory, public health, and clinical research experience to support clinical trials for tuberculosis (TB) control and prevention and for development of new TB drugs and treatment regimens. Cultura specializes in laboratory gap analyses, development of plans and procedures to bridge those gaps, hands-on training and technical support to build capacity and maintain quality in those laboratories, and project management to operationalize clinical trial protocols for TB research. Major clients include Gates Medical Research Institute, Otsuka Pharmaceutical Development and Commercialization, Pharmaceutical Product Development (PPD), and Novartis Pharma AG. As a former employee of Otsuka, Kelly gained expertise in performing industry-standard TB drug development clinical trials for multi-drug tuberculosis (MDR TB) in support of the successful registration of delamanid (Deltyba®), one of the first new drugs registered for TB treatment in nearly 40 years. For this registration program, she supported all microbiological aspects of the trials including management and oversight of more than 15 global laboratories for participation in Phase 2 and Phase 3 clinical trials. As a former CDC employee, Kelly collaborated with several national and international partners to execute TB research and TB/HIV surveillance, and utilized outcomes to inform WHO policy.

Thomas Turi, PhD, Covance

Thomas Turi is Vice President Companion Diagnostics for Covance Central Laboratory Services. He joined Covance in 2008 to establish the Biomarker Center of Excellence and was integral to the acquisition of the Covance Genomics Laboratory and the formation of Covance's Discovery and Translational Services business unit. More recently, he has led CLS' expansion in Companion Diagnostics. Previously, Dr. Turi spent fifteen years at Pfizer, where he held a broad array of scientific leadership positions of increasing responsibility. Most recently he served as the Senior Director of Translational Biomarkers and Mechanistic Biology at Pfizer's laboratories in Groton, Connecticut.

In addition to his current responsibilities, Dr. Turi served on the Board of Trustees for The Life Sciences Foundation and on the Board of Directors for Caprion Proteomics. Additionally, he has led or participated in numerous external partnerships, including Rules Based Medicine, Celera, Incyte and Affymetrix.

Dr. Turi received dual bachelor's degrees in Biochemistry and Chemistry from the University of Illinois at Urbana-Champaign, and his doctorate in Molecular Genetics from the University of Cincinnati College of Medicine. He completed postdoctoral training at the Yale University School of Medicine applying molecular genetic techniques to investigate the mechanisms of protein transport.

He has participated on grant and program project review boards for NASA's Section for Biotechnology and Tissue Engineering.

John A. Wagner, MD, PhD, FCP, FAAPS, Foresite Capital

John A. Wagner is a Partner at Foresite Capital overseeing venture capital investments in the biomedical and diagnostic areas. He is also currently Editor-in-Chief, *Clinical and Translational Science*. Dr. Wagner has over 20 years of experience in pharmaceuticals, drug research and development, translational medicine, experimental medicine, clinical pharmacology, biomarkers and surrogate endpoints, modeling and simulation, precompetitive collaboration, project leadership and management, portfolio management and prioritization, and scientific strategy. Until recently he was the Senior Vice President and Head of Clinical and Translational Sciences at Takeda Pharmaceuticals International Co. Dr. Wagner received his M.D. from Stanford University School of Medicine and Ph.D. from the Johns Hopkins University School of Medicine. Postgraduate training included Internal Medicine Internship and Residency, as well as Molecular and Clinical Pharmacology Postdoctoral Fellowships at Stanford. He began his professional career in academic research on Cystic Fibrosis and has continued in the pharmaceutical industry, largely in the context of drug development as well as biomarkers. Previously, Dr. Wagner's professional positions included Past-President, the American Society for Clinical Pharmacology and Therapeutics (ASCPT), Senior Consultant to the Institute of Medicine, Vice President and Head, Early Development Pipeline and Projects and Head, Global Project Management at Merck & Co., Inc., Vice President and Head, Clinical Pharmacology, at Merck & Co., Inc and Acting Modeling and Simulation Integrator, Strategically Integrated Modeling and Simulation at Merck & Co., Inc. He is the past chair of the PhRMA Clinical Pharmacology Technical Group, past chair of the adiponectin work group for the Biomarkers Consortium, past committee member of the National Academies Institute of Medicine Committee on Qualification of Biomarkers and Surrogate Endpoints in Chronic Disease, and past member of the National Academies Forum on Drug Discovery, Development, and Translation and National Cancer Policy Forum. Over 200 peer-reviewed publications detail work across a variety of therapeutic areas and disciplines.

Greta Wegner, PhD, Bio-Techne

Greta Wegner leads the ELISA business unit for the R&D Systems brand at Bio-Techne in Minneapolis, MN. She received a bachelor's degree in chemistry from Concordia College and a Ph.D. in chemistry from the University of Wisconsin-Madison. Greta began her career as a bench scientist developing blood glucose test strips and then transitioned to focus on the development of assay products to serve the spectrum of customers from discovery to clinical research. In her current role, she leads the product management and development teams designing ELISA, Luminex, and Simple Plex products as well as custom assay solutions.

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Thank you to all of our Organizers, Speakers, Sponsors and Delegates!

Without your dedication, support and participation ABA 2019 would not be possible. We greatly value your comments regarding ABA 2019 as well as thoughts or suggestions for improving future conferences.

Please take the time to fill out our survey when we send it to you next week.

Sincerely,

The Boston Society