17th Annual
Discovery on TARGET

The Industry’s Preeminent Event on Novel Drug Targets and Technologies
September 16-19, 2019
The Westin Copley Place
Boston, MA

CONFERENCE PROGRAMS
September 17-18
- Target Identification and Validation
- Lead Generation Strategies
- Emerging Ubiquitin and Autophagy Targets
- Targeting NASH
- Immuno-Oncology: Emerging Targets and Therapeutics NEW!
- Antibodies Against Membrane Protein Targets – Part 1
- Antibody Forum – Part 1
- TS: Targeting GPCRs for Drug Discovery

September 18-19
- RNA as a Drug Target
- Kinase Inhibitor Discovery
- PROTACs and Targeted Protein Degradation NEW!
- Targeting Fibrosis NEW!
- GPCR-Based Drug Discovery
- Antibodies Against Membrane Protein Targets – Part 2
- Antibody Forum – Part 2
- TS: Introduction to Small Molecule Drug Discovery and Development
- TS: Practical Phenotypic Screening

PLENARY KEYNOTE PROGRAM
Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD
Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

PROTACs: Past, Present, and Future
Craig M. Crews, PhD
Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

Plenary Keynote Introduction Sponsored by Syngene

FINAL WEEKS TO REGISTER

DiscoveryonTARGET.com

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**VIEW**
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**“**
Discovery on Target gave us a platform to make real connections with the leading experts in cell & gene therapy to collaborate on their ground-breaking research.

– Marketing & Client Development Manager, Aldevron
The 17th Annual Discovery on Target (DOT), the industry’s preeminent event on novel drug targets and technologies, will convene over 1,300 drug discovery professionals in Boston, MA, on September 16-19, 2019. This event highlights advances in current and emerging “hot” targets and technologies, as well as target validation strategies for the discovery and development of novel therapeutic agents, ranging from biologics to small molecules. Delegates can customize their experience at the event by choosing from 14 conference programs, plus focused training seminars, comprehensive short courses, moderated roundtables and networking functions to meet their own research needs and those of their organizations.

Additions for 2019 include new programming dedicated to PROTACs and their applications, drugs and targets in fibrosis, novel immune-oncology targets, RNA as an emerging target for small molecule drugs, along with expanded coverage of protein engineering and novel biotherapeutics.
SPONSOR, EXHIBIT AND LEAD GEN OPPORTUNITIES

Comprehensive sponsorship packages allow you to achieve your objectives before, during, and long after the event. Signing on earlier will allow you to maximize exposure to hard-to-reach decision-makers.

Podium Presentations—Available within Main Agenda!
Showcase your solutions to a guaranteed, targeted audience. Package includes a 15 or 30-minute podium presentation on the scientific agenda, exhibit space, branding, full conference registrations, use of the event mailing list and more.

Luncheon Presentations
Opportunity includes a 30-minute podium presentation in the main session room. Lunch will be served to all delegates in attendance. A limited number of presentations are available for sponsorship and they will sell out quickly. Sign on early to secure your talk!

Invitation-Only VIP Dinner/Hospitality Suite
Select specific delegates from the pre-registration list to attend a private function at an upscale restaurant or a reception at the hotel. From extending invitations, to venue to suggestions, CHI will deliver your prospects and help you make the most of this invaluable experience.

Exhibit
Exhibitors will enjoy facilitated networking opportunities with qualified delegates, making it the perfect platform to launch a new product, collect feedback, and generate new leads. Exhibit space sells out quickly, so reserve yours today!

Additional branding & promotional opportunities include:
- Hotel Room Keys
- Footprint Trails
- Staircase Ads
- Conference Tote Bags
- Literature Distribution (Tote Bag Insert or Chair Drop)
- Badge Lanyards
- Program Guide Advertisement
- Notepads
- Water Bottles
- Seating Area Sponsor
- Meter Boards
- Hanging Aisle Sign

To learn more about sponsorship and exhibit opportunities, please contact:

Rod Eymael  Manager, Business Development
781.247.6286  reymael@healthtech.com

2018 ATTENDEE DEMOGRAPHICS
Attendees included industry leaders, innovators and decision makers from many different backgrounds

Looking for additional ways to drive leads to your sales team?
CHI’s Lead Generation Programs will help you obtain more targeted, quality leads throughout the year. We will mine our database of 800,000+ life science professionals to your specific needs. We guarantee a minimum of 100 leads per program! Opportunities include:

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Join 1,300 of your colleagues for the Discovery on Target Plenary Keynote Program. Bridging both halves of the event, it’s the only time our whole community of drug discovery professionals assembles in one room to learn about big-picture perspectives, innovative technologies, and thought-provoking trends from luminaries in the field.

PLENARY KEYNOTE PROGRAM

WEDNESDAY, SEPTEMBER 18 | 12:20 - 2:00 PM

12:20 pm Event Chairperson's Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

Point mutations represent most known human genetic variants associated with disease but are difficult to correct cleanly and efficiently using nuclease-based genome editing methods. I will describe the development, application, and evolution of base editing, a new approach to genome editing that directly converts a target base pair to another base pair in living cells without requiring double-stranded DNA breaks or donor DNA templates. We have recently expanded the scope of base editing by enhancing its efficiency, product purity, targeting scope, and DNA specificity, and have integrated these developments with in vivo delivery methods to treat animal models of human genetic diseases.

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry, Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

The ability to control protein levels using PROTACs is changing how drugs are being developed and is expanding our concept of the druggable target space. Moreover, PROTACs offer the advantages of siRNA but with more favorable pharmaceutical properties (ADME, biodistribution, routes of administration). For the past 18 years, Professor Crews has pioneered the development of this new modality from concept to clinical trials. Here he will describe the current and future trends in this fast-paced, exciting new therapeutic field.

2:00 Close of Plenary Keynote Program

*For updated Plenary Keynote details, visit: DiscoveryOnTarget.com/plenary-keynotes

PLENARY KEYNOTE BIOGRAPHIES:

David R. Liu, PhD
Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

David R. Liu is the Richard Merkin Professor, Director of the Merkin Institute of Transformative Technologies in Healthcare, and Vice-Chair of the Faculty at the Broad Institute of Harvard and MIT. Thomas Dudley Cabot Professor of the Natural Sciences and Professor of Chemistry and Chemical Biology at Harvard University; and Howard Hughes Medical Institute Investigator. Liu graduated first in his class at Harvard in 1994. During his PhD research with Professor Peter Schultz at UC Berkeley, Liu initiated the first general effort to expand the genetic code in living cells. Liu has published ≥170 papers and is the inventor of ≥65 issued U.S. patents. In 2016 he was named one of the Top 20 Translational Researchers in the world by Nature Biotechnology, and in 2017 was named to the "Nature's 10" researchers in the world and to the Foreign Policy Leading Global Thinkers. Liu's research integrates chemistry and evolution to illuminate biology and enable next-generation therapeutics. Base editing (named one of four 2017 Breakthrough of the Year finalists by Science), phage-assisted continuous evolution (PACE), and DNA-templated synthesis are three examples of technologies pioneered in his laboratory. He is the scientific founder or co-founder of six biotechnology and therapeutics companies, including Editas Medicine, Pairwise Plants, Exo Therapeutics, and Beam Therapeutics.

Craig M. Crews, PhD
Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

Dr. Crews is the American Cancer Society Professor of Molecular, Cellular and Developmental Biology and holds joint appointments in the departments of Chemistry and Pharmacology at Yale University. He graduated from the University of Virginia with a BA in Chemistry and received his PhD from Harvard University in Biochemistry. Dr. Crews has a foothold in both the academic and biotech arenas; on the faculty at Yale since 1995, his laboratory pioneered the use of small molecules to control intracellular protein levels. His first company, Proteolix, developed the proteasome inhibitor, Kyprolis® for the treatment of multiple myeloma. His second venture, Arvinas, applies his lab's PROTAC 'induced protein degradation' technology to drug development. He has received numerous awards and honors, including the CURE Entrepreneur of the Year Award (2013), Ehrlich Award for Medicinal Chemistry (2014), Yale Cancer Center Translational Research Prize (2015), a NIH R35 Outstanding Investigator Award (2015), the AACR Award for Outstanding Achievement in Chemistry in Cancer Research (2017), the Khorana Prize from the Royal Society of Chemistry (2018), the Pierre Fable Award for Therapeutic Innovation (2018), the Pharmacia-ASPET Award for Experimental Therapeutics (2019) and was named an American Cancer Society Professor in 2018.
Discussions separating the hope from the hype. It goes into the caveats and with explaining the basic terminology used and what it means, followed by Drug Discovery and Development Identification and Validation Program, Department of Experimental Geoffrey Bartholomeusz, PhD, Associate Professor and Director, Target Research, U.S. Food and Drug Administration

Instructors: Madhu Lal-Nag, PhD, Program Lead, Research Governance

Experimental design to data analysis, will be discussed.

cell cultures in your lab. The challenges working with 3D cell cultures, from when setting up low- and high-throughput screening experiments using 3D and growth matrices, what worked, what didn’t and what you need to consider experiences on how they tested and evaluated various cell culture reagents used, specifically for oncology research. The instructors will share their models currently available and where and how these models are being discussed. We will examine emerging technologies and strategies for enabling the isolation of functional anti-ion channel antibodies and highlight progress via case studies.

Instructor: Trevor Wilkinson, PhD, Associate Director, Antibody Discovery and case studies.

Ion channels are important therapeutic targets and currently represent the second largest target class addressed by therapeutic drugs. Significant opportunities exist for targeting ion channels with antibodies, but to date it has been challenging to discover therapeutic antibodies against them. This course will examine emerging technologies and strategies for enabling the isolation of functional anti-ion channel antibodies and highlight progress via case studies.

Instructor: Trevor Wilkinson, PhD, Associate Director, Antibody Discovery and Protein Engineering, AstraZeneca BioPharmaceuticals Unit, United Kingdom

A comprehensive overview of different display technologies as well as screening approaches for the selection of specific binders. In addition, it will discuss engineering strategies including affinity maturation and how to implement these strategies. Classical antibodies and antibody fragments as well as alternative binding scaffolds will also be covered.

Instructors: Jonas V. Schafer, PhD, Laboratory Head, Novartis Institutes for BioMedical Research (NIBR), Switzerland

Christian Kunz, PhD, Director, Discovery Alliances & Technologies, MorphoSys AG, Germany

This course will provide an overview of 3D cell culture and spheroid models currently available and where and how these models are being used, specifically for oncology research. The instructors will share their experiences on how they tested and evaluated various cell culture reagents and growth matrices, what worked, what didn't and what you need to consider when setting up low- and high-throughput screening experiments using 3D cell cultures in your lab. The challenges working with 3D cell cultures, from experimental design to data analysis, will be discussed.

Instructors: Madhu Lal-Nag, PhD, Program Lead, Research Governance Council, Office of Translational Sciences, Center for Drug Evaluation & Research, U.S. Food and Drug Administration

Geoffrey Bartholomeusz, PhD, Associate Professor and Director, Target Identification and Validation Program, Department of Experimental Therapeutics, Division of Cancer Medicine, The University of Texas MD Anderson Cancer Center

This course aims to educate a diverse group of scientists-chemists, biologists, toxicologists, and those involved in translational and clinical research, about the growing use and applications of AI & ML. Talks start with explaining the basic terminology used and what it means, followed by discussions separating the hope from the hype. It goes into the caveats and limitations in AI and ML, while exploring ways in which it can be successfully applied in the drug discovery and development pipeline. There will be experts from various areas presenting case studies on how they have used AI/ML tools for lead optimization, target discovery, visualizing and classifying large datasets, patient stratification and more.

Instructors: Arvind Rao, PhD, Associate Professor, Department of Computational Medicine and Bioinformatics, University of Michigan

Daniel Anderson, PhD, Vice President, Biology, Recursion Pharma

Paul Rohricht MS MBA, Chief Business Officer – Pharma, Nuritas Corporation

Kuan-Fu Ding, MSc, PhD, Chief Science Officer, Sapiens Data Science

Ion channels are important therapeutic targets and currently represent the second largest target class addressed by therapeutic drugs. Significant opportunities exist for targeting ion channels with antibodies, but to date it has been challenging to discover therapeutic antibodies against them. This course will examine emerging technologies and strategies for enabling the isolation of functional anti-ion channel antibodies and highlight progress via case studies.

Instructor: Trevor Wilkinson, PhD, Associate Director, Antibody Discovery and case studies.

The high-resolution structures of G protein-coupled receptors (GPCRs) determined by X-ray crystallography and recently by cryo-EM are rapidly impacting the pharmaceutical industry. This course will review the structural biology concepts and tools developed to date that enabled successful GPCR structural determination. We will also examine how the elucidated structures have informed our current understanding of GPCR function. Examples will be provided of how GPCR structural information is guiding rational design of subtype selectivity and functional selectivity for small molecules. Perspectives on current gaps in GPCR structure-based drug design will be provided at the end to stimulate deep thinking and discussion on how to overcome these hurdles.

Instructor: Huixian Wu, PhD, Principal Scientist, Structural and Molecular Sciences, Discovery Sciences, Pfizer, Inc.

Targeted protein degradation using molecular glues and bifunctional small molecules known as proteolysis-targeting chimeric molecules (PROTACs) are emerging as a useful tool for drug discovery, and as a new therapeutic modality for chasing previously “undruggable” targets. This course will cover the basic understanding of what these entities are, how they work and how they can be applied to target and degrade specific proteins of interest. Case studies drawn from the work that the instructors have done in their labs will also be presented.

Instructors: Alexander Statsyuk, PhD, Assistant Professor, Department of Pharmacological and Pharmaceutical Sciences, University of Houston

James Robinson, PhD, Team Leader, Discovery Sciences, AstraZeneca

Stewart Fisher, PhD, CSO, C4 Therapeutics

*Separate registration required
considerably expanded and revitalized the possibilities for GPCRs as therapeutic targets. Of NAMs, PAMs. I will illustrate how concepts introduced over the past 15 years have
(2) antagonists (with inverse agonists) and (3) allosteric modulators (characterization
GPCR ligands will be discussed: (1) agonists (with special reference to biased signaling),
properties to reduce attrition in late-stage drug development. Three major classes of
parameters, offset rates, etc. The desired outcome is to more fully define ligand
seen) through universal pharmacological scales such as affinity, efficacy, cooperativity
physiology. More specifically, this seminar describes the pharmacological procedures
needed to convert ‘descriptive data’ (what we see) to ‘predictive data’ (what will be
seen) through universal pharmacological scales such as affinity, efficacy, cooperativity
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GPCR ligands will be discussed: (1) agonists (with special reference to biased signaling),
(2) antagonists (with inverse agonists) and (3) allosteric modulators (characterization
of concepts introduced over the past 15 years have considerably expanded and revitalized the possibilities for GPCRs as therapeutic targets.

Instructor: Terry Kenakin, PhD, Professor, Department of Pharmacology, University of North Carolina School of Medicine

TS1: Targeting GPCRs for Drug Discovery
This training seminar is designed for medicinal chemists, biologists and scientists concentrating on discovering and developing drugs against G Protein-Coupled Receptors (GPCRs). The challenge the seminar addresses is how to predict therapeutic activity – because drug candidate profiles seen in in vitro test systems often do not adequately reflect in vivo responses due to the drug candidates’ interaction with variable ambient physiology. More specifically, this seminar describes the pharmacological procedures needed to convert ‘descriptive data’ (what we see) to ‘predictive data’ (what will be seen) through universal pharmacological scales such as affinity, efficacy, cooperativity parameters, offset rates, etc. The desired outcome is to more fully define ligand properties to reduce attrition in late-stage drug development. Three major classes of GPCR ligands will be discussed: (1) agonists (with special reference to biased signaling), (2) antagonists (with inverse agonists) and (3) allosteric modulators (characterization of NAMs, PAMs). I will illustrate how concepts introduced over the past 15 years have considerably expanded and revitalized the possibilities for GPCRs as therapeutic targets.

Instructor: Terry Kenakin, PhD, Professor, Department of Pharmacology, University of North Carolina School of Medicine

TS3: Introduction to Small Molecule Drug Discovery and Development
This lecture-based interactive seminar focuses on strategies for identifying drug discovery targets, discovering and characterizing small molecule hits, and developing structure-activity relationships to advance hits through lead optimization, preclinical development, and clinical evaluation. Participants will learn the stages and processes required to advance programs from idea to clinic, through examples and case studies. This seminar is intended for scientists in either academia or industry who would like to become more familiar with small molecule drug discovery and development.

Instructor: H. James Harwood Jr., PhD, Founder and CEO, Delphi BioMedical Consultants, LLC

TS4: Practical Phenotypic Screening
Phenotypic drug discovery is experiencing a renaissance in the pharmaceutical industry, based on its successful track record in delivering first-in-class medicines. This approach offers the promise of delivering both novel targets and chemical matter modulating a disease phenotype of interest. Although phenotypic screening may appear at first sight to be similar to target-based screening, there are some significant differences between the two approaches. These need to be properly considered and addressed to ensure the greatest likelihood of success for phenotypic drug discovery programs. This training seminar will cover a range of relevant topics with a goal of providing practical information to help prosecute such programs more effectively from assay design all the way to clinical trials.

Instructor: Fabien Vincent, PhD, Associate Research Fellow, Discovery Sciences, Pfizer, Inc.

**STUDENT FELLOWSHIP**

Full-time graduate and PhD candidates qualify for a student rate. Students are encouraged to present a research poster and receive an additional $50 off their registration fee. Students with a research poster will be recognized as a student fellow at the event.

**Deadline to submit a poster: August 16, 2019**
Finding novel, druggable targets for therapeutic intervention remains a top priority for the pharma/biotech industry. It also remains a formidable challenge and companies continue to invest a lot of time and resources in identifying and validating targets that will yield viable drugs. What are the challenges in target discovery today? What new tools and strategies are being used to identify targets and how well are they working? What’s being done to adequately validate the targets once they are identified? What efforts are being taken to go after difficult or “undruggable” targets? Cambridge Healthtech Institute’s conference on Target Identification and Validation will bring together leading experts to discuss some of these critical issues. This is a unique opportunity to meet and network with biologists and screening groups from around the world to share ideas and set up collaborations.

RECOMMENDED PREMIUM PACKAGE:
Choose 2 Short Courses and 2 Conferences/Training Seminars
- September 16 Pre-Conference Short Course: SC4: How to Best Utilize 3D Cells, Spheroids and PDx Models in Oncology
- September 17-18 Conference: Target Identification and Validation
- September 18 Dinner Short Course: SC9: Targeted Protein Degradation Using PROTACs, Molecular Glues and More
- September 18-19 Training Seminar: TS4: Practical Phenotypic Screening

MONDAY, SEPTEMBER 16
1:00 pm Pre-Conference Short Course Registration
Click here for details on short courses offered.

TUESDAY, SEPTEMBER 17
7:00 am Registration Open and Morning Coffee

TARGET DISCOVERY USING ADVANCED DISEASE MODELS

8:00 Organizer's Welcome Remarks

8:05 Chairperson's Opening Remarks
Roderick Beijersbergen, PhD, Group Leader, Division of Molecular Carcinogenesis and NKI Robotics and Screening Center, The Netherlands Cancer Institute

8:10 Exploring Opportunities – Synergy in Translational Science
Madhu Lal-Nag, PhD, Program Lead, Research Governance Council, Office of Translational Sciences, Center for Drug Evaluation & Research, U.S. Food and Drug Administration
Translation is the process of turning observations in the laboratory, clinic, and community into interventions that improve the health of individuals and the public — from diagnostics and therapeutics to medical procedures and behavioral changes. We will explore the challenges and solutions of identifying novel targets for rare diseases.

8:40 FEATURED PRESENTATION: CRISPR Screens in Challenging Model Systems
John Doench, PhD, Associate Director, Genetic Perturbation Platform, Broad Institute of Harvard and MIT
CRISPR screens have become the method of choice for large-scale assessment of gene function, but implementation in complex model systems remains a significant challenge. Here I will present the optimization of mouse models to discover modulators of tumor immunotherapy. Combinatorial screens present similar challenges and will also be discussed.

9:10 Aspartate/Asparagine Beta Hydroxylase (ASPH): A Potential Therapeutic Target for Overcoming HER2 Resistant Metastatic Breast Cancer
Geoffrey Bartholomeusz, PhD, Associate Professor and Director, Target Identification and Validation Program, Department of Experimental Therapeutics, Division of Cancer Medicine, The University of Texas MD Anderson Cancer Center
Inflammatory breast cancer (IBC), is a rare and extremely aggressive subtype of breast cancer. Mis-diagnosis and lack of effective therapies further compound the poor clinical outcome of this disease. We observed that Aspartate-beta-hydroxylase (ASPH), known to contribute to the aggressive behavior of cancers, is highly expressed in IBC. Our studies have also suggested that targeting ASPH could potentially improve our ability to treat IBC.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

CRISPR SCREENING FOR TARGET & OFF-TARGET IDENTIFICATION

10:25 Off-Target Toxicity is a Common Mechanism-of-Action of Cancer Drugs Undergoing Clinical Trials
Jason Sheltzer, PhD, Principal Investigator, Cold Spring Harbor Laboratory
We have found that cancer cells can tolerate CRISPR-Cas9 mutagenesis of many reported cancer drug targets with no loss in cell fitness. In contrast, RNAi hairpins and small-molecules designed against those targets continue to kill cells, even when their putative target has been knocked out. We suggest that many RNAi constructs and clinical compounds exhibit much greater off-target killing than previously realized, and several dozen clinical trials have been initiated based on irreproducible preclinical research.

10:55 Functional Genomics Screening in Primary Human T Cells to Identify Novel Targets for Autoimmune Diseases
Kristin Rockwell, Senior Scientist, Discovery Sciences, Pfizer
To identify new targets/pathways involved in autoimmune disorders, we have successfully developed two high throughput functional genomics screening platforms based on primary human T-cells, high throughput flow cytometry (HT-FCM) and nucleofection technology. A siRNA screen encompassing 2,000 genes was completed, followed by a CRISPR screen to validate hits. Assay design and optimization as well as the results of these functional genomics screening efforts in primary human T cells will be presented.

11:25 Beyond Viability: Sensor-Based CRISPR Screening
Roderick Beijersbergen, PhD, Group Leader, Division of Molecular Carcinogenesis and NKI Robotics and Screening Center, The Netherlands Cancer Institute
Large scale CRISPR screens have proven their power in many different screening models, predominantly based on read-outs associated with proliferation or survival. Recently, more complex screening models such as co-cultures, cell surface marker expression or reporter gene activation have been applied. The next step is the use of even more sophisticated reporter systems that measure specific biological processes or pathways. The development and application of examples of such systems will be discussed.

11:55 Transcriptome Profiling and Functional Screening to Identify Genes Driving Biological Responses and Disease Progression
Paul Diehl, PhD, C00, Cellecta, Inc.
Pooled libraries of heterogenous lentiviral constructs have proven to be an effective approach to individually label cells in a target population with cell-specific barcodes and/or other genetic effectors. NGS analysis of targeted multiplex RT-PCR from cell samples enables parallel...
analysis of differences in gene activation as a result of perturbation. These approaches can be used to gain a more comprehensive understanding of genetic pathways in disease.

12:25 pm Session Break

12:35 Luncheon Presentation: A Blueprint for Translational Integrated Drug Discovery

John Montana, PhD, Corporate Vice President, Integrated Drug Development and Strategic Projects, Charles River

What does the future of your drug discovery program look like? Historically high R&D costs and low success rates have emphasized the need to identify drugs focused on translationally relevant targets in the most cost and time efficient way. There are innovative ways to progress truly translational drug discovery projects in an increasingly complex and competitive environment. These case studies will demonstrate how to optimize operations and build a new model for drug development that emphasizes collaboration and novel approaches.

1:15 Refreshment Break in the Exhibit Hall with Poster Viewing

GENETICS-BASED TARGET DISCOVERY

1:50 Chairperson's Remarks

Paola G. Bronson, PhD, Scientist II, Human Target Validation Core (Translational Biology), Biogen, Inc.

1:55 Human Genetics-Based Target Identification & Validation for 2x Success in the Clinic

Narender R. Gavva, PhD, Director, Early Target Discovery, Takeda California, Inc.

Most expensive clinical pipeline attrition occurs for lack of efficacy. This could be due to an over-estimation of “effect size” in target validation efforts in preclinical species/models, mismatch of candidate mechanism and clinical indication(s), clinical trial design, etc. Utilization of patient genetics as target validation is yielding targets and mechanisms with higher success in the clinic (estimated at ~2x). This presentation covers different types of human genetics and how to follow up for target validation.

2:25 Genetic Studies of MS for Drug Discovery

Paola G. Bronson, PhD, Senior Scientist, Human Target Validation Core (Translational Biology), Biogen, Inc.

Over 200 loci are associated with multiple sclerosis (MS) susceptibility, but the non-immune component is unknown and the genetic contribution to disease severity is undefined. The goals of this study were: (a) to partition out the non-immune component of MS susceptibility loci; and (b) to evaluate the impact of common genetic variants on disease severity measures (brain atrophy and serum neurofilament light) using MS clinical trial participants. We applied a colocalization strategy to identify neurological targets for MS and potential adverse events, alternate indications, and biomarkers. Our study represents a step toward using objective, quantitative traits to examine the genetics of MS progression.

2:55 SPR Binding Studies of Small Molecule Inhibitors of PRMT5

Rebecca Eells, PhD, Associate Director, Biophysical Assays, Reaction Biology Corporation

Epigenetic modifications are dynamic, reversible processes that regulate gene expression without altering DNA sequence. The proteins involved, epigenetic modifiers, are attractive targets for therapeutics discovery/development since abnormal expression/alteration leads to disease. Reaction Biology offers a suite of services for epigenetic drug discovery, including biophysical assays to directly determine the kinetics/affinity of binding to the target. Here we present SPR data for small molecule inhibitors of PRMT5 that engage the target using distinct binding modes.

3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

4:05 Unbiased Compound-Target Interface Mapping through Forward Genetics

Moritz Horn, CEO, Acus Laboratories GmbH, Max Planck Institute for Biology of Ageing

Identifying druggable target structures and understanding an active molecules target space remain challenges in drug development. We established a chemical mutagenesis approach that allows entirely unbiased identification of small molecule targets at amino acid resolution, literally mapping compound-target interaction surfaces. Applied to relevant cellular systems, our screen uncovers specific drug target structures as well as entirely new ‘druggable’ targets in an unbiased and genome-wide manner.

4:35 An Evolutionary Cross-Species Approach to Context-Specifically Identify Essential Genes Using CRISPR Screens

Raghuvir “Ram” Viswanatha, PhD, Postdoctoral Research Fellow, Blavatnik Institute of Genetics, Harvard Medical School

Insect cell-lines are simple model animal cell-lines, possessing few paralogs while retaining most of the core signaling pathways underlying human disease. My research introduces new CRISPR-based functional screening strategies to insect cell-lines allowing high-resolution, genome-wide dissection of growth and signaling and uncovering new players. I will discuss published and ongoing work related to gene paralogy and redundancy, nuclear steroid hormone transport and signaling, and mTor-dependent control of cell proliferation.

5:05 Interactive Breakout Discussion Groups

Join a breakout discussion group. These are informal, moderated discussions from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

6:05 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

7:10 Close of Day

WEDNESDAY, SEPTEMBER 18

7:30 am Registration Open and Morning Coffee

CASE STUDIES USING PHENOTYPIC SCREENING & CHEMICAL BIOLOGY APPROACHES

8:00 Chairperson's Remarks

Jaimeen Majmudar, PhD, Principal Scientist, Chemical Biology, Pfizer, Inc.

8:05 Comparison of Target Identification Approaches Using an IRAK4 Inhibitor

Jeff Martin, PhD, Scientist II, Chemical Biology & Proteomics, Biogen, Inc.

Phenotypic screening is a key starting point for drug discovery that allows for the identification of small molecules that produce a beneficial phenotype in disease relevant models. Target identification of these small molecule hits from phenotypic screens is challenging due to the inherent complexity of the cellular systems involved. Comparison of multiple target identification...
approaches will be described in this talk including clickable photoprobes, affinity enrichment, and CETSA.

8:35 Influence of Post-Translational Modifications, Metals and Partner Proteins on the Fe-S Cluster Synthesis Machinery
Jaimeen Majmudar, PhD, Principal Scientist, Chemical Biology, Pfizer, Inc.
Recombinant proteins are routinely utilized for high-throughput screening for identification of lead chemical equity for drug development. While this has proven of immense value, translation of biochemical screens into cellular assays can be challenging. Using the example of the Fe-S cluster machinery proteins NFS1-ISD11-ACP-ISCU2 and FXN, we show that it is critical to understand recombinant systems in the context of metal dependence, complex formation and post-translational modifications.

9:05 Utilizing Integrated Real-World Health and Genomic Data Resources for Discovery
Manjinder Sandhu, CEO, Reader in Global Health & Population Sciences, University of Cambridge, Omnigen Biodata
Large-scale clinical and biodata resources have the potential to spur innovation in drug discovery and target validation and real world data analyses—enabling precision health initiatives and informing health policy to improve the health of individuals and populations. We now have opportunities to create and integrate real-world health and genomic data globally. I outline the value of such resources and approaches to build biodata alongside participants and providers—enabling compliance with data protection and privacy.

9:35 Coffee Break in the Exhibit Hall with Poster Viewing

10:20 Application of Chemical Proteomics in Drug Discovery: Selectivity Profiling and Target Identification
Hua Xu, PhD, Associate Research Fellow, Medicine Design, Pfizer
Chemical proteomics is a powerful and impactful tool and has been frequently used to address a number of key questions in drug discovery. A few case studies on selectivity profiling and target identification will be described to demonstrate its impact on preclinical and clinical programs at Pfizer.

10:50 - 11:50 BRIDGING LUNCHEON PANEL
DISCUSSION: GPCRs: Leveraging Years of Data for Transformative Drug Discovery
This 1-hour panel moderated by Michel Bouvier, PhD, Principal Investigator & CEO, Institute for Research in Immunology and Cancer (IRIC) and Professor, Department of Biochemistry and Molecular Medicine, Faculty of Medicine, Université de Montréal will feature two talks related to new horizons in GPCR drug discovery. The talks will be followed by a question and answer session.

- GPCR Mutations: Towards a More Personalized Drug Discovery
  Olivier Lichtarge, MD, PhD, Molecular and Human Genetics, Computational and Integrative Biomedical Research Center, Baylor College of Medicine

- Virtual Screening: A Post-Structural Era
  John Irwin, PhD, Adjunct Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

11:20 Conference Registration for Programs 1B-7B
11:50 Session Break

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.

12:20 pm Event Chairperson’s Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry, Pharmacology, Molecular, Cellular & Developmental Biology, Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing
2:45 Close of Target Identification and Validation Conference
RNA molecules are crucial for delivering cellular information and genetic regulation, but until recently, the drug discovery world has emphasized protein drug targets. Our lack of knowledge in RNA biology prevented us from exploring possibilities of RNA drug targets, but with recent advances in technologies such as sequencing, new therapeutic strategies are being explored. Join us at the inaugural RNA as a Drug Target conference, part of Discovery on Target, as we discuss RNA as a novel target site for therapeutics.

3:25 Directly Targeting RNA with Small Molecules
Meizhong Jin, PhD, Senior Director, Chemistry, Arrakis Therapeutics

RNA plays critical roles in gene expression and regulation and, as such, RNA molecules are implicated in human disease, often via the undruggable proteins expressed by those RNAs. RNA as a therapeutic target has been validated clinically by oligonucleotide drugs although with limitations. Recent advances in RNA structure and biology point to the exciting potential of directly targeting RNA with drug-like small molecules, offering potential advantages over oligonucleotides.

3:55 Inducing the Biogenesis of Mir-124 by the Drug Candidate ABX464 Opens a Novel Way to Treat Inflammatory Diseases
Jamal Tazi, PhD, Professor, University of Montpellier; Vice President, Research, ABIVAX; Director, Cooperative Laboratory ABIVAX-CNRS

ABX464 is a first-in-class, clinical-stage, small molecule for oral administration that has shown strong anti-inflammatory effects in patients with moderate to severe Ulcerative Colitis. ABX464 binds to the cap binding complex (CBC) leading to enhancement of the splicing of a single long noncoding RNA to generate the anti-inflammatory miR-124 in patients. The specific ability of ABX464 to generate anti-inflammatory miR-124 may pave the way of a safe and efficient treatment in several inflammatory diseases.

4:25 Refreshment Break in the Exhibit Hall with Poster Viewing

5:00 Precise and Potently Bioactive Small Molecules Interacting with RNA (SMiRNAs)
Suzanne Rzucek, PhD, Associate Scientific Director, Expansion Therapeutics

The expanding role of RNA in disease has led to exploring RNA as a drug target; however, the ability to selectively target RNA remains challenging. We have assembled technologies and tools to facilitate the identification of specific and potent novel small molecule binders of RNA. We will highlight this generally applicable technology to the design and study of potently bioactive and selective SMiRNAs targeting CUG repeats in Myotonic Dystrophy Type 1 (DM1).

5:30 Targeting Structurally and Functionally Diverse RNAs with Drug-Like Small Molecules
John S. Schneekloth Jr. (Jay), PhD, Principal Investigator, Chemical Biology Laboratory; Head, Chemical Genetics Section, Center for Cancer Research, National Cancer Institute, NIH

The past twenty years have seen an explosion of interest in the structure and function of RNA and DNA. While some 80% of the human genome is transcribed into RNA, just ~3% of those transcripts code for protein sequences. Here we discuss our group’s efforts to target RNA and DNA with drug-like small molecules using a Small Molecule Microarray (SMM) screening platform and the molecular basis for these interactions.

6:00 Targeting Pre-mRNA Splicing with Small Molecules
Marla Weetall, PhD, Vice President, Pharmacology, PTC Therapeutics

Pre-mRNA splicing is emerging as a key control point in the expression of disease-modifying genes. Mutations causing alterations in splicing may result in diseases. Small molecules that affect pre-mRNA splicing have been identified and are being clinically developed. At PTC, we have developed a general approach to discover and develop drugs targeting splicing. Here we describe the application of this approach to spinal muscular atrophy, familial dysautonomia, and Huntington’s disease.

6:30 Dinner Short Course Registration
Click here for details on short courses offered.
10:55 Enabling Modulation of RNA Biology in Human Disease with Small Molecules
Razvan Nutiu, PhD, Investigator, Chemical Biology & Therapeutics, Novartis
RNA biology is relevant to human disease and drug discovery. To enable drug discovery in the RNA space, several key challenges have to be addressed: what are the most relevant RNA biology phenotypes that affect human disease? What are the molecular interactions that control these phenotypes? What is the chemistry capable of modulating relevant RNA structures and/or RNA/protein complexes? The presentation aims to discuss some of these challenges and to propose an integrated approach to RNA targeted drug discovery using small molecules.

11:25 FEATURED PRESENTATION: Structure-Based Discovery of New Functions in Large RNAs
Kevin Weeks, PhD, Kenan Distinguished Professor of Chemistry, University of North Carolina
The functions of many RNA molecules – including mRNAs, long non-coding RNAs, and the genomes of RNA viruses – require that an RNA fold back on itself to create intricately and complexly folded structures. This talk will focus on recent progress in our lab with high-resolution RNA structure probing over large scales such that both secondary and tertiary structure elements can be identified and such that these structural data can be used to identify RNA elements likely to have direct and important roles in cellular function and gene regulation.

11:55 Biophysics-Based Drug Discovery for Epitranscriptomics: Fragment Derived Inhibitors of METTL3/METTL14
Stijn Gremmen, Head, Chemistry, ZoBio
Modulation of enzymes that modify RNA (epitranscriptomics) is gaining interest in drug discovery. Gotham Therapeutics and ZoBio are developing inhibitors of METTL3/METTL14, a SAM-dependent methyltransferase that modifies adenosine in mRNA to generate m6A and thereby regulates protein expression. Results from fragment screening and hit evolution that have further Gotham’s programs.

12:25 pm Session Break

12:35 Luncheon Presentation (Sponsorship Opportunity Available) or Enjoy Lunch on Your Own

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

FINDING THE DRUGGABLE STRUCTURES

7:30 Interactive Breakfast Breakout Discussion Groups
Grab a cup of coffee and join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

8:30 Transition to Sessions

SMALL MOLECULES TO TARGET RNA CONT.

8:40 Chairperson’s Remarks
Razvan Nutiu, PhD, Investigator, Chemical Biology & Therapeutics, Novartis

8:45 Translation Control Therapeutics
Kevin Pong, PhD, Vice President, Business Development, Anima Biotech, Inc.
Anima Biotech is advancing Translation Control Therapeutics, the first platform for the discovery of small molecule drugs that specifically control mRNA translation as a new strategy against many diseases. With novel biology that monitors the translation of proteins and proprietary cloud-based analysis software, we identify drug candidates that modulate a target protein’s production. We develop a pipeline across therapeutic areas and partner with Pharma for their targets including our +$1B collaboration with Lilly. Our approach was further validated with 5 granted patents, 14 peer reviewed publications and 17 scientific collaborations.

RNA-PROTEIN COMPLEXES

9:15 RNA Splicing Modulation… Application to CD33
Tom Chappie, Associate Research Fellow, Pfizer
GWAS studies on large populations of patients with late-onset Alzheimer’s Disease have identified a SNP in the innate immune-response receptor CD33 (Siglec 3) that is protective for Alzheimer’s disease. This protective SNP is hypothesized to induce an exon skipping event in the translation of CD33 protein. A phenomimetic strategy for hit identification of small molecule splicing modulators will be described.

9:45 Modulating the Epitranscriptomic RNA Modifications for Cancer Therapy
Pawel Sledz, PhD, Senior Scientist, Department of Biochemistry, University of Zurich
The modifications of transcriptomic RNA (also called epitranscriptomic modifications) have recently emerged as mechanism of regulation of gene expression, and due to implication in a number of diseases have attracted attention of the drug discovery community. We have pioneered early discovery in epitranscriptomic target space focusing on modulating the protein-RNA interactions (PRIs) and RNA-modifying proteins (RMPs), and delivered lead candidates in two programs. In my talk I will discuss the challenges and opportunities in this target space, as well as provide update on our portfolio: lead generation efforts, preclinical studies, and drug-discovery platform.

10:15 Coffee Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced
2:40 Cooperative RNA Modulation to Improve Iron Homeostasis Specific to Neurons while Providing Anti-Amyloid Efficacy as a Potential Alzheimer’s Disease Therapy

Jack Rogers, PhD, Director of Neurochemistry Laboratory, Associate Professor (HMS), Harvard University; Director of Neurochemistry Massachusetts General Hospital

The project describes an active collaboration between Drs. Jack Rogers, Catherine Cahill, Xudong Huang, Debmoy Lahiri to pursue RNA mediated therapies with the neurotrophin BL-1. This agent represses neuronal Prion Protein (anti amyloid), activates neuronal iron storage in ferritin and it can inhibit phosphorylation of the neurofibrillary associated tau protein.

3:10 PATrOL-Enabled Therapies Targeting Mutant RNA Primary and Secondary Structures

Letha Sooter, PhD, VP of Biology and Bioinformatics, NeuBase Therapeutics, Inc.

NeuBase is developing next-generation gene silencing therapies with a flexible, highly specific synthetic antisense technology. The proprietary peptide-nucleic acid (PNA) antisense oligonucleotide (PATrOL™) platform allows for the rapid development of targeted drugs, increasing the treatment opportunities for the hundreds of millions of people affected by rare genetic diseases, including those that are impossible to treat using traditional antisense approaches. Using PATrOL technology, NeuBase aims to first tackle rare, genetic neurological disorders.

3:40 PANEL DISCUSSION: What Have We Learned and Where Do We Go?

4:10 Close of Conference
Finding new drug leads for medical conditions with unmet solutions is one of the biggest hurdles in recent drug discovery as the "obvious" drug candidates have already been found. Plus, there are more molecular targets to develop new drugs against thanks to the rapid pace of medical research. Many of these new molecular targets are more complex, such as protein-protein interactions (PPIs) or protein-nucleic acid complexes, and move "drug hunters" into less explored chemical space from which to find or design appropriate lead compounds. Luckily, synthetic chemistry and other innovations have expanded the chemical space new drug leads can occupy while still fitting the properties of a "good drug". Join fellow discovery chemists and biologists at the Lead Generation Strategies conference to review the various advances and strategies for finding and creating novel drug leads in today's expanded chemical and molecular universe.

**RECOMMENDED PREMIUM PACKAGE:**
Choose 2 Short Courses and 2 Conferences/Training Seminars
- September 16 Pre-Conference Short Course: SC5: Applications of Artificial Intelligence and Machine Learning in Drug Discovery and Development
- September 17-18 Conference: Lead Generation Strategies
- September 18 Dinner Short Course: SC9: Targeted Protein Degradation Using PROTACs, Molecular Glues and More
- September 18-19 Conference: Kinase Inhibitor Discovery

**MONDAY, SEPTEMBER 16**
1:00 pm Pre-Conference Short Course Registration
Click [here](#) for details on short courses offered.

**TUESDAY, SEPTEMBER 17**
7:00 am Registration Open and Morning Coffee

**PROGRESSING FROM TARGET HITS TO DRUG LEADS**

8:00 Organizer's Welcome Remarks

8:05 Chairperson's Opening Remarks
Robert D. Mazzola, PhD, Director, Chemical Research, Merck Research Labs

8:10 FEATURED PRESENTATION: Interplay between Lead Generation and Target Validation in AbbVie Early Chemistry: A Wild-Type Isocitrate Dehydrogenase 1 Case Study
J. Brad Shotwell, PhD, Senior Principal Scientist, Tool and Lead Generation Chemistry Group Leader, AbbVie
Inhibition of wild type isocitrate dehydrogenase 1 (IDH1), a key source of cytosolic NADPH under conditions of cellular stress, represents an inroad for treatment of VHL-null mutant renal cell carcinomas. We will summarize AbbVie's IDH1 lead-finding activities as they inform both best practices for an integrated hit confirmation approach and the critical interplay between small molecule lead generation and the pharmacological testing of novel target hypotheses.

8:40 Exploiting Pilot Screen Hits to Pressure-Test HTS Screening Triage Funnels
Michael Finley, PhD, Principal Scientist, Screening, Discovery Sciences, Janssen R&D
High-throughput screening (HTS) of small molecule libraries requires careful consideration of potential off-target mechanisms that may contribute to false positives or mask identification of on-target active compounds. Employing a pilot screen of representative chemotypes of the larger collection provides a means to pressure test a triage strategy with initial hits. We illustrate several examples in which pilot data were used to identify and address gaps in HTS triage.

9:10 Encoded Library Technologies as Integrated Lead Finding Platforms for Drug Discovery
Jonas V. Schafer, PhD, Laboratory Head, Encoded Library Technologies, Novartis Institutes for Biomedical Research, Chemical Biology & Therapeutics (CBT), Novartis Pharma AG
The scope of targets investigated in pharmaceutical research is continuously moving into uncharted territory. Consequently, finding suitable chemical matter with the current compound collections is proving increasingly difficult. Encoded library technologies allow for the rapid exploration of a large chemical space for the identification of ligands for such targets. In the presentation, we will discuss how we apply these platforms in our research, including how we narrow the myriad of hits to a few leads, and why we believe it is beneficial to run both pipelines in-house.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

10:25 Phenotypic Screening Approaches to ALS
Dean G. Brown, PhD, Director, External Chemistry, Hit Discovery, Discovery Sciences, IMED Biotech Unit, AstraZeneca

10:55 Phenotypic Screening and Chemical Biology Strategies to Identify Mechanisms that Regulate Brain Apolipoprotein E Levels
Martin Pettersson, PhD, Research Fellow, Internal Medicine & Medicinal Chemistry, Pfizer
Apolipoprotein E (ApoE) is a 34 kDa protein that functions as a transporter of cholesterol and phospholipids in both the brain and the periphery. In the brain, it is produced primarily by astro-cytes, and plays an important role in neuronal repair, synaptogenesis, and clearance of neurotoxic amyloid β peptides. This presentation will describe phenotypic screening approaches to identify compounds that regulate ApoE secretion. Chemical biology strategies to elucidate mechanism of action will also be discussed.

11:25 CryoEM Applications for Drug Discovery
Seungil Han, PhD, Cryo-EM Lab Head, Structural & Molecular Sciences, Pfizer Global R&D
Since the introduction of direct electron detectors, the resolution and range of biological molecules amenable to single particle cryo-EM have significantly widened. The prospects of studying protein-ligand interactions of large macromolecular complexes such as ribosome, viral glycoprotein complexes, ion-channels, gamma-secretase etc. without having to generate single crystal, are definitely appealing. We have started to work on several targets to support the discovery of new drugs and vaccines. I will describe the applications of cryo-EM and progresses we have made.

11:55 Preclinical Approaches to Develop Treatment for Tinnitus
Sylvie Pucheu, CSO, CILcare
Tinnitus is usually perceived as an intermittent or continuous sound. There are many mechanisms inducing tinnitus (acoustic trauma, drug intake, oxidative stress, inflammation), for which there are no approved drugs. This is why CILcare proposes preclinical approaches to help pharmaceutical companies develop new therapies to prevent and treat tinnitus.
Simultaneous optimization of multiple objectives is a major challenge in drug discovery. We present the application of Ikto's AI technology to a complex MPO challenge in a real-life lead optimization project and show that the technology is capable of generating compounds matching all the objectives of the target product profile.

12:25 Session Break

12:35 Grating-Coupled Interferometry's Integration into LeadXpro's Structure-Based Drug Discovery Pipeline  
Nicolas Bocquet, PhD, Principal Scientist, leadXpro AG
LeadXpro is a world-class structure based lead (small molecules and biologics) discovery company focusing on challenging membrane protein drug targets, including G-protein coupled receptors (GPCRs), ion channels and transporters. With access to state-of-the-art facilities for structure determination, including the SwissFEL and a single particle cryo-EM system, leadXpro uses the Grating-Coupled Interferometry (GCI) technology to characterize in depth ligand interactions to transmembrane proteins, a significant challenge in the drug discovery "gene-to-lead" process.

1:15 Refreshment Break in the Exhibit Hall with Poster Viewing

COVALENT FRAGMENTS AS DRUG DISCOVERY TOOLS

1:50 Chairperson's Remarks  
Beth Knapp-Reed, PhD, Scientific Leader, NCE-MD Medicinal Chemistry, R&D Platform Technology & Science, GSK

1:55 Use of Chemotype Evolution to Discover Novel, Potent, Irreversible Inhibitors of the Oncogenic G12C Mutant Form of k-RAS  
Dan Erlanson, PhD, Co-Founder, Carmot Therapeutics
The protein KRAS has been intensively studied as an oncology target. This presentation will demonstrate how a powerful lead discovery technology, Chemotype Evolution, along with medicinal chemistry and structure-based drug design, were combined to discover novel, irreversible small molecule inhibitors of the oncogenic G12C mutant form of KRAS with potent biochemical and cell-based activity.

2:25 Reactive-Cysteine Profiling for Covalent Ligand Discovery  
Eranthie Weerapana, PhD, Associate Professor, Department of Chemistry, Boston College
Reactive and functional cysteine residues provide ideal anchors for covalent ligands. This presentation will focus on the application of a chemical-proteomic technology, known as isoTOP-ABPP, to identify functional cysteines, and monitor proteome-wide selectivity of cysteine-targeted ligands.

2:55 Presentation to be Announced

3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

4:05 Covalent Fragments Technology for Drug Lead Generation: Past, Present, and Future  
Alexander Statsyuk, PhD, Assistant Professor, Department of Pharmacological and Pharmaceutical Sciences, University of Houston
Covalent fragments is a new lead generation technology, which rests on principles of covalent drug design and fragment-based drug discovery. The main advantage of covalent fragments relative to reversible fragments is that they have enhanced potency and that crystal structures of covalent fragments bound to protein targets can readily be obtained. I will talk about the use of this technology to discover E3 ligase inhibitors and the technology's future applications in target-based and phenotypic screens.

4:35 Applying Covalent Fragment Approaches to E3 Ligase Inhibitor Discovery  
Katrin Rittinger, PhD, Professor, Molecular Structure of Cell Signaling, The Francis Crick Institute, UK
Protein ubiquitination is a critical mechanism to regulate almost all biological processes and defects in the ubiquitin system that are associated with many diseases. However, only a limited number of inhibitors against enzymes of the ubiquitin system are available. I will present a fragment-based covalent ligand screening approach to identify inhibitors of thioester-forming E3 ubiquitin ligases and describe the structure-based development of an inhibitor specific for the RBR ligase HOIP.

5:05 Interactive Breakout Discussion Groups
Join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

6:05 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

7:10 Close of Day

WEDNESDAY, SEPTEMBER 18

7:30 am Registration Open and Morning Coffee

FRAGMENT-BASED AND ORTHOGONAL APPROACHES

8:00 Chairperson's Remarks  
J. Brad Shotwell, PhD, Senior Principal Scientist, Tool and Lead Generation Chemistry Group Leader, AbbVie

8:05 Fragment Screening to Assess Target Ligandability  
Fredrik Edfeldt, PhD, Associate Principal Scientist, Discovery Sciences, R&D Biopharmaceuticals, AstraZeneca, Gothenburg, Sweden
Evaluating the ligandability, or chemical tractability, of a protein target is critical when defining hit-finding strategies or to prioritize amongst potential targets. Fragment screening has emerged as a useful approach for this purpose. We demonstrate that thermal shift assays can be used as a simple and generic biophysical method to assess target ligandability. We have applied the method to a set of proteins and show that the assessment is predictive for the success of HTS.

8:35 Fragment-Based Approach to Lactate Dehydrogenase A (LDHA) Inhibitors  
Beth Knapp-Reed, PhD, Scientific Leader, NCE-MD Medicinal Chemistry, R&D Platform Technology & Science, GSK
A fragment-based approach was used to identify a unique series of LDHA inhibitors with good ligand efficiencies. Subsequent optimization delivered a novel lead series with LDHA cellular activity of 10 μM, selectivity against LDHB, and good physicochemical properties. The overall strategy of identification and optimization, lessons learned, and some guiding principles of the FBDD effort will be presented in the context of the discovery of a fragment-derived lead series for the inhibition of LDHA.

9:05 Presentation to be Announced

9:35 Coffee Break in the Exhibit Hall with Poster Viewing
10:20 Fragment-Based Discovery and Characterization of ERK1/2 Inhibitors
Puja Pathuri, PhD, Associate Director, Molecular Sciences, Astex Pharmaceuticals

Using a fragment-based campaign and multiple screening methods, including high throughput crystallography and biophysical assays, we identified and developed novel, orally bioavailable inhibitors of ERK1/2 – key components of the Ras signaling pathway in cancer cells. The inhibitors elicit a similar conformational change to currently available inhibitors but also modulate phosphorylation of ERK. Our series of pERK modulating ERK1/2 inhibitors went through progressive rounds of structure-guided optimization and iterative optimizations. The screening cascade included measurement of pRSK levels and anti-proliferative activity in ras and BRAF mutant cells.

10:50 Drug Discovery Using DNA-Encoded Chemical Libraries
Rachel Jetson, PhD, Senior Research Scientist, Lead Discovery, X-Chem Pharmaceuticals

X-Chem’s DNA-encoded chemistry platform provides a method to simultaneously interrogate a diverse chemical library against many targets to identify lead compounds. This presentation will describe the X-Chem platform and highlight case studies leading to the discovery of novel covalent and non-covalent chemical equity to multiple targets.

11:20 Enjoy Lunch on Your Own

11:20 Conference Registration for Programs 1B-7B

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.

12:20 pm Event Chairperson’s Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing

2:45 Close of Lead Generation Strategies Conference

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Attendees can gain further exposure and networking by presenting their work in the poster sessions. Dedicated poster sessions occur in the Exhibit Hall. Network, collaborate and enhance your time out of the office.

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The human kinome is a very large and druggable class of targets with many disease indications. Thus, the kinome targets account for a significant portion of drug discovery efforts. Kinase inhibitor discovery is a very active area as developers explore more deeply into designing immune-modulatory agents as single or combination therapies, tackling chronic disease indications such as inflammation and CNS disorders as well as effectively harnessing allosteric modulators and covalently binding compounds. This year we'll also be discussing PROTACs and the role of artificial intelligence in kinase inhibitor discovery.

**EMERGING CHALLENGES AND OPPORTUNITIES**

3:25 **Brain Penetrant Kinase Chemotherapeutics: Learnings from CNS Discovery**
Mary M. Mader, PhD, Vice President, Chemistry, Relay Therapeutics, Inc.

Brain penetration is significantly impacted by the physicochemical properties of the drugs. Compound properties associated with brain penetration have been analyzed recently for kinase inhibitors in glioblastoma trials, although many of these examples exploit opportunities identified in clinical development rather than specific compound design strategies. An examination of kinase inhibitors that were optimized specifically for CNS indications could provide insight into preferred property space and lead to greater success in neuro-oncology efforts.

3:55 **SPR Binding Studies of Small Molecule Inhibitors of PRMT5**
Rebecca Eells, PhD, Associate Director, Biophysical Assays, Reaction Biology Corporation

**WEDNESDAY, SEPTEMBER 18**

11:20 am **Conference Registration Open**

**PLENARY KEYNOTE PROGRAM**

Click [here](#) for full abstracts.

12:20 pm **Event Chairperson's Opening Remarks**
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 **Plenary Keynote Introduction**
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

12:40 **Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells**
David R. Liu, PhD, Howard Hughes Medical Institute Investigator; Professor of Chemistry & Chemical Biology, Harvard University

1:20 **PROTACs: Past, Present, and Future**
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology, Yale University

2:00 **Close of Plenary Keynote Program**

2:00 **Dessert Break in the Exhibit Hall with Poster Viewing**

**EMERGING BREAKS**

2:45 **Organizer's Welcome Remarks**
Mary M. Mader, PhD, Vice President, Chemistry, Relay Therapeutics, Inc.

2:50 **Chairperson's Opening Remarks**
Mary M. Mader, PhD, Vice President, Chemistry, Relay Therapeutics, Inc.

2:55 **Targeting Human Pseudokinases with Kinase Inhibitors**
Patrick Eyers, PhD, Professor, Cell Signaling, Biochemistry, University of Liverpool

Protein pseudokinases are atypical (usually inactive) members of the human kinome. The thriving pseudokinesase field is strongly placed to benefit from decades of research undertaken on canonical protein kinases, and the approval of ~50 kinase inhibitors in oncology and inflammatory indications. In this talk, I will focus on the serendipitous discovery of covalent modulators of Tribbles 2 (TRIB2) pseudokinase, which induces a conformation that drives TRIB2 degradation in human cells.

**THURSDAY, SEPTEMBER 19**

7:00 am **Registration Open**
NEW APPROACHES & APPLICATIONS FOR PROTEIN DEGRADATION

11:25 Orally Active IRAK4 Degraders for Oncology and Autoimmune Diseases
Nello Mainolfi, PhD, Founder and CSO, Kymera Therapeutics, Inc.

Targeted protein degradation combines the power of eliminating a disease-causing protein with the advantages of small molecule circulation in the body. Kymera is pioneering and advancing this technology by designing novel heterobifunctional molecules that engage the target protein and the E3 ligases to direct the target protein to be selectively degraded by the ubiquitin proteasome system. We have utilized this technology to successfully degrade IRAK4, a key node in innate immunity and cancer. This talk will describe the investigation of the pharmacology of IRAK4 degraders, in cellular systems and in vivo.

11:55 Sponsored Presentation (Opportunity Available)

12:25 pm Session Break

12:35 Luncheon Presentation: Use of InCELL Pulse™ Cellular Thermal Shift Target Engagement Assays in Early Drug Discovery
Paul Shapiro, PhD, Group Leader, Assay and Product Development, Research and Development Department, Eurofins DiscoverX

A common problem in early target-based drug discovery is the lack of correlation between potencies, or even rank order of potencies, derived from initial biochemical screens and those observed in cellular assays. In phenotypic screening approaches, often the actual drug target is unknown and needs to be identified and proven. Cellular thermal shift assays for target engagement are of increasing interest because they bridge these gaps, however, existing technologies have been cumbersome and low-throughput. InCELL Pulse™, using Eurofins DiscoverX Enzyme Fragment Complementation technology, is a rapid, homogeneous, cell-based assay based on ligand-induced changes in protein thermal stability and is used to study drug-target engagement in live cells. We have successfully applied InCELL Pulse™ to rapidly measure quantitative cellular target engagement potency values for ligands of diverse intracellular protein classes such as kinases, methyltransferases, and hydrolases.

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

NEW APPROACHES & APPLICATIONS FOR PROTEIN DEGRADATION (CONT.)

2:05 Chairperson’s Remarks
Nello Mainolfi, PhD, Founder and CSO, Kymera Therapeutics, Inc.

2:10 KEYNOTE PRESENTATION AND DISCUSSION: Targeting Kinases for Degradation- Challenges and Opportunities
Nathanael S. Gray, PhD, Professor of Biological Chemistry and Molecular Pharmacology, Dana-Farber Cancer Institute

Heterobifunctional molecules that recruit E3 ubiquitin ligases, such as cereblon, for targeted protein degradation represent an emerging pharmacological strategy. A major unanswered question is how generally applicable this strategy is to all protein targets. In this talk I will discuss our efforts to develop chemoproteomic strategies to identify degradable kinases. Methods to characterize small molecule kinase degraders will also be discussed.

3:10 Novel Strategies for Oncoprotein Degradation
Willem den Besten, PhD, Senior Scientific Researcher, Genentech

Targeted protein degradation has the potential to open the door to therapeutic...
targets previously deemed undruggable. In this talk, I will present the characterization of two ligase ligands and show how target deg-radation coupled with modulation of ligase biology leads to increased cellular efficacy. I will also share results on a new method for inducing the degradation of an ubiquitin ligase.

3:40 E3 Ubiquitin Ligases for PROTACs Discovery

Matthieu Schapira, PhD, Principal Investigator, Structural Genomics Consortium and Associate Professor, Pharmacology & Toxicology, University of Toronto

To be active, a PROTAC must induce the formation of a productive complex between a target of interest and a structurally and functionally compatible E3 ubiquitin ligase. Considering that less than ten E3 ligases out of over 600 in the human proteome are exploited by current PROTACs, extending the repertoire of lig-ands to E3 ligases with a variety of structural properties as well as diverse temporal and spatial expression profiles should considerably expand potential applications of PROTACs for chemical biology, and broaden the horizon for future drug discovery efforts. I will review the classification, ubiquitin-proteasome system association, tissue expression profile and druggability of human E3 ligases.

4:10 Close of Conference
Autophagy and the ubiquitin-proteasome system (UPS) are the two major pathways responsible for protein degradation and maintenance of cellular homeostasis. They consist of well-controlled, selective mechanisms for intracellular protein degradation and turnover. New understanding of the role and molecular mechanisms involved in the dysregulation of autophagy and ubiquitin pathways has revealed its underlying role in cancer, CNS, immunology and other diseases. However, the diversity of substrates and the multi-step processes involved, make it difficult to target these pathways for therapeutic intervention. In recent years, the development of high-quality chemical probes, small molecule modulators, assays and screening platforms have helped identify novel autophagy and ubiquitin targets for drug discovery. Cambridge Healthtech Institute’s conference on Emerging Ubiquitin and Autophagy Targets will bring together a diverse group of chemists and biologists to discuss the promise and challenges in this area of research. This conference will be followed by one that focuses exclusively on targeted protein degradation using proteolysis-targeting chimeric molecules (PROTACs) and other molecular entities for hijacking the ubiquitin system.

The connection between pathways and the role of microenvironment metabolic alterations in cancer associated fibroblasts (CAFs) activation is unknown. CSL/RBPJ suppress gene expression program(s) leading to CAF activation. GLI signaling also contributes to CAF conversion. I will report on a degradative autophagy mechanism targeting CSL and leading to CAF activation. Then I will outline the identification and targeting of ULK3 kinase, which links CSL and GLI signaling and represent a tool for stroma-focused anti-cancer intervention.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

10:25 Analysis of Mammalian ER-Associated Degradation Using Genome-Wide CRISPR Screens
Dara E. Leto, PhD, Basic Life Research Scientist, Departments of Biology, Genetics, Chemical and Systems Biology and Program in Chemistry, Engineering and Medicine for Human Health, Stanford University

Only a handful of ubiquitin-proteasome system (UPS) components have been linked to the recognition and degradation of specific protein quality control substrates. To identify genes required for the destruction of distinct clients of the ER-associated degradation (ERAD) system, we developed a screening approach that combines genome-wide CRISPR-Cas9-mediated gene deletions and a phenotypic selection based on protein turnover kinetics. Our findings show that forward genetic analysis can be used to discover new biochemical pathways in protein quality control.

10:55 Engineering Protein-Protein Interactions to Probe and Rewire Ubiquitin Signaling
Wei Zhang, PhD, Assistant Professor, Molecular and Cellular Biology, University of Guelph

Advances of genomic technologies accelerated the identification of signal transduction cascades essential for initiation and progression of human diseases. In particular, protein-protein interactions in ubiquitin signaling are found to play critical roles in eliciting numerous mis-regulated biological functions. We employ structure-based combinatorial protein design and engineering strategies to develop potent and selective modulators to probe the ubiquitin signaling pathways with unprecedented precision for underlying molecular mechanisms and potential therapeutics.

11:25 Structures of the Substrate-Engaged Proteasome Reveal the Mechanism of Translocation and Activation
Andres Hernandez de la Peña, PhD, Scientist I, Structural and Chemical Biology, Celgene

As the primary eukaryotic proteolytic machine, the 26S proteasome is responsible for ubiquitin-mediated degradation of misfolded, damaged, or obsolete proteins. We determined several structures of the proteasome as it actively translocated substrate. These structures reveal the mechano-chemical coupling of ATP hydrolysis to substrate translocation and gate opening. Additionally, these structures reveal a co-translational deubiquitination mechanism that positions ubiquitin and the isopeptide scissile bond in the Rpn11 deubiquitinase.
11:55 Presentation to be Announced

12:25 pm Session Break

12:35 Luncheon Presentation (Sponsorship Opportunity Available) or Enjoy Lunch On Your Own

1:15 Refreshment Break in the Exhibit Hall with Poster Viewing

DEVELOPING SMALL MOLECULE UBIQUITIN-MEDIATED DEGRADATION

1:50 Chairperson's Remarks
Yue Xiong, PhD, William R. Kenan Professor of the Biochemistry and Biophysics, University of North Carolina; Co-Founder, Cullgen

1:55 SMARCA2/4 Degraders for Cancer Therapy
Murali Ramachandra, CEO, Aurige Discovery Technologies Limited
SMARCA2 and SMARCA4 are ATPases in the SWI/SNF complexes, which function in regulating transcription, DNA replication and repair. SMARCA4 is mutated in a number of cancers, which are dependent on functional SMARCA2. SMARCA4 is also highly expressed without mutation in certain other tumor types, where overexpression contributes to proliferation and survival. In view of these findings, our efforts in developing novel bi-functional molecules inducing proteasome-mediated degradation of SMARCA2/4 for the treatment of cancers will be presented.

2:25 Ubiquitin-Mediated Small Molecule Induced Target Elimination in Cancer
Yue Xiong, PhD, William R. Kenan Professor of the Biochemistry and Biophysics, University of North Carolina; Co-Founder, Cullgen
Development of small molecules to target ubiquitin-dependent degradation of disease-linked proteins represents a promising opportunity for the drug discovery. Multiple such small molecules have been developed based on different E3 ubiquitin ligases. I will discuss the catalytic mechanism, assembly and regulation of cullin-RING E3 ubiquitin ligases (CRLs). I will also present our efforts in developing novel degraders targeting different human cancer protein. Finally, I will share some thoughts on the development of novel E3 ligands.

2:55 Sponsored Presentation (Opportunity Available)

3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

NOVEL APPROACHES FOR PROTEIN DEGRADATION

4:05 New Ubiquitin Ligases and Novel PROTAC Approaches
Tauseef R. Butt, PhD, President and CEO, Progena, Inc.
Ligases that reside primarily in the nucleus are not suited to cytosolic targets, for example, while membrane-associated ligases are required to target GPCRs and other membrane associated targets. Novel E3 ligases and ligands would thus expand the therapeutic potential of PROTACs and provide new IP. I will present data on PROTACs that hijack novel ubiquitin ligases to ubiquitylate targets affecting immune oncology and anti-inflammatory cascades. Degradative versus non-degradative ubiquitylation and relationships between the type of ubiquitylation and PROTAC-targeted function will be discussed.

4:35 Broad-Spectrum Proteome Editing with an Engineered Bacterial Ubiquitin Ligase Mimic
Matthew DeLisa, PhD, William L. Lewis Professor of Engineering, Robert Frederick Smith School of Chemical and Biomolecular Engineering, Cornell University
Ubiquibodies are comprised of a synthetic binding protein fused to an E3 ubiquitin ligase, thus enabling post-translational ubiquitination and degradation of a target protein independent of its function. Here, we have designed a panel of new ubiquibodies based on E3 ubiquitin ligase mimic from bacterial pathogens that enable selective and customizable removal of proteins of interest. Delivery of synthetic mRNA encoding ubiquibodies caused efficient target depletion in cultured mammalian cells as well as in transgenic mice. Overall, our results suggest that engineered ubiquibodies are a highly modular proteome editing technology with the potential for pharmacologically modulating disease-causing proteins.

5:05 Interactive Breakout Discussion Groups
Join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

6:05 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

7:10 Close of Day

WEDNESDAY, SEPTEMBER 18

7:30 am Registration Open and Morning Coffee

EMERGING UBIQUITIN TARGETS & MODULATORS

8:00 Chairperson's Remarks
Mary Matysiela, PhD, Principal Scientist, Structural and Chemical Biology, Celgene

8:05 Potent Small Molecule Parkin Activators for Treating Neurodegenerative Diseases
Suresh Kumar, PhD, Senior Director R&D, Progena, Inc.
Parkin, an ubiquitin E3 ligase, is a critical regulator of mitochondrial dynamics and a protector of neuronal health. Inactivating mutations in both Parkin and PINK1 are found in Parkinson’s disease patients. Using the UbiProTM HTS platform we have discovered novel small molecule Parkin activators. Parkin activators promote degradation of mitochondrial and cytosolic Parkin substrates in human neurons. Development of these Parkin activators offers potentially viable therapeutic options to treat Parkinson’s and other neurodegenerative diseases.

8:35 A Neurodevelopmental Disorder Caused by USP7 Haploinsufficiency
Ryan Potts, PhD, Associate Member, Department of Cell and Molecular Biology, St. Jude Children’s Research Hospital
USP7 is a prominent deubiquitinating enzyme that has a multitude of cellular functions. Most notably its role in regulation of p53 has garnered much attention. This has resulted in tremendous interest in development of USP7 inhibitors for cancer treatment. Here, I will discuss progress in understanding how mutation or deletion of a single copy of USP7 leads to a neurodevelopmental disorder. The implications of these findings in drug development will be discussed.

REGISTER EARLY & SAVE!
9:05 Solving a 60 Year Mystery: SALL4 Mediates Teratogenicity as a Thalidomide-dependent Substrate of Cereblon
Mary Matyskiela, PhD, Principle Scientist, Group Leader, Structural and Chemical Biology, Celgene
Targeted protein degradation through small molecule modulation of cereblon offers vast potential for new therapeutics, but cereblon-binding molecules carry the safety risks of thalidomide, which caused an epidemic of severe birth defects in the 1950s. We identify SALL4 as a thalidomide-dependent cereblon substrate whose degradation phenocopies genetic embryopathies caused by SALL4 mutation. This work offers a path towards safer therapeutics through understanding the molecular basis of thalidomide-induced teratogenicity, and expands the scope of cereblon neosubstrates.

9:35 Coffee Break in the Exhibit Hall with Poster Viewing

10:20 FEATURED PRESENTATION: Advancing Targeted Protein Degradation for CNS Proteinopathies
Stephen. J. Haggarty, PhD, Associate Professor, Department of Neurology, Harvard Medical School; Associate in Neuroscience and Director, Chemical Neurobiology Laboratory, Center for Genomic Medicine, Massachusetts General Hospital
Exploiting the control of protein proximity to catalyze targeted protein degradation provides a potentially powerful therapeutic strategy. Recent advances enabling the generation of patient-derived, ex vivo models of central nervous system (CNS) proteinopathies and the development of bifunctional molecules capable of selectively targeting pathological protein conformations now allow this strategy to be applied to the context of neurodegeneration. Here we will summarize recent findings focused on targeted degradation of tau, a protein implicated in multiple forms of dementia.

11:20 Enjoy Lunch on Your Own
11:20 Conference Registration for Programs 1B-7B

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.

12:20 pm Event Chairperson's Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing
2:45 Close of Emerging Ubiquitin and Autophagy Targets Conference
Please click here to continue to the agenda for PROTACs and Targeted Protein Degradation
The ubiquitin-proteasome system (UPS) is a well-controlled, selective mechanism for intracellular protein degradation and turnover, and it acts as a key regulator in cancer, CNS and other diseases. However, the multi-step processes involved and the diversity of substrates make it difficult to target the UPS. Proteolysis-targeting chimeric molecules (PROTACs) are a group of engineered hetero-bifunctional chemical entities that bind to the target and ligase to mediate ubiquitination and subsequent protein degradation. Like PROTACs, other chemical entities and molecular glues, using varied mechanisms-of-action, are being developed to trigger targeted protein degradation. These approaches have a lot of potential in seeking out previously "undruggable" protein targets for applications in drug discovery and for developing new therapeutic modalities. However, some challenges do exist in terms of stability, biodistribution and penetration of these molecules in vivo. Cambridge Healthtech Institute's conference on PROTACs and Targeted Protein Degradation will bring together a diverse group of chemists and biologists to discuss the prospects, as well as, the challenges underlying strategies for targeted protein degradation. This will be preceded by a conference that discusses emerging ubiquitin and autophagy targets for therapeutic intervention.

**RECOMMENDED PREMIUM PACKAGE:**
Choose 2 Short Courses and 2 Conferences/Training Seminars
- September 16 Pre-Conference Short Course: SC6: Biochemistry and Pharmacology of the Ubiquitin-Proteasome System
- September 17-18 Conference: Emerging Ubiquitin and Autophagy Targets
- September 18 Dinner Short Course: SC9: Targeted Protein Degradation Using PROTACs, Molecular Glues and More
- September 18-19 Conference: PROTACs and Targeted Protein Degradation

**WEDNESDAY, SEPTEMBER 18**

11:20 am Conference Registration Open

**PLENARY KEYNOTE PROGRAM**
Click here for full abstracts.

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An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

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1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing

**OVERCOMING TRANSLATIONAL CHALLENGES**

2:45 Organizer's Welcome Remarks

2:50 Chairperson's Opening Remarks

Peter Dragovich, PhD, Staff Scientist, Discovery Chemistry, Genentech

2:55 Translating Cellular Degradation Insights to in vivo Models
Stewart Fisher, PhD, CSO, C4 Therapeutics

Targeted protein degradation, through the use of heterobifunctional degraders that act as catalytic activators for an E3 ligase and target protein, has the potential to transform drug discovery. This talk will discuss the application of an enzymology framework to characterize cellular degradation data and the extension of these insights to pharmacodynamic modeling and predictions.

3:25 FEATURED PRESENTATION: Targeting the Undruggables Using PROTACs
Shaomeng Wang, PhD, Warner-Lambert/Parke-Davis Professor of Medicine, Pharmacology and Medicinal Chemistry; Co-Director, Molecular Therapeutics Program and Director, Cancer Drug Discovery Program, University of Michigan

I will present our recent efforts to design potent, selective and highly efficacious degraders to target STAT3 (signal transducers and activators of transcription 3), a classical undruggable target by small molecules. In vitro and in vivo data demonstrate that our most promising STAT3 degrader is highly potent and effective in inducing degradation of the STAT3 protein and demonstrates absolute selectivity over other STAT members. It achieves complete and long-lasting tumor regression in multiple xenograft models in mice at well tolerated dose-schedules.

3:55 Novel Approaches to PROTAC Drug Discovery
Dahmane Ouazia, PhD, Business Development Manager, LifeSensors, Inc.

Karteek Kadimisetty, PhD, Assistant Director, Research & Development, LifeSensors, Inc.

Current methods for PROTAC drug discovery are inefficient and full of artifacts. We developed a plate-based methodology for rapid screening of PROTAC-mediated protein ubiquitination, a true measure of PROTAC drug effect. This method is faster, more reproducible and requires less starting material than already used Western blotting and reporter assays.

4:25 Refreshment Break in the Exhibit Hall with Poster Viewing

5:00 Pharmacokinetics Related Challenges of PROTACs
Upendra Dahal, PhD, Senior Scientist, Pharmacokinetics and Drug Metabolism, Amgen, Inc.

PROTACs are bifunctional molecules, designed to bind with target protein and E3 ligase to degrade protein of interest by hijacking cell's ubiquitin proteasome system. Several challenges remain in designing optimal PROTACs that has good PK properties to show efficacy in vivo. For example, PROTACs have high MW (beyond rule of 5), low permeability and low oral bioavailability. This presentation will focus on pharmacokinetics related challenges of PROTACs to share/discuss/improve PK properties of PROTACs.

5:30 Targeted Protein Degradation Enters the Clinic: Insights From ARV-110 and Other PROTAC® Degraders
Miklos Bokes, PhD, Research Investigator, Platform Biology, Arvinas, Inc.

The orally bioavailable, androgen receptor-targeted PROTAC protein degrader ARV-110 entered Phase I clinical trials for metastatic, castration-resistant prostate cancer in 1Q19; and is followed by a planned 3Q19 clinical trial initiation for the orally bioavailable, estrogen receptor-targeted PROTAC® protein degrader ARV-471 for ER+ locally advanced or metastatic breast cancer. I will present learnings from these programs. Additionally, I will discuss results for tau-targeted PROTAC protein degraders for potential application in Alzheimer’s disease and other tauopathies.
Here I present our approaches to identify degraders of two high profile drug targets. In the first case we deployed a suite of high throughput plate-based assays to enable profiling and optimisation of a series of PROTACs. In the second case we performed a high throughput screen to identify novel small molecule degraders.

10:15 Coffee Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

10:55 Computational Design of PROTACs
Ye Che, PhD, Head of Computational Design, Discovery Sciences, Pfizer, Inc.
Orthosteric and allosteric modulators of enzyme function or receptor signaling are well-established mechanisms of drug action. Drugs that promote novel protein-protein interactions and induce protein degradation promise to dramatically expand opportunities for therapeutic intervention. This approach is more difficult for rational design due to the extensive contact surfaces that must be perturbed antagonistically. Here, I will highlight recent applications of computational methods in the design and optimization of targeted protein degraders.

11:25 Structure-Based Design of Degraders
Radoslaw Nowak, PhD, Scientist, Laboratory of Dr. Eric Fischer, Department of Cancer Biology, Dana-Farber Cancer Institute, Harvard Medical School
Small molecule degraders have shown considerable promise as a new pharmacological modality. With the mounting structural information on degrader mediated ligase-substrate interactions we are beginning to understand the rationale for target recruitment and selectivity. This presentation will describe a recently developed framework for use of computational tools, such as protein-protein docking, for accelerating degrader design.

11:55 In silico Modeling of PROTAC-Mediated Ternary Complexes for Predicting Protein Degradation
Michael Drummond, PhD, Scientific Applications Manager, Chemical Computing Group
Successful development of Proteolysis-Targeting Chimeras (PROTACs) hinges upon the ability to rationally modify and design new PROTACs. We have recently developed a suite of computational tools for generating ensembles of PROTAC-mediated ternary complexes. Furthermore, we propose metrics based on available experimental knowledge to identify the structures within the larger ensemble that are likely to degrade. We demonstrate the utility of our methods in a number of scenarios, including across different targets and PROTAC molecules.

12:25 pm Session Break

12:35 Luncheon Presentation (Sponsorship Opportunity Available) or Enjoy Lunch on Your Own

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

NEW APPROACHES & APPLICATIONS FOR PROTEIN DEGRADATION

2:05 Chairperson’s Remarks
Nello Mainolfi, PhD, Founder and CSO, Kymera Therapeutics, Inc.

2:10 KEYNOTE PRESENTATION AND DISCUSSION: Targeting Kinases for Degradation– Challenges and Opportunities
Nathanael S. Gray, PhD, Professor of Biological Chemistry and Molecular Pharmacology, Dana-Farber Cancer Institute
Heterobifunctional molecules that recruit E3 ubiquitin ligases, such as cereblon, for targeted protein degradation represent an emerging
We will discuss a new strategy to identify degradable kinases. Methods to characterize small molecule kinase degraders will also be discussed. A major unanswered question is how generally applicable this strategy is to all protein targets. In this talk, I will present the characterization of two ligase ligands and show how target degradation coupled with modulation of ligase biology leads to increased cellular efficacy. I will also share results on a new method for inducing the degradation of an ubiquitin ligase.

**3:40 E3 Ubiquitin Ligases for PROTACs Discovery**

*Matthieu Schapira, PhD, Principal Investigator, Structural Genomics Consortium and Associate Professor, Pharmacology & Toxicology, University of Toronto*

To be active, a PROTAC must induce the formation of a productive complex between a target of interest and a structurally and functionally compatible E3 ubiquitin ligase. Considering that less than ten E3 ligases out of over 600 in the human proteome are exploited by current PROTACs, extending the repertoire of ligands to E3 ligases with a variety of structural properties as well as diverse temporal and spatial expression profiles should considerably expand potential applications of PROTACs for chemical biology, and broaden the horizon for future drug discovery efforts. I will review the classification, ubiquitin-proteasome system association, tissue expression profile and druggability of human E3 ligases.

**4:10 Close of Conference**

Please click here to return to the agenda for Emerging Ubiquitin and Autophagy Targets
Non-alcoholic steatohepatitis (NASH) is a disease whose incidence is rising and is related to an accumulation of fat in the liver that can lead to its dysfunction due to excessive inflammation and fibrosis. No medical treatments yet exist for NASH but it’s a hopeful time for the field because several drug candidates are in Phase II and III clinical trials. New NASH drug targets are also being revealed due to progress in the fields of NASH contributors: metabolic disfunction, inflammation and fibrosis. Significant challenges remain, however, such as the need for non-invasive biomarkers and better models for the disease. At Cambridge Healthtech Institute’s Targeting NASH conference, join academic and industry investigators to learn and discuss with one another drug development progress, challenges and solutions in the arena of treating fatty liver disease.

9:10 Targeting GLP-1 for NASH
Karim Conde-Knape, PhD, Corporate Vice President, Cardiovascular and Liver Disease Research, Novo Nordisk
GLP1 receptor agonists have been successfully positioned for the treatment of diabetes and obesity. It has been documented that weight loss either by dietary or surgical intervention leads to improvement in NASH and fibrosis. Initial clinical data suggests a beneficial effect of GLP1 receptor agonists in NASH clinical trials. An overview of GLP1 receptor agonism in the treatment of NASH and future directions will be provided.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

NASH THERAPEUTIC COMBINATIONS

10:25 Combinations with ACC Inhibitor for Treating NASH
Archana Vijayakumar, PhD, Research Scientist, Fibrosis, Gilead
Firsocostat (FIR), a liver-targeted acetyl-CoA carboxylase inhibitor (ACCI), improves hepatic steatosis and liver biochemistry in NASH patients, but may increase plasma TGs in patients with pre-existing hypertriglyceridemia. This is likely mediated by repression of PPARα activity. In diet-induced obese mice, co-administration of fenofibrate, a PPARα agonist, with a liver-targeted FIR analogue ACCI completely normalized elevations in plasma TGs, and improved liver metabolism. The data suggest that ACCI/fenofibrate combination may improve NASH efficacy more than either monotherapy.

10:55 CC-Chemokine Receptor Antagonism as a Therapeutic Target in NASH
Star Seyedkazemi, PharmD, Associate Vice President, Clinical Development, Liver Therapeutic Area, Allergan

12:10 pm Luncheon Presentation

12:25 pm Session Break

12:35 Luncheon Presentation (Sponsorship Opportunity Available) or Enjoy Lunch on Your Own
1:15 Refreshment Break in the Exhibit Hall with Poster Viewing

NASH DRUG DEVELOPMENT CHALLENGES

1:50 Chairperson’s Remarks
Kendra K. Bence, PhD, Senior Director, Metabolism, Internal Medicine Research Unit (IMRU), Pfizer, Inc.

1:55 Are Circulating Fibrosis Biomarkers Useful in NASH Drug Development?
Saurabh Gupta, PhD, Director, Translational Medicine and Early Clinical, Takeda Pharmaceuticals International Co.
Clinical Diagnosis of NASH and evaluation of anti-fibrotic activity in clinical trials heavily relies on the histological readouts based on liver biopsy, a highly invasive, variable and a non-representative technique. We will summarize soluble biomarkers which have shown most promising results in terms of fibrosis and NASH staging, and measuring the anti-fibrotic activity in clinical trials.

2:25 Federal Landscape for NASH Patients and Products
Barrett Thornhill, JD, Executive Director, NASH Alliance
Washington, DC has become the confluence of products, policy, pricing and access, but NAFLD-NASH is a virtual unknown among federal policymakers. The now-silent public health crisis will grow dramatically in coming years, and the NASH community of clinicians, innovators and patients is developing the public health infrastructure to better understand NASH implications and support product commercialization. This session will provide an overview of these efforts and explore how federal programs can be a ‘pull incentive’ that bolsters product development.

2:55 Precision Metabolomics: Understanding the Complexity of NAFLD/NASH
Kari Wong, Senior Study Director, Metabolon, Inc.
Disease drivers including genetics, environmental cues and microbiota drive the development of nonalcoholic-steatohepatitis (NASH). The constellation of factors inciting NASH has spawned a remarkable array of targets. A tool for augmenting the challenges of R&D programs is Metabolon’s Metabolomics platform. By identifying 1000+ metabolites in a single sample across pathways that underly NASH pathogenesis, key insights of target/molecule combinations can be illuminated with this platform. This approach can be applied at any stage of drug development.

3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

4:05 Drug Development for NASH Cirrhosis
Peter Traber, MD, Partner, Alacrita Consulting; Adjunct Professor of Medicine, University of Pennsylvania School of Medicine
NASH is a chronic, slowly progressive inflammatory and fibrotic disease of the liver which progresses in some individuals to cirrhosis with its attendant complications, including death and liver transplant. In this presentation, the differences in the pathophysiology and impact on patients between precirrhotic and cirrhotic NASH will be reviewed. Additionally, acceptable and potential regulatory endpoints for clinical trials will be reviewed and put in the context of current ongoing development programs. The publicly disclosed information on established clinical trial programs in cirrhotic NASH will be reviewed and compared, and thoughts about future clinical development for NASH cirrhosis will be discussed.

4:35 Translational Challenges in NASH
Brad Geddes, PhD, Senior Director, Innate Immunity Research Unit, GSK
This presentation will focus on recent FDA guidance regarding fibrosis-centric primary endpoints for NASH clinical trials and its impact on preclinical development of potential NASH therapeutics.

5:05 Interactive Breakout Discussion Groups
Join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

6:05 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

7:10 Close of Day

WEDNESDAY, SEPTEMBER 18

7:30 am Registration Open and Morning Coffee

NEW DRUG TARGETS OR EARLIER STAGE COMPOUNDS FOR FATTY LIVER DISEASE

8:05 Chairperson’s Remarks
Weilin Xie, PhD, Senior Principal Scientist, Biotherapeutics, Celgene

8:05 Targeting Integrin αVβ1 for the Treatment of Liver Fibrosis Associated with NASH
Eric Lefebvre, PhD, CMO, Pliant Therapeutics
Fibrosis is a common pathway for progression of many debilitating diseases associated with loss of organ function. Integrins play a key role in regulating TGF-β activation and cell-matrix interactions, and thus represent attractive antifibrotic targets. We evaluated small molecule integrin inhibitors with different selectivity profiles in lung, liver and kidney models of injury and fibrosis, in tissue slices from patients with lung and liver fibrosis, as well as assessed non-invasive in vivo biomarkers of target engagement.

8:35 Targeting Fructose Metabolism: Update on KHK Inhibitor for NASH
Kendra K. Bence, PhD, Senior Director, Metabolism, Internal Medicine Research Unit (IMRU), Pfizer, Inc.
Excessive fructose intake leads to increased energy storage in the form of fat as well as accumulation of pro-inflammatory metabolites, both important components in the development of NAFLD and NASH. To understand the specific role of fructose in T2DM and NAFLD/NASH, we designed and tested a potent, novel, orally-bioavailable inhibitor of ketohexokinase (KHK), the primary enzyme which catalyzes the conversion of fructose to fructose-1-phosphate (F1P) in the first step of fructose metabolism.

9:05 Population-scale Human Genetics and Genomics for NASH Drug Target & Biomarker Discovery
Richard Williams, MBBS, PhD, Global Head, Medicine, WuXi NextCODE
New drug targets & biomarkers are desperately needed for effective NASH therapy, monitoring & prevention.

In our global NASH discovery programs, we are (1) using whole genome sequencing (WGS) to compare thousands of patients with high fibrosis NASH, Low or No fibrosis NASH & NAFL, and population controls, and (2) interrogating hundreds of fresh liver biopsies from NASH & NAFL patients and control individuals with ‘bulk’ multi-omic genomic analysis (WGS, RNA-Seq, DNA methylation), single cell RNA-seq and fully-integrated AI to reveal novel disease biology, drug targets and biomarkers.

9:35 Coffee Break in the Exhibit Hall with Poster Viewing

10:20 Liver X Receptor (LXR) Agonists PX665 for NASH
Claus Kremoser, PhD, CEO, Phexon
The liver X receptor is a nuclear hormone receptor and is therefore similar to other promising NASH targets such as PPARs and FXR. LXRs regulate cholesterol, fatty acid and glucose levels in the cell. We present our results on an LXR inverse agonist, PX665, which combines antisteatotic, weight lowering, antifibrotic and insulin sensitizing properties in one approach to combat NASH.

10:50 An Antisense DGAT Inhibitor for NASH
Erin Morgan, Executive Director, Clinical Development, Ionis Pharmaceuticals
DGAT2 catalyzes the terminal step in the synthesis of triacylglycerols from de novo synthesized fatty acids and newly formed diglycerides. In pre-clinical models of NAFLD, we previously reported that specific inhibition of DGAT2 caused a marked improvement in hepatic steatosis. The talk will discuss results with a Novel antisense inhibitor of diacylglycerol acyltransferase 2 (IONIS-DGAT2RX) administered in NAFLD patients with type 2 diabetes. Results from the international randomized placebo-controlled Phase 2 trial demonstrated that IONIS DGAT2 RX significantly improved hepatic steatosis without causing hypertriglyceridemia or affecting hepatic function in type-2 diabetes mellitus patients with steatosis, supporting further development of IONIS- DGAT2 RX in NASH patients.

11:20 Enjoy Lunch on Your Own

11:20 Conference Registration for Programs 1B-7B

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.

12:20 pm Event Chairperson's Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd
Sponsored by Syngene

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing

2:45 Close of Targeting NASH Conference
Please click here to continue to the agenda for Targeting Fibrosis
The incidence of fibrosis, a process that under conditions of persistent injury or inflammation contributes to organ damage, has been steadily increasing over the past decade. Activity in the drug development arena for fibrosis has also grown. Much of the progress has been spurred by the fields of autoimmunity and inflammation which are revealing common mechanisms for fibrosis across the organs where fibrosis is most frequently observed: lung, liver, heart, kidney and skin. CHI’s Inaugural Targeting Fibrosis conference aims to convene the leading fibrosis researchers from academics and industry working across organ types, as well as immunology and inflammation investigators to share progress and shape future directions in this burgeoning field of new drug discovery.

RECOMMENDED PREMIUM PACKAGE:
Choose 2 Short Courses and 2 Conferences/Training Seminars
- September 16 Pre-Conference Short Course: SC1: Immunology Basics: Focusing on Autoimmunity and Cancer
- September 17-18 Conference: Targeting NASH
- September 18 Dinner Short Course: SC9: Targeted Protein Degradation Using PROTACs, Molecular Glues and More
- September 18-19 Conference: Targeting Fibrosis

INTEGRINS AS FIBROSIS TARGETS

2:45 Organizer’s Welcome Remarks
2:50 Chairperson’s Opening Remarks
Carolyn Cuff, PhD, Senior Director, Translational Immunology, Immunology Discovery, AbbVie Bioresearch Center

2:55 FEATURED PRESENTATION: An Overview of Fibrosis and the Hope of Pharmacologic Treatments
Bryan Fuchs, PhD, Senior Director, Research TA Head for GI & Liver Disease, Ferring Research Institute

3:25 Targeting Integrins for Fibrotic Diseases
Liangsu Wang, PhD, Vice President, Head of Biology, Morphic Therapeutics
Integrins lie at the heart of many biological processes and are involved in the pathophysiology of a variety of human diseases. This talk will discuss the roles of integrins in fibrotic diseases, highlight some key data on pharmacological effects of Morphic small molecule inhibitors against selected integrin targets, and share our insights of molecular modes of action of different inhibitors and the implications of integrin conformations in disease microenvironment.

3:55 Sponsored Presentation (Opportunity Available)

4:25 Refreshment Break in the Exhibit Hall with Poster Viewing

5:00 Targeting Integrins for Fibrosis
Ji Zhang, PhD, Scientist, Cardiorenal Metabolic & Ophthalmologic Drug Discovery, Merck Research Labs
Fibrosis is an evolutionarily conserved mechanism developed by an organism to survive chronic injury. Excessive fibrosis, however, leads to disruption of organ function and is a common feature of many chronic diseases. We are developing new medicines for multiple indications and this presentation will describe some of our efforts to target integrins for fibrosis.

5:30 IDL-2965: A Selective, Highly Potent, Clinical-Stage, Oral Integrin Antagonist for Treatment of Chronic Fibrosis
Karl Kossen, PhD, Senior Vice President, Translational Science, Indalo Therapeutics
IDL-2965 is an oral small-molecule integrin antagonist that potently inhibits αvβ1, αvβ3, and αvβ6. These integrins play central roles in TGF-β activation and the ability of stiff extracellular matrix to promote fibroblast activation and survival. Once-daily, oral, therapeutic dosing reduces fibrosis in multiple animal models across organ systems with minimal effective doses ranging from 0.4 to 3 mg/kg. 28-day GLP safety studies suggest a large therapeutic index. IDL-2965 entered clinical studies in April 2019.

6:00 Established and Emerging Integrin Targets and Treatments for Fibrosis
Scott Turner, PhD, Vice President, Translational Sciences, Pilant Therapeutics
Fibrosis is a common pathway for progression of many debilitating diseases associated with loss of organ function. Integrins play a key role in regulating TGF-β activation and cell-matrix interactions, and thus represent attractive antifibrotic targets. We evaluated small molecule integrin inhibitors with different selectivity profiles in lung, liver and kidney models of injury and fibrosis, in tissue slices from patients with lung and liver fibrosis, as well as assessed non-invasive in vivo biomarkers of target engagement.

6:30 Dinner Short Course Registration
Click here for details on short courses offered.

9:30 Close of Day

THURSDAY, SEPTEMBER 19

7:00 am Registration Open

7:30 Interactive Breakfast Breakout Discussion Groups
Grab a cup of coffee and join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.
AdAlta has used its unique human single domain protein platform to identify a novel i-body, AD-214, that specifically antagonizes the GPCR CXCR4 and shows both anti-inflammatory and anti-fibrotic in several animal models of fibrosis.

11:55 Sponsored Presentation (Opportunity Available)

12:25 pm Session Break

12:35 Luncheon Presentation (Sponsorship Opportunity Available) or Enjoy Lunch on Your Own

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

EMERGING FIBROSIS TARGETS (NON-INTEGRINS)

2:05 Chairperson's Remarks

Brian Murphy, PhD, Senior Principal Scientist, CV and Fibrosis Drug Discovery, Disease Sciences and Biologics, R&D, Bristol-Myers Squibb

2:10 RIPK1 as a Liver Fibrosis Target

Allison Beal, PhD, Associate Fellow, Innate Immunity Research Unit, GSK

RIPK1 (receptor-interacting protein kinase-1) is a key homeostatic regulator of cell survival and cell death signaling pathways, particularly downstream of TNF signaling. RIPK1 is ubiquitously expressed and has complex, cellular context-dependent actions mediated by a combination of scaffold activity (survival) and kinase activity (cell death). I will discuss the role of RIPK1 in tissue injury and discuss why it is a promising target for modulating fibrosis.

2:40 Lysyl Oxidase and Lysyl Oxidase-Like Inhibitors for the Direct Treatment of Fibrosis

Jonathan Foot, PhD, Senior Research Scientist, Drug Discovery, Pharmaxis Ltd.

The lysyl oxidase (LOX/LOXL-1-4) family are proteins involved in the cross-linking of elastin and collagen fibrils in the extracellular matrix. Up-regulation of one or more of the LOX family can lead to aberrant cross-linking, excessive local collagen deposition and propagation of pro-fibrotic signaling. This can lead to tissue scarring, fibrosis and ultimately organ failure. We will present strategies to directly target lysyl oxidases using small molecule inhibitors, and their effectiveness in treating fibrosis.

3:10 Discovery and Development of NTZ as an Anti-Fibrotic Agent in NASH

Suneil Hosmane, PhD, Executive Vice President, Strategic Development, Genfit

Nitazoxanide, or NTZ, is an approved anti-parasitic agent that has shown promising activity against fibrosis in preclinical disease models. We are currently evaluating NTZ in an investigator-initiated Phase 2 proof-of-concept clinical trial for the treatment of NASH-induced significant or severe fibrosis.

3:40 Targeting ROCK in Fibrotic Disease

Masha Poyurovsky, PhD, Vice President, Discovery Biology, Kadmon Corporation, LLC

Rho-associated coiled-coil kinase (ROCK) is central to the control of cell movement and shape. This presentation will cover the role of ROCK in the regulation of the bio-mechanical and biochemical signaling pathways in fibrotic disease. We discuss re-sults of Kadmon’s ROCK inhibitor discovery program which integrated lessons from earlier ROCK inhibitors, SBDD and medicinal chemistry. Our compounds are currently progressing toward early stage clinical development and Phase II clinical trials for IPF.

4:10 Close of Conference

Please click here to return to the agenda for Targeting NASH
The paradigm of immuno-oncology: figuring out and then circumventing how cancer cells evade the immune system has been validated by a few high-impact therapeutic successes in the past few years and has thus spurred a flurry of more drug discovery and development in the field. However, much of the current pharmaceutical activity is focused on a few cell surface drug targets and their inhibition by biologics-based therapies. CHI's Inaugural Immuno-Oncology: Emerging Targets and Therapeutics conference will cover newer cell surface targets in the IO field that are being investigated for modulation by biologics as well as by other modalities, especially small molecules that have the potential to be oral-based medicines. We will also cover drug targets that are intracellular, thus only accessible to small molecules or newer, non-biologic modalities. Please join us to stay abreast of this rapidly progressing field.

RECOMMENDED PREMIUM PACKAGE:
Choose 2 Short Courses and 2 Conferences/Training Seminars
• September 16 Pre-Conference Short Course: SC1: Immunology Basics: Focusing on Autoimmunity and Cancer
• September 17-18 Conference: Immuno-Oncology: Emerging Targets and Therapeutics
• September 18 Dinner Short Course: SC8: GPCR Structure-Based Drug Discovery
• September 18-19 Conference: Targeting Fibrosis

MONDAY, SEPTEMBER 16
1:00 pm Pre-Conference Short Course Registration
Click here for details on short courses offered.

TUESDAY, SEPTEMBER 17
7:00 am Registration Open and Morning Coffee

RE-ACTIVATING THE INNATE IMMUNE SYSTEM AGAINST CANCER
8:00 Organizer's Welcome Remarks
8:05 Chairperson's Opening Remarks
Charles A. Lesburg, PhD, Senior Principal Scientist, Computational and Structural Chemistry, Merck & Co., Inc

8:10 Discovery of STING Agonist with Systemic Anti-Tumor Response
Scott Pesinidis, PhD, Associate Fellow, Scientific Leader - Discovery Biology, GSK
Medicines targeting STING are intensely pursued as innate immune modulators with potential to complement other immuno-oncology agents. While the first wave of STING agonists are derived from cyclic dinucleotides limited to intra-tumoral delivery, we discovered a small molecule dimeric ligand known as the ABZI series that is selective STING agonists with remarkable single agent efficacy upon intravenous delivery.

8:40 Characterization of Novel STING Ligands
Gottfried Schroeder, PhD, Senior Scientist, Department of Pharmacology, Merck Research Labs Boston
Modulation of the innate immune receptor STING is of pharmacological interest for both oncology and autoimmune indications. Binding of cyclic dinucleotide 2’3’-cGAMP to dimeric STING stabilizes a ‘lid-closed’ protein conformation, ultimately inducing interferon production. Biophysical characterization of different classes of STING ligands using surface plasmon resonance (SPR) has revealed significant differences in binding kinetics, stoichiometry and mode of action. The results of complimentary techniques further support these observed mechanistic differences.

9:10 Potent STING and RIG-1 Agonists for Immuno-Therapy of Cancer
Radhakrishnan P. Iyer, PhD, CSO, Spring Bank Pharmaceuticals
The induction of innate and adaptive immunity via activation of Stimulator of Interferon Genes (STING) signaling is a potentially transformative immuno-therapeutic strategy in cancer. Using structure-based drug design and focused library synthesis, we have discovered novel cyclic dinucleotides (CDNs) that self-assemble into cell-permeable nanostructures for uptake by immune cells. The lead CDNs administered by i.v., i.p., and i.t. routes in subcutaneous and orthotopic syngeneic tumor models show potent STING-mediated induction of Type I IFNs and cytokines resulting in profound and durable anti-tumor activity, abscopal effects and induction of immune memory. The lead CDNs have been formulated into nanoparticles for controlled and sustained delivery and have also been conjugated with antibodies to enable targeted delivery to the tumor site.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

10:25 Using Synthetic Biology to Target Innate Immunity in the Tumor Microenvironment
Daniel Leventhal, PhD, Lead Biologist, Immuno-Oncology, Synlogic, Inc
STING plays an essential role in initiating anti-tumor immunity through activation of antigen presenting cells (APCs), production of type I interferon and T cell priming. Bacteria provide an ideal mechanism for STING activation as they can be deployed within the tumor microenvironment, are engulfed by APCs and activate parallel pathways of innate immunity. We have generated an engineered bacterial strain, SYN819891, that is capable of efficient activation of innate immunity through engagement of TLRs and activation of STING.

10:55 Using the Gut Microbiome to Re-Direct Innate Immunity for Enhancing Responses to Engineered T-Cell Therapy
Muhammad Bilal Abid, MD, Clinician-Scientist, Division of Hematology/Oncology & Infectious Diseases, Medical College of Wisconsin
Despite impressive outcomes in select patients, there remains significant heterogeneity in clinical responses to both immunotherapy and CAR T-cells. The diversity and composition of the gut microbiome influences response to immunotherapy, according to recent evidence. The role of the gut microbiome in ACT or CAR T-cell setting have not been explored. We hypothesize that the gut microbiome modulation carries the potential for enhancing CAR T-cell responses.

11:25 RNAi Therapy for Activation of the Innate Immune System to Remodel the Tumor Microenvironment
Shanthi Ganesh, PhD, Associate Director, Oncology, Dicerna Pharmaceuticals, Inc
Recent research implicates the role of oncogenic pathways in mediating resistance to cancer immunotherapy. In preclinical models, systemic administration of RNAi-based experimental drugs targeting the un-druggable β-catenin or KRAS formulated in a tumor-selective nanoparticle dramatically increased T-cell infiltration and responses to immunotherapy agents. In this presentation, we will explore translational strategies for overcoming resistance in patient populations by synergistically targeting oncogenic pathways and other suppressive pathways using RNAi drugs and small molecule inhibitors.

11:55 Fragment Based Drug Discovery for Human STING Protein
Ismail Moarefi, CSO, Crelux GmbH - a WuXi AppTec company

Sponsored by
The cyclic GMP-AMP synthase (cGAS) – stimulator of interferon genes (STING) pathway stimulates innate immunity by triggering the production of interferons and inflammatory cytokines. Here we describe the production of the two most prominent human STING isoforms & assay optimization for surface plasmon resonance (SPR) and microscale thermophoresis (MST) based fragment-screening.

12:10 pm Late Breaking Presentation: EOS100850, A Best-in-Class Non Brain Penetrant A2aR elective antagonist that maintains potency in high adenosine tumor microenvironment
Gregory Driessens, PhD, Project Leader, in vivo Pharmacology, iTeos Therapeutics

The A2a receptor is the main adenosine receptor expressed on immune cells. Its activation by adenosine, present in high concentrations in the tumor microenvironment, induces potent local immunosuppression and protects tumor cells against immune attack. This presentation will highlight the development of the clinical compound EOS100850, a highly selective, non-brain penetrant best-in-class A2aR antagonist which is able to maintain strong potency and restore immune cells function within an elevated adenosine environment found in some tumors.

12:35 Enjoy Lunch on Your Own

1:15 Refreshment Break in the Exhibit Hall with Poster Viewing

1:50 Chairperson’s Remarks
Scott Pesiridis, PhD, Associate Fellow, Scientific Leader - Discovery Biology, GSK

1:55 Antagonists of the Adenosine 2a Receptor (A2AR) to Reverse Tumor Suppression in the TME
Alwin Schuller, PhD, Senior Principal Scientist/Team Lead, Oncology, IMED Biotech Unit, Astra Zeneca

Adenosine, signaling through the high affinity A2AR receptor, contributes to an immune suppressed tumor micro environment by inhibiting multiple cell types involved in both innate and adaptive immunity. AZD4635 (HTL-1071) is a potent oral A2AR antagonist in clinical development in combination with durvalumab (anti-PDL1). This presentation will highlight our current pre-clinical understanding of the mechanism of action of AZD4635, including activation of various immune cell types, and anti-tumor activity in different syngeneic tumor models.

2:25 Targeting the Adenosine Immunosuppressive Pathway
Daniela Cipolletta, PhD, Investigator III, Exploratory ImmunoOncology, Novartis Therapeutics

2:55 Arrayed CRISPR Screening to Enable Immuno-Oncology
Abhishek Saharia, Vice President, Commercial Development, Syntego INC

3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

4:05 A Dual CD73-A2AR Antagonist to Reduce Adenosine in the TME
Murali Ramachandra, CEO, Aurigene Discovery Technologies Limited

Adenosine generated within the tumor by CD73 thwarts the anti-tumor immunity by signaling through receptors such as A2AR on immune cells. Interestingly, the co-blockade of CD73 and A2AR results in a more pronounced anti-tumor activity than blockade of either, likely due to production of adenosine by alternate routes, increased CD73 expression upon A2AR inhibition and compensatory activity of other adenosine receptors. We will discuss our success in discovering inhibitors that dually target CD73 and A2AR.

4:35 Discovery of Small Molecule Aryl Hydrocarbon Receptor (AhR) Antagonists for Cancer Immunotherapy
Thomas Hoffman, PhD, CFO, Phenex Pharmaceuticals

Activation and accumulation of the nuclear aryl hydrocarbon receptor (AhR) protein is frequently seen in different tumor types and has been linked to immunosuppression, resulting in a diminished anti-tumor immune response. Targeting of AhR with an antagonist may therefore provide a novel immunotherapeutic approach for enhancing anti-tumoral immune responses. We identified small molecule AhR antagonists to block activated downstream signaling of AhR. The lead molecules show high potency, selectivity, favorable ADME/PK and in vivo efficacy in different preclinical models.

5:05 Interactive Breakout Discussion Groups
Join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

6:05 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

7:10 Close of Day
a critical component of any development program. PathHunter® cell-based assay platform offers ready to use bioassays for potency determination & stability testing of biological drugs. These quantitative and robust assays rely on the native biology of the relevant receptor, allowing developers to choose a readout reflective of the MOA of their drug. Importantly, since these are homogeneous assays that employ thaw-and-use cryopreserved cells, they not only provide convenience while minimizing assay variability, they are also highly scalable and suitable for automation. We will share case studies from our expanding portfolio of qualified bioassays for several immune-oncology targets.

9:20 Sponsored Presentation (Opportunity Available)

9:35 Coffee Break in the Exhibit Hall with Poster Viewing

10:20 CA-170, a First-in-Class, Orally Available, Small Molecule Immune Checkpoint Inhibitor Dually Targeting VISTA and PDL1
Raul Soikes, PhD, Senior Director & Global Program Leader, Curis

10:50 Late Breaking Presentation: Small-Molecule TEAD-Yap Antagonists
Samy Meroueh, PhD, Associate Professor, Biochemistry & Molecular Biology, Indiana University
Yap1 creates a signaling hub that promotes tumor growth and immune evasion. Yap1 tightly binds to TEAD transcription factors making the development of small-molecule inhibitors challenging. Here, we report small-molecule TEAD-Yap inhibitors that form a covalent bond with a cysteine in the palmitate-binding pocket of TEADs. In mammalian cells, the compounds formed a covalent complex with TEAD4, inhibited its binding to Yap1, blocked its transcriptional activity, and suppressed expression of connective tissue growth factor.

11:20 Enjoy Lunch on Your Own

11:20 Conference Registration for Programs 1B-7B

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.

12:20 pm Event Chairperson’s Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

Sponsored by Syngene

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing
G-protein coupled receptors (GPCRs) play roles in many physiological processes and have therefore been the target of medical therapeutics for decades. Their complexities in signaling, however, are still being unraveled and starting to be exploited for more targeted therapies. Progress in biophysical techniques and cryo-electron microscopy have also aided targeted drug discovery against GPCRs. At CHI’s well-established GPCR-Based Drug Discovery conference, join colleagues and experts in the GPCR field who hail from both academics and industry to review advances in the field and discuss cutting edge topics impacting drug development against this very medically relevant class of drug targets.

**RECOMMENDED PREMIUM PACKAGE:**

- **September 16 Pre-Conference Short Course: SC1: Immunology Basics: Focusing on Autoimmunity and Cancer**
- **September 17-18 Training Seminar: TS1: Targeting GPCRs for Drug Discovery**
- **September 18 Dinner Short Course: SC8: GPCR Structure-Based Drug Discovery**
- **September 18-19 Conference: GPCR-Based Drug Discovery**

**PLenary Keynote Program**

**2:00 Close of Plenary Keynote Program**

**2:00 Dessert Break in the Exhibit Hall with Poster Viewing**

**GPCRs IN DISEASE**

**2:45 Organizer’s Welcome Remarks**

**2:50 Chairperson’s Opening Remarks**

**2:55 Design and Preclinical Profile of a GPR40 Superagonist**

Mark R. Player, MD, PhD, Senior Scientific Director & Fellow, Discovery Chemistry, Janssen Pharmaceutical Research & Development

Full agonists of GPR40 exhibit superior glucose lowering to partial agonists in pre-clinical species due to increased insulin and GLP-1 secretion, the latter also promoting weight loss. We have identified a GPR40 superagonist which displayed excellent in vitro potency and superior efficacy in the Gas-mediated signaling pathway. Design and preclinical efficacy (human islets, oGTT and weight loss in DIO mice) and safety data (DILI-derisking, pancreatic insulin/proinsulin after compound rechallenge in Wistar rats) will be presented.

**3:25 GLP1-R Agonist**

David A. Griffith, PhD, Research Fellow, Medicinal Chemistry, Pfizer Global R&D Glucagon-like peptide-1 receptor (GLP-1R) agonists comprise a growing class of agents that deliver unprecedented efficacy in diabetes. We will report on a program to identify an oral, small molecule GLP-1 receptor agonist for the treatment of diabetes. An innovative hit identification strategy provided weak leads that were progressed through structure-activity exploration to achieve drug-like potency and ADMET attributes. This presentation will disclose the discovery of the oral small molecule GLP-1R agonist PF-06882961, including emerging human pharmacokinetic data.

**3:55 Enabling Drug Discovery with Multispan**

Lisa Minor, Scientific Consultant, Multispan, Inc.

The path to successful drug discovery requires: 1) a validated target, 2) assays accurately measuring the specific target, and 3) assays run reproducibly and robustly. This presentation will demonstrate how Multispan can uniquely empower your drug discovery efforts. We provide fully validated cells expressing your target along with a battery of well characterized MultiScreen™ assays for conducting your primary and secondary screens in our Bay Area laboratory. Our vast attention to detail and cellular pharmacology helps to ensure your project’s success and shorten your timeline.

**4:10 Sponsored Presentation (Opportunity Available)**

**4:25 Refreshment Break in the Exhibit Hall with Poster Viewing**

**5:00 Signaling Bias of a Novel LPAR1 “Antagonist” Lead Molecule and Implications for Drug Discovery**

Marie-Laure Rives, PhD, Senior Scientist, Molecular and Cellular Pharmacology, Lead Discovery, Janssen Research & Development

Lyso phosphatidic acid (LPA) is a bioactive lipid and pro-fibrotic agent acting through LPA receptors: LPAR1 - 6. A wealth of preclinical data has revealed the relevance of LPA1 in the development of kidney fibrosis. We have identified a new LPA1 allosteric antagonist that shows promising selectivity. However, this compound and its analogs show intriguing signaling bias properties whose physiological consequences are still unknown and under investigation.

**5:30 GPR84: Can Context-Dependent Signaling Inform Therapeutic Direction?**

Carleton Sage, PhD, Vice President, Computational Sciences, Beacon Discovery
GPCR-Based Drug Discovery
Modulating G Protein-Coupled Receptors for New Therapeutic Options

GPR84 is an inflammation-related orphan G Protein-Coupled GPCR. Expression analysis suggests that modulation of GPR84 could be valuable for inflammation related diseases such as Crohn’s disease, IBD, or idiopathic pulmonary fibrosis, but thus far agonists have proven unsuccessful in clinical trials. New observations of signaling in immune cells suggest an explanation and a path forward.

6:00 Drug-Target Binding Kinetics – Implications for Insurmountable Antagonism at GPCRs
Laura H. Heitman, PhD, Associate Professor for Molecular Pharmacology, Leiden Academic Centre for Drug Research (LACDR), Leiden University

6:30 Dinner Short Course Registration
Click here for details on short courses offered.

9:30 Close of Day

THURSDAY, SEPTEMBER 19

7:00 am Registration Open

7:30 Interactive Breakfast Breakout Discussion Groups
Grab a cup of coffee and join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

8:30 Transition to Sessions

BIASED AGONISTS AND ALLOSTERISM

8:40 Chairperson’s Remarks
Huixian Wu, PhD, Principal Scientist, Structural and Molecular Sciences, Discovery Sciences, Pfizer, Inc.

8:45 FEATURED PRESENTATION: Bias and Beyond: Challenges and Opportunities in GPCR Drug Development
Michael Fossler, PharmD, PhD, FCP Vice President, Clinical Operations and Quantitative Sciences, Trevena, Inc.

Oliceridine is a novel investigational G protein-biased ligand at the µ-opioid receptor developed for the management of moderate to severe acute pain. Oliceridine produced differentiated pharmacology in preclinical studies compared to unbiased ligands and maintained a similar profile in the clinic—rapid analgesia with a favorable safety profile with regard to respiratory and gastrointestinal adverse effects compared to morphine. The totality of the data indicate that ligand bias is an important concept in designing new drugs.

9:15 De novo Design of Ga Mimetics: Generalizable Tools for Allosteric Control of G Protein-Coupled Receptors
Christopher D. Bahl, PhD, Head of Protein Design, Institute for Protein Innovation

Generalizable tools to stabilize the active conformational state of GPCRs will facilitate protein purification and structure determination, as well as accelerate the engineering of molecules which act as agonists or antagonists. Using de novo protein design, we have developed novel Galpha mimetic proteins that are thermostable, selectively bind to the active state of GPCRs, and can bind to a wide range of different GPCRs.

9:45 Structure-Based Conversion of the Subtype Selectivity of the Muscarinic Toxin
Shoji Maeda, PhD, Senior Postdoctoral Fellow, Kobilka Lab, Department of Molecular and Cellular Physiology, Stanford University

Muscarinic toxin 7 (MT7) is a natural protein toxin produced by green mamba snakes that exclusively binds to muscarinic acetylcholine receptor 1 (M1R) and modulates its function. To understand the molecular mechanism of this strict subtype selectivity and allosteric mechanism, we solved the crystal structure of M1R-MT7 complex. Furthermore, we converted the selectivity of MT7 towards M2R by in vitro engineering. This study suggests the possibility of the three-finger fold as a promising scaffold to target GPCRs.

10:15 Coffee Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

NON-CLASSICAL SIGNALING

10:55 Understanding the Consequences of GPCR Dimerization
Terry Hébert, PhD, Professor, Department of Pharmacology and Therapeutics, McGill University

How GPCRs interact with one another remains an area of active investigation. Well-characterized dimers of class C GPCRs such as GABA-B and glutamate receptors are well accepted, but whether this is a general feature of GPCRs is still debated. GPCR oligomers are better imagined as parts of larger metastable signaling complexes. The nature of functional oligomeric entities, stability, kinetic features and structural and functional asymmetries of such metastable entities have implications for drug discovery.

11:25 FEATURED PRESENTATION: Non-Traditional Aspects of Gas: Interaction with Ubiquitin and Regulation of GPCR Endosomal Sorting
Christine Lavoie, PhD, Professor, Department of Pharmacology and Physiology, University of Sherbrooke

Although Gαs structure has been known for years, we found a novel motif in Gαs that allows its interaction with ubiquitin, a key signal for receptor sorting to the lysosomal pathway. This presentation will cover the new role for Gαs as an integral component of the ubiquitin-dependent endosomal sorting machinery of GPCRs and highlight the dual role of Gαs in receptor trafficking and signaling for the fine-tuning of the cellular response.

11:55 Using Smart Drug Discovery Software to Enhance Collaboration and Manage Disperse Assay Data
Robert Thorn, PhD, Customer Engagement Scientist, Collaborative Drug Discovery, Inc.

12:10 pm Machine-Learning & AI-Based Approaches for GPCR Bioactive Ligand Discovery
Sebastian Raschka, PhD, Assistant Professor, Department of Statistics, University of Wisconsin at Madison

This talk will provide an overview of the latest advances for automating the discovery of bioactive ligands using machine learning. Applications include the discovery of a potent GPCR pheromone inhibitor as well as models predicting active and inactive GPCR states by combining machine learning and structural rigidity analysis. Lastly, the talk will conclude with the recent developments in deep learning that are aimed at replacing the need for hand-engineering molecular representations by automatic representation learning.

12:40 Session Break
14th Annual | September 18-19
GPCR-Based Drug Discovery
Modulating G Protein-Coupled Receptors for New Therapeutic Options

12:45 Luncheon Presentation: Integrating Experimental and Computational Pharmacology for Intelligent GPCR Drug Candidate Selection
Martin Ostermaier, PhD, CEO, InterAx Biotech AG
InterAx built a computational tool to integrate theoretical knowledge with experimental data of GPCR-mediated trafficking events. As a result, deeper mechanistic insights into the dynamic cellular system are achievable. Such mathematical models allow to predict experimental outcomes and deliver novel insights into drug actions on GPCRs. As an example, our predictive model allowed us to discriminate 17 marketed asthma drugs for their duration of action. This technology is currently applicable to discovery programs on GPCRs.

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

MEDICINAL CHEMISTRY AND BIOPHYSICAL APPROACHES FOR GPCRs

2:05 Chairperson’s Remarks
Mark R. Player, MD, PhD, Senior Scientific Director & Fellow, Discovery Chemistry, Janssen Pharmaceutical Research & Development

2:10 Lessons Learned from Various GPCR Lead Optimization Projects
Chi Sum, PhD, Senior Research Investigator, Lead Discovery and Optimization, Bristol Myers Squibb & Co.
The recent new concepts of GPCR function, including signaling bias, allosteric, kinetics, and receptor trafficking, have provided an important frame of reference for GPCR Drug Discovery. Recognizing these pharmacological properties has become fundamental for a successful campaign. Here, we present some case studies on how these principles operate directly or indirectly to influence lead optimization effort.

2:40 First Orally Bioavailable Antagonist of the Neuropeptide Y Receptor 2 (NPY2R)
Pierre Wasnaire, PhD, Senior Scientist, Pharmaceuticals R&D, Bayer AG
Autonomic imbalance with increased sympathetic activity and withdrawal of vagal activity is associated with increased mortality both after myocardial infarction (MI) and in heart failure (HF). Neuropeptide Y (NPY) is suggested to be a key link between enhanced sympathetic and decreased vagal activity in autonomic imbalance in HF. NPY receptor 2 (NPY2R) antagonism seems attractive for the treatment of autonomic imbalance by restoring vagal activity in HF patients and patients post-MI. After high-throughput screening and medicinal chemistry optimization we found new, potent and selective NPY2R antagonist, showing suitable DMPK and safety profiles.

3:10 Structural Insights into GPCR Recognition by Arrestin
John Janetcko, PhD, Damon Runyon Postdoctoral Fellow, Kobilka Lab, Department of Molecular and Cellular Pharmacology, Stanford University
While there is a wealth of structural information pertaining to the basis of G protein-receptor interactions, there exists no structure of a non-rhodopsin GPCR in complex with arrestin. Using cryo-electron microscopy we obtained a structure of the neotensin type I receptor (NTSR1) in complex with arrestin 2. This structure reveals how the receptor is engaged by arrestin, how phosphorylation of the receptor might regulate arrestin recruitment and activation and how the plasticity of the interactions formed between the two enable arrestin to recognize a large set of diverse GPCRs.

3:40 Surface Plasmon Resonance Microscopy for GPCRs
Shijie Wu, PhD, Application Scientist, Biosensing Instrument
One of the most recent significant biophysical advances to study GPCR binding properties is Surface Plasmon Resonance Microscopy (SPRM), a powerful technique that simultaneously visualizes cellular structures and measures molecular binding interactions of membrane proteins label-free, in vitro and in real time. With this award-winning biosensor technique, the measurement of phenotypical changes of the cell via bright field and binding affinity and kinetics of GPCR targets via SPR can be done. In this presentation, we will review the principles behind SPRM and show application examples of binding affinity and kinetics of multiple whole cells as well as localized responses on a single cell.

3:55 Close of Conference
Membrane-bound proteins are attractive drug targets for antibodies and other protein scaffolds, but for the field to advance, fundamental challenges in optimizing antigen quality and presentation, discovery methodologies, protein engineering and target identification must be resolved. This two-part meeting provides a forum in which discovery biologists and protein engineers can come together to discuss next-generation strategies and technologies that will allow antibody-based therapeutics directed against GPCR and ion channel targets to advance into the clinic and beyond. Part 1, Antibody and Antibody Generation, will focus on best practices for antigen preparation, new approaches to antibody generation and the important role of structural modeling and analysis – and track early stage, preclinical and clinical progress in this space.

**RECOMMENDED PREMIUM PACKAGE:**
Choose 2 Short Courses and 2 Conferences/Training Seminars
- September 16 Pre-Conference Short Course: SC2: Targeting of Ion Channels with Monoclonal Antibodies
- September 17-18 Conference: Antibodies Against Membrane Protein Targets – Part 1
- September 18 Dinner Short Course: SC8: GPCR Structure-Based Drug Discovery
- September 18-19 Conference: Antibodies Against Membrane Protein Targets – Part 2

**MONDAY, SEPTEMBER 16**

1:00 pm Pre-Conference Short Course Registration
Click here for details on short courses offered.

**TUESDAY, SEPTEMBER 17**

7:00 am Registration Open and Morning Coffee

**INNOVATION IN TARGETING MEMBRANE PROTEINS**

8:00 Organizer's Welcome Remarks
Catherine Hutchings, PhD, Independent Consultant, United Kingdom

8:10 Novel Biologies and Modalities for Targeting Membrane Proteins
Zhiqiang An, PhD, Professor, Chemistry; Director, Texas Therapeutics Institute, University of Texas Health Science Center at Houston

Rapid progress in the discovery of membrane proteins’ role in disease development provides a rich pool of targets for biologics-based drug modalities. Challenges in the development of these drugs include delivery across the BBB, targeting multiple targets simultaneously, and specific delivery of cytotoxic drugs inside a cell and to the disease microenvironment. This presentation will provide an overview of opportunities and challenges in developing novel biologics targeting membrane proteins.

8:40 Clinical and Preclinical Progress in Targeting Membrane Proteins: What Is Working (and Not)?
Catherine Hutchings, PhD, Independent Consultant, United Kingdom

G protein-coupled receptors (GPCRs), ion channels and transporters represent some of the most important drug target classes across a wide range of diseases. An update on the clinical and preclinical progress made by antibody-based therapeutics directed to these target classes will be presented along with examples of success and failure encountered in the R&D pipeline.

9:10 KEYNOTE PRESENTATION: GPCRomics: “New” GPCRs That Expand Their Utility as Drug Targets
Paul A. Insel, MD, Distinguished Professor, Pharmacology and Medicine, University of California, San Diego

G protein-coupled receptors (GPCRs) are the largest family of cell surface receptor proteins and the most frequent targets (~35%) of approved drugs. However, only ~15% of the ~800 human GPCRs are currently targeted. This talk will discuss how GPCRomics – approaches to identify and quantify endogenously expressed GPCRs in healthy and diseased cells and tissues – can reveal “new” GPCRs as targets for new therapeutics and the repurposing of approved drugs.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

**ANTIGEN GENERATION AND OPTIMIZATION**

10:25 Functional Validation and High-Throughput Screening of Purified Ion Channel Proteins Using Reconstituted Proteoliposomes
Zhenwei Su, PhD, Senior Scientist, Biomedicine Design, Pfizer, Inc.

Maintaining native conformations and biological functions of purified membrane proteins greatly facilitates drug discovery. This presentation focuses on the use of reconstituted proteoliposomes as a powerful tool to validate functionality of purified ion channel proteins. Validated proteins serve as valuable resources for immunizations and assay developments. The proteoliposome system also offers a screening method for the hit identification.

10:55 Large Asymmetric Nanodiscs and Their Applications in Drug Discovery
Mahmoud Nasr, PhD, Instructor, Medicine, Brigham and Women’s Hospital

Lipids are asymmetrically distributed between the two leaflets of many biological membranes. Also, membrane proteins may assemble in functional clusters in the plane of the membrane. We have developed large nanodiscs up to 90 nm in diameter that are suitable for reconstructing this asymmetry and can be used to study membrane protein complexes and virus entry. The methods for making these nanodiscs as well as their application in drug discovery will be presented.

11:25 Overcoming Production Challenges for Membrane Proteins in Antibody Discovery
Leyu Wang, PhD, Senior Scientist and Project Leader, Protein Sciences, AbbVie

Antibodies against membrane proteins are highly attractive as therapeutics. The success to discover the therapeutic antibodies is critically depending on the quality of membrane protein itself. Due to the complex nature of membrane proteins, there is no single method to address the membrane protein production challenges. Practical solution is to develop “fit-for-purpose” membrane production for immunization, display, screening and characterization that will be discussed in this presentation.

11:55 Discovery and Development of Antibodies Against Ion Channel Targets
Ted Clark, Founder & CSO, TetraGenetics, Inc.

Identifying antibodies that block ion channels is a challenging endeavor exacerbated by difficulties in producing recombinant protein in amounts that support drug discovery programs. We have developed a general strategy to address this challenge by combining high-level expression of recombinant VGICs with immunization of diverse species and unique screening tools.

Sponsored by TetraGenetics
AbCheck discovers and optimizes human antibodies for therapeutic applications leveraging several proprietary platforms including in vitro and in vivo technologies. AbCheck delivers high quality leads with subnanomolar affinities and good stabilities which are compatible with different antibody designs including bispecifics.

3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

4:05 Single-Domain Antibody Fragments as Tools to Interrogate GPCR Structure and Function
Andrew C. Kruse, PhD, Associate Professor, Biological Chemistry and Molecular Pharmacology, Harvard Medical School
Camelid VHH antibody fragments have become versatile tools to study G protein-coupled receptor (GPCR) structure and signaling. Using a fully synthetic VHH fragment library displayed on yeast we developed high-affinity binders to the angiotensin II type 1 receptor and used these to shed light on its activation mechanism and regulation by peptide agonists. These approaches are highly general to GPCR modulator discovery and provide a tool to accelerate GPCR research.

4:35 Modulating Effector Functions of Membrane Protein-Specific Heavy-Chain Antibodies through Hinge Engineering
Jamshid Tanha, PhD, Research Officer, National Research Council, Canada
The effector functions of membrane protein-specific conventional and heavy-chain antibodies are known to be affected by Fc modification, i.e., glycan or protein engineering. Data on a series of hinge-engineered heavy-chain antibodies (HCAbs) are presented and demonstrate that the effector functions of HCAbs can also be modulated simply by varying the length of the Ab hinge; this strategy may be useful to consider when engineering therapeutic heavy chain antibodies for optimal effector functions.
8:35 How Native-MS Can Complement X-Ray and CryoEM Studies in Understanding the Interactions of Membrane Proteins with Lipids and Proteins
Arthur Laganowsky, PhD, Assistant Professor, Chemistry, Texas A&M University
Native ion mobility mass spectrometry (IM-MS) is an emerging biophysical technique to probe membrane protein complexes and their interactions with lipids and other molecules. I will describe how native IM-MS can be used to determine thermodynamics of individual ligand binding events to proteins. We also have developed native IM-MS approaches to unravel how individual lipid-binding events to membrane proteins can allosterically modulate their interactions with proteins and lipids.

9:05 Efficient Discovery of Single Domain Antibodies to Membrane Proteins Using a Synthetic Library
Guy Hermans, PhD, CSO, Isogenica Ltd
Isogenica’s llamdA™ library is a highly diverse, fully synthetic single domain VHH library. We will illustrate some of the unique benefits of VHH technology over conventional antibodies and demonstrate how the unbiased diversity and lack of tolerance enables rapid and resource efficient isolation of VHH to membrane proteins. Examples will include the use of the library in ‘whole cell’ panning projects, as well as in selections using purified membrane proteins complexes.

9:35 Coffee Break in the Exhibit Hall with Poster Viewing

PANEL DISCUSSION
10:20 Membrane Protein Tools and Technologies – What Is Working and What Isn’t?
Moderator: Kevin Heyries, PhD, Co-Founder, AbCellera, Canada
Panelists: John Blankenship, PhD, Senior Investigator and Group Leader, Antibody Discovery, Novartis
Brian Booth, PhD, Senior Scientist, Drug Discovery, Visterra
Benjamin Doranz, PhD, MBA, President and CEO, Integral Molecular
Heike Wulff, PhD, Associate Professor, Pharmacology, School of Medicine, University of California, Davis
The challenging nature of membrane proteins has often dictated that researchers employ a toolbox approach to this work, cycling through a wide range of methods and technologies to find the best fit for a specific project. Join this panel – shared between the Antibodies Against Membrane Targets and Antibody Forum audiences – for an interactive discussion of experiences with different discovery tools used in this space. You’ll hear perspectives from both panelists and other audience members and have the opportunity to share your own questions and best practices.

11:20 Enjoy Lunch on Your Own

11:20 Conference Registration for Programs 1B-7B

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.
Membrane-bound proteins are attractive drug targets for antibodies and other protein scaffolds, but for the field to advance, fundamental challenges in optimizing antigen quality and presentation, discovery methodologies, protein engineering and target identification must be resolved. This two-part meeting provides a forum in which discovery biologists and protein engineers can come together to discuss next-generation strategies and technologies that will allow antibody-based therapeutics directed against GPCR and ion channel targets to advance into the clinic and beyond. Part 2, Discovery, Characterization and GPCR/Ion Channel Updates, explores developments at the discovery and screening stages and offers focused sessions on each of these target classes.

AMGN12 antibody, derived from an in vivo immunization of the XenoMouse®, demonstrated single digit pM affinity to the human orthologue of the target protein, but a 200-fold weaker binding to the cyno orthologue. We applied a novel affinity maturation approach, based on combining non-hypothesis driven CDR-engineering with cell surface display, to “close” the affinity gap without compromising binding affinity to the human target. This led to identification of variants with affinity improvements and potency improvement in bioassays.

3:25 Lead Antibody Identification against Membrane Protein Targets Using Rabbit Single B Cell Cloning Technology
Noriyuki Takahashi, Unit Leader, Lead Identification Unit, Chugai Pharmabody Research, Singapore
Membrane proteins are attractive targets for drug discovery but antibody identification against membrane targets are challenging. Rabbit single B cell cloning technology is an immunization based powerful high throughput platform to identify lead antibodies. Our antibody identification strategy against membrane protein targets will be introduced.

3:55 Uncovering Novel Receptor Targets and Assessing Target Specificity Against Human Membrane and Secreted Proteins
Alex Kelly, US Business Development Manager, Retrogenix Limited
Cell microarray screening of plasma membrane and tethered secreted proteins that are expressed in human cells enables rapid discovery of primary receptors as well as potential off-targets for a variety of biologics including: peptides, antibodies, proteins, CAR T and other cell therapies. Case studies will demonstrate the utility of the technology in identifying novel, druggable targets as well as in specificity screening to aid safety assessment and provide key data to support IND submissions.

4:25 Refreshment Break in the Exhibit Hall with Poster Viewing

THERAPEUTIC DEVELOPMENT FOR GPCRs

5:00 Discovery and Optimization of Antibodies Targeting Ion Channels and G Protein-Coupled Receptors
Trevor Wilkinson, PhD, Associate Director, Antibody Discovery and Protein Engineering, AstraZeneca BioPharmaceuticals Unit, United Kingdom
Multi-spanning membrane proteins such as GPCRs and ion channels are important drug target classes and are implicated in a broad range of diseases. There is significant interest in developing monoclonal antibodies directed against these target classes which exploit the unique properties of these therapeutics. This presentation will use case studies to address the challenges of isolating and optimizing antibodies against complex membrane proteins which have desired functional properties.

5:30 Development of Therapeutic Antibodies Targeting C5aR1
Brian Booth, PhD, Senior Scientist, Drug Discovery, Visterra
The potent anaphylatoxin, C5a, promotes chemotaxis and activation of neutrophils, a key driver in inflammatory diseases such as ANCA-vasculitis. Blockade of the C5a-C5aR1 axis mitigates disease symptoms of ANCA-vasculitis animal models and in humans. An antibody targeting C5aR1 can provide improved specificity and pharmacokinetic properties and would be an ideal treatment modality for diseases involving complement pathway dysregulation. We detail the discovery of antibodies that antagonize the C5a receptor (C5aR1).
6:00 Discovery and Optimization of Fully Human CCR8 Antibodies with CCL1 Antagonistic Function using a Whole Cell Selection Platform
Robert Pejchal, Ph.D. Director, Antibody Discovery Adimab LLC
Whole cell selections extend discovery of IgGs to integral membrane proteins, such as GPCRs. A case study from initial binder identification to functional characterization of affinity-optimized antagonist leads against a C-C chemokine receptor 8 (CCR8) will be presented, along with takeaways for leveraging multiple cell lines to affect the largest clonal frequency changes in NGS-based enrichment analysis of highly-diverse library selection outputs.

6:30 Dinner Short Course Registration
Click here for details on short courses offered.

9:30 Close of Day

THURSDAY, SEPTEMBER 19

7:00 am Registration Open

7:30 Interactive Breakfast Breakout Discussion Groups
Grab a cup of coffee and join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

8:30 Transition to Sessions

THERAPEUTIC DEVELOPMENT FOR ION CHANNELS

8:40 Chairperson’s Remarks
Jen Pan, PhD, Director, Translational Neurobiology, Stanley Center at the Broad Institute

8:45 Targeting Kv1.3 with Biologics: Venom Peptides, Antibodies and Things in Between
Heike Wulff, PhD, Associate Professor, Pharmacology, School of Medicine, University of California, Davis
The voltage-gated potassium channel Kv1.3 is expressed in T cells, B cells, microglia and macrophages and has long been pursued as a target for T-cell mediated autoimmune diseases. It has more recently also emerged as an attractive target for reducing neuroinflammation associated with stroke, Alzheimer’s and Parkinson’s disease. This talk will discuss targeting of Kv1.3 with venom peptides or conventional monoclonal antibodies and compare these approaches to so-called “knotbodies”.

9:15 Controlling Membrane Proteins with Photopharmacology
Dirk Trauner, PhD, Professor, Chemistry, New York University
Photopharmacology endeavors to control biological function with synthetic photoswitches that interact in various ways with their biological targets. I will discuss the advantages and disadvantages of photopharmacology and its potential applications in biology and medicine, in particular with respect to controlling cell proliferation, cell migration, and targeted protein degradation. I will also touch on the use of biological binders (nanobodies, etc.) for targeting GPCRs and ion channels with photopharmacology.

9:45 Modulating the Function of the P2X7 Ion Channel with Antibodies and Nanobodies
Friedrich Koch-Nolte, PhD, Professor, Laboratory of Molecular Immunology, University Medical Center Hamburg-Eppendorf, Germany
The P2X7 ion channel is expressed by immune cells as a sensor for nucleotides released from stressed cells. Blockade of P2X7 ameliorates disease in animal models of sterile inflammation. We have generated antibodies and nanobodies that antagonize or potentiate nucleotide-mediated gating of P2X7 with high specificity and efficacy. We can engineer these biologics to target specific immune cell subsets and to tune the duration of P2X7 antagonism in vivo.

10:15 Coffee Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

10:55 High Throughput, High Resolution Electrophysiology in the Era of Genetic Variations
Jen Pan, PhD, Director, Translational Neurobiology, Stanley Center at the Broad Institute
Whole-exome sequencing has rapidly expanded the genetic variation that are identified in control subjects and in disorders. Here we propose a framework and workflow to dissect the impact of human genetic variations on ion channels in health and in sickness, and present two examples of data-driven approach to investigate the impact of human genetics on risk genes using high throughput and high-resolution electrophysiology.

11:25 Targeting KCa1.1 Channels for the Treatment of Rheumatoid Arthritis
Christine Beeton, PhD, Associate Professor, Molecular Physiology and Biophysics, Baylor College of Medicine
Fibroblast-like synoviocytes (FLS) upregulate KCa1.1 (BK) channels and become highly invasive and erosive during rheumatoid arthritis (RA). Blocking KCa1.1 inhibits their invasiveness and attenuates disease severity in animal models of RA. Combining blockers of KCa1.1 to target FLS and of Kv1.3 channels to target effector-memory T lymphocytes is synergistic in animal models of RA.

11:55 GPCR Focused Antibody Libraries Modeled on Natural Binding Motifs and Patented GPCR Antibodies
Qiangu Liu, PhD, Director, Antibody Engineering, Biopharma, Twist Bioscience
To enable the discovery of functional GPCR antibodies, we grafted a large number of GPCR-binding motifs into a focused antibody library. By incorporating these motifs into the antibody heavy chain CDR3, we developed our first generation GPCR library. Another approach mined the patented GPCR antibody sequences and used the sequence information to guide the design of another synthetic library. We demonstrate the utility of both libraries to discover potent functional antibodies against multiple GPCR targets.

12:25 pm Session Break

12:35 Luncheon Presentation Title to be Announced
Bill Harriman, PhD, MBA, Vice President, Antibody Discovery Services, OmniAb, a Ligand technology

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

SCREENING AND CHARACTERIZATION

2:05 Chairperson’s Remarks
Marina Lemos-Duarte, PhD, Postdoctoral Researcher, Icahn School of Medicine at Mount Sinai

2:10 Massive Antibody Discovery Used to Probe Structure-Function Relationships of an Essential Gram-Negative Bacteria Outer Membrane Protein
Steven Rutherford, PhD, Scientist, Infectious Diseases, Genentech
A diverse library of monoclonal antibodies was used to probe the extracellular loops of an essential *Escherichia coli* outer membrane protein. Epitope binning, mapping, and site-directed mutagenesis suggest that dispensable loops shield functionally important epitopes from antibody interference. Our workflow enables structure-function studies in cellular environments, provides insight into an essential outer membrane protein, and presents a method to assess therapeutic potential of antibody targets.

2:40 Cell-Based Assays to Characterize Ligands for Chemokine Receptor CXCR4

*Tom Van Loy, PhD, Senior Postdoctoral Scientist, Rega Institute, K.U. Leuven, Belgium*

G protein-coupled receptors (GPCRs) form an important family of membrane proteins and the single largest class of therapeutic targets. In GPCR drug discovery *in vitro* cell-based assays are of key importance to characterize ligands (small molecules, biotherapeutics) that target this receptor class. We will exemplify this by discussing both label-free and label-based methodologies used to profile ligands targeting chemokine receptor CXCR4, as well as several other related GPCRs.

3:10 Integrated Discovery Approaches for Challenging Membrane Proteins

*John Blankenship, PhD, Senior Investigator and Group Leader, Antibody Discovery, Novartis*

Traditional antibody discovery processes often fail to deliver functional antibodies against complex multi-pass membrane proteins. A case study will be presented using multiple approaches – immunization, antibody display technologies, and high throughput screening – to identify and refine specific, functional antibodies against a challenging target, enabling incorporation of these antibodies into next-generation antibody formats.

3:40 Development of High Throughput Functional Screening for the Characterization of an Active State-Sensitive Antibody to Protein Kinase C

*Mariana Lemos-Duarte, PhD, Postdoctoral Researcher, Icahn School of Medicine at Mount Sinai*

We have developed a high-throughput functional screening to explore PKC activation in the context of opioid receptor signaling and desensitization. We generated antibodies to a PKC epitope that is revealed upon activation. This strategy allowed us to obtain rabbit monoclonal antibodies to activated PKC with high affinity and specificity. This talk will highlight a novel antibody-based strategy, with a novel yeast display approach to antibody development, CRISPR-Cas9 to validate it and high content microscopy to explore PKC signaling.
Discovery on Target’s Antibody Forum offers R&D research scientists the opportunity to participate in a unique meeting format that encourages discussion and the exchange of best practices on the application of new science and technology for the discovery and development of novel biotherapeutics. The meeting will feature short presentations, panel discussions, facilitated roundtables and an audience layout that allows a sharing of ideas and experiences. Part 1 will focus on the discovery stage, offering ideas on how to accelerate and optimize these steps, emerging discovery technologies and the integration of artificial intelligence and machine learning.

**RECOMMENDED PREMIUM PACKAGE:**

Choose 2 Short Courses and 2 Conferences/Training Seminars
- September 16 Pre-Conference Short Course: SC3: Selection, Screening and Engineering for Affinity Reagents
- September 17-18 Conference: Antibody Forum – Part 1
- September 18 Dinner Short Course: SC8: GPCR Structure-Based Drug Discovery
- September 18-19 Conference: Antibody Forum – Part 2

**MONDAY, SEPTEMBER 16**

1:00 pm Pre-Conference Short Course Registration
Click here for details on short courses offered.

**TUESDAY, SEPTEMBER 17**

7:00 am Registration Open and Morning Coffee

**OPTIMIZING THE DISCOVERY WORKFLOW**

8:00 Organizer’s Welcome Remarks

8:05 Chairperson’s Opening Remarks
Jane Seagal, PhD, Principal Research Scientist, Biologics Generation, AbbVie Bioresearch Center

8:10 **KEYNOTE PRESENTATION:** Antibody Discovery at the Intersection of Immunology and Oncology
Andrew Nixon, PhD, Vice President, Biotherapeutics Molecule Discovery, Boehringer Ingelheim

8:40 Functional Interrogation of Antibody Repertoire at Single Cell Level
Yuxing Cheng, PhD, Principal Scientist, Antibody Discovery, Pfizer, Inc.
Recent advances in microfluidic technology allow massively parallelized analysis of B cell repertoire at single cell level. Here we are presenting a novel microfluidic platform based on Opto-electroposition technology that enables single cell manipulation in a microfluidic environment with semi-automated workflow and functional interrogation of the antibody repertoire from immunized animals with cell-based binding and functional assays.

9:10 Integrated Antibody Discovery Platforms
Jane Seagal, PhD, Principal Research Scientist, Biologics Generation, AbbVie Bioresearch Center
The constantly growing demand for novel therapeutic biologics drives technology innovation enabling efficient antibody discovery. Optimization and ‘digitalization’ of antibody discovery workflows is essential for successful identification of antibodies against challenging targets and the sampling diverse antibody repertoires. In this talk, integrated platforms for discovery of antibodies from yeast display, hybridoma and single B cell technologies are presented highlighting the integration of sequence information, screening data, and informatics for large panels of antibodies.

9:40 Grand Opening Coffee Break in the Exhibit Hall with Poster Viewing

**DISCOVERY WORKFLOW CASE STUDIES**

10:25 Integrating Yeast Display with Transgenic Mouse Immunization for Human VH Domain Lead Generation
Irwin Chen, PhD, Principal Scientist, Biologic Discovery, Amgen
Autonomous human VH-only domains (VHOs) promise to simplify the construction of multi-specific molecules and potentially bind epitopes that are difficult to access with conventional antibodies. To discover VHO leads, we employed a workflow combining transgenic Harbour mouse immunization and yeast surface display to isolate binders against diverse targets. I will present challenges encountered in VHO lead identification and developability assessment, and strategies to overcome some of the obstacles.

10:55 Leveraging Computational Approaches in Antibody Workflows: Discovery, Design and Engineering
Luke Robinson, PhD, Director, Research, Visterra
A variety of computational biology approaches have matured over recent years, positioning them to substantially aid the therapeutic antibody discovery and engineering process. How can we productively leverage these computational approaches, in combination with existing high-throughput experimental techniques, to improve therapeutic antibody discovery and engineering? I will present examples of using computational tools of structural modeling, bioinformatics and machine learning to applications of Fc engineering, antibody-antigen docking and de novo antibody design.

11:25 High-Throughput Production of Antibodies Using Yeast and Mammalian Cells
Rebecca Hurley Niles, PhD, Senior Scientist, High Throughput Expression, Adimab
High-throughput, small-scale production of antibodies is an essential part of a discovery workflow. After isolation from a large yeast-based antibody library, Adimab directly expresses large panels of full-length IgGs in 96-well and 24-well format. Protein purification is accomplished in a plate-based format using liquid handling platforms. The same semi-automated process is also compatible with IgGs expressed in mammalian hosts. Process setup, attributes, and output will be reviewed.

11:55 Against Nature: How to Hack Immune Systems to Discover Antibodies that Target Complex Membrane Proteins
Véronique Lecault, PhD, Co-Founder, AbCellera
Antibodies offer significant selectivity advantages over small molecules to target complex membrane proteins. Yet, few have made it to clinic, primarily due to discovery challenges. Over the years, AbCellera has successfully completed several antibody discovery programs targeting GPCRs and ion channels. We will share lessons and insights that were instrumental to those successes, centred on deep screening and a suite of cutting-edge technologies that includes intelligent antigen formats, strategic immunizations, machine learning, and data visualization.

12:25 pm Session Break

12:35 Luncheon Presentation: Rapid Therapeutic Antibody Discovery in Challenging Projects Using AlivaMabTM Mouse and AlivaMab Discovery Services
Larry Green, PhD, Founder and CEO, Ablexis / AlivaMab Discovery Services

**REGISTER EARLY & SAVE!**
AlvaMab Mouse delivers superior molecular diversity and high-affinity, high-potency therapeutic antibody candidates with faster timelines than other platforms on the market. AlvaMab Discovery Services has developed proprietary processes to overcome the challenges of modern antibody drug discovery with industry-leading timelines. We will present case studies in the rapid generation of therapeutic quality antibodies with challenging discovery plans including against several GPCRs.

1:15 Refreshment Break in the Exhibit Hall with Poster Viewing

1:50 Chairperson’s Remarks
Andrew Bradbury, PhD, MB BS (MD), CSO, Specifica, Inc.

PANEL DISCUSSION

1:55 Emerging Discovery Technologies
Moderator: Andrew Bradbury, PhD, MB BS (MD), CSO, Specifica, Inc.
Panelists: Irwin Chen, PhD, Principal Scientist, Biologic Discovery, Amgen
Enkelejda Miho, PhD, Professor, Digital Life Sciences, FHNW University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Andrew Nixon, PhD, Vice President, Biotherapeutics Molecule Discovery, Boehringer Ingelheim
Jane Seagal, PhD, Senior Scientist, Biologics Generation Group, AbbVie BioResearch Center

Please join us for this informative and useful discussion of new and emerging tools and technologies used to help early stage researchers discover new and novel therapeutic antibodies. Our panel will share updates and best practices on NGS, single b-cell cloning, artificial intelligence, computational modeling and more. Come prepared to share your own experiences and ask questions (even basic ones) about this rapidly-changing field.

2:55 Sponsored Presentation (Opportunity Available)
3:25 Refreshment Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

MACHINE LEARNING AND AI FOR ANTIBODY AND PROTEIN ENGINEERING

4:05 Designing Smart Nanobodies and Antibodies Using Neural-Networked Powered Alignment-Free Models
Deborah S. Marks, PhD, Associate Professor, Systems Biology, Harvard Medical School

Antibodies and nanobodies are highly valued molecular tools, used in research for isolating and imaging specific proteins, and in medical applications as therapeutics. However, for a large number of human and model-organism proteins, existing antibodies are non-existent or unreliable. Emerging experimental techniques enable orders-of-magnitude improvement in the number of sequences assayed for target affinity but are notoriously non-specific and not always well-folded. We have explored the use of generative deep probabilistic models for this design challenge.

4:35 Transitioning from Traditional Computational Modeling to Machine Learning and AI
Enkelejda Miho, PhD, Professor, Digital Life Sciences, FHNW University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

The advent of large-scale data was followed by the consequential shift from one-at-a-time considerations to systems computational investigations. As a result, statistical analysis focused on the quantification of systems patterns. However, machine learning and deep learning have fast-forwarded analysis from the systems-level initial insights to application-driven results. We investigate the applicability of neural networks in longitudinal antibody sequences of personal immune repertoires and compare systems insights versus deep learning predictions.

5:05 Interactive Breakout Discussion Groups
Join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

6:05 Welcome Reception in the Exhibit Hall with Poster Viewing (Sponsorship Opportunity Available)

7:10 Close of Day

WEDNESDAY, SEPTEMBER 18

7:30 am Registration Open and Morning Coffee

HIGH-THROUGHPUT FUNCTIONAL SCREENING

8:00 Chairperson’s Remarks
Enkelejda Miho, PhD, Professor, Digital Life Sciences, FHNW University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

8:05 Simultaneous Pharmacokinetic Measurements of More than 100 Individual Binding Proteins by NestLink
Pascal Egloff, PhD, Platform Leader, University of Zurich, Switzerland

NestLink enables characterization of thousands of individual binding proteins at once. The technology was previously applied in vitro for the efficient identification high-affinity binders against integral membrane proteins in the cellular context. In this talk, I will show that NestLink can be applied in vivo as well, such as to simultaneously determine pharmacokinetic parameters of more than one hundred individual multi-specific binding proteins in a single model organism.

8:35 The Impact of Isotype on Antibody Screening
Ian Foltz, PhD, Scientific Director, Amgen

Successful screening of human antibody panels requires an understanding of the therapeutic design goals including specificity, functional activity and affinity. Antibody isotype differences can be leveraged in IgG2 antibodies to enhance agonist antibody screening and in IgG4 antibodies through Fab arm exchange for monovalent antibody screening. This presentation will outline some of the challenges and advantages of screening these antibody isotypes against design goals for therapeutic antibody development.

9:05 Immunizing Divergent Species as a MAb Discovery Strategy for Difficult Targets
Ross Chambers, PhD, Vice President of Antibody Discovery, Integral Molecular

The FDA’s recent approval of a llama nanobody reflects increasing acceptance of nonrodent species for therapeutic antibody discovery. Using our MPS Antibody Discovery platform, we immunize chickens to produce antibodies against complex targets with an unprecedented success rate. Our antibody panels cover diverse epitopes, even for highly conserved proteins; react to human and rodent orthologs, avoiding the need for surrogate antibodies; and include rare functional and state-specific antibodies, enabling development of novel therapeutics.

9:35 Coffee Break in the Exhibit Hall with Poster Viewing

PANEL DISCUSSION

10:20 Membrane Protein Tools and Technologies – What Is Working and What Isn’t?
Moderator: Kevin Heyries, PhD, Co-Founder, AbCellera, Canada
Panelists: John Blankenship, PhD, Senior Investigator and Group Leader, Antibody Discovery, Novartis
Brian Booth, PhD, Senior Scientist, Drug Discovery, Visterra
Benjamin Doranz, PhD, MBA, President and CEO, Integral Molecular
Heike Wulff, PhD, Associate Professor, Pharmacology, School of Medicine, University of California, Davis

The challenging nature of membrane proteins has often dictated that researchers employ a toolbox approach to this work, cycling through a wide range of methods and technologies to find the best fit for a specific project. Join this panel – shared between the Antibodies Against Membrane Targets and Antibody Forum audiences – for an interactive discussion of experiences with different discovery tools used in this space. You’ll hear perspectives from both panelists and other audience members and have the opportunity to share your own questions and best practices.

11:20 Enjoy Lunch on Your Own

11:20 Conference Registration for Programs 1B-7B

PLENARY KEYNOTE PROGRAM
Click here for full abstracts.

12:20 pm Event Chairperson’s Opening Remarks
An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

12:30 Plenary Keynote Introduction
Anjan Chakrabarti, Vice President, Discovery Chemistry, Syngene International Ltd

12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

2:00 Dessert Break in the Exhibit Hall with Poster Viewing

2:45 Close of Antibody Forum – Part 1 Conference
Please click here to continue to the agenda for Antibody Forum – Part 2: Engineering and Development
Discovery on Target's Antibody Forum offers R&D research scientists the opportunity to participate in a unique meeting format that encourages discussion and the exchange of best practices on the application of new science and technology for the discovery and development of novel biotherapeutics. The meeting will feature short presentations, panel discussions, facilitated roundtables and an audience layout that allows a sharing of ideas and experiences. Part 2 picks up at the transition from Discovery into Development, examining the screening approaches used for candidate selection, engineering problem solving and approaches for challenging molecules and new modalities.

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### WEDNESDAY, SEPTEMBER 18

11:20 am Conference Registration Open

### PLENARY KEYNOTE PROGRAM
Click here for all abstracts.

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An-Dinh Nguyen, Team Lead, Discovery on Target 2019, Cambridge Healthtech Institute

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12:40 Base Editing: Chemistry on a Target Nucleotide in the Genome of Living Cells
David R. Liu, PhD, Howard Hughes Medical Institute Investigator, Professor of Chemistry & Chemical Biology, Harvard University

1:20 PROTACs: Past, Present, and Future
Craig M. Crews, PhD, Professor, Chemistry; Pharmacology; Molecular, Cellular & Developmental Biology; Yale University

2:00 Close of Plenary Keynote Program

### TRANSITIONING FROM DISCOVERY TO DEVELOPMENT

2:45 Organizer’s Welcome Remarks

2:50 Chairperson’s Opening Remarks
Noah Pefaur, PhD, Senior Scientist, AbbVie

2:55 Deep Mutagenesis for Integrative Structure Determination, Binding Site Characterization, and Conformational Engineering of Dynamic Membrane Proteins
Erik Procko, PhD, Assistant Professor, Biochemistry, University of Illinois at Urbana-Champaign

### 3:25 Monoclonality Does Not Mean Monospecificity – Paratope Refinement to Mitigate Antibody Polyspecificity
Jonny Finlay, PhD, CSO, Ultrahuman, United Kingdom

Antibodies are well known to become ‘polyreactive’ (randomly sticky) via excess charge or hydrophobicity. We have a much poorer understanding of what causes off-target reactivity to disparate, but selective, targets (polyspecificity). There is also a paucity of understanding in how this drives antibody toxicity. This will show that polyspecificity is an underappreciated phenomenon in therapeutic antibody development, but that these unwanted properties can be fully ameliorated by paratope refinement.

### 3:55 Rapid Assembly of Diverse Gene Variant Libraries Using Semiconductor Technologies
Irene Song, Scientific Advisor, GenScript USA Inc.

Optimization of therapeutics requires the use of high quality mutant libraries. Traditional methods for library construction suffer from limited control over codons, resulting in poor variant representation. Our advanced oligo synthesis platform allows for precise control over codon usage, creating a diverse and fully represented mutant library, improving screening efficiency.

### 4:10 Use of Mammalian Virus Display to Select Antibodies Specific for Complex Membrane Antigens
Ernest Smith, PhD, Senior Vice President & CSO, Vaccinex

We have developed a technology to enable direct incorporation of multipass membrane proteins into the membrane of a mammalian virus. Antigen expressing virus is easily purified for antibody selection. This method does not require any detergents or refolding and produces properly folded protein that is necessary for antibody selection.

### 4:25 Refreshment Break in the Exhibit Hall with Poster Viewing

### 5:00 Emerging Technologies to Evaluate Developability and Manufacturability
Aaron Beach, Investigator, Novartis Biologics Center, Novartis Institute for BioMedical Research, Inc.

The diversity and increasing complexity of new protein formats requires a change from former platform approaches often applied for antibodies. The Novartis developability assessment combines information about expression, aggregation propensity, process fit, stability, solubility, physicochemical properties, in vivo fitness and immunogenicity of potential candidates. This integrated approach prior to lead selection provides a thorough, yet resource efficient approach. The presentation will provide an overview about the concept and provide selected case studies.

### 5:30 Utilization of Throughput-Based Platforms to Identify Optimal Bispecifics
Noah Pefaur, PhD, Senior Scientist, AbbVie

Following entry of the DVD-Ig format into the clinic it has become a preferred format for bispecifics at AbbVie. As with any engineered biologic identification of potent molecules with favorable drug like properties frequently requires engineering and screening to identify optimal lead candidates. Here, we present a throughput-based strategy to increase project probability of success, reduce time spent on lead optimization, and increase the quality of identified leads.
6:00 Creating a New Paradigm for Biotherapeutics: Attributes More Potent than Potency
Vishal Toprani, PhD, Scientist, Pharmaceutical Development, Alexion Pharmaceuticals, Inc.
The field of biotherapeutics is rapidly advancing into novel molecular formats from traditional antibody-based products. This shift to novel protein modalities will require addressing new types of liabilities and implementing modern technologies to evaluate the risk/benefit profiles of these molecules. This presentation will focus on using DOE approaches and automated high throughput biophysical tools, in combination with automated sample preparation to identify attributes that may overrun the potency selection, predominant in protein engineering.

6:30 Dinner Short Course Registration
Click here for details on short courses offered.

9:30 Close of Day
THURSDAY, SEPTEMBER 19
7:00 am Registration Open

7:30 Interactive Breakfast Breakout Discussion Groups
Grab a cup of coffee and join a breakout discussion group. These are informal, moderated discussions with brainstorming and interactive problem solving, allowing participants from diverse backgrounds to exchange ideas and experiences and develop future collaborations around a focused topic. Visit the conference website for discussion topics and moderators.

8:30 Transition to Sessions
ENGINEERING PROBLEM SOLVING

8:40 Chairperson’s Remarks
Colby Souders, PhD, CTO, Abveris

8:45 Engineering Patient-Derived Anti-HIV Broadly Neutralizing Antibodies for Therapeutic Development
Nathan Thomsen, PhD, Senior Research Scientist, Gilead Sciences
Advances in discovery technology have led to the isolation of HIV broadly neutralizing antibodies (bNAb) with exceptional breadth. These bNAb hold promise for the treatment or cure of HIV, with many in clinical trials. Evolving alongside the virus within a single individual, HIV bNAb diverge significantly from the human germline repertoire and present unique engineering challenges. Strategies to identify and mitigate development challenges in HIV bNAb will be discussed.

9:15 Identification, Characterization & Engineering of Antibodies Directed against Complex Target Molecules
Christian Kunz, PhD, Director, Discovery Alliances & Technologies, MorphoSys AG, Germany
Methods generating highly specific antibodies against classical target molecules, e.g. receptor tyrosine kinases or cytokines, are routinely established. Antibody compounds inhibiting these classical target classes are widely used in clinical development and as approved therapeutics. Innovative selection strategies have to be applied to broaden target space and bring new target classes, as GPCRs or HLA/Peptide complexes, into clinical development.

9:45 KEYNOTE PRESENTATION: Chemical and Physical Determinants of Drug-Like Monoclonal Antibodies
Peter M. Tessier, PhD, Professor, Pharmaceutical Sciences and Chemical Engineering, University of Michigan
Therapeutic antibodies display variable and difficult-to-predict levels of non-specific and self-interactions that lead to various drug development challenges, including abnormally high viscosity and fast antibody clearance. We are developing bioinformatics methods for predicting the overall specificity of antibodies in terms of their relative risk for displaying high levels of non-specific and self-interactions. We will report novel types of chemical descriptors that are strong predictors of antibody specificity.

10:15 Coffee Break in the Exhibit Hall with Poster Viewing and Poster Competition Winner Announced

PANEL DISCUSSION
10:55 Development Stage Problem Solving
Moderator: Colby Souders, PhD, CTO, Abveris
Panelists: Georg Fertig, PhD, Head, Screening & Functional Assays, Roche Pharmaceuticals, Germany
Jonny Finlay, PhD, CSO, Ultrahuman, United Kingdom
Peter M. Tessier, PhD, Professor, Pharmaceutical Sciences and Chemical Engineering, University of Michigan
Nathan Thomsen, PhD, Senior Research Scientist, Gilead Sciences
Discovery and Development stage scientists are under pressure to improve the quality of lead selections, avoid later stage liabilities and advance programs more rapidly to the clinic. Join our panel and your colleagues to hear about tools and technologies being used to achieve these goals and share ideas on how to respond to challenges at this critical point in the pipeline. The panel will include discussion by the panelists and provide the opportunity for participants to guide the discussion by offering perspectives and pose questions.

11:55 Overnight Target Engineering
Katie Lyons, Senior Scientist, Research & Development, SGI-DNA Inc.
Advancements in DNA synthesis and modification have yielded powerful new techniques for target engineering. As these techniques become more specialized, engineering becomes more resource-intensive. Here, we discuss a fully-automated workflow for protein engineering using SGI-DNA’s BioXp™. The instrument generates Libraries, Clones, and Tiles from sequence information in an overnight run.

12:10 pm Just a Specific Target is Not Good Enough to Achieve Desired Effect; The Case of Vedolizumab (Entyvio®)
Pierre Eftekhar, PhD, Founder and CEO, Inoviem Scientific
Vedolizumab an antibody against ITGB7 is used for treatment of IBD. Molecular analysis of 31 IBD outpatients, in a prospective clinical study treated with Vedolizumab, showed that the efficient treatment could only be reached when ITGB7 interacts directly with 4 other proteins forming a signaling complex. In the absence of these proteins despite the presence of ITGB7 no therapeutic effect was observed. A therapeutic target is therefore defined as the presence of primary target within its corresponding signaling complex.

12:25 Session Break
12:35 Luncheon Presentation: Lead Optimization of Biologics Using Physics-Based Computational Methods
Eliud Oloo, PhD, Senior Principal Scientist, Schrödinger
In this presentation, we will describe how calculated properties derived from 3D structural analyses and simulation through physics-based methods are applied to not only optimize binding affinity and selectivity but also identify and mitigate potential liabilities in the development of biologics. Using such computational strategies to direct experimental focus can result in reductions in cost and timelines.

1:25 Refreshment Break in the Exhibit Hall with Poster Viewing

DEVELOPMENT CHALLENGES OF NEW MODALITIES AND COMPLEX BIOLOGICS

2:05 Chairperson's Remarks
Benjamin Smith, PhD, Scientist, Biologics Drug Discovery, CNS Delivery, Biogen

2:10 Strategies, Considerations and Challenges in Engineering Antibody-Drug Conjugates
Chen-Ni Chin, PhD, Director, Antibody Discovery, Mersana Therapeutics
Antibody-drug conjugates (ADCs) are a growing class of biopharmaceuticals designed to harness the targeting specificity of a mAb by linking it to highly potent drugs for delivery. In this talk we will discuss what it means to make an ADC through engineering the antibody as well as applying novel linker and payload technologies for the optimal pharmacological profile. Case studies will be presented.

2:40 Bispecific Antibodies – A Platform Approach for Generation and Screening in Final Format
Georg Fertig, PhD, Head, Screening & Functional Assays, Roche Pharmaceuticals, Germany
The generation of bi-functional bispecific antibodies requires the combination of two monospecific binders, which bind to the right epitope of the respective target in the right format. High-throughput generation and screening of such antibodies will be discussed in the context of an effective and robust technology platform, an automated production of bsAb binder-format combination matrices and the format, which defines the function.

3:10 Protein Engineering for Enhanced and Sustained CNS Exposure of Neuro-Therapeutic Antibodies
Benjamin Smith, PhD, Scientist, Biologics Drug Discovery, CNS Delivery, Biogen
The single domain antibody FC5 engages receptor-mediated transcytosis and is a promising BBB carrier. Here the humanization and stability engineering of FC5 and design of FC5 bispecifics with antibodies against neurodegenerative disease targets will be described. Enhanced BBB penetration of the bispecifics in an in vitro BBB model as well as CNS pharmacokinetics in rats and monkeys dosed at therapeutically relevant doses by systemic injections will be shown.

3:40 Screening Tools for Early Prediction of Development and Clinical Success
Colby Souders, PhD, CTO, Abveris
As industry-wide advancements in antibody drug discovery continue to push toward larger panels of candidates for early-stage characterization, more efficient identification of lead molecules through enhanced screening resolution is required. Integrating tools and methods into the overall characterization workflow enables reliable, high throughput selection of lead candidates more effectively than alternative traditional techniques. Comparisons across platforms, including traditional ELISA, flow cytometry, Octet and in vivo studies will be presented that provide enhanced prediction of downstream development and clinical success.

4:10 Close of Conference
Please click here to return to the agenda for Antibody Forum – Part 1: The Discovery Stage