12th Annual

PEGS EUROPE VIRTUAL

Protein and Antibody Engineering Summit

9 - 12 NOVEMBER 2020

FINAL DAYS TO REGISTER

PEGSummitEurope.com

2020 PLENARY KEYNOTES

mAbs vs. Bugs - Antibody Therapies for Infectious Disease

Steve Martin, PhD
Vice President, Biopharm Discovery, GlaxoSmithKline

Clinical Trials on Stimulating Innate Immunity for Type 1 Diabetes, Alzheimer's, and COVID

Denise L. Faustman, MD, PhD
Associate Professor & Director, Immunobiology Labs, Massachusetts General Hospital

BENEFITS OF A VIRTUAL PEGS EUROPE EVENT

- View more presentations at your convenience as your Virtual registration includes On-Demand access
- See unpublished data & case studies from leading researchers from industry & academia
- Reduced registration fees and no travel or hotel costs
- Connect with the right attendees based on mutual interests and expertise
- Take advantage of facilitated networking opportunities
- Visit virtual exhibit booths, posters, and networking roundtables without leaving home

Engineering
- Display of Biologics
- Engineering Antibodies
- Engineering Bispecifics

Oncology
- Antibody-Drug Conjugates
- Advancing Bispecifics
- Novel Targets

Analytical
- Optimisation & Developability
- Analytical Characterisation
- Aggregation & Stability

Immunotherapy
- Tumour Microenvironment
- CAR T, TIL & TCR Therapy
- Targeting Innate Immunity

Expression
- Systems Engineering
- Optimising Expression
- Purification Technologies

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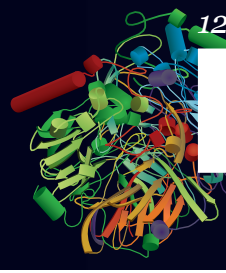

12th Annual

PEGS EUROPE VIRTUAL

9 - 12 NOVEMBER 2020

Protein and Antibody Engineering Summit

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CONFERENCE-AT-A-GLANCE

	MONDAY 9 November	TUESDAY 10 November	WEDNESDAY 11 November	THURSDAY 12 November
ENGINEERING	Plenary Keynote Session and VIP Networking	Display of Biologics	Engineering Antibodies	Engineering Bispecifics
ONCOLOGY		Antibody-Drug Conjugates	Advancing Bispecifics	Novel Targets
ANALYTICAL		Optimisation & Developability	Analytical Characterisation	Aggregation & Stability
IMMUNOTHERAPY		Tumour Microenvironment	CAR T, TIL & TCR Therapy	Targeting Innate Immunity
EXPRESSION		Systems Engineering	Optimising Expression	Purification Technologies

2020 PLENARY KEYNOTE SESSION

9 NOVEMBER 2020 | ALL TIMES WET (GMT+0)

14:00 Keynote Chairperson's Remarks
Janice M. Reichert, PhD, Executive Director, The Antibody Society

14:05 mAbs vs. Bugs: Antibody Therapies for Infectious Disease

Steve Martin, PhD, Vice President, Biopharm Discovery, GlaxoSmithKline
This year's coronavirus pandemic has provided a stark reminder of the threat to global health posed by infectious disease and the need for new treatments. Renewed attention has been brought to the potential of antibodies as anti-infective therapeutics, which historically has been a challenging area for drug discovery. Synergies between modern vaccine development approaches and antibody discovery technologies offer new opportunities in the fight against our microbial foes.

14:30 Clinical Trials on Stimulating Innate Immunity for Type 1 Diabetes, Alzheimer's, and COVID

Denise L. Faustman, MD, PhD, Associate Professor & Director, Immunobiology Labs, Massachusetts General Hospital
It has become apparent that perhaps in the developed world, there is less lifelong innate immunity. This is consistent with the Hygiene Hypothesis and maybe made worse by less exposure to the BCG vaccine. In this presentation we will use BCG as an example of potent innate immune stimulation from data from human clinical trials. The impact of stimulated innate immunity may have implications for infectious diseases such as COVID, for changes in metabolism related to diabetes and finally perhaps a growing human data set on benefit in Alzheimer's disease.

14:55 Overview of Biologic COVID-19 Interventions Live Panel Discussion

PANEL MODERATOR:
Janice M. Reichert, PhD, Executive Director, The Antibody Society

PANELISTS:

James E Crowe Jr, Ann Scott Carell Chair & Prof & Dir, Vaccine Center, Vanderbilt University Medical Center

Michael Hust, PhD, Prof & Research Grp Leader, Biotechnology, Technical Univ of Braunschweig

15:20 Refresh Break - View Our Virtual Exhibit Hall

15:40 Problem-Solving Breakout Discussions - View Our Virtual Exhibit Hall
Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers.

16:30 Close of Day

> "The best biologics technology meeting in Europe: A must-attend conference for novel biologics."
>
> **Rakesh D.,** PhD, President & CEO, Bionavigen

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7th Annual

Display of Biologics

Leading the Way for New Classes of Therapy

Bonus Plenary Keynote Session

Don't miss the bonus Plenary Keynote Session and Problem-Solving Breakouts on Monday! This day is included in all Premium and Standard package registrations.

CO-PRESENTATION: BREAKOUT: Antibody Engineering Approaches to Improve Efficacy of Biologics for Autoimmune Disease

E. Sally Ward, PhD, Director, Translational Immunology; Professor, Molecular Immunology, Centre for Cancer Immunology, University of Southampton

Ahuva Nissim, PhD, Professor, Antibody and Therapeutic Engineering, William Harvey Research Institute, Queen Mary University of London

- Targeting therapy to diseased tissue epitopes
- Targeting FcRn to modulate antibody dynamics for the treatment of autoimmunity
- Engineering antibodies to enhance the clearance of inflammatory mediators

Generating MAbs Against Multi-Pass Membrane Proteins

Joseph Rucker, PhD, VP of Research and Development, Integral Molecular

Key considerations in antigen design

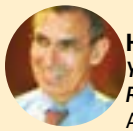
Accessing conserved and functional epitopes

Finding your lead molecule

16:30 **Close of Day**

TUESDAY 10 NOVEMBER

CUTTING-EDGE DRUG DEVELOPMENT FOR INFLAMMATORY AND AUTOIMMUNE DISEASE



9:00 **KEYNOTE PRESENTATION: Why We Develop Autoimmune Diseases: Hyperstimulation of the Immune System**

Yehuda Shoenfeld, MD, FRCP, MaACR, Past Incumbent of the Laura Schwarz-Kipp Chair, Research of Autoimmune Diseases, Tel-Aviv University

Autoimmune diseases are genetics, HLADRB1 haplotypes are prevalent with diverse autoimmune diseases. Hyperstimulation of genetically prone subjects bearing HLABRB1 may lead to autoimmunity. Checkpoint inhibitor (CPI) therapy unleashing the breaks on the immune system has been found to cure several untreatable cancers, and silicone breast implants (SBI) induce different autoimmune conditions. Thus, CPI and SBI are 2 proofs-of-concept for the importance of genetics with aggressive immune system and environmental factors.

9:20 **Engineering the Next Generation of Therapeutics**

John Delaney, PhD, Director, Research Technologies and Collaborations, Amgen

9:40 **Targeting Subcellular Trafficking Behavior for the Design of Therapeutic Antibodies**

E. Sally Ward, PhD, Director, Translational Immunology; Professor, Molecular Immunology, Centre for Cancer Immunology, University of Southampton

The use of antibody engineering combined with subcellular trafficking analyses to design therapeutic antibodies in two areas will be discussed: First, the development of engineered antibodies that clear pathogenic antibodies. Second, the design of antibody-drug conjugates (ADCs) that deliver their cytotoxic payload more efficiently to lysosomes within cells, resulting in a strategy to generate ADCs that are effective at lower doses.

10:00 **Discovery of Claudin 6 (CLDN6) and Claudin 18.2 (CLDN18.2) Monoclonal Antibodies with Best-in-Class Specificity**

Joseph Rucker, PhD, Vice President, Research & Development, Integral Molecular

Oncology targets Claudin 6 (CLDN6) and 18.2 (CLDN18.2) are overexpressed in select cancers but are absent in most adult healthy tissues. Using our MPS Antibody Discovery platform, we discovered and humanized lead candidate antibodies that bind unique residues on CLDN6 but not closely related receptors CLDN9, CLDN3, and CLDN4, or members of the human proteome. We also present a panel of humanized CLDN18.2 MAbs with picomolar affinities that are superior to the clinical-stage benchmark.

10:20 **Coffee Break - View Our Virtual Exhibit Hall**

CUTTING-EDGE DRUG DEVELOPMENT FOR INFLAMMATORY AND AUTOIMMUNE DISEASE (CONT.)

10:35 **Post-Translational Modification and Disease-Potential Targets for Therapy**

Ahuva Nissim, PhD, Professor, Antibody and Therapeutic Engineering, William Harvey Research Institute, Queen Mary University of London

We discovered that auto reactivity in arthritis is against neoepitopes formed as a result of oxidative post-translational modification (oxPTM) collagen type II (oxPTM-CII) that are formed in the arthritic joints. We showed that targeting of a payload drug by anti-oxPTM-CII antibody to inflamed arthritic joints (Etanercept or viral IL-10) and hence nanoparticles loaded with multiple drugs. We also showed that anti-oxPTM-CII antibodies can detect early OA before cartilage erosion.

10:55 **Early Detection of Osteoarthritis in the Rat with an Antibody Specific to Type II Collagen Modified by Reactive Oxygen Species**

Anne Gigout, PhD, Group Leader in vivo Pharmacology, Galapagos, Romainville, France

We used an antibody specific to oxidative post-translationally modified type II collagen (oxPTM-CII) to stain rat cartilage in two different chronic osteoarthritis models. Several time points were evaluated as early as one day post operation. We could observe that oxPTM-CII staining is mainly localized in the deep zone and is detectable before the appearance of cartilage lesions. It indicates that oxPTM-CII could serve to detect early osteoarthritis.

IMMUNO-MODULATION FROM PHAGE AND YEAST DISPLAY LIBRARIES

11:15 **Allosteric Anti-Tryptase Antibodies for the Treatment of Mast-Cell Mediated Severe Asthma**

Henry Maun, PhD, Principal Scientific Researcher, Department of Early Discovery Biochemistry, Genentech

We found that mast cell tryptase levels are elevated in severe asthma patients independent of type 2 inflammation which correlates with active ß-tryptase allele count. We discovered an inhibitory antibody against human ß-tryptase, that dissociates active tryptase tetramers into inactive monomers. A co-

crystal structure along with biochemical studies reveal the molecular basis for inhibition. This antibody inhibits tryptase activity in two *in vivo* models, providing a foundation for clinical development.

11:35 Affinity Maturation of B7-H6 Translates into Enhanced NK Cell-Mediated Tumor Cell Lysis and Improved Proinflammatory Cytokine Release of Bispecific Immunoligands via NKp30 Engagement

Stefan Zielonka, PhD, Associate Director, Protein Engineering & Antibody Technologies, Merck KGaA

Activating Natural Killer (NK) cell receptors represent promising target structures to elicit potent anti-tumor immune responses. Here, novel immunoligands were generated that bridge the activating NK cell receptor NKp30 on NK cells with epidermal growth factor receptor (EGFR) on tumor cells in a bispecific IgG-like format based on affinity-optimized versions of B7-H6 and the Fab arm derived from Cetuximab.

11:55 Lunch Break - View Our Virtual Exhibit Hall

NEXT-GENERATION PLATFORMS FOR TARGET DISCOVERY

12:45 KEYNOTE PRESENTATION: Highly Targeted Anticalin® Therapies

Hitto Kaufmann, PhD, CSO & Senior Vice President, Pieris Pharmaceuticals GmbH

A number of Anticalin-based new therapeutic entities are currently in clinical and preclinical development. We are gaining an increasing understanding of these molecules as they are being developed either as inhalable proteins treating respiratory diseases or as multi-specific injectables in immune-oncology. This translates into an enhanced discovery and development platform for a broad pipeline of highly targeted biologics.

13:05 Rapid Identification of Highly Potent Fully Human Anti-CCR-1 Antagonist mAbs

Martin Scott, PhD, Scientific Leader & Associate Fellow, GlaxoSmithKline

Complex cellular targets represent a challenge for therapeutic antibody discovery, primarily because poor target protein stability upon extraction from cell membranes. We have used different formats to identify and optimise anti CCR-1 functional antibodies using an *in vitro* yeast-based antibody discovery platform (AdimabTM). These data exemplify a methodology to generate potent fully-human mAbs for challenging targets rapidly using whole cells as antigen and defining a route to affinity-matured variants.

13:25 Phenotypic Discovery of Antibody-Target Combinations and Deep Mining of Complex Antibody Pools

Anne Ljungars, PhD, Senior Research Scientist, Preclinical Research, BioInvent International AB

The antibody drug development field suffers from a crowded target space and an approach for discovery of both novel antibodies and targets is phenotypic screening, using phage display and selection on whole cells, followed by functional testing and target deconvolution. In this strategy, the generated pool of antibodies will be very complex and by applying various mining technologies antibodies against a broad range of cell surface receptors are discovered.

13:45 From Antigens to Antibodies – Streamlined Discovery of Therapeutic Antibodies

Mart Ustav Jr., PhD, Chief Scientific Officer, Icosagen Cell Factory

We will present Icosagen's latest breakthrough in developing highly potent virus neutralizing antibodies against SARS-CoV-2 based on multiple antibody formats. We demonstrate the implementation of the Hybrifree technology in rapidly developing antibodies with drug like properties and highly potent virus neutralizing efficacy.

14:05 Refresh Break - View Our Virtual Exhibit Hall

14:20 The Application of Ribosome Display for Optimisation of 'Hard to Mature' Clones

Mark J. Austin, PhD, Team Leader, Display Technology, CRUK AstraZeneca Antibody Alliance Laboratory (AAL)

The *in vitro* affinity and/or functional maturation of naïve antibodies is common practice. In most cases, targeted introduction of sequence diversity into a limited number of complementarity determining region (CDR) loops coupled with selection for improved variants through phage or ribosome display is sufficient to deliver the required affinity or functional improvements.

MAKING ANTIBODIES RAPIDLY TO COMBAT PANDEMIC VIRUSES

14:40 Human Neutralizing Antibodies against SARS, MERS and Emerging Coronaviruses: Implications for Future Immunotherapy

Wayne Marasco, MD, PhD, Professor of Medicine, Cancer Immunology & Virology, Dana-Farber Cancer Institute

Developing human neutralizing antibodies (nAbs) against emerging viral pathogens can be seriously delayed due to limited access of blood specimens from acute/convalescent infected individuals due to privacy, public safety, regulatory and national security concerns. However, seminal discoveries of nAbs for emerging coronaviruses have also been made the old-fashioned way through antibody phage display using non-immune libraries. I will discuss the lessons learned for nAb discovery during these outbreaks.

15:00 Rapid Discovery of Anti-Viral Antibodies and Development as Gene Therapies for Pandemic Prevention

Sarav Rajan, PhD, Senior Scientist, AstraZeneca

We have built a platform to rapidly isolate anti-influenza antibodies in as little as 10 days. We then optimized parallel manufacturing workflows to deliver one of these antibodies by plasmid DNA, mRNA and AAV platforms that afforded mice complete protection from lethal challenge. The complete process was completed in approximately 60 days and could form the basis for a rapid therapeutic response to upcoming pandemics.

15:20 Session Break

15:40 LIVE PANEL DISCUSSION: Target Discovery and Rapid Antibody Production

Moderator: Ana Barbas, PhD, Coordinator, Bayer Satellite Laboratory, iBET, Bayer Portugal SA

Panelists:

Martin Scott, PhD, Scientific Leader & Associate Fellow, GlaxoSmithKline

Anne Ljungars, PhD, Senior Research Scientist, Preclinical Research, BioInvent International AB

Mark J. Austin, PhD, Team Leader, Display Technology, CRUK AstraZeneca Antibody Alliance Laboratory (AAL)

Wayne Marasco, MD, PhD, Professor of Medicine, Cancer Immunology & Virology, Dana-Farber Cancer Institute

Mart Ustav Jr., PhD, Chief Scientific Officer, Icosagen Cell Factory

Sarav Rajan, PhD, Senior Scientist, AstraZeneca

16:00 Happy Hour - View Our Virtual Exhibit Hall

16:30 Close of Display of Biologics Conference

5th Annual

Engineering Antibodies

Designing Next-Generation Biomolecules

WEDNESDAY 11 NOVEMBER

DESIGNING ANTIBODIES FOR BETTER BINDING AND AFFINITY

9:00 KEYNOTE PRESENTATION: Antibody Discovery Is More than Just Binders

Ruud M. De Wildt, PhD, Director & Biopharm R&D Head, Lead Discovery, GlaxoSmithKline

This talk will provide an overview of how current antibody technologies have revolutionised the way patients are being treated. Fully human high-affinity antibodies are now routinely selected from many different *in vitro* display or *in vivo* transgenic platforms. This talk will also give an overview of GSK's antibody discovery platforms and processes, exemplified with cutting-edge antibody engineering and optimization approaches to identify antibodies with desirable properties for useful therapeutic approaches.

9:20 Domain Antibody Libraries for Rapid Binder Discovery

Franck Perez, PhD, Director, Biology and Cancer Unit, CNRS, Institut Curie

While *in vivo* immunization remains the main source of antibody identification, progress in gene synthesis opened up the development of fully synthetic libraries. We designed several humanized single-domain scaffolds and generated high-diversity libraries that can be screened by phage display. We will show here that such libraries enable the fast identification of highly specific antibodies that can be used to identify novel tumor antigen, stain or destroy cancer cells.

9:40 Antibodies Exhibit Multiple Paratope States that Can Differ in VH-VL Domain Orientations

Klaus R. Liedl, PhD, Professor & Head, General, Inorganic & Theoretical Chemistry, University of Innsbruck

For decades, antibody CDR loops have been thought to be limited to static canonical conformations determining their binding properties. We escape this long-believed paradigm of static canonical structures determining binding properties and specificity of antibodies.

10:00 Reaching the High-Hanging Fruit: Accessing broad B cell diversity to select better lead candidates in under 1 week

Anupam Singhal, PhD, Sr. Product Manager, Antibody Discovery, Marketing, Berkeley Lights, Inc.

The discovery of antibodies against difficult targets, the high-hanging fruit, will require technology that can functionally screen the B cell repertoire. This presentation will demonstrate how users of the Beacon® optofluidic system can generate diverse hit panels and down-select lead candidates in less than 1 week.

10:20 Coffee Break - View Our Virtual Exhibit Hall

NOVEL ANTIBODY PLATFORMS

10:35 Bispecific Antibody-Activated Synthetic Agonistic Receptors as a Novel Modular Platform for Cellular Therapies

Sebastian Kobold, MD, Professor, Clinical Pharmacology, Klinikum der Universität München

We have developed a novel, modular cell therapy platform constituted of fully synthetic inert proteins introduced into T cells that can only be triggered through antibodies specific for said fusion proteins and bound to the tumor cell. This platform is actionable, controllable, and modular. I will present data describing the properties of the platform and supporting its use for cancer treatment.

10:55 Discovery to Preclinical Development of ARGX-117, A Sweeping Antibody Targeting Complement Factor C2

Karen Silence, PhD, Project Leader, argenx BVBA

11:15 Affinity Tailored Multispecific MATCH™ antibodies – Generation of Powerful Cancer Treatments

Stefan Warmuth, PhD, VP, Head CMC, Numab Therapeutics AG

Numab's MATCH platform was exploited for the generation of a monovalent trispecific 4-1BB/PD-L1/HSA MATCH3 molecule (NM21-1480) that agonizes 4-1BB on anti-cancer T cells, conditionally upon binding to and blockade of PD-L1 on tumor cells. NM21-1480 shows superior efficacy over conventional CPI therapies and avoid dose limiting toxicities of systemic 4-1BB agonism. Further, tetra-specific MATCH4 molecules are exploited to improve on safety and efficacy of conventional bispecific strategies.

11:35 Amplifying Antibody Diversity with Single-Cell Screening and Immune Repertoire Sequencing

Christopher Williamson, Ph.D., Senior Research Scientist, Cell Biology & Immunology, AbCellera

High-throughput single-cell screening is enabling the rapid generation of large, diverse antibody sequence datasets. By combining immune repertoire sequencing with functionally validated single-cell data, we further expand antibody diversity accessible for lead identification. Celium™, AbCellera's interactive software, interprets these complex datasets to guide the selection of valuable antibodies.

11:55 LIVE PANEL DISCUSSION: Novel Antibody Designs for Better Binding, Affinity and Targeting

Moderator: Ruud M. De Wildt, PhD, Director & Biopharm R&D Head, Lead Discovery, GlaxoSmithKline

Panelists:

Klaus R. Liedl, PhD, Professor & Head, General, Inorganic & Theoretical Chemistry, University of Innsbruck

Kevin Heyries, Ph.D., Co-Founder and Head of Business Development, Business Development, AbCellera

Mio Muelthaler, Executive Account Manager, Switzerland, Sales, Berkeley Lights, Inc.

Franck Perez, PhD, Director, Biology and Cancer Unit, CNRS, Institut Curie

Karen Silence, PhD, Project Leader, argenx BVBA

Stefan Warmuth, PhD, VP, Head CMC, Numab Therapeutics AG

12:15 Lunch Break - View Our Virtual Exhibit Hall

12:45 Problem-Solving Breakout Discussions - View Our Virtual Exhibit Hall

Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers. View all breakouts.

BREAKOUT: How to Make Antibodies/Therapeutic Proteins Enter Specific Cell Types

Greta Hultqvist, PhD, Associate Senior Lecturer, Pharmaceutical Biosciences, Uppsala University

5th Annual

Engineering Antibodies

Designing Next-Generation Biomolecules

- How to induce endocytosis of specific cells?
- how to exit the endosome?

13:25 Refresh Break - View Our Virtual Exhibit Hall

ANTIBODIES FOR CHALLENGING & EMERGING TARGETS

13:45 Road to the First GPCR Agonist Antibody and Future Prospects

Yanbin Ma, Drug Discovery Head, Innovation Center, Shanghai Benemae Pharmaceutical Corp.

Agonists for G-protein-coupled receptors (GPCRs) in treating diseases are needed, whereas it remains a big challenge in developing antibody agonist as a novel modality targeting GPCR. Here, we report a full agonist, JN241-9, for human apelin receptor (APJ), realized by structure-guided conversion of single-domain antibody antagonist, JN241.

14:05 Molecular Insight into Recognition of the CGRPR Complex by Migraine Prevention Therapy, Aimovig (Erenumab)

Fernando Garces, PhD, Principal Scientist and Group Lead, Protein Engineering, Therapeutics Discovery, Amgen, Inc.

Erenumab is the only US FDA-approved mAb therapy against the CGRP receptor (CGRPR) for the prevention of migraine, and also against a GPCR. The crystal structure of erenumab, in complex with CGRPR, reveals a direct ligand-blocking mechanism, enabled by a remarkable 21-residue-long CDR-H3 loop that projects deep into CGRPR. Such structural insights reveal the drug action mechanism of erenumab and shed light on developing antibody therapeutics targeting GPCRs.

14:25 Tailored On-Demand Therapeutics: Changing the Future Treatment Landscape with *de novo* Protein Design

Daniel-Adriano Silva, PhD, Vice President, Head of Research and Co-Founder, Neoleukin Therapeutics, Inc.

Engineering of *de novo* proteins has the revolutionary potential to transform the field of therapeutic development, from traditional molecule discovery to a purposeful, ad hoc, molecule engineering. The first examples are already showing tangible results that hint at its enormous potential to deliver the next generation of therapeutics, tailored on demand to treat disease. I will illustrate the concept with a few of our recent research developments.

14:45 Synthetic DNA Technologies Enable Fast and Responsive SARS- CoV-2 Antibody Discovery and Optimization

Genedata

Aaron Sato, Chief Scientific Officer, Biohpharma, Twist Biosciences

Utilizing its proprietary DNA technology to write synthetic libraries, Twist Biopharma provides antibody discovery and optimization solutions for the biotechnology industry, based on a strategy of combining highly diverse synthetic naïve antibody phage display libraries with an end-to-end digitalization workflow that allows us to identify leads against difficult-to-drug targets in high-throughput. Here, we present a panel of high affinity anti-SARS-CoV-2 S1 and anti-ACE2 antibodies we have identified that may have both therapeutic and/or diagnostic applications.

15:05 Refresh Break - View Our Virtual Exhibit Hall

ANTIBODIES ENGINEERED TO CROSS THE BLOOD-BRAIN BARRIER

15:20 Transporting Antibodies over the Blood-Brain Barrier and Therapeutic Effects on Neurodegenerative Diseases

Greta Hultqvist, PhD, Associate Senior Lecturer, Pharmaceutical Biosciences, Uppsala University

The blood brain-barrier (BBB) severely limits the number of antibodies that reaches the brain, impeding the development of immunotherapy. We have developed a transporter for antibodies, which increases the brain uptake 80 times and enables novel treatment strategies. Here, I illustrate this by showing data from a treatment study where we have managed to decrease amyloid amounts in the brain of mice with Alzheimer's disease.

15:40 Blood Brain Barrier Delivery in Non-Human Primates by Single Domain VNAR Antibodies to TfR1

Pawel Stocki, PhD, Director, Research, Ossianix Inc.

Ossianix will present the results of a non-human primate study demonstrating an exceptionally efficient blood-brain barrier (BBB) delivery shuttle using single domain VNAR antibody. TXP1, which is VNAR antibody specific to TfR1 showed highly efficient transfer into the brain, with up to a 35-fold increase over the control. The TXP1 shuttle, when administered at 1.35 mg/kg, reached 4 nM concentration in the brain at 20 hour timepoint.

16:00 The Transport Vehicle: Crossing the Blood-Brain Barrier for Neurotherapeutics

Joy Yu Zuchero, PhD, Associate Director, Denali Therapeutics Inc.

Effective delivery of protein therapeutics to the central nervous system (CNS) has been greatly restricted by the blood-brain barrier (BBB). We have developed a transport vehicle (TV) by engineering the Fc fragment to exploit receptor-mediated transcytosis by binding to a highly expressed BBB cell target. The TV platform significantly improves CNS uptake of peripherally administered protein therapeutics and results in sustained pharmacodynamic responses in both mice and non-human primates.

16:20 Novel analysis method for therapeutic antibodies by FcR affinity chromatography

TOSOH

Toru Tanaka, Mr., Bioscience Division, Tosoh Corporation

The structure of N-glycans is important in QC of antibody drugs. In 2018, we launched TSKgel FcR-IIIA-NPR with a modified FcgRIIIa ligand as HPLC column for rapid analysis of antibodies. A preparative column for more detailed analysis will be launched soon. Characteristics and applications of these products will be introduced.

16:40 LIVE PANEL DISCUSSION: Antibodies for Complex Modalities and Applications

Moderator: Fernando Garces, PhD, Principal Scientist and Group Lead, Protein Engineering, Therapeutics Discovery, Amgen, Inc.

Panelists:

Greta Hultqvist, PhD, Associate Senior Lecturer, Pharmaceutical Biosciences, Uppsala University

Aaron Sato, Chief Scientific Officer, Biohpharma, Twist Biosciences

Daniel-Adriano Silva, PhD, Vice President, Head of Research and Co-Founder, Neoleukin Therapeutics, Inc.

Pawel Stocki, PhD, Director, Research, Ossianix Inc.

Toru Tanaka, Mr., Bioscience Division, Tosoh Corporation

Joy Yu Zuchero, PhD, Associate Director, Denali Therapeutics Inc.

17:00 Close of Engineering Antibodies Conference

11th Annual

Engineering Bispecific Antibodies

Designing New Off-the-Shelf Antibody Therapies

THURSDAY 12 NOVEMBER

DEFINING CLINICAL CHALLENGES AND ENGINEERING SOLUTIONS: THERAPEUTIC PLATFORMS

9:00 KEYNOTE PRESENTATION: Clinical Challenges and Engineering Solutions in Cancer Immunotherapy: What Do We Need Now?

Daniel S. Chen, MD, PhD, CMO, IGM Biosciences

Cancer immunotherapy has resulted in long-term durable benefit for some patients with otherwise terminal cancer. But why are we struggling to deliver a similar benefit to the majority of cancer patients? Advances in biology and technology offer opportunities for the future, but what are the challenges that they should be focused on now? Presentation of clinical and biomarker data and scientific framework, challenges and engineered approaches will be discussed.

9:20 Multifunctional Natural Killer Cell Engagers Targeting NKp46 Trigger Protective Tumor Immunity

Éric Vivier, PhD, CSO, Innate Pharma

Despite interesting clinical results in hematological malignancies, the development of bispecific killer cell-engager antibody formats directed against tumor cells and stimulating anti-tumor T cell immunity has proved challenging, mostly due to toxicity problems. We report here the generation of trifunctional natural killer (NK) cell engagers (NKCEs), targeting two activating receptors, NKp46 and CD16, on NK cells, and a tumor antigen on cancer cells.

9:40 Bispecific Antibodies – Next-Generation Molecules & Applications

Ulrich Brinkmann, PhD, Expert Scientist, Pharma Research & Early Development, Roche Innovation Center Zurich

The presentation will provide an overview and examples of our bsAb molecules, including examples of novel exploratory approaches. Important aspects that will be covered also include high-throughput technologies to identify optimal binder-format combinations to elicit desired bsAb functionalities, and examples that demonstrate its relevance.

10:00 Leveraging proteogenomics to uncover the antibody repertoire in polyclonal sera

Anthony Stajduhar, Director of International Business Development, Rapid Novor Inc

Hybridoma & phage display technologies dominate the antibody discovery space, but there is a growing interest in functionally interrogating the b-cell repertoire. We're presenting results from our REpAb technology which leverages NGS & MS antibody protein sequencing technologies to *de novo* sequence the most functionally abundant antibodies in polyclonal sera.

10:20 Coffee Break - View Our Virtual Exhibit Hall

FORMAT ARCHITECTURE: CHOOSING THE RIGHT EPITOPE-AFFINITY COMBINATION

10:35 Anti-Idiotypic Bispecific Antibody Derivatives for Personalized Medicine

Harald Kolmar, PhD, Professor and Head, Institute for Organic Chemistry and Biochemistry, Technische Universität Darmstadt

We report an approach for a personalized cancer therapy by generating patient-specific binders against the B-cell receptor of lymphomas. To this end, we established a platform for rapid yeast surface display identification of shark-derived vNAR antibody domains from semisynthetic libraries specifically targeting lymphoma cells. Several formats of vNAR bispecifics and ADCs were evaluated aimed at widening the therapeutic window for B-cell lymphoma therapy.

10:55 Developing a Plethora of Innate Cell Engagers for New Cancer Treatments on the ROCK® Platform

Arndt Schottelius, MD, PhD, CSO, Affimed GmbH

Many cancer therapies don't involve the innate immune system. Affimed's ROCK platform is designed to develop innate cell engagers (ICEs) for various indications. All ICEs bear a CD16A-binding paratope, which triggers tumor cell killing through activating NK cells and macrophages.The modular ROCK platform allows to customize ICEs with respect to tumor target, affinity, pharmacokinetics, and the plethora of molecules in our pipeline has demonstrated rapid and predictable engineering capabilities.

11:15 Effects on ImmTAC Activity of Varying Affinity for pHLA and CD3

Peter Kirk, PhD, Group Leader, Antibody Research, Immunocore Ltd.

ImmTAC molecules are T cell-engaging bispecifics that target tumor-specific peptide-HLA. To optimise ImmTAC design, we assessed the impact on potency and specificity of combinatorially varying the affinity for target and CD3 over a 1000-fold range.

11:35 Session Break

11:55 Targeting Bispecific Biologics to Disease Tissues

Lorenzo Benatuil, PhD, Senior Principal Research Scientist & Head, Biologics, AbbVie

Bispecific biologics such as dual variable domain immunoglobulins (DVD-Igs) offer new opportunities for innovative tissue/disease targeted therapies and have permitted the exploration of tissue specific and disease tissue specific targeting of biologics. We will describe preclinical examples of tissue targeting in normal and disease *in vivo* models as part of a new generation of locally acting "regio-specific" biologics therapies.

12:15 Lunch Break - View Our Virtual Exhibit Hall

11th Annual

Engineering Bispecific Antibodies

Designing New Off-the-Shelf Antibody Therapies

FORMAT ARCHITECTURE: CHOOSING THE RIGHT EPITOPE-AFFINITY COMBINATION (CONT.)

12:45 Formation of Multivalent and Multispecific Antibodies for Therapeutical Therapy

Oliver Seifert, PhD, Senior Scientist, Institute of Cell Biology and Immunology, University of Stuttgart

Multispecific antibodies find increasing interest for therapeutic applications. With our newly designed antibody platform technologies we are able to generate Ig-like molecules of varying valency, specificity, geometry, flexibility, and size. Data will be presented demonstrating the effects of these parameters on the efficacy of bispecific T cell engagers.

ADVANCING T CELL BISPECIFIC ANTIBODIES

13:05 Tumor-Conditional Anti-CTLA4 Uncouples Antitumor Efficacy from Immunotherapy-Related Toxicity

Feng Dong, PhD, Principal Research Scientist II, Foundational Immunology, AbbVie Cambridge Research Center

While immune checkpoint blockade leads to potent antitumor efficacy, it also leads to immune-related adverse events in cancer patients. We developed an anti-CTLA4 DVD-Ig possessing an outer tumor-specific antigen-binding domain engineered to shield the inner anti-CTLA4-binding domain until the outer domain was cleaved by MT-SP1 present in the tumor microenvironment. Thus, our tumor-conditional anti-CTLA4 DVD provides an avenue for uncoupling antitumor efficacy from immunotherapy-induced toxicities.

13:25 Mechanistic Basis of Bispecific Antibodies Targeting Immune Receptors

Wei Xu, MD, PhD, Vice President, New Drug Biology & Translational Medicine, Innovent Biologics Co. Ltd.

Cancer immunotherapy, such as PD1/PD-L1 inhibitors, have demonstrated therapeutic efficacy across a range of human cancers. Extending this benefit to a greater number of patients, however, will require a better understanding of how these therapies affect anti-tumor immunity, especially in exisiting immunity in the tumor microenvironment. I will discuss how to harness the power of immunity using bispecific antibodies that could create new biology.

13:45 Dissecting the IgG-[L]-scFv Format: How BsAb Design Impacts Function

Brian Santich, PhD, Research Fellow, Pediatrics, Memorial Sloan Kettering Cancer Center

T cell bispecific antibodies (BsAbs) couple T-lymphocytes against tumor cells, inducing their destruction. We have recently identified 3 features of the IgG-[L]-scFv BsAb format which impacted their function: i) spatial configuration (cis-configuration), ii) interdomain spacing (one Ig-domain) and iii) valency (two cis-modules). When combined these parameters enhanced cytotoxicity, cytokine release and anti-tumor responses. These findings highlight the importance of BsAb design and provide guidelines for improving BsAb function.

14:05 Revision of RTK Tumor Targeting: Turning Receptors on and off with Bi-Paratopic Agents

Rastislav Tamaskovic, PhD, Head, TCL Tumor Targeting, Biochemistry, University of Zurich

Due to adaptiveness of oncogenic networks, tumors driven by hyperactivated RTK receptors readily develop resistance against targeted therapies. We developed multivalent DARPin and IgG chimeric agents devoid of toxic payloads, which achieve tumoricidal activity by trapping tumor-driving receptor tyrosine kinases in inactive conformations and/or supramolecular assemblies. Using analogous construction scheme, we built a novel platform for tumor RTK fingerprinting aimed at identification of prospective therapeutic leads or truly synergistic combination therapies.

14:25 Refresh Break - View Our Virtual Exhibit Hall

14:40 LIVE PANEL DISCUSSION: Advancing T Cell Bispecific Antibodies

Moderator: Christian Klein, PhD, Cancer Immunotherapy Discovery, Roche Innovation Center Zurich, Roche Pharma Research & Early Development, pRED

Panelists:

Wei Xu, MD, PhD, Vice President, New Drug Biology & Translational Medicine, Innovent Biologics Co. Ltd.

Brian Santich, PhD, Research Fellow, Pediatrics, Memorial Sloan Kettering Cancer Center

Rastislav Tamaskovic, PhD, Head, TCL Tumor Targeting, Biochemistry, University of Zurich

Feng Dong, PhD, Principal Research Scientist II, Foundational Immunology, AbbVie Cambridge Research Center

Anthony Stajduhar, Director of International Business Development, Rapid Novor Inc

15:00 Close of PEGS Europe Summit

> "This year's PEGS Europe meeting once again was perfect to catch up on most recent developments and trends in antibody engineering and therapeutic advances."
>
> **Christian K.,** PhD, Head, Oncology Programs and Cancer Immunotherapy Discovery, Roche PRED, Roche Innovation Center Zurich

5th Annual

Next-Generation Antibody-Drug Conjugates

Engineering Strategies & Successess

Bonus Plenary Keynote Session

Don't miss the bonus Plenary Keynote Session and Problem-Solving Breakouts on Monday! This day is included in all Premium and Standard package registrations.

BREAKOUT: Combining ADCs with Immunotherapy Approaches - What Works and What Doesn't? Lessons Learned and Next-Steps

Mahendra P. Deonarain, PhD, Chief Executive and Science Officer, Antikor Biopharma Ltd.

16:30 **Close of Day**

TUESDAY 10 NOVEMBER

ADCs TARGETING CANCER

9:00 **How Stroma Targeting through a Novel FAP-Targeting ADC, OMTX705, Represents a New Treatment Alternative for Chemotherapy and Pembrolizumab-Resistant Solid Tumors**

Myriam Fabre, PhD, CSO, Oncomatryx Biopharma SL

FAP-expressing cancer-associated fibroblasts play a key role in cancer development, progression, and resistance to chemo- and immuno-therapy. OMTX705 is a novel, potent, antibody-drug conjugate that targets FAP-positive CAFs. Results from preclinical mouse models show that OMTX705 exerts a potent and long-lasting anti-tumor activity as single agent, in combination with chemotherapy, and in solid tumors resistant to PD-1 inhibitors. These data support the clinical development of OMTX705 for cancer treatment.

9:20 **Amanitin-Based Antibody-Drug Conjugates as New Therapeutic Modalities for Cancer Therapy**

Stephanie Voss, PhD, Grp Leader, Bioconjugation & Protein Chemistry, Heidelberg Pharma Research GmbH

Antigen-Targeted Amanitin-Conjugates (ATACs) represent a new class of ADCs using the payload Amanitin. This payload introduces a novel mode of action into oncology therapy, the inhibition of RNA polymerase II. The technology platform includes Amanitin supply, site-specific conjugation, demonstrated safety profile and biomarker. HDP-101 is the first ATAC directed against BCMA soon entering Phase I trials.

9:40 **Engineered Avibodies (enhanced Diabodies) Precisely Loaded with Novel ADC Payloads that Surpass IgG-ADCs in Cancer Therapy.**

Peter J. Hudson, PhD, Chief Scientist and CSO, Victorian Cancer Biologics Consortium, Avipep Pty Ltd.

Avibodies™ comprise unique surface disulphides for precise loading of drug payloads (auristatins, maytansinoids) with superior tumor xenograft regression compared to conventional IgGs (targeting CD30). PK of Tag-72 targeted diabodies has been demonstrated in a first-in-man Phase 1 clinical biodistribution trial. With TagWorks NV², Avibodies were shown to pre-target and upload tumors with the ADC-drug subsequently released by a systemic activator.

10:00 **Addressing the Challenges of Next-Generation Antibody-Drug Conjugate Medicines** ABZENA

Nicolas Camper, Group Leader, Bioconjugation Chemistry, Abzena

Antibody Drug Conjugates (ADCs) are an emerging class of therapeutics offering the opportunity to develop truly targeted therapies, facilitating release at the point of treatment, by attaching cytotoxic drugs to an antibody using a linker. However, developing and manufacturing ADCs can be a complex process.

10:20 **Coffee Break - View Our Virtual Exhibit Hall**

IMPROVING THE SAFETY, EFFICACY AND STABILITY OF ADCs

10:35 **Novel Approaches to Modulate the TME with Immuno-Modulatory Combination Therapies, with Improved Safety and Efficacy in Mice**

Amrik Basran, PhD, CSO, Avacta Life Sciences

By combining our anti-PD-L1 Affimer antagonist (AVA04 Fc) with a potent, small-molecule inducer of the innate immune system (Val-Boro-Pro, VbP), we have demonstrated full tumour regression in mouse syngeneic models with an immunological memory effect. We developed an Affimer-drug conjugate (TMAC) that included a novel FAP-a cleavable linker which is preferentially cleaved in the TME, which showed significant anti-tumour effects in a CT26 syngeneic model.

10:55 **Monodisperse Polysarcosine Drug-Linker Platform: Towards More Hydrophilic Antibody-Drug Conjugates**

Warren Viricel, PhD, CSO, Mablink Bioscience

"Hydrophobicity masking" chemical modifiers can be orthogonally embedded into drug-linker constructs of ADCs. These hydrophilic entities have the potential to enable increased drug-loading (drug-antibody ratios at or above 8) and improve PK profiles, efficacy, and tolerability of ADCs. Our efforts in developing a hydrophilic, monodisperse, polysarcosine-based ADC platform will be presented. Impact of polysarcosine on physicochemical and pharmacological properties of conjugates bearing different payloads will be discussed.

11:15 **Session Break**

11:55 **LIVE PANEL DISCUSSION: Improving the Therapeutic Index in ADCs**

Moderator: Myriam Fabre, PhD, CSO, Oncomatryx Biopharma SL

Panelists:

Amrik Basran, PhD, CSO, Avacta Life Sciences

Nicolas Camper, Group Leader, Bioconjugation Chemistry, Abzena

Peter J. Hudson, PhD, Chief Scientist and CSO, Victorian Cancer Biologics Consortium, Avipep Pty Ltd.

Warren Viricel, PhD, CSO, Mablink Bioscience

Stephanie Voss, PhD, Grp Leader, Bioconjugation & Protein Chemistry, Heidelberg Pharma Research GmbH

5th Annual

Next-Generation Antibody-Drug Conjugates

Engineering Strategies & Successess

12:15 Lunch Break - View Our Virtual Exhibit Hall

IMPROVING ADC CONJUGATION AND WARHEADS

12:45 Duotoxins – Two Highly Synergistic Bullets Hit a Target Hard

Fabian Müller, MD, Physician Scientist, Hematology and Oncology, University Hospital of Erlangen

Duotoxins combine Fab-Pseudomonas, exotoxin-based immunotoxins, plus DM1 on one molecule. Similar to our published data with free Paclitaxel, the two molecules on one antibody fragment generate *in vivo*-specific high synergy.

13:05 Linker Matters: Highly Stable and Efficient ADCs Made with Native Antibodies and Peptide Linkers

Philipp Spycher, PhD, CEO, Araris Biotech AG

We introduce a novel linker technology that enables site-specific payload conjugation to native antibodies with no prior engineering necessary. Our approach is based on novel hydrophilic peptide-linkers and the microbial transglutaminase (MTG), previously believed to require antibody engineering for conjugation. We show that payloads can directly and efficiently be conjugated in one step, and that the resulting ADCs show excellent *in vivo* stability and efficacy.

13:25 CO-PRESENTATION: Tubulis Presents Novel Platforms, Leveraging Advanced Chemistry and Biology to Create Improved Antibody Drug Conjugates

Marc-André Kasper, PhD, Chemical Biology II, Leibniz Institute for Molecular Pharmacology (FMP)

Jonas Helma-Smets, PhD, Founder & CSO, Tubulis GmbH

Tubulis generates uniquely matched protein-drug conjugates by combining proprietary novel technologies with disease-specific biology. The Tub-tag® technology is a novel chemoenzymatic, site-specific conjugation approach that provides a biology inspired solution for improved ADC stability. P5 conjugation is cysteine selective and characterized by drastically improved stability combined with beneficial *in vivo* behavior, compared to maleimide chemistry. In consequence, we achieve optimal ADC integrity even at high drug-to-antibody ratios (DAR).

13:45 Session Break

14:05 Refresh Break - View Our Virtual Exhibit Hall

ENGINEERING THE ANTIBODY MOIETY

14:20 Antibody-Drug Conjugates (ADCs) and Small-Molecule Drug Conjugates (SMDCs): A Comparative Analysis

Dario Neri, PhD, Full Professor, Chemistry & Applied Biosciences, ETH Zurich

Antibody-drug conjugates (ADCs) and small-molecule drug conjugates (SMDCs) represent two conceptually related strategies for the targeted delivery of potent cytotoxic agents to various types of cancer. In this lecture, I will present a comparative analysis of therapy and biodistribution results in mouse models of cancer, as well as clinical data and information on how ADCs and SMDCs can be potentiated using targeted cytokine therapeutics.

14:40 Antibody Fragment Drug Conjugates (FDCs): Harnessing the Benefits of Superior Tumour Penetration

Mahendra P. Deonarain, PhD, Chief Executive and Science Officer, Antikor Biopharma Ltd.

15:00 Can ADCs Replace Chemotherapy? Mirvetuximab Soravtansine, a Folate Receptor Alpha (FRa)-Targeting Antibody-Drug Conjugate (ADC), in Combination with Bevacizumab in Patients with Platinum-Agnostic Ovarian Cancer

Patrick A Zweidler-McKay, PhD, Sr Medical Dir Heme & Solid Tumors, Heme & Solid Tumors, ImmunoGen Inc

Chemotherapy (paclitaxel, PLD, topotecan) combinations with bevacizumab are commonly used in recurrent ovarian cancer. As an alternate to chemotherapy, MIRV was given in combination with bevacizumab (BEV) to 60 patients with recurrent ovarian cancer with medium or high FRalpha expression. MIRV+BEV demonstrated a favorable, predictable safety profile and a compelling 64% ORR in FRalpha high (n=33) patients, with 69% in PSOC and 59% in PROC subsets.

15:20 Session Break

15:40 LIVE PANEL DISCUSSION: New ADC Platforms and Engineering Strategies

Moderator: Philipp Spycher, PhD, CEO, Araris Biotech AG

Panelists:

Mahendra P. Deonarain, PhD, Chief Executive and Science Officer, Antikor Biopharma Ltd.

Jonas Helma-Smets, PhD, Founder & CSO, Tubulis GmbH

Marc-André Kasper, PhD, Chemical Biology II, Leibniz Institute for Molecular Pharmacology (FMP)

Fabian Müller, MD, Physician Scientist, Hematology and Oncology, University Hospital of Erlangen

Dario Neri, PhD, Full Professor, Chemistry & Applied Biosciences, ETH Zurich

Patrick A Zweidler-McKay, PhD, Sr Medical Dir Heme & Solid Tumors, Heme & Solid Tumors, ImmunoGen Inc

16:00 Happy Hour - View Our Virtual Exhibit Hall

16:30 Close of Next Generation Antibody-Drug Conjugates Conference

12th Annual

Advancing Bispecifics and Combination Therapy to the Clinic

Novel and Synergistic Combinations

WEDNESDAY 11 NOVEMBER

T CELL ENGAGEMENT

9:00 KEYNOTE PRESENTATION: Next-Generation T Cell Engagers

Paul Parren, PhD, Executive Vice President & Head, Lava Therapeutics

Lava Therapeutics' platform is based on the selective recruitment of Vγ9Vδ2 T cells for eradicating tumor cells. This γδ T cell subset displays powerful anti-tumor immune effector activity with an ability to infiltrate human tumors in which its abundance positively correlates with patient survival. This presentation will discuss a novel class of bispecific T cell engager designed to engage Vγ9Vδ2-T cells for the development of efficacious and safe cancer immunotherapies.

9:20 BiTE® Antibody Constructs for the Treatment of Cancer

Roman Kischel, MD, Director, Research & Early Development Lead, Oncology, Amgen Research Munich GmbH

The presentation will discuss structure and mode of action of BiTE antibody constructs, provide an update on the development of the BiTE antibody platform, and showcase clinical data for a novel BiTE antibody construct targeting AML.

9:40 Triclonics™ ENGAGE: Trispecific Antibody Platform for the Discovery of Next-Generation T Cell Engagers

Pieter Fokko Van Loo, PhD, Director Oncology Immunology, Merus NV

Triclonics Engagers are multivalent molecules with three Fab arms that bind up to three different targets and are designed to have long half-life, stability and low immunogenicity. The presentation will highlight the novel features and therapeutic opportunities of the platform, and functional screening of thousands of Triclonics Engagers in T cell assays.

10:00 Session Break

10:20 Coffee Break - View Our Virtual Exhibit Hall

BISPECIFICS WITH CHECKPOINT INHIBITORS TOGETHER AND IN COMBINATION

10:35 Combinatorial Approaches to Enhance Bispecific Anti-Tumor Efficacy

Eric Smith, PhD, Senior Director, Bispecifics, Regeneron Pharmaceuticals, Inc.

This presentation will describe key preclinical data from Regeneron's clinical stage T cell-redirecting bispecific programs (REGN1979, REGN4018, REGN5458), as well as status updates from the ongoing clinical trials. In addition, data from new combinatorial approaches being taken to enhance bispecific anti-tumor efficacy, focusing on costimulatory bispecifics, will be discussed.

10:55 Modulating the Immune System with Multi-Specific Antibodies for the Treatment of Cancer

Nathan D. Trinklein, PhD, CTO, TeneoBio Inc.

Tumor-targeted immune agonist antibodies increase the therapeutic index of cancer therapies. Using NGS-based discovery with humanized rats, we created a large collection of fully human antibodies targeting a variety of tumor antigens and activating receptors on immune cells. Our lead program, TNB-383B (BCMAxCD3) is currently in clinical studies for the treatment of multiple myeloma. In addition to CD3 bispecific antibodies, immune-stimulatory platforms recently developed at Teneobio will also be discussed.

11:15 Dual Agonist Bispecific Antibody Targeting CD137 and OX40 Mediates Anti-Tumour Immunity

Francisca Wollerton, PhD, Director, Antibody Engineering, F-star Biotechnology, Ltd.

This presentation will describe preclinical data on the potent anti-tumor activity of FS120, a first-in-class dual-agonist, tetravalent bispecific antibody targeting CD137 and OX40. FS120 delays tumor growth by improving the activation and proliferation of T cells. FS120 can activate both $CD4^+$ and $CD8^+$ T cells in an FcγR-independent mechanism, therefore promoting focused immune stimulation. F-star's proprietary $mAb^{2™}$ technology platform will also be discussed.

11:35 MGD019, a PD-1 x CTLA-4 Bispecific DART® Protein, with Optimal Dual Checkpoint Blockade and Favorable Tolerability

Alexey Berezhnoy, PhD, Scientist III, MacroGenics, Inc.

We developed MGD019, a bispecific DART protein designed to maintain full blockade of both PD-1 and CTLA-4, while limiting Fc-mediated effector function. MGD019 demonstrated increased CTLA-4 blockade on dual-expressing cells that recapitulate tumor-infiltrating T lymphocytes, and T cell co-activation *in vitro* at least as potent as a combination of ipilimumab and nivolumab. Preclinical pharmacology and additional information relevant to a Phase 1 clinical trial will be discussed.

11:55 PD1-X: Targeting PD-1 with Bispecific Agents

Christian Klein, PhD, Cancer Immunotherapy Discovery, Roche Innovation Center Zurich, Roche Pharma Research & Early Development, pRED

Targeting of the PD-1/PD-L1 axis is the basis for cancer immunotherapy. However, many patients do not respond to cancer immunotherapy and relapse. We have generated bispecific PD-1/TIM-3 and PD-1/LAG-3 checkpoint inhibitory antibodies with superior properties over PD-1 monotherapy as well as a novel PD-1 targeted PD1-IL2v immunocytokine to specifically target PD-1+ T cells. The design and preclinical properties of these PD1-X molecules will be discussed in depth during this presentation.

12:15 Lunch Break - View Our Virtual Exhibit Hall

12:45 Problem-Solving Breakout Discussions - View Our Virtual Exhibit Hall

Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers. View all breakouts.

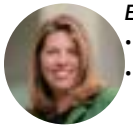
12th Annual

Advancing Bispecifics and Combination Therapy to the Clinic

Novel and Synergistic Combinations

CO-PRESENTATION: BREAKOUT: Antibodies against Viral Pandemics: Results of Global Collaborations

Daniel Emerling, PhD, Senior Vice President, Research, Atreca, Inc.



Erica Ollmann Saphire, PhD, Professor, La Jolla Institute for Immunology

- Best use of *in vitro* data and animal models to adequately forecast human protection
- Identifying and evaluating antibody cocktails against these viruses, including best candidates for low income countries
- Understanding what structural biology reveals about epitopes recognized and cocktail choice

13:25 **Refresh Break - View Our Virtual Exhibit Hall**

T CELL ENGAGEMENT (CONT.)

13:45 **PRS-343 (a 4-1BB/HER2 Bispecific) – From Concept to Clinical Efficacy**

Shane A. Olwill, PhD, Senior Vice President, Head of Translational Science, Pieris Pharmaceuticals GmbH

PRS-343 is a first-in-class bispecific antibody-Anticalin fusion protein targeting HER2 and the costimulatory immune receptor 4-1BB on T cells. This presentation will describe the rational for tumor localized 4-1BB agonism with PRS-343 together with supporting preclinical and clinical data. PRS-343 is currently in early clinical testing where it has demonstrated a good safety profile and single agent efficacy.

14:05 **Priming Neoantigen-Specific T Cells Using ATOR-4224, a Novel CD40xEpCAM bsAb Generated in the RUBY™ Format**

Mattias Levin, PhD, Senior Scientist, Alligator Bioscience AB

ATOR-4224 is a novel tumor-targeted dendritic cell (DC) activator, acting as an endogenous neoantigen delivery vehicle to prime tumor-specific T cells. Simultaneous targeting of patient-specific tumor debris to DCs and DC activation leads to T cell priming, activation and induction of an anti-tumor response, with potential to turn cold tumors hot. ATOR-4224 is built in the RUBY format, a novel plug-and-play tetravalent bispecific format with favorable developability properties.

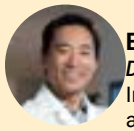
14:25 **CD47 Dual Targeting Enhances Safety and Pharmacokinetics**

Nicolas Fischer, PhD, CEO, Light Chain Bioscience

Safe and selective blockade of the ubiquitously expressed immune checkpoint CD47 can be achieved using bispecific antibodies (bsAb) incorporating two arms with different affinities. This dual targeting concept has been validated in different preclinical models of human cancer and applied to different tumor associated antigens. This approach is now been explored in patients with a bsAb generated using our kappa-Lambda body platform.

14:45 **Session Break**

15:05 **Refresh Break - View Our Virtual Exhibit Hall**



15:20 **KEYNOTE PRESENTATION: Immunologic Mechanisms and Engineering Objectives: Case Study of Anti-PD-L1 x IL-15**

Daniel S. Chen, MD, PhD, CMO, IGM Biosciences

Initial successes in cancer immunotherapy largely relied on therapeutics that inhibit a specific receptor. This can lead to anti-cancer immunity and autoimmunity, and consequent limitations in the clinical benefit. Novel approaches that leverage an increasing appreciation for immune biology, biophysics and advances in therapeutic engineering are likely to be important. These principles and a case study of an Anti-PD-L1 x IL-15 IgM therapeutic antibody will be presented.

BISPECIFICS FOR HAEMOPHILIA: INNOVATIVE APPROACHES

15:40 **New Factor VIII Function-Mimetic Bispecific Antibodies Engineered from Emicizumab for Further Improving the Treatment of Haemophilia A**

Yuri Teranishi, Principal Scientist, Lead Optimization Unit, Chugai Pharmabody Research Pte. Ltd.

Emicizumab is a factor (F)VIII-function mimetic therapeutic antibody for treating persons with haemophilia A (PwHA). Currently, it plays a central role in treating PwHA, although there is some room for improvement in dosing frequency/volume and/or haemostatic activity to achieve non-haemophilic status. In this presentation, a novel antibody engineering technology to further improve the property of emicizumab will be presented.

16:00 **Mim8: Development of a Next-Generation Factor VIII-Mimetic Bispecific Antibody**

Jais R. Bjelke, PhD, Principal Scientist, Global Research, Novo Nordisk AS

A next-generation FVIII-mimetic bispecific antibody for treatment of Haemophilia A was developed based on the robust and versatile arm-exchange DuoBody® technology. The preclinical route from idea to antibody screening, engineering, and final selection of the development candidate, Mim8, and manufacturability aspects of using the arm-exchange technology will be presented. *In vivo* studies highlighting potency and efficacy of Mim8 in a rodent bleeding model will conclude the presentation.

16:20 **Close of Advancing Bispecific Antibodies Conference**

5th Annual

Novel Targets and Emerging Therapeutic Areas

Exploring Unconventional Approaches for Clinical Success in Oncology and Beyond

THURSDAY 12 NOVEMBER

DEFINING CLINICAL CHALLENGES AND ENGINEERING SOLUTIONS: THERAPEUTIC PLATFORMS

9:00 KEYNOTE PRESENTATION: Clinical Challenges and Engineering Solutions in Cancer Immunotherapy: What Do We Need Now?

Daniel S. Chen, MD, PhD, CMO, IGM Biosciences

Cancer immunotherapy has resulted in long-term durable benefit for some patients with otherwise terminal cancer. But why are we struggling to deliver a similar benefit to the majority of cancer patients? Advances in biology and technology offer opportunities for the future, but what are the challenges that they should be focused on now? Presentation of clinical and biomarker data and scientific framework, challenges and engineered approaches will be discussed.

9:20 TGFb/PDL1 Antibody

Michael R. Streit, PhD, Vice President, Development, GlaxoSmithKline

9:40 IgA as Anti-Cancer Therapeutic Antibodies 2.0

Marjolein Van Egmond, PhD, Professor, Oncology and Inflammation, Surgery/Molecular Cell Biology and Immunology, Amsterdam UMC

IgA is the most prevalent antibody at mucosal sites, with important roles in immune defense by preventing invasion of pathogens. We previously demonstrated that IgA is a very potent stimulus to trigger myeloid immune cell activation, most notably as it induces neutrophil migration through interaction with the IgA Fc receptor (FcaRI). Unleashing the destructive capacity of neutrophils through IgA anti-tumour antibodies may represent an attractive opportunity in anti-cancer therapy.

10:00 Mastering Immunogenicity in Biologics Development

PROIMMUNE www.proimmune.com

Jeremy Fry, Dr., Director of Sales, ProImmune Ltd.

Immunogenicity is one of the most complex issues to address in drug design and development and requires application of integrated platforms to mitigate the risk to your biologic. In this talk I will present our extensive experience using case studies to illustrate the range of solutions that ProImmune offers.

10:20 Coffee Break - View Our Virtual Exhibit Hall

DEFINING CLINICAL CHALLENGES AND ENGINEERING SOLUTIONS

10:35 Tumor-Targeted Immune-Stimulating Antibody Conjugates

David Dornan, PhD, Senior Vice President & Head, Research & Manufacturing, Bolt Biotherapeutics, Inc.

Immune-stimulating antibody conjugates (ISACs) are tumor-targeting antibodies conjugated with powerful innate immune stimulants, such as TLR7/8 agonists, and are capable of invoking localized, potent myeloid cell activation and the production of pro-inflammatory cytokines that favor a productive anti-tumor immune response. ISACs are active in preclinical *in vivo* models of cancer, and are highly efficacious by enhancing ADCP, promoting antigen presentation, immunological memory, and epitope spreading.

10:55 Conditionally Active Biologics (CABs) for Increasing the Therapeutic Index in Cancer Therapeutics

Jay Short, PhD, Co-Founder, CEO & Chairman, BioAtla LLC

BioAtla pioneered the development of conditionally active antibodies (CAB) that are reversibly activated by the acidic tumor microenvironment in order to increase the therapeutic index of these cancer therapeutics. Preclinical and selected clinical data will be presented demonstrating the reduction of on-target, off-tumor toxicity, allowing for increased exposure and potency, while maintaining safety in all formats, including bispecific, ADC, CAR T and naked antibodies.

11:15 Agonist IgM: Anti-Death Receptor 5 IgM Induces Tumor Cell Apoptosis *in vitro* and *in vivo* with a Favorable Safety Profile.

Bruce Keyt, PhD, CSO, R&D, IGM Biosciences, Inc.

Death receptor 5 (DR5) is a TNF-family receptor that binds TRAIL, induces receptor trimerization and apoptosis in tumor cells. IgM efficiently clusters DR5 with enhanced cellular cytotoxicity, resulting in 5,000-fold increased potency compared to IgGs. Anti-DR5 IgM (IGM-8444) was efficacious in mouse xenograft tumor models. Our data supports clinical development of IGM-8444 for treatment of solid and hematologic malignancies, with an IND filing in 2020.

11:35 Session Break

11:55 LIVE PANEL DISCUSSION: Defining Clinical Challenges and Engineering Solutions

Moderator: Daniel S. Chen, MD, PhD, CMO, IGM Biosciences

Panelists:

Michael R. Streit, PhD, Vice President, Development, GlaxoSmithKline

Bruce Keyt, PhD, CSO, R&D, IGM Biosciences, Inc.

Jay Short, PhD, Co-Founder, CEO & Chairman, BioAtla LLC

Marjolein Van Egmond, PhD, Professor, Oncology and Inflammation, Surgery/Molecular Cell Biology and Immunology, Amsterdam UMC

David Dornan, PhD, Senior Vice President & Head, Research & Manufacturing, Bolt Biotherapeutics, Inc.

Jeremy Fry, Dr., Director of Sales, ProImmune Ltd.

12:15 Lunch Break - View Our Virtual Exhibit Hall

ANTIBODY DISCOVERY FROM PATIENTS: CORONAVIRUS

12:45 Antibodies against Viral Pandemics: Results of Global Collaborations

Erica Ollmann Saphire, PhD, Professor, La Jolla Institute for Immunology

Thousands of antibody candidates have been mobilized by international groups of researchers against emerging and re-emerging viral threats like SARS-CoV-2, Ebola and Lassa viruses. We describe efforts of two international consortia, CoVIC and VIC, to identify and evaluate antibody cocktails against these viruses, with a particular focus on what structural biology reveals about epitopes recognized and cocktail choice.

5th Annual

Novel Targets and Emerging Therapeutic Areas

Exploring Unconventional Approaches for Clinical Success in Oncology and Beyond

13:05 Infectious Diseases and Antibody Therapy

Davide Corti, PhD, Senior Vice President, Antibody Research, Humabs BioMed, a subsidiary of Vir Biotechnology, Inc.

Dr. Corti will provide an overview of the specificity, antiviral and immunological mechanisms of action of neutralizing monoclonal antibodies directed against multiple viral targets. The presentation will also introduce the concept of antibody-driven vaccine design, i.e. how the analysis of the human immune response have provided an innovative approach to the identification of protective antigens, which are the basis for the design of vaccines capable of eliciting effective B cell immunity.

13:25 Engineering Broadly Neutralizing Antibodies to Combat SARS-like Coronaviruses

Laura M. Walker, PhD, Director, Antibody Sciences, Adimab LLC

I will describe our efforts to improve the SARS-CoV-2 neutralization potency of one such antibody by two orders of magnitude while retaining breadth across other sarbecovirueses. The affinity-matured antibody, ADG-2, displays strong binding activity to a large panel of sarbecovirus receptor binding domains, neutralizes representative sarbecoviruses with remarkable potency, and optimally triggers Fc-mediated effector functions.

13:45 Isolation and Characterization of Plasmablast Antibody Repertoires from Acutely Infected SARS-CoV-2 Patients

Daniel Emerling, PhD, Senior Vice President, Research, Atreca, Inc.

We've characterized the humoral immune response in patients acutely infected with SARS-CoV-2 displaying a range of disease severity. Samples were evaluated by analyzing expressed IgG sequences from isolated blood plasmablasts. Higher plasmablast levels were associated with increased disease severity. IgG repertoire analysis revealed expanded clonal lineages representing a majority of blood plasmablasts. Expanded clonal lineage sequences displayed high somatic hypermutation (SHM) levels. We'll describe further recombinant antibody characterization from these lineages.

14:05 Human Monoclonal Antibodies for Prevention and Therapy of Covid-19

Emanuele Andreano, PhD, Postdoc Fellow, Fondazione Toscana Life Sciences

In the absence of approved drugs or vaccines, there is a pressing need to develop tools for therapy and prevention of Covid-19. Human monoclonal antibodies have very good probability of being safe and effective tools for therapy and prevention of SARS-CoV-2 infection and disease. PBMCs from people who survived Covid-19 infection were used to isolate several hundreds of human monoclonal antibodies able to neutralize SARS-CoV-2.

14:25 Refresh Break - View Our Virtual Exhibit Hall

14:40 LIVE PANEL DISCUSSION: Antibody Discovery from Patients: Coronavirus

Moderator: Daniel Emerling, PhD, Senior Vice President, Research, Atreca, Inc.

Panelists:

Davide Corti, PhD, Senior Vice President, Antibody Research, Humabs BioMed, a subsidiary of Vir Biotechnology, Inc.

Erica Ollmann Saphire, PhD, Professor, La Jolla Institute for Immunology

Emanuele Andreano, PhD, Postdoc Fellow, Fondazione Toscana Life Sciences

Laura M. Walker, PhD, Director, Antibody Sciences, Adimab LLC

15:00 Close of PEGS Europe Summit

11th Annual

Optimisation & Developability

Improving Candidate Selection and Lead Optimisation

Bonus Plenary Keynote Session

Don't miss the bonus Plenary Keynote Session and Problem-Solving Breakouts on Monday! This day is included in all Premium and Standard package registrations.

TUESDAY 10 NOVEMBER

OPTIMISATION STRATEGIES FOR IMPROVED PROPERTIES AND DEVELOPABILITY

9:00 Developing Precision TCR-Like Specificities Using the NextCore Phage Display Platform

Geir Age Loset, PhD, CEO, Nextera AS

To identify and develop optimal lead candidates against specific members of the HLA ligandome remains difficult. We have used a combination of classical HLA-matched subtractive antibody phage display in combination with thermal and competitor challenged CDR and FR targeted engineering using our pIX-based NextCore display platform to develop highly specific TCR-like antibodies allowing for high-resolution T cell epitope targeting and sequestering.

9:20 Optimising C7 Antibodies for High Affinity and Developability

Susannah Davis, Scientific Leader, BioPharm, GlaxoSmithKline

In this presentation, we will describe the methods that we applied to improve the affinity and developability attributes of a diverse panel of C7 antibodies. Affinity improvements were engineered using CDR-targeted mutagenesis libraries constructed in the Adimab Yeast Platform. In parallel, developability liabilities were removed using molecular design and engineering approaches combined with early quality-based screening techniques.

9:40 Determining Binding Affinities of Therapeutic Antibodies Targeting Transmembrane Proteins

Tony Christopeit, PhD, Research Scientist, Pharma Research & Early Development, Roche Diagnostics GmbH

Investigating the interaction of antibodies with membrane proteins under physiologically relevant conditions is a challenging task. We have explored different methods, such as surface plasmon resonance (SPR)-based biosensors, Ligand Tracer, and KinExA, to investigate the interaction of antibodies with full-length membrane proteins embedded into a lipid membrane. The assays allowed the calculation of binding affinities (K_D), and hence improved the assessment of therapeutic antibodies.

10:00 Recombinant Protein Expression Optimization Strategies and Process Development

Yuning Chen, Ph.D., R&D Manager at Sino Biological, Inc., Sino Biological, Inc.

This presentation provides an overview of the basic concept of recombinant protein expression, key factors and major challenges in this field, as well as the application of this technique in the development of SARS COV2 proteins. Strategies and methods for obtaining high-quality protein products are also discussed.

10:20 Coffee Break - View Our Virtual Exhibit Hall

10:35 Antibodies against Complex Molecules

Annika Schmid, PhD, Associate Director, MorphoSys AG

Methods generating highly specific antibodies against classical target molecules, as 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 like next-generation sequencing have been applied to enable broadening the target space and addressing new target classes such as e.g., HLA/peptide complexes.

10:55 Humanization of Antibodies Using a Machine Learning Approach

Charlotte M. Deane, PhD, Professor of Structural Bioinformatics, Statistics, University of Oxford

11:15 Predicting Solution Behavior during Developability Screening

Charles G. Starr, PhD, Scientist, Developability & Preformulation Sciences, Sanofi Group

Early-stage developability assessments of biologic drug candidates are often undertaken with minimal material availability. Such resource limitations complicate or prevent completely the characterization of macroscopic solution properties, such as viscosity and opalescence, which only emerge at high protein concentrations. Here, we present a strategy for the identification of molecules with a high propensity to self-associate in dilute solution, which is strongly predictive of poor solution behavior at elevated concentrations.

11:35 Get Clarity at the Critical Junctures in Your Biological Development with Prometheus

Charles Heffern, Product Manager, Research & Development, NanoTemper Technologies, Inc

Making critical decisions that determine the success of a biopharmaceutical requires clear and precise results. Here, we discuss how Prometheus empowers experienced organizations to improve their biologic discovery and development by using high-quality data to make better decisions.

11:55 LIVE PANEL DISCUSSION: Optimisation Strategies for Improved Properties and Developability

Moderator: Charlotte M. Deane, PhD, Professor of Structural Bioinformatics, Statistics, University of Oxford

Panelists:

Tony Christopeit, PhD, Research Scientist, Pharma Research & Early Development, Roche Diagnostics GmbH

Yuning Chen, Ph.D., R&D Manager at Sino Biological, Inc., Sino Biological, Inc.

Susannah Davis, Scientific Leader, BioPharm, GlaxoSmithKline

Claire Hatty, Applications Specialist, Applications, NanoTemper Technologies GmbH

Geir Age Loset, PhD, CEO, Nextera AS

Annika Schmid, PhD, Associate Director, MorphoSys AG

Charles G. Starr, PhD, Scientist, Developability & Preformulation Sciences, Sanofi Group

12:15 Lunch Break - View Our Virtual Exhibit Hall

11th Annual

Optimisation & Developability | Improving Candidate Selection and Lead Optimisation

COMPUTATIONAL AND MACHINE LEARNING APPROACHES TO DEVELOPABILITY & OPTIMISATION

12:45 Design and Evaluation of pH-Selective Antibodies Targeting the Acidity of Solid Tumors

Traian Sulea, PhD, Principal Research Officer, Human Health Therapeutics Research Centre, National Research Council Canada

Development of monoclonal antibodies as anticancer agents requires optimization of their safety for use in humans. Among optimization avenues for specific tumor targeting is the slightly higher acidity of solid tumors relative to normal tissues. A structure-based computational approach was applied to engineer antibody fragments with selective binding in an acidic environment relative to physiological pH. Designed full-size antibodies exhibit binding and functional selectivities between tumor and normal cell models.

13:05 An *in silico* Perspective of the Therapeutic Antibody Landscape

Max Vasquez, PhD, Vice President, Computational Biology, Adimab LLC

We will review published examples where antibody developability metrics were assessed on large antibody sets and sequence information provided. We will apply existing and in-development computational approaches aimed at assessing some of those metrics from sequence information alone.

13:25 Molecular Decomposition of Polyclonal Immunoglobulin Repertoires

Gregory C. Ippolito, PhD, Research Assistant Professor, Molecular Biosciences, University of Texas at Austin

Traditional antibody discovery typically investigates membrane-bound antigen-receptors encoded by a pool of B cells. Alternatively, mass spectrometry can identify high-affinity, bioactive antibody proteins secreted by a select subset of the total B-cell pool. Here, I present: (i) two techniques which can comprehensively determine cellular and serological antibody repertoires; and (ii) data illustrating the connectivity between them in the context of two primary immune responses–malaria vaccination and SARS-CoV-2 infection.

13:45 Towards More Accurate Property Prediction and Developability Profiling for Biologics

David Thompson, PhD, Senior Applications Scientist, Chemical Computing Group

The use of descriptors averaged over an ensemble of molecular conformations has improved the accuracy of property predictions key to biologics' utility and developability as therapeutics. Using an increasing database of clinical stage therapeutics, we present some useful guidelines for developable biologicals, similar to the Lipinski rules for small molecules.

14:05 Refresh Break - View Our Virtual Exhibit Hall

14:20 From Glassware to Software: Better Understanding of Chemical Degradation Mechanisms by Physics-Based Simulations

Saeed Izadi, PhD, Scientist, Early Stage Pharmaceutical Development, Genentech, Inc.

In this talk, I will present a comprehensive analysis of 1000+ isomerization and deamidation sites across 130+ antibodies. Microsecond, unrestrained molecular dynamics simulations, along with extensive QM calculations, were utilized to understand the mechanistic roles of structure and chemical environment promoting the isomerization and deamidation reaction. Such physics-based models can be reliably leveraged to predict deamidation and isomerization propensity of therapeutic proteins in external data sets.

14:40 Early *in silico* and *in vitro* Screening for Improved Biophysical Properties of Antibodies and Bispecific Antibodies

Patrick Farber, Scientist, Technology Intergration, Zymeworks Inc.

In the development of an antibody therapeutic, candidates are often chosen for their desired functional properties rather than their stability and manufacturability. This talk will describe the use of rational design of a bispecific antibody to improve properties including heterogeneity, stability, and purity. Additionally, I will present predictive *in vitro* and *in silico* developability techniques for early detection of liabilities that can affect biological function, clearance, and homogeneity.

15:00 Presence of a Positive Charge Cluster on Fc-fusion of Mouse LIGHT Impacts Its Exposure and *in vivo* Activity in Mice

Ayse Meric Ovacik, PhD, Scientist, Developmental Sciences, Genentech, Inc.

Mouse LIGHT (targeting the Lymphotoxin beta receptor, LTBR) showed significant PK liability in mice, therefore *in vivo* studies could not be interpreted. Homology modeling identified a positive charge cluster on the mouse ligand. We engineered two alternative variants where the cluster was removed. The variants showed no impact on the binding and *in vitro* activity with substantial improvement in exposure, and an increase in Ccl19 (biomarker for agonizing LTBR pathway).

15:20 Session Break

15:40 LIVE PANEL DISCUSSION: Computational and Machine Learning Approaches to Developability and Optimisation

Moderator: Gregory C. Ippolito, PhD, Research Assistant Professor, Molecular Biosciences, University of Texas at Austin

Panelists:

Patrick Farber, Scientist, Technology Intergration, Zymeworks Inc.

Saeed Izadi, PhD, Scientist, Early Stage Pharmaceutical Development, Genentech, Inc.

Traian Sulea, PhD, Principal Research Officer, Human Health Therapeutics Research Centre, National Research Council Canada

David Thompson, PhD, Senior Applications Scientist, Chemical Computing Group

Max Vasquez, PhD, Vice President, Computational Biology, Adimab LLC

16:00 Close of Optimisation & Developability Conference

7th Annual

Analytical Characterisation of Biotherapeutics

Harnessing Technologies to Speed Innovation

WEDNESDAY 11 NOVEMBER

VECTOR ANAYTICS FOR CELL & GENE THERAPY

9:00 KEYNOTE PRESENTATION: ATMP Potency: Metrological Considerations

Christopher Bravery, PhD, Consulting Regulatory Scientist, Consulting on Advanced Biologicals Ltd.

Establishing suitable release assays for gene, and especially, cell therapies presents a number of unusual challenges. This talk will highlight a few common issues and provide some examples of how these have been addressed so far.

9:20 Analytical Technologies for Determining the Proportion of AAV Capsids Containing Full-Length Vector Genomes

Sonya Schermann, PhD, Director, Analytics, Freeline Therapeutics

A critical quality parameter for all AAV products is the proportion of capsids, which contain the gene of interest in its full length, the so-called 'full-to-empty ratio'. No single currently available analytical method allows an accurate determination of this parameter. As such, a panel of assays should be used to fully characterise the AAV product. This talk will discuss several of these assays, along with their advantages and possible pitfalls.

9:40 AUC Characterization of Empty, Partial, and Full AAV Particles

Chris Rogers, Senior Scientist, Allergan Biologics

Analytical ultracentrifugation is a mature technique used for the analysis of complex biopharmaceutical proteins and protein complexes. Its use as both release test and as a potential in-process control and process characterisation generates challenges that can be overcome with recent advances in software. I will describe what is possible with current equipment and software and how the data fits in with other techniques in the analysis of gene therapy products.

10:00 Session Break

10:20 Coffee Break - View Our Virtual Exhibit Hall

CHARACTERISING NOVEL BIOTHERAPEUTICS

10:35 Development, Transfer and Validation of Analytical Methods for Cell and Gene Therapy Products: Learnings & Challenges

Francesca Rossetti, Analytical Methods Development Manager, Qualified Person, AGC Biologics

MolMed has developed an analytical panel, lentiviral platform based, in order to release and characterize vectors and LV genetically modified cell products. All the assays have been studied and optimized in order to achieve the best optimization in term of volume of sample used, time for the analysis, applicability of different projects and GMP suitability according ICH Q2 (R1) guidelines.

10:55 Challenges in Characterization and Developability Assessments of Multispecific Antibodies

Melanie Fischer, PhD, Head of Assays and Analytics, Biologics Research, Sanofi

The complexity of multispecific antibodies requires a comprehensive set of analytical techniques to guide lead discovery and optimization. An overview of these techniques will be presented with a focus on mispairing analysis and functional characterization of multispecific drug candidates. Furthermore, the integrated developability concept at Sanofi Biologics will be presented along with show cases highlighting the challenges in characterization and developability of multispecifics.

11:15 Complementing Biophysical Characterization of Antibodies and ADCs with Mass Spectrometry to Assess Higher-Order Structure

Eef Dirksen, PhD, Group Lead, NBE Extended Characterization, Byondis

The efficacy of biopharmaceuticals, like antibodies and ADCs, largely depends on their higher-order structure. Consequently, structural characterization is of importance throughout pharmaceutical development. The thermal stability of an antibody and its corresponding drug conjugate was assessed using several orthogonal analytical techniques, both spectroscopic and spectrometric. Results will be presented that provide a comprehensive picture of the structure of both types of molecules and the differences between these.

11:35 Off-the-Shelf CAR-T Therapy-using Hybrid NPs: Physicochemical Characterization

HORIBA Scientific

Özgül Tezgel, Polymer Scientist, Rexgenero France

Rexgenero-France is producing bald-lentivectors lacking the VSV-G immunogenic protein which are later encapsulated in targeting ligand incorporated biodegradable, oligo-peptide modified poly(beta amino ester)s to obtain T-cell targeting hybrid nanoparticles (NPs). Further, these hybrid NPs are used as therapeutic agents to generate *in vivo* CAR-T therapy.

11:55 LIVE PANEL DISCUSSION: Transferability of Analytical Methods for Proteins to Cell & Gene-based Therapies and other Novel Modalities

Moderator: Christopher Bravery, PhD, Consulting Regulatory Scientist, Consulting on Advanced Biologicals Ltd.

Panelists:

Eef Dirksen, PhD, Group Lead, NBE Extended Characterization, Byondis

Melanie Fischer, PhD, Head of Assays and Analytics, Biologics Research, Sanofi

Chris Rogers, Senior Scientist, Allergan Biologics

Francesca Rossetti, Analytical Methods Development Manager, Qualified Person, AGC Biologics

Sonya Schermann, PhD, Director, Analytics, Freeline Therapeutics

Özgül Tezgel, Polymer Scientist, Rexgenero France

12:15 Lunch Break - View Our Virtual Exhibit Hall

7th Annual

Analytical Characterisation of Biotherapeutics

Harnessing Technologies to Speed Innovation

12:45 Problem-Solving Breakout Discussions - View Our Virtual Exhibit Hall
Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers. View all breakouts.

BREAKOUT: Analytical Challenges for Gene & Cell Therapy Products
Christopher Bravery, PhD, Consulting Regulatory Scientist, Consulting on Advanced Biologicals Ltd.

- Reference materials for cell and gene products – development to approval/commercial
- Challenges in potency assay development and qualification during product development, and when seeking approval
- Managing critical analytical reagents: pre and post approval changes
- CQA identification and assessment

13:25 Refresh Break - View Our Virtual Exhibit Hall

CUTTING-EDGE TECHNOLOGIES AND NEW APPLICATIONS

13:45 Exploring the Non-Ideality of High-Concentration Biopharmaceutical Formulations by AUC
Alexander Bepperling, PhD, Lab Head, Biophysical Characterisation II, Technical R&D/Technical Development Biosimilars, Novartis Global Drug Development, c/o Hexal AG
AUC is widely used as an orthogonal technique to confirm the aggregation content. New fitting algorithms for non-ideal sedimentation allow the determination of self- and cross-sedimentation terms, as well as the non-ideality parameters, kS and kD. In combination with 3D printed centerpieces, this allows the accurate description of protein solutions up to 100 mg per ml, and even the discovery of previously unrecognized self-association.

14:05 From Intact Native MS to Peptide Mapping in Biopharmaceutical Development: Platform Diversity & Synergy, Robustness, Automation of Sample Preparation, and Case Studies
Dan Bach Kristensen, PhD, Principal Scientist, Symphogen
Topics that will be covered in the presentation include: 1) native MS platform robustness, including impact of transferring from one MS platform to another; 2) streamlining of sample preparation, with a focus on simplicity, robustness, and a hands-off approach; and 3) case studies from stability, lead selection, and clone selection studies.

14:25 Exploring the Heterogeneity of Intact Biopharmaceuticals Using Charge-Sensitive Separation Modes Directly Interfaced to Mass Spectrometry
Florian Fuessl, Postdoc Researcher, Bones Laboratory, National Institute for Bioprocessing Research & Training NIBRT
Recent years have seen great advances in interfacing formerly MS-incompatible separation modes to mass spectrometric detection. In this course, we developed MS-friendly, pH-gradient-based cation- and anion-exchange chromatography methods, which have proven exceptionally powerful for the characterisation of monoclonal antibodies and other protein formats. Additionally, the CE-MS-based ZipChip platform was explored and found to be a highly potent and complementary technique for the sensitive and comprehensive characterisation of complex biopharmaceuticals.

14:45 Kinetic Analysis of Antibody Binding to Native Antigen Surfaces on a heliX® Biosensor
dynamic BIOSENSORS
Nena Matscheko, Scientist – Team Lead Cell Applications, Dynamic Biosensors GmbH
switchSENSE® tackles the challenge of quantifying association and dissociation rates of antibodies in their native environment. The new heliX Biosensor delivers *in vitro* data on target and off-target kinetic rates measured on cell surfaces with defined epitope distributions. Multiplexed resolution of affinity and avidity speeds up development of your bi- and multi-specific, or locked, formats.

15:05 Refresh Break - View Our Virtual Exhibit Hall

15:20 Development of Novel Native LC-MS Methods and Solutions for the Characterization of mAbs and Related Products
Shunhai Wang, PhD, Senior Staff Scientist, Analytical Chemistry, Regeneron Pharmaceuticals Inc.
Over the past decade, a wide variety of separation methods have been successfully coupled to native MS to characterize the heterogeneity of mAbs and related products. Here, we report the development of several novel native LC-MS techniques and showcase their applications in drug product characterization. In addition, we introduce an integrated native LC-MS solution that offers large dynamic range, high robustness and great versatility.

15:40 In Pursuit of Quality Molecules: Early Biophysical Characterization Tools for the Prediction of *in vivo* Stability
Sathya Venkataramani, PhD, Associate Director, Biophysics, BDS, Janssen Biotherapeutics
Identifying the "Critical Quality Attributes" of a lead candidate early in the research phase is mandatory for selecting "Right the First Time" molecule and avoiding late-stage failures. The top quality attributes of biotherapeutics, such as conformational and serum stability, non-specific binding, and aggregation propensity, need immediate characterization. Integrated biophysical screening of these attributes, in combination with sequence quality assessment, offers a successful predictive tool for selecting risk-free candidates early on.

16:00 A Novel Approach in Middle-Down Biologics Characterization
Francois Griaud, PhD, Functional Lead & Principal Scientist, Analytical Development & Characterization, Novartis Pharma AG
Top and middle-down biologics characterization approaches aim at capturing a direct snapshot of all proteoforms with their combinatorial distribution. This presentation will focus on a new data analysis workflow to reveal relevant diagnostic information in middle-down MS spectra, missed by the classical middle-down approach. This new workflow enabled the localization of a deamidation event and a sequence variant site directly from the gas-phase fragmentation of a mAb light chain.

7th Annual

Analytical Characterisation of Biotherapeutics

Harnessing Technologies to Speed Innovation

16:20 Quantification of Viral Vector Critical Quality Attributes with SEC-MALS

Robert Mildner, Dr., Analytical Service, Wyatt Technology

To ensure the safety and efficacy of viral vector based drugs, it is crucial to characterize their critical quality attributes (CQA) throughout product development, manufacturing, and QC. We will discuss how SEC-MALS can quantify three CQAs of AAVs in one single assay: capsid concentration, payload content and degree of aggregation.

16:40 LIVE PANEL DISCUSSION: New Approaches and Applications: From Intact MS to Peptide Mapping

Moderator: Alexander Bepperling, PhD, Lab Head, Biophysical Characterisation II, Technical R&D/ Technical Development Biosimilars, Novartis Global Drug Development, c/o Hexal AG

Panelists:

Florian Fuessl, Postdoc Researcher, Bones Laboratory, National Institute for Bioprocessing Research & Training NIBRT

Francois Griaud, PhD, Functional Lead & Principal Scientist, Analytical Development & Characterization, Novartis Pharma AG

Dan Bach Kristensen, PhD, Principal Scientist, Symphogen

Nena Matscheko, Scientist – Team Lead Cell Applications, Dynamic Biosensors GmbH

Robert Mildner, Dr., Analytical Service, Wyatt Technology

Shunhai Wang, PhD, Senior Staff Scientist, Analytical Chemistry, Regeneron Pharmaceuticals Inc.

Sathya Venkataramani, PhD, Associate Director, Biophysics, BDS, Janssen Biotherapeutics

17:00 Close of Analytical Characterisation of Biotherapeutics Conference

7th Annual

Protein Stability & Aggregation | Advances in Particle Analytics and Prediction

THURSDAY 12 NOVEMBER

INTERFACES AND STORAGE: IMPACT ON STABILITY

9:00 KEYNOTE PRESENTATION: Synergistic Effect of Hydrodynamic Flow and Interfaces on Antibody Aggregation

Paolo Arosio, PhD, Assistant Professor, Chemistry & Applied Biosciences, ETH Zurich

We present our efforts towards the development of small-scale and high-throughput assays for the investigation of the synergistic effect of interfaces and hydrodynamic flow on protein aggregation. Our assays, largely based on microfluidic technology, exhibit an accurate control of interfaces and flow stresses, and pave a way to develop methods for the evaluation of antibody stability against interfaces and hydrodynamic flows, both during early-stage screening and during bioprocessing.

9:20 They Must Be Compatible: Mutual Interaction Phenomena between Protein Formulation and Siliconized/Silicone-Free Syringe Packaging Materials with an Effect on Functionality and Stability

Karoline B. Bechtold-Peters, PhD, Senior Strategy & Technology Leader, Pharmaceuticals & Biopharma Process, Novartis Pharma AG

For prefilled syringes, studies focused so far on the possible incompatibility of biologics with hydrophobic surfaces. Silicone spiking studies or studies with over siliconised syringes should test the silicone compatibility. However, recent studies in our company show that the formulation/certain components can also attack the silicone layer. The consequence is the release of silicone-like droplets into the solution and a loss of syringe functionality over the storage period.

9:40 A Nanoparticle-Based Assay to Evaluate Surface-Mediated Protein Instability in Developability Studies

Marie Kopp, Graduate Student, Biochemical Engineering, ETH Zurich

Air-water and solid-liquid interfaces are well known to potentially trigger undesired protein instability and aggregation. Challenges in the investigation of interface-induced protein aggregation include the control of the amount and type of surfaces, as well as the presence of synergistic effects between interfaces and hydrodynamic flows. Here, we present a newly developed surface stress assay based on polymeric nanoparticles, which could complement developability studies in early-stage development.

10:00 Protein or Not? Advanced High Throughput Aggregate Analysis with the Aura

halo labs

Rick Gordon, MS, Vice President, Sales, Halo Labs

Distinguishing aggregated API from other particle types is important for understanding the root cause of instability. Existing methods are unreliable, too cumbersome and difficult to use in many workflows. With Aura, you can now finally count, size, and characterize aggregates and identify them as proteins, non-proteins, or other molecules.

10:20 Coffee Break - View Our Virtual Exhibit Hall

IMPURITIES AND AGGREGATES: IMPACT ON PRODUCT QUALITY

10:35 Identification of HCPs Inducing Particle Formation during Protein Stability Testing

Veronika Reisinger, PhD, Lab Head, Physico Chemical Characterization, Novartis AG

Residual HCPs can impact product quality in different ways. Besides effects on patient safety, product stability might be affected. Here, we present workflows based on LCMS to identify HCPs inducing particle formation. LCMS is the method of choice for identification of unknown HCPs as ELISA is usually not capable to identify individual HCPs. In addition to HCP identification, LCMS allows the relative and absolute identification of single HCPs.

10:55 Measuring Colloidal Stability of Partially Folded scFv Proteins and the Impact on Aggregation

Robin Curtis, PhD, Senior Lecturer, University of Manchester

We present key insights into protein structural factors controlling aggregation behaviour for scFv mutants. Aggregate growth rates are controlled by non-specific electrostatic interactions, while increasing the scFv lysine to arginine content lowers aggregation by preventing partially unfolded regions from associating. We show protein-protein interaction measurements made under chemically denaturing conditions reflect colloidal stability of scFv partially unfolded states, which play key roles in aggregation pathways.

11:15 Challenges in Mutein IL2 Purification Process: How to Control the Aggregation and Misfolding Processes

Kathya Rashida de la Luz Hernandez, PhD, Head, Analytical, Center of Molecular Immunology

A mutant of the interleukin-2 molecule without interaction with the alpha chain of the IL-2 receptor was designed at the CIM. This new mutant shows higher antitumor activity and less toxicity than human IL-2. To improve the quality of the final protein, some of the purification steps and conditions were modified. The proposed purification process enabled a consistent purified product, with similar physical-chemical and biological properties at higher quality.

11:35 Session Break

11:55 LIVE PANEL DISCUSSION: Sources and Mechanisms Affecting Protein Stability

Moderator: Karoline B. Bechtold-Peters, PhD, Senior Strategy & Technology Leader, Pharmaceuticals & Biopharma Process, Novartis Pharma AG

Panelists:

Paolo Arosio, PhD, Assistant Professor, Chemistry & Applied Biosciences, ETH Zurich

Robin Curtis, PhD, Senior Lecturer, University of Manchester

Rick Gordon, MS, Vice President, Sales, Halo Labs

Marie Kopp, Graduate Student, Biochemical Engineering, ETH Zurich

Kathya Rashida de la Luz Hernandez, PhD, Head, Analytical, Center of Molecular Immunology

Veronika Reisinger, PhD, Lab Head, Physico Chemical Characterization, Novartis AG

12:15 Lunch Break - View Our Virtual Exhibit Hall

7th Annual

Protein Stability & Aggregation | Advances in Particle Analytics and Prediction

PREDICTING, ASSESSING AND MONITORING PROTEIN AGGREGATION

12:45 Structural Hot Spots for the Solubility of Globular Proteins

Frederic Rousseau, PhD, Principal Investigator, Switch Laboratory, VIB-KU Leuven Center for Brain & Disease Research

I will discuss why proteins aggregate and how aggregation relates to protein stability. Next I will cover how nature selects against protein aggregation and discuss the implications of these findings for protein engineering and redesign.

13:05 Assessing Refoldability to Select Therapeutic Proteins and Formulations with Lower Aggregation Propensity during Storage

Hristo Svilenov, PhD, Researcher, Pharmacy, Technical University Munich

Protein refoldability is an essential feature of therapeutic protein formulations with lower aggregation tendency during storage. I will introduce you to two approaches that allow the assessment of protein refoldability after unfolding caused by heat or chemical denaturants. Further, I will demonstrate how the presented methods can be useful for the selection of protein molecules with lower aggregation propensity and formulations that impede the formation of aggregates during storage.

13:25 From Formulation Screening to Early Manufacturing

Bernhard Valldorf, PhD, Principal Scientist & Lab Head, Formulation Development, EMD Serono

In the process of developing biotherapeutics early developability and manufacturability assessment is crucial to select the best candidate for the CMC phase. Therefore we focus on miniaturized screening approaches which allow us to predict stability and rank lead candidates for further development. This talk will give an overview of our formulation screening cascade and show its applicability in a case study.

13:45 Quant it all and quant it now: answers from only microliters with Uncle and Stunner

Kevin Lance, PhD, Marketing Manager, Unchained Labs

Quantifying concentration, checking aggregation and testing stability of proteins and AAV often consumes more sample than you want. Stunner delivers fast, accurate quantification and aggregation information on 2 µL of sample. Uncle's full-spectrum fluorescence gives full visibility on protein stability in less than 10 µL.

14:05 Refresh Break - View Our Virtual Exhibit Hall

14:20 Chemical Modifications in Biotherapuetic Proteins and Their Impact on HOS and Function

Sambit R. Kar, PhD, Principal Scientist & Head, Biophysics Center of Excellence, Bristol Myers Squibb Co.

Characterization of protein higher order structure (HOS) is technically challenging. A simple normalization technique will be discussed, with a few examples, to demonstrate enhanced precision of circular dichroism (CD) spectroscopy to better monitor and interpret HOS changes in proteins. Additionally, a case study with six different monoclonal antibodies will be presented where the consequences of Tryptophan (Trp) oxidation on product HOS and biological activity will be discussed.

14:40 Development and Application of Screening Assays to Predict Aggregation upon Long-Term Storage

Fabian Dingfelder, PhD, Industrial Postdoc, Biophysics, Novo Nordisk AS

Protein aggregation remains a challenge for the development of biopharmaceuticals, and currently there are no screening assays validated to predict aggregation upon long-term storage. Identifying predictive assays would be an important advancement to guide the design and selection of druggable candidates in screening campaigns. In this talk, I will show how we probe multiple biophysical properties of different antibody formats to calculate correlations with the aggregation propensity upon long-term storage.

15:00 Small-Angle Neutron and X-Ray Scattering: Emerging Biophysical Tools for Frozen and Freeze-Dried Biologicals

Evgenyi Y. Shalaev, PhD, Research Investigator, Pharmaceutical Development, Allergan, Inc.

Essentially all biopharmaceutical drug substances and drug product are exposed to freeze-thaw and/or freeze-drying/reconstitution. Recently, frozen and freeze-dried proteins with various excipients (surfactants and lyoprotectors) are studied using small-angle neutron scattering (SANS) and small- and wide-angle X-ray scattering (SAXS/WAXS). Both protein-protein interaction and various crystalline and liquid-crystalline phases of excipients are monitored. SANS and SAXS/WAXS represent valuable orthogonal tools to study mechanisms of protein (de)stabilization during freeze-thaw and freeze-drying.

15:20 Long Acting Injectables of Fragile Molecules: Opportunities from New Technologies for the Delivery of Small Bispecific Antibodies

Joel Richard, PhD, Chief Development Officer, MedinCell SA

This talk will provide insight into the many advantages of the BEPO® *in situ* implant forming (ISIF) technology and present the promising results obtained for the controlled delivery of a small, bispecific short half-life antibody for immunotherapy in prostate cancer. The antibody remains functional and active through formulation and release processes and demonstrates high anti-tumor activity in animal models, while improving subcutaneous bioavailability and half-life of the biomolecule.

15:40 Panel Discussion: Tools & Techniques for Characterising and Quantifying Protein Aggregation

Moderator: Bernhard Valldorf, PhD, Principal Scientist & Lab Head, Formulation Development, EMD Serono

Panelists:

Fabian Dingfelder, PhD, Industrial Postdoc, Biophysics, Novo Nordisk AS

Sambit R. Kar, PhD, Principal Scientist & Head, Biophysics Center of Excellence, Bristol Myers Squibb Co.

Kevin Lance, PhD, Marketing Manager, Unchained Labs

Joel Richard, PhD, Chief Development Officer, MedinCell SA

Frederic Rousseau, PhD, Principal Investigator, Switch Laboratory, VIB-KU Leuven Center for Brain & Disease Research

Hristo Svilenov, PhD, Researcher, Pharmacy, Technical University Munich

16:00 Close of PEGS Europe Summit

3rd Annual

Modulating the Tumour Microenvironment

Enhancing Effector Activity and Suppressing Inhibitory Factors

Bonus Plenary Keynote Session

Don't miss the bonus Plenary Keynote Session and Problem-Solving Breakouts on Monday! This day is included in all Premium and Standard package registrations.

BREAKOUT: Immunosuppressive Mechanisms that Restrict Anti-Tumour Functions of Monoclonal Antibodies in the Tumour Microenvironment and Means of Overcoming Them

Mark S. Cragg, Professor of Experimental Cancer Biology, School of Cancer Sciences, Faculty of Medicine, University of Southampton

- Target antigen heterogeneity and its influence on anti-tumour functions of antibodies; escape mechanisms.
- Importance of affinity to the target antigen and to Fc receptors
- Interrogating the cytokine environment and the immunosuppresive cell populations infiltrating tumours

16:30 Close of Day

TUESDAY 10 NOVEMBER

ACTIVATING MACROPHAGE SUBSETS AND MONOCYTES TO ENHANCE THE IMMUNE RESPONSE

9:00 Regulation of Macrophages in the Tumour Microenvironment and Monocytes in the Peripheral Blood by Means of IgE Immunotherapy

Sophia N. Karagiannis, PhD, Professor, Translational Cancer Immunology & Immunotherapy, Kings College London

In several models and functional evaluations, anti-tumour IgE immunotherapy can restrict cancer growth by immune effector mechanisms employed by this antibody class against parasites. IgEs recognizing tumour-associated antigens potentiated re-activation of monocytes and recruitment of stimulated macrophages into the tumour microenvironment. We will discuss the clinical development of a first-in-class IgE and the mechanisms by which IgE can reconfigure the tumour microenvironment and activate previously untapped immune mechanisms against tumours.

9:20 Manipulation of Macrophages through T-Cell Immunostimulation

Sean H. Lim, MBChB PhD, Associate Professor & Honorary Consultant in Haematological Oncology, Centre for Cancer Immunology, University of Southampton

Macrophages are critical for the anti-tumour activity of direct targeting antibodies, such as rituximab. Here, we will present recent preclinical and clinical experience on how T-cell stimulation with CD27 agonists can modulate the activity and enhance the anti-tumour activity of macrophages.

9:40 Oncolytic Virus and Antibody-Drug Conjugate-Based Therapeutic Combinations: Different Modalities – Common Themes

Jutta Petschenka, Princioal Scientist, Boehringer Ingelheim Pharma GmbH & Co. KG

Despite the clinical breakthroughs achieved with checkpoint blockade, the overall proportion of patients experiencing durable responses remains relatively small. Therefore, the real promise for most cancer patients lies in complementary combination therapies, combining checkpoint blockade with the immune-promoting/supporting properties of other therapeutic modalities, which help breach physical barriers, overcome immunosuppression, and improve immune cell infiltration in tumors. This talk will compare and highlight 2 categories: ADCs and oncolytic viruses.

10:00 Bioluminescent Bioassays for T Cell Immunotherapy

Julia Gilden, Sr Scientist, Integrated Biology, Research & Development, Promega Corporation

We have developed new bioluminescent tools that expedite the development of T cell-redirecting cancer therapies. We will describe how TCRαβ-null reporter cells can be used to screen TCRs against tumor antigen, and NanoBiT-based assay platforms that quantitatively measure the potency of CD3 bispecific antibodies to induce T cell-dependent effector functions.

10:20 Coffee Break - View Our Virtual Exhibit Hall

10:35 Multispecific Nanofitin Assemblies for Modulating the Tumor Microenvironment

Mathieu Cinier, PhD, Scientific Director & CSO, Affilogic

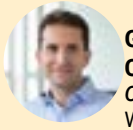
Understanding of the manipulation of the immune system to treat cancer remains limited and has to be addressed with other technical challenges, such as tumor penetration, off-target systemic toxicity, and simultaneous co-engagement of several tumor progression pathways. We will be sharing our strategy to answer these different challenges using the Nanofitin scaffold, with examples of multispecific constructions directed against several tumor progression pathways (angiogenesis, T cell population, and macrophage differentiation).

ADVANCES WITH CYTOKINES

10:55 KEYNOTE PRESENTATION: Immunocytokines with "Activity on Demand"

Dario Neri, PhD, Full Professor, Chemistry & Applied Biosciences, ETH Zurich

Engineered cytokines are gaining importance for the treatment of cancer and of chronic inflammatory conditions. In this seminar, I will present strategies and experimental results for the creation of antibody-cytokine fusions, which display a preferential activity at the site of disease, helping spare normal tissues.



11:15 KEYNOTE PRESENTATION: Novel Cytokine-Grafting Technique Generates Potent Interleukin-2 Immunotherapy with Efficacy in Multiple Cancer Models

Onur Boyman, Professor & Chair, Immunology, University Hospital Zurich

We developed a novel strategy to permanently graft human interleukin-2 (IL-2) to its antigen-binding groove on anti-human IL-2 antibody NARA1, thereby generating NARA1leukin. NARA1leukin was unable to bind to IL-2 receptor alpha, and thus showed uncompromised selectivity for effector immune cells *in vitro* and *in vivo*. This translated into efficacious anti-tumor responses in several cancer models with superior effects on metastatic lesions. NARA1leukin is a novel and potent IL-2 immunotherapy.

3rd Annual

Modulating the Tumour Microenvironment

Enhancing Effector Activity and Suppressing Inhibitory Factors

11:35 Session Break

11:55 LIVE PANEL DISCUSSION: Activating Macrophages and Monocytes to Enhance the Immune Response

Moderator: Sophia N. Karagiannis, PhD, Professor, Translational Cancer Immunology & Immunotherapy, Kings College London

Panelists:

Onur Boyman, Professor & Chair, Immunology, University Hospital Zurich

Mathieu Cinier, PhD, Scientific Director & CSO, Affilogic

Julia Gilden, Sr Scientist, Integrated Biology, Research & Development, Promega Corporation

Sean H. Lim, MBChB PhD, Associate Professor & Honorary Consultant in Haematological Oncology, Centre for Cancer Immunology, University of Southampton

Dario Neri, PhD, Full Professor, Chemistry & Applied Biosciences, ETH Zurich

Jutta Petschenka, Princioal Scientist, Boehringer Ingelheim Pharma GmbH & Co. KG

12:15 Lunch Break - View Our Virtual Exhibit Hall

OVERCOMING IMMUNE RESPONSE WITH AGONISTS

12:45 Targeting Intratumoral Treg and CD8+ T Cells by Isotype-Optimized Blocking/ Depleting and Agonist Anti-TNFR2 Antibodies

Björn L. Frendeus, PhD, CSO, BioInvent International AB

Fine-tailoring antibody Fv- and Fc- interactions is needed to optimize anti-TNFRs antibodies' activity. Here, the potent anti-tumor activity of isotype-optimized ligand-blocking, or agonist, antibodies to the T cell co-stimulatory receptor TNFR2 is described. Both types of mAbs eradicated large solid tumors through mechanisms involving intratumoral Treg-depletion and/or CD8+ T cell expansion, alone or in combination with anti-PD-1. BI-1808 has completed GLP toxicology and is scheduled to enter the clinic in 2020.

13:05 Overcoming Resistance to MAb Therapy

Mark S. Cragg, Professor of Experimental Cancer Biology, School of Cancer Sciences, Faculty of Medicine, University of Southampton

There is growing appreciation of the depth of interaction between tumour cells and their microenvironment serving to modulate tumour growth, proliferation and immune suppression. Although these interactions limit responses to conventional treatments such as chemotherapy, their impact on antibody immunotherapy is less clear. This presentation will discuss several key interactions between the host and the tumour that impact antibody immunotherapy and how they might be targeted to improve treatment efficacy.

13:25 A Tumor-Targeted CD40 Agonistic DARPin® Molecule Leading to Anti-Tumor Activity Without Signs of Systemic Toxicity

Nicolo Rigamonti, PhD, Project Leader, Cancer Immunology, Molecular Partners AG

To overcome dose-limiting toxicity of agonistic anti-CD40 antibodies, we developed a multispecific DARPin® therapeutic candidate, MP0317, intended to activate the CD40 receptor locally, rather than systemically, in the tumor microenvironment through cross-linking with fibroblast activation protein (FAP). *In vitro* and *in vivo* data will be presented showing that MP0317 is able to activate the CD40 receptor locally in FAP-positive tumors, producing significant antitumor activity in the absence of systemic toxicity.

13:45 Session Break

14:05 Refresh Break - View Our Virtual Exhibit Hall

14:20 FEATURED PRESENTATION: Dominant Antagonism of the TNF Superfamily

Denise L. Faustman, MD, PhD, Associate Professor & Director, Immunobiology Labs, Massachusetts General Hospital

One limitation of checkpoint inhibitors is Treg escape. We believe it is possible to only target the highly immunosuppressive Tregs of the tumor microenvironment. The TNFR2 receptor is massively expressed in the tumor microenvironment on Tregs and the design of dominant TNFR2 antagonists has been possible. The unique structural biology of this dominant receptor agonism has been determined to represent the stabilization of the anti-parallel proteins.

14:40 Session Break

15:00 LIVE PANEL DISCUSSION: Overcoming Immune Response with Agonists

Moderator: Björn L. Frendeus, PhD, CSO, BioInvent International AB

Panelists:

Mark S. Cragg, Professor of Experimental Cancer Biology, School of Cancer Sciences, Faculty of Medicine, University of Southampton

Denise L. Faustman, MD, PhD, Associate Professor & Director, Immunobiology Labs, Massachusetts General Hospital

Nicolo Rigamonti, PhD, Project Leader, Cancer Immunology, Molecular Partners AG

15:20 Close of Modulating The Tumor Environment Conference

3rd Annual

Winning Strategies for CAR T Therapy, TILs and TCRs

Advances in Adoptive and Antibody Approaches

WEDNESDAY 11 NOVEMBER

WINNING STRATEGIES FOR GAMMA DELTA T CELL THERAPY: ADVANCES IN ADOPTIVE AND BISPECIFIC ANTIBODY APPROACHES

9:00 BTN3A and BTN2A Are New Immune-Checkpoint Targeting Vg9Vd2 T Cell Functions against Cancer Cells

Daniel Olive, MD, PhD, Head, Tumor Immunology, Marseille Cancer Research Center

Vg9Vd2 T cell activation leads to broad functional activities against tumors. Tumor-infiltrating γδ T cells are the most significant favorable cancer-wide prognostic signature. Anti-tumoral response of Vg9Vd2 T cells requires sensing of phosphoantigens accumulated through binding of butyrophilin 3A(BTN3A) expressed in tumors. We identified butyrophilin 2A (BTN2A) as a requirement for BTN3A-mediated Vg9Vd2 T cell cytotoxicity against cancer cells.

9:20 Bispecific γδ-T Cell Engagers for Cancer Immunotherapy

Hans van der Vliet, MD, PhD, CSO, Lava Therapeutics

Vγ9Vδ2-T cells constitute the largest γδ-T cell subset in human peripheral blood and are powerful anti-tumor immune effector cells that can be identified in many different tumor types. This presentation will discuss bispecific antibodies designed to engage Vγ9Vδ2-T cells and their use for cancer immunotherapy.

9:40 Enhancing CAR T Cell Therapy by Enabling CAR T Cell Interaction with Antigen-Presenting Cells (APCs)

Clare Y. Slaney, PhD, Senior Research Officer, Peter MacCallum Cancer Centre

We generated novel bispecific proteins to mediate the interaction between APCs and CAR T cells. We termed these bispecifics "Bispecific Engagers of APCs and T Cells (BEATs)". CAR T cell proliferation and function was significantly enhanced by BEATs in the presence of APCs *in vitro* and *in vivo*. Importantly, murine syngeneic and human xenograft solid tumor growth was significantly inhibited when CAR T cells were administered in combination with BEATs.

10:00 Session Break

10:20 Coffee Break - View Our Virtual Exhibit Hall

WINNING STRATEGIES FOR GAMMA DELTA T CELL THERAPY: ADVANCES IN ADOPTIVE AND BISPECIFIC ANTIBODY APPROACHES (CONT.)

10:35 Advancing Vdelta1 T Cells to the Clinic: A Unique Allogeneic Adoptive Cell Therapy Platform

Oliver Nussbaumer, PhD, Founder & Vice President, Immunology, GammaDelta Therapeutics, Ltd.

The treatment of malignancies with adoptive cell therapy is largely limited to patient-derived, autologous alpha beta T cells. This approach comes with challenges (toxicities, relapse, production costs, lack of migration) and a requirement for gene editing to avoid graft vs. host disease in allogeneic settings. In contrast, V delta 1 T cells innately recognise malignant cells, aren't MHC-restricted, and facilitate broader immunological responses. Thus, they're an ideal vehicle for immunotherapy.

10:55 Development of a Next-Generation Anti-Cancer Immunotherapy into the Clinic: A Humanized Anti-BTN3A Antibody that Activates Vγ9Vδ2 T Cells

René Hoet, PhD, CSO, ImCheck Therapeutics

ImCheck Therapeutics is developing the first activating humanized antibody to butyrophilin3A (BTN3A). ICT01 binds to BTN3A that specifically activates human gamma9delta2 T cells and has entered into Phase I studies in solid and hematological malignancies. This opens a completely new space clearly different from the current B7/CD28 superfamily targets and has the potential to become the next generation therapeutic immune modulators.

11:15 Harnessing Blood-Derived Gamma Delta T Cells for Cancer Immunotherapy

John Maher, PhD, Consultant & Senior Lecturer, Immunology, Kings College London

In this presentation, we will illustrate the anti-tumour activity of TGF-b-supplemented, blood-derived gamma delta T cells across a spectrum of solid and haematological malignancies. Moreover, we will present our experience with CAR targeting of these cells.

11:35 Using the Membrane Proteome Array to Predict Clinical Safety Failures

Benjamin Doranz, PhD, President and CEO, Integral Molecular

Emerging data suggest that approximately 25% of therapeutic MAbs in development are polyspecific and can result in severe or even life-threatening adverse events. We developed the Membrane Proteome Array (MPA) to de-risk MAb safety by specificity testing across an array of 6,000 native membrane proteins. Having tested hundreds of molecules, we will discuss the importance of specificity testing during discovery, and case studies of clinical MAb and CAR T safety failures that could have been averted.

11:55 LIVE PANEL DISCUSSION: Gamma Delta T Cell Therapy

Moderator: Paul Parren, PhD, Executive Vice President & Head, Lava Therapeutics

Panelists:

René Hoet, PhD, CSO, ImCheck Therapeutics

John Maher, PhD, Consultant & Senior Lecturer, Immunology, Kings College London

Oliver Nussbaumer, PhD, Founder & Vice President, Immunology, GammaDelta Therapeutics, Ltd.

Daniel Olive, MD, PhD, Head, Tumor Immunology, Marseille Cancer Research Center

Clare Y. Slaney, PhD, Senior Research Officer, Peter MacCallum Cancer Centre

Hans van der Vliet, MD, PhD, CSO, Lava Therapeutics

12:15 Lunch Break - View Our Virtual Exhibit Hall

3rd Annual

Winning Strategies for CAR T Therapy, TILs and TCRs

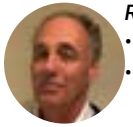
Advances in Adoptive and Antibody Approaches

12:45 Problem-Solving Breakout Discussions - View Our Virtual Exhibit Hall
Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers. View all breakouts.

BREAKOUT: Next-Generation CAR T Cells for Solid Tumor Treatment
Sònia Guedan, PhD, Principal Investigator, Hematology & Oncology, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS)

- CAR T cells for solid tumors
- Next-generation CAR T cells
- Obstacles that CAR T cells find in solid tumors and how to overcome them

CO-PRESENTATION: BREAKOUT: Innate Immunity, Gamma Delta T Cells, Oncology, Infectious Diseases
Daniel Olive, MD, PhD, Head, Tumor Immunology, Marseille Cancer Research Center



René Hoet, PhD, CSO, ImCheck Therapeutics

- Role of innate immunity in infectious diseases how can we tackle them?
- What are the the pathologies that are the more relevant for disease: cancer, infectious diseases
- What might be the respective roles of delta1 and delta 2?
- Is there an interest for gamma-delta CAR T cells ?
- Is there a role for gamma delta T cells in auto-immune diseases ?

13:25 Refresh Break - View Our Virtual Exhibit Hall

ACTIVATING GAMMA DELTA T CELLS

13:45 TEGs: αβT Cells Engineered to Express Defined γδT Cell Receptors
Jürgen Kuball, PhD, Head, Hematology, University Medical Center Utrecht

Clinical responses to checkpoint inhibitors used for cancer immunotherapy require αβT cells that recognize tumour neoantigens. However, there's renewed interest in therapeutic use of γδT cells and their receptors. γδT cells display potent cytotoxicity towards a large array of haematological and solid tumours, while preserving normal tissues. In this review, we discuss the challenges and opportunities for clinical implementation of cancer immunotherapies based on γδT cells and their receptors.

14:05 Butyrophilin 2A1 Mediates Phosphoantigen Recognition and Tumor Targeting by Gamma Delta T Cells
Adam Uldrich, PhD, Microbiology & Immunology, Peter Doherty Institute for Infection and Immunity, The University of Melbourne

In humans, most γδ T cells express Vγ9Vδ2+T cell receptors (TCRs), which respond to phosphoantigens produced by cellular pathogens and cancer. However, the molecular targets recognized by these γδTCRs are unknown. We've identified butyrophilin-2A1 (BTN2A1) as a key ligand that directly binds to the γδTCR. While most current immunotherapy approaches rely on activation of conventional alpha-beta T cells, this creates additional opportunities for the development of γδ T cell-based immunotherapies.

14:25 LIVE PANEL DISCUSSION: Comparing and Contrasting Antibody vs. Cellular Approaches
Moderator: Mihriban Tuna, PhD, MBA, CSO, Adaptate Biotherapeutics Ltd.
Panelists:
Adam Uldrich, PhD, Microbiology & Immunology, Peter Doherty Institute for Infection and Immunity, The University of Melbourne
René Hoet, PhD, CSO, ImCheck Therapeutics
Paul Parren, PhD, Executive Vice President & Head, Lava Therapeutics
Daniel Olive, MD, PhD, Head, Tumor Immunology, Marseille Cancer Research Center

14:45 Specificity Screening of mAbs, scFvs & CAR Ts against Expressed Receptors, Heterodimers & Secreted Protein Targets
Diogo Rodrigues Ferreirinha, MSc, European Business Development Manager, Retrogenix Limited

RETROGENIX™ SPOTTING YOUR TARGET.

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.

15:05 Refresh Break - View Our Virtual Exhibit Hall

CAR T AND SOLID TUMORS – HOW WE MAKE THE LEAP

15:20 Next-Generation CAR T Cells for the Treatment of Solid Tumors
Sònia Guedan, PhD, Principal Investigator, Hematology & Oncology, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS)

Despite the remarkable results of CAR T cells in patients with hematologic malignancies, the success of CAR T cells in treating patients with solid tumors has been poor. A major obstacle is the limited ability of CAR T cells to persist and maintain their functions in the tumour microenvironment. New approaches enhancing the persistence and efficacy of CAR T cells will be presented, focusing on the treatment of solid tumors.

3rd Annual

Winning Strategies for CAR T Therapy, TILs and TCRs

Advances in Adoptive and Antibody Approaches

15:40 Computationally Designed STOP-CAR Disrupted by Small Molecule Confers On-Command Regulation of T Cell Therapy

Bruno Correia, PhD, Assistant Professor, Laboratory of Protein Design & Immunoengineering, University of Lausanne

Chimeric antigen receptor (CAR) T cells have enabled advances in cancer therapy, but unexpected toxicity and other adverse side effects remain an important issue. To engineer safety, we computationally designed a synthetic chemically disruptable heterodimer (CDH) incorporated into a synthetic heterodimer receptor, dubbed STOP-CAR. We propose that STOP-CARs hold important clinical promise, and our work highlights the potential for rational, structure-based design to implement novel, controllable elements into synthetic cellular therapies.

16:00 Arming CAR T Cells for Metabolic Competition in the Tumour Microenvironment

Sophie Papa, PhD, Reader and Honorary Consultant Medical Oncologist, King's College London

Metabolic competition in the tumour microenvironment is a limiting factor in cancer immune therapy. T cell efficacy and phenotypic changes are dependent on shifts in metabolic pathways within individual cells. I will explore approaches to target a putative tumour-associated antigen is a key role in metabolic solute availability, as well as methods to adapt CAR T cells to be armed to better manage the competitive cancer microenvironment.

16:20 Utilization of *In Vivo* PBMC Humanized Mouse Model for Determining Bispecific Antibody Related Cytokine Release Syndrome

James Keck, PhD, Senior Director, Innovation & Product Development, The Jackson Laboratory

Immunotherapeutic antibodies and cell therapies have proven to be highly effective cancer therapy for solid tumors, leukemia and lymphomas. The immunotherapy acts in part by stimulating and redirecting the immune system to attack cancer cells, and cytokines can be released during the process.

16:40 LIVE PANEL DISCUSSION: CAR Ts and Solid Tumors

Moderator: John Maher, PhD, Consultant & Senior Lecturer, Immunology, Kings College London

Panelists:

Sònia Guedan, PhD, Principal Investigator, Hematology & Oncology, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS)

Bruno Correia, PhD, Assistant Professor, Laboratory of Protein Design & Immunoengineering, University of Lausanne

Sophie Papa, PhD, Reader and Honorary Consultant Medical Oncologist, King's College London

Diogo Rodrigues Ferreirinha, MSc, European Business Development Manager, Retrogenix Limited

James Keck, PhD, Senior Director, Innovation & Product Development, The Jackson Laboratory

17:00 Close of CAR, TCR and TIL Conference

Inaugural

Targeting Innate Immunity | Tapping the Potential of the Innate Immune System

Bonus Plenary Keynote Session

Don't miss the bonus Plenary Keynote Session and Problem-Solving Breakouts on Monday! This day is included in all **Premium and Standard** *package registrations.*

BREAKOUT: Role of Pattern Recognition Receptors in Tumor Immunity

Subramanya Hegde, PhD, Principal Research Scientist II, AbbVie

- The family of pattern recognition receptors
- Role of PRRs in maintenance of homeostasis
- PRRs in Tumor Growth and Metastasis- immune evasion and angiogenesis
- Mechanism of PRRs in cancer and its immune microenvironment
- Clinical applications of PRRs in cancer therapies
- PRRs as Cancer Biomarkers
- PRR Signaling as Potential Targets to Inhibit Carcinogenesis
- PRR agonists to overcome immune checkpoint blockade resistance
- Impact of Pattern Recognition Receptors on the Prognosis of cancer

16:30 **Close of Day**

THURSDAY 12 NOVEMBER

ENGINEERING STRATEGIES FOR INNATE IMMUNE CELLS

9:00 **KEYNOTE PRESENTATION: Harnessing Innate Immunity in Cancer Therapy**

Éric Vivier, PhD, CSO, Innate Pharma

New therapies that promote antitumor immunity have been recently developed. Given the crucial role of innate immune responses in immunity, harnessing these responses opens up new possibilities for long-lasting, multilayered tumor control. We will present innovative anti-tumor therapies based on the manipulation of the innate immune system.

9:20 **ILCs: New Actors in Tumor Immunity**

Sara Trabanelli, PhD, Associate Investigator, Pathology and Immunology, CMU – University of Geneva

We have recently reported the identification of novel, dominant ILC2-dependent circuits of immunosuppression in cancer patients. Therefore, ILC2 may represent attractive cell targets to reprogram the immunosuppressive tumor microenvironment. By decoding the transcriptional programs of ILC2, we have identified candidate targets for ILC2 functional reprogramming. By therapeutically interfering with these circuits, we are exploring the impact of these discoveries in preclinical mouse models, in view of Phase I clinical trial.

9:40 **HVEM Is a Novel Immune Checkpoint for Cancer Immunity**

Gilles Marodon, Research Manager, Immunology & Infectious Diseases, UPMC Sorbonne University

The TNFSR14 (herpes virus entrymediator/HVEM) delivers a negative signal to T cells through the B and T lymphocyte attenuator (BTLA) molecule and has been associated with a worse prognosis in various malignancies. Here, we show in humanized mice that HVEM/BTLA is a novel immune checkpoint and that a mAb targeting HVEM acts on tumor growth in part through activation of myeloid cells.

10:00 **Session Break**

10:20 **Coffee Break - View Our Virtual Exhibit Hall**

10:35 **Kick-Starting the Cancer-Immunity Cycle by Targeting CD40 to Unleash Dendritic Cells in Immuno-Oncology**

Peter Ellmark, PhD, Vice President, Discovery, Alligator Bioscience AB

Antigen-presenting cells, in particular dendritic cells, play a central role in the cancer-immunity cycle. Alligator Bioscience develops therapies targeting CD40, which is the key activating receptor on dendritic cells. Mitazalimab is a Phase 2-ready monoclonal CD40 agonist that activates antigen-presenting cells, such as B cells, dendritic cells and macrophages, which can expand the tumor-specific T cell repertoire and remodel the tumor microenvironment.

10:55 **The CD47-SIRP Immune Checkpoint as a Therapeutic Target in Cancer**

Timo K. Van den Berg, PhD, Head, Blood Cell Research, Sanquin Research

This presentation will cover the fundamental aspects of the CD47-SIRP axis, with a focus on our own contribution, including the discovery, history and current status, with respect to clinical developments.

11:15 **Triggering NKG2D or NKp30 with Antibody Derivatives to Enhance Anti-Tumor NK Cell Responses**

Matthias Peipp, PhD, Research Head & Mildred Scheel Professor, Stem Cell Transplantation & Immunotherapy, University of Kiel

Activating NK cell receptors represent promising trigger molecules on natural killer cells to modulate anti-tumor NK cell responses. In the presentation different strategies to modulate the NKG2D or NKp30 receptor by antibody derivatives will be presented.

11:35 **Session Break**

11:55 **LIVE PANEL DISCUSSION: Engineering Strategies for Innate Immune Cells**

Moderator: Peter Ellmark, PhD, Vice President, Discovery, Alligator Bioscience AB

Panelists:

Gilles Marodon, Research Manager, Immunology & Infectious Diseases, UPMC Sorbonne University

Matthias Peipp, PhD, Research Head & Mildred Scheel Professor, Stem Cell Transplantation & Immunotherapy, University of Kiel

Timo K. Van den Berg, PhD, Head, Blood Cell Research, Sanquin Research

Éric Vivier, PhD, CSO, Innate Pharma

12:15 **Lunch Break - View Our Virtual Exhibit Hall**

ENGINEERING MACROPHAGES AND MONOCYTES FOR CANCER IMMUNOTHERAPY

12:45 **Completing the Immune Cycle by Targeting Novel Macrophage Checkpoints**

Inaugural

Targeting Innate Immunity | Tapping the Potential of the Innate Immune System

Tatiana Novobrantseva, PhD, Co-Founder & CSO, R&D, Verseau Therapeutics

Macrophages can adopt different functional roles in response to signals from their environment, including the ability to direct pro-inflammatory and anti-inflammatory immune responses. Verseau is utilizing its proprietary, all-human, drug discovery and translation platform to develop a pipeline of Macrophage Checkpoint Modulators. The lead monoclonal antibody program, targeting PSGL-1, reprograms macrophages to a pro-inflammatory state, activates T cells, and attracts other immune cells to generate a powerful antitumor response.

13:05 Engineered Monocytes and Macrophages for Cancer Immunotherapy: CARs and Beyond

Michael Klichinsky, PharmD, PhD, Co-Founder & Vice President, Discovery, Carisma Therapeutics

Chimeric antigen receptor (CAR)-based approaches have shown promise in hematologic malignancies, but responses in solid tumors have been minimal. This presentation will focus on the novel approach of genetically engineering primary human myeloid cells, such as monocytes and macrophages, and how this advance may overcome many of the challenges cell therapies face in the solid tumor setting.

13:25 AO-176, a Highly Differentiated Clinical Stage Anti-CD47 Antibody

Daniel Pereira, PhD, CSO, Arch Oncology

Preclinical data will be presented about our lead product candidate, AO-176, that is in a Phase 1 clinical trial for the treatment of patients with select solid tumors. AO-176 is a highly differentiated, anti-CD47 antibody that binds preferentially to CD47 on tumor versus normal cells, directly kills tumor cells while inducing damage-associated molecular patterns, and shows enhanced binding under acidic conditions as found in the tumor microenvironment.

13:45 Session Break

14:05 Refresh Break - View Our Virtual Exhibit Hall

BRIDGING INNATE & ADAPTIVE IMMUNITY AND IMPROVING ANTI-TUMOR RESPONSE

14:20 CD40 Enhances Type-1 Interferon Responses Downstream of CD47 Blockade, Bridging Innate and Adaptive Immunity

George J. Fromm Jr., PhD, Vice President, R&D, Shattuck Labs, Inc.

The CD47/SIRP axis has recently been validated as an exciting clinical target, and importantly, its blockade could enhance antigen cross-presentation in the setting of immune-neglected (anti-PD1 refractory) tumors. The subset of dendritic cells which are the most potent antigen cross-presenters, express CD40, and its stimulation enhances CD8+ lymphocyte activation by these cells. SIRP-Fc-CD40L can simultaneously block immunosuppressive signals and activate innate immune cells, inducing a potent anti-tumor adaptive immune response.

14:40 Targeting Pro-Tumor Inflammation via the Inflammasome Pathway

Pushpa Jayaraman, PhD, Senior Principal Scientist, Exploratory Immuno-Oncology, Novartis Institutes for Biomedical Research

Chronic inflammation via the inflammasome pathway plays a key role in carcinogenesis by accelerating tumor invasiveness, growth, and metastatic spread by promoting an immunosuppressive tumor microenvironment. Our work highlights the pathophysiological role of NLRP3 downstream mediator, IL-1b in tumor immunomodulation, and that IL-1b blockade might have important consequences on T cell function and checkpoint blockade in cancer.

15:00 Immune Modulation by Targeted Antigen Delivery to and Metabolic Manipulation of Antigen-Presenting Cells (APCs)

Subramanya Hegde, PhD, Principal Research Scientist II, AbbVie

Dendritic cells (DCs) play a major role in both inflammatory diseases and cancer. DCs within tumors are inefficient in taking up, processing, and presenting the tumor antigens effectively. This presentation will discuss the reprogramming of DC metabolism and targeting of the tumor antigens via surface receptors to improve anti-tumor immune response.

15:20 Session Break

15:40 LIVE PANEL DISCUSSION: Bridging Innate and Adaptive Immunity to Improve Anti-Tumor Response

Moderator: George J. Fromm Jr., PhD, Vice President, R&D, Shattuck Labs, Inc.

Panelists:

Subramanya Hegde, PhD, Principal Research Scientist II, AbbVie

Michael Klichinsky, PharmD, PhD, Co-Founder & Vice President, Discovery, Carisma Therapeutics

Tatiana Novobrantseva, PhD, Co-Founder & CSO, R&D, Verseau Therapeutics

Daniel Pereira, PhD, CSO, Arch Oncology

16:00 Close of PEGS Europe Summit

3rd Annual

Cell Line and Systems Engineering

Expanding the Protein Engineering and Expression Toolbox

Bonus Plenary Keynote Session

Don't miss the bonus Plenary Keynote Session and Problem-Solving Breakouts on Monday! This day is included in all Premium and Standard package registrations.

CO-PRESENTATION: BREAKOUT: Common Issues with Transient Protein Production

Richard Altman, Field Application Scientist, Life Science Solutions, Thermo Fisher Scientific
Henry C. Chiou, PhD, Director, Cell Biology, Life Science Solutions, Thermo Fisher Scientific
Dominic Esposito, PhD, Director, Protein Sciences, Frederick National Laboratory

- What are the current challenges to transient protein production?
- What are the keys to optimizing expression?
- How do we optimize the whole protein expression process?
- How can we maintain volumetric yields while scaling transient expression up or down?
- What cell line(s) should we use and when?
- What parameters can impact the quality or physical attributes of transiently produced proteins?

16:30 **Close of Day**

TUESDAY 10 NOVEMBER

CODON OPTIMIZATION

9:00 **Enhancing Bispecific Antibody Productivity by Codon Deoptimization**

Giovanni Magistrelli, Head, Protein Engineering, Light Chain Bioscience

Properly tuning the expression of the different polypeptide chains composing a protein complex can maximize production yields. A codon bias is observed in all organisms and contributes to efficient translation and expression of functional proteins. We applied codon de-optimization in a single multi-cistronic plasmid to improve assembly and expression of bispecific antibodies using different mammalian cell lines. This approach can be applied to different multispecific antibody formats and other protein complexes.

9:20 **Optimizing the Dynamics of Protein Expression**

Christel Kamp, PhD, Researcher, Federal Institute for Vaccines & Biomedicines, Paul-Ehrlich-Institut

Heterologously expressed genes require adaptation to the host organism to ensure sufficient protein synthesis rates. An alignment of codon choices with the host organism's preferred codons often results in satisfactory outcomes. To improve the method – not only for suboptimal outcomes – we study codon-specific dynamics of mRNA translation by modelling and simulation. We integrate this with machine learning approaches to propose an advanced codon optimization scheme (https://doi.org/10.1038/s41598-019-43857-5).

9:40 **Drivers of Recombinant Soluble Influenza A Virus Hemagglutinin and Neuraminidase Expression in Mammalian Cells**

Robert de Vries, PhD, Principal Investigator, Department of Chemical Biology and Drug Discovery, Utrecht University

Recombinant soluble trimeric influenza A virus hemagglutinins (HA) and tetrameric neuraminidases (NAs) have proven to be excellent tools to decipher biological properties. Expression of HA and NA can be achieved in a plethora of different laboratory hosts. Here we report that using codon-optimized genes and sfGFP fusions, the expression yield of HA can be significantly improved. In this study, a suite of different hemagglutinin and neuraminidase constructs are described.

10:00 **Session Break**

10:20 **Coffee Break - View Our Virtual Exhibit Hall**

SYNTHETIC BIOLOGY

10:35 **Synthetic Biology and Comparative Biology to Improve Protein Production in *Pichia pastoris***

Thomas Vogl, PhD, Researcher, Computer Science & Applied Mathematics, Molecular Cell Biology, Weizmann Institute Of Science

The yeast, *Pichia pastoris*, is one of the most commonly applied expression systems for heterologous protein production, even surpassing *Saccharomyces cerevisiae*. Here, recent synthetic biology approaches for increasing production yields will be covered ranging from artificial promoters (doi:10.1038/s41467-018-05915-w) to CRISPR-Cas systems (doi:10.1002/jcb.26474). Complementarily, also leveraging 'classical' comparative biology will be illustrated with the identification of novel, powerful heterologous promoters surpassing endogenous promoters in terms of both strength and regulation (doi:10.1186/s13568-020-00972-1).

10:55 **Harnessing Synthetic Biology to Produce Difficult-to-Express Proteins**

Shlomo Zarzhitsky, PhD, Research Associate, Chemistry, Princeton University

11:35 **GlycoExpress® – An Alternative Host for Difficult to Express Proteins** GLYCOTOPE

Lars Stöckl, Dr., Division Manager, Service, Glycotope GmbH

With CHO being a good production cell line for IgG molecules, they might fail to produce more challenging candidates. The GlycoExpress (GEX®) system represents an alternative for the production difficult to express protein molecules and we will provide case studies which demonstrate the superiority in productivity and product quality.

11:55 **LIVE PANEL DISCUSSION: From Codon Optimization to Synthetic Biology**

Moderator: Giovanni Magistrelli, Head, Protein Engineering, Light Chain Bioscience

Panelists:

Robert de Vries, PhD, Principal Investigator, Department of Chemical Biology and Drug Discovery, Utrecht University

Christel Kamp, PhD, Researcher, Federal Institute for Vaccines & Biomedicines, Paul-Ehrlich-Institut

Lars Stöckl, Dr., Division Manager, Service, Glycotope GmbH

3rd Annual

Cell Line and Systems Engineering

Expanding the Protein Engineering and Expression Toolbox

Thomas Vogl, PhD, Researcher, Computer Science & Applied Mathematics, Molecular Cell Biology, Weizmann Institute Of Science

Shlomo Zarzhitsky, PhD, Research Associate, Chemistry, Princeton University

12:15 **Lunch Break - View Our Virtual Exhibit Hall**

CELL-FREE SYSTEMS

12:45 **Application of *E. coli* Cell-Free System Optimal below Room Temperature to Aggregation-Prone Proteins**

Takanori Kigawa, PhD, Team Leader, Laboratory for Cellular Structural Biology, RIKEN Center for Biosystems Dynamics Research

We have developed a new method for *E. coli* cell extract-based, cell-free protein synthesis system. By supplementing cold shock proteins, the protein synthesis below room temperature was dramatically improved to be comparable to those at 30-37 ºC, thus it is particularly useful for expressing "difficult-to-express" proteins, which are usually prone to aggregation above room temperature. The successful applications to improving the soluble yield of aggregation-prone proteins will be presented.

13:05 **Microfluidic Control of Cell-Free Gene Expression**

Nadanai Laohakunakorn, PhD, Chancellor's Fellow, Institute of Quantitative Biology, Biochemistry and Biotechnology (IQB3), School of Biological Sciences, University of Edinburgh

Cell-free protein synthesis is a powerful technology which offers capabilities for bioproduction, biosensing, and biocomputation, freed from the constraints of living cells. In my talk, I will present recent work on the use of microfluidic devices to study and control aspects of cell-free gene expression, including synthetic transcription factor engineering for the regulation of cell-free gene circuits, and steady-state, long-term gene expression using microfluidic chemostats.

13:25 **Cell-free Expression of Full-length Mammalian Receptors for Functional and Cellular Studies**

Matthew Coleman, PhD, Senior Scientist & Group Leader, Biosciences and Biotechnology Division, Lawrence Livermore National Laboratory

13:45 **Premium Bioactive Proteins**

Gráinne Dunlevy, Head of Protein Sciences, Abcam plc

Abcam has developed a high-throughput protein production platform that consistently delivers high-quality proteins with high success rates.Our first Premium Bioactive Proteins are a range of cytokines aimed at cell-culture.This session reviews how Abcam used this knowledge to deliver high-quality and reliable batch to batch consistency Premium Bioactive Proteins.

14:05 **Refresh Break - View Our Virtual Exhibit Hall**

CELL-LINE ENGINEERING

14:20 **LIVE PANEL DISCUSSION: Protein Production Lab Challenges: Methodologies, Strategies, and the Art of Managing Multiple Projects**

Moderator: Richard Altman, Field Application Scientist, Life Science Solutions, Thermo Fisher Scientific

There are many challenges in operating protein production labs. This panel focuses on the following topics: initiating projects; basic expression and purification systems; pros and cons for each system; screening platforms; troubleshooting; and how much time should be spent on each system before moving to the next option. In addition to "hands-on" tips, we touch upon strategies on how to manage multiple "top-priority" projects.

Panelists:

Nicola A. Burgess-Brown, PhD, Principal Investigator, Biotechnology, Structural Genomics Consortium, University of Oxford

Dominic Esposito, PhD, Director, Protein Sciences, Frederick National Laboratory

Bernd Voedisch, PhD, Principal Scientist II, Novartis Pharma AG

Bjørn Voldborg, MSc, Director, CHO Cell Line Development, Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark

15:00 **Exploring the Link Between Sequence and Product: Learning from the Expression, Purification and Characterisation of 50 mAb Sequences at Scale**

Philip Probert, PhD, Head of Technical, Biologics, CPI

Biologics manufacture is expensive and time-consuming. Progression of the best candidates is key to minimising cost and time to market, however tools to assess and select the best candidates to progress remain undeveloped. This talk describes our experience generating data to produce a selection tool, through the expression, purification and analysis of a diverse set of 50 mAb sequences, and how sequence and process interact to determine titre and quality.

15:20 **CRISPR/Cas9 as a Genome Editing Tool for Targeted Gene Integration in CHO Cells**

Lise Marie Grav, PhD, Postdoc, DTU Biosustain, Technical University of Denmark

Targeted gene integration of protein-coding genes in the genome has become an attractive method to develop cell lines for production of therapeutic proteins. This talk will focus on the research efforts of our team to use CRISPR/Cas9 and recombinase-mediated cassette exchange (RMCE) as genome editing tools for targeted integration, and how it significantly speeds up the traditional timelines to achieve high-producing, stable CHO cell lines with predictable culture performance.

15:40 **LIVE PANEL DISCUSSION: Cell-Free Systems and Cell-Line Engineering**

Moderator: Philip Probert, PhD, Head of Technical, Biologics, CPI

Panelists:

Matthew Coleman, PhD, Senior Scientist & Group Leader, Biosciences and Biotechnology Division, Lawrence Livermore National Laboratory

Gráinne Dunlevy, Head of Protein Sciences, Abcam plc

Lise Marie Grav, PhD, Postdoc, DTU Biosustain, Technical University of Denmark

Takanori Kigawa, PhD, Team Leader, Laboratory for Cellular Structural Biology, RIKEN Center for Biosystems Dynamics Research

Nadanai Laohakunakorn, PhD, Chancellor's Fellow, Institute of Quantitative Biology, Biochemistry and Biotechnology (IQB3), School of Biological Sciences, University of Edinburgh

16:00 **Happy Hour - View Our Virtual Exhibit Hall**

16:30 **Close of Cell Line and Systems Engineering Conference**

13th Annual

Optimising Expression Platforms

Employing Cell Factories for the Enhanced Production of Biotherapeutics

WEDNESDAY 11 NOVEMBER

OVERCOMING EXPRESSION AND PRODUCTION CHALLENGES

9:00 Temperature Downshift Modifies Expression of UPR-/ERAD-Related Genes and Enhances Production of a Chimeric Fusion Protein in CHO Cells

Alan Dickson, PhD, Professor of Biotechnology; Director, Centre of Excellence in Biopharmaceuticals, Manchester Institute of Biotechnology, The University of Manchester

9:20 Nanobody: Outstanding Features for Diagnostic and Therapeutic Applications

J. Pablo Salvador, PhD, Research Associate, Nanobiotechnology for Diagnostics Group, CIBER-BBN, Spanish Council for Scientific Research

Nanobodies are defined as recombinant protein that corresponds to the variable region of a heavy-chain antibody. Due to its size and structure, nanobodies have conferred characteristic properties such as stability, inexpensive mass production, deep tissue penetration and low immunogenicity maintaining the excellent properties from conventional antibodies such as detectability, selectivity and easy to implement in different assays. Some examples will be showed for both diagnostics and therapeutics applications.

9:40 Engineering and Expression of Antibodies of Different Isotypes and Specificities for Cancer Immunotherapy

Silvia Crescioli, PhD, Postdoctoral Research Associate, St. John's Institute of Dermatology, School of Basic & Medical Biosciences, King's College London

There is a growing interest in antibodies with enhanced functional attributes for cancer immunotherapy, such as Fc-engineered and glyco-engineered antibodies and different isotypes to the commonly used IgG1 (IgG4, IgE). I will present our flexible platforms for engineering and glyco-engineering antibodies of different isotypes and specificities, and expression in transient and stable systems. I will illustrate how these can also be used for the generation of scFv-Fc and antibody-drug conjugates.

10:20 Coffee Break - View Our Virtual Exhibit Hall

10:35 FEATURED PRESENTATION: Get the Optimal Glycan: Tailor-Made and Controlled Glycosylation of Therapeutic Proteins

Bjørn Voldborg, MSc, Director, CHO Cell Line Development, Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark

Glycosylation of therapeutic proteins can have severe implications on activity, half-life, and response. We have engineered a large panel of CHO cell lines for the production of therapeutic proteins with tailor-made glycosylation. Using this panel, we are able to quickly produce defined glycovariants of protein-based drug candidates to screen for the optimal variant to bring into development, hereby improving the likelihood of bringing the optimal candidates into clinical trials.

10:55 Achieving High Expression and Solubility of Recombinant Proteins Using TISIGNER.com

Chun Shen Lim, PhD, Postdoctoral Fellow, Department of Biochemistry, School of Biomedical Sciences, University of Otago

Recombinant protein production is a widely used technique, yet half of these experiments fail at the expression phase and only a quarter of target proteins are successfully purified. With this in mind, we have developed TISIGNER.com that allows users to choose a protein region of interest for optimising expression and solubility.

11:15 Increased-Throughput Protein Production of Novel Botulinum Neurotoxins

Matthias Ehebauer, PhD, Senior Scientist, Neuroscience R&D, Ipsen Bioinnovation

Ipsen Bioinnovation produces engineered protein neurotoxins to support the discovery and development of novel pharmaceutical botulinum toxins. We have increased the throughput of neurotoxin production through expression screening. This was achieved using microbioreactors and magnet-based affinity protein extraction. Selected constructs are then produced in a containment laboratory. Under the constraints of working in a contained setting, we can currently produce 24 novel neurotoxins per month.

11:35 High-Yield Production of SARS-CoV-2 Proteins: From Small Scale Transfection to GMP Compliant Process

Reinhold Horlacher, PhD, Managing Director, trenzyme GmbH

To support research groups for development of serological tests, generation of high-affinity antibodies and new vaccine candidates, trenzyme has developed a platform for rapid production of high-quality recombinant SARS-CoV-2 proteins by transient transfection, high-producer cell lines and even GMP compliant production cell lines for development of the intranasal vaccine XPOVAX.

11:55 LIVE PANEL DISCUSSION: Overcoming Expression and Production Challenges

Moderator: Bjørn Voldborg, MSc, Director, CHO Cell Line Development, Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark

Panelists:

Silvia Crescioli, PhD, Postdoctoral Research Associate, St. John's Institute of Dermatology, School of Basic & Medical Biosciences, King's College London

Alan Dickson, PhD, Professor of Biotechnology; Director, Centre of Excellence in Biopharmaceuticals, Manchester Institute of Biotechnology, The University of Manchester

Matthias Ehebauer, PhD, Senior Scientist, Neuroscience R&D, Ipsen Bioinnovation

Reinhold Horlacher, PhD, Managing Director, trenzyme GmbH

Chun Shen Lim, PhD, Postdoctoral Fellow, Department of Biochemistry, School of Biomedical Sciences, University of Otago

J. Pablo Salvador, PhD, Research Associate, Nanobiotechnology for Diagnostics Group, CIBER-BBN, Spanish Council for Scientific Research

12:15 Lunch Break - View Our Virtual Exhibit Hall

12:45 Problem-Solving Breakout Discussions - View Our Virtual Exhibit Hall

Join your colleagues and fellow delegates for a focused, informal discussion moderated by a member of our speaking faculty. A small group format allows participants to meet potential collaborators, share examples from their own work and discuss ideas with peers. View all breakouts.

BREAKOUT: Glycosylation of Therapeutic Proteins

Bjørn Voldborg, MSc, Director, CHO Cell Line Development, Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark

13:25 Refresh Break - View Our Virtual Exhibit Hall

13th Annual

Optimising Expression Platforms

Employing Cell Factories for the Enhanced Production of Biotherapeutics

EFFECTIVE EXPRESSION AND PRODUCTION OF UNIQUE BIOPRODUCTS

13:45 Integrating High Cell-Density Cultures (HCDCs) with Adapted Laboratory Evolution for Vaccine Production Using Stable Insect Cell Lines

Antonio Roldao, PhD, Head of Cell-Based Vaccines Development Laboratory, Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (iBET)

Production platforms capable of manufacturing high amounts of vaccines in short timeframes are lacking today. The work herein developed aims at solving this bottleneck by combining evolutionary engineering (i.e. adaptive laboratory evolution of stable insect cells to hypothermic culture conditions) and process intensification (i.e. HCDCs using perfusion). Adapted cells producing influenza HA-Gag-VLPs were cultured to 100x106 cell/ml in perfusion, with specific Gag and HA production rates similar to batch.

14:05 Improving AAV Production in Insect Cells through Metabolic Modulation by Targeted Supplements

Inês A. Isidro, PhD, Scientist, Animal Cell Technology, iBET Instituto de Biologia Experimental Tecnologica

Insect cells are an established platform for production of adeno-associated virus (AAV) vectors for gene therapy, but improved understanding of these cells is still necessary to push towards higher productivities and product quality. Based on one-time additions of supplements known to modulate cell metabolism and on statistical design of experiments, we explored the coordinated effect of baculovirus infection and supplementation on insect cell metabolism, cell cycle distribution, and AAV production.

14:25 Robust and Reproducible Production of CoV-2 Proteins by Transient Gene Expression in High Five Cells

Joop Van den Heuvel, PhD, Research Group Leader, Recombinant Protein Expression, Helmholtz Center for Infection Research

Transient plasmid-based gene expression (TGE) in High Five insect cells is a fast and cheap alternative to produce ample amounts of high-quality proteins for structural and functional studies of the SARS 2019 CoV-2 virus. Here we show the steps to create a robust and reproducible method to provide recombinant CoV-2 surface proteins for host-pathogen interaction studies and application in intervention strategies using neutralizing antibodies.

15:05 Refresh Break - View Our Virtual Exhibit Hall

NIMBLE AND EFFICIENT CLD PLATFORMS

15:20 KEYNOTE PRESENTATION: Rapid and Nimble Expression and Production Tools: Lessons Learned over the Past Few Months

Nicola A. Burgess-Brown, PhD, Principal Investigator, Biotechnology, Structural Genomics Consortium, University of Oxford

The SGC advances research through our open access policy. Our well-established expression platforms for production and validation of intracellular and membrane proteins have enabled the deposition of more than 2000 human protein structures, including 15 novel integral membrane proteins. Since the onset of COVID-19, we have applied our technologies, optimisation strategies, and strength in teamwork to produce challenging SARS-CoV-2 proteins for serological assay development.

15:40 Cell Line Development for Biologics R&D

Bernd Voedisch, PhD, Principal Scientist II, Novartis Pharma AG

The presentation will highlight approaches and technologies applied for the generation of mammalian cell lines that support biologics projects from target identification and candidate generation to manufacturing.

16:00 Validation of a Single-Cell OptoElectro Positioning-Assisted Cell-Line Development Process

Linas Tamosaitis, PhD, Marie Curie Early Stage Researcher, Industrial Biotechnology, University of Kent

Here we analyse and compare two different mammalian cell line development platforms for recombinant protein production. A novel single-cell optoelectro positioning enabled system and an industrially validated ClonePix 2 method. We find that both methods are capable of producing similar high producing clones, however the single-cell method yields distinct advantages in terms of time overhead and predictive power.

16:20 Establishment of a Fully Integrated Developability Assessment Platform from Discovery to Pre-Clinical Studies

Thibaut Angevin, Associate Director, Head of Upstream Development, Technical Development, PierisPharmaceuticals

The biopharmaceutical industry is challenged to produce sufficient amounts of representative material for in-depth analysis, while maintaining a large panel of candidate molecules to increase the chance of success within short timelines. We introduced a developability assessment platform to address this challenge through a funnel-like approach with discrete screening steps.

16:40 LIVE PANEL DISCUSSION: Effective Expression and Production of Unique Bioproducts

Moderator: Inês A. Isidro, PhD, Scientist, Animal Cell Technology, iBET Instituto de Biologia Experimental Tecnologica

Panelists:

Nicola A. Burgess-Brown, PhD, Principal Investigator, Biotechnology, Structural Genomics Consortium, University of Oxford

Thibaut Angevin, Associate Director, Head of Upstream Development, Technical Development, PierisPharmaceuticals

Antonio Roldao, PhD, Head of Cell-Based Vaccines Development Laboratory, Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (iBET)

Linas Tamosaitis, PhD, Marie Curie Early Stage Researcher, Industrial Biotechnology, University of Kent

Joop Van den Heuvel, PhD, Research Group Leader, Recombinant Protein Expression, Helmholtz Center for Infection Research

Bernd Voedisch, PhD, Principal Scientist II, Novartis Pharma AG

17:00 Close of Optimising Expression Platforms Conference

5th Annual

Protein Purification Technologies | Innovating Processes

THURSDAY 12 NOVEMBER

TAG / AFFINITY INNOVATIONS

9:20 Tailor-Made Affinity Adsorbents for Selective Capture and Recovery

Cecilia Roque, PhD, Associate Professor in Bioengineering, NOVA University of Lisbon

The main goal for affinity ligands is to discover or improve functionality. However, the methodologies must adapt to the diversity of biologicals being developed, and the availability of new tools for data analysis and AI. In this presentation, we will show how rationally designed chemical combinatorial libraries support the development of robust peptidomimetics. We studied the potential of these scaffold affinity reagents to find binding partners against several biological targets.

9:40 Development of Affinity Ligands for Mild Purification of Biological Therapeutics

Sophia Hober, PhD, Professor, School of Biotechnology, KTH Royal Institute of Technology

Novel biological drugs, including monoclonal antibodies, are recurrently approved by the FDA. To address the demand for mild and specific purification, a protein purification ligand with calcium-dependent binding to IgG has been developed. Further improvement of this concept will be presented, including a novel protocol for antibody purification, as well as the development of new tailor-made ligands for purification of other biological therapeutics.

10:00 Session Break

10:20 Coffee Break - View Our Virtual Exhibit Hall

PROCESS IMPROVEMENTS

10:35 CO-PRESENTATION: Inclusion Body Processing: A REAL Black Box Case Study

Daniel Kronberger, Head, Downstream Pilot, Process Science, Boehringer Ingelheim RCV GmbH & Co. KG

Oliver Spadiut, PhD, Associate Professor, Vienna University of Technology (BOKU)

In this shared talk, we will present an exciting industry-academia challenge. The workflows developed at TU Wien were put to the ultimate test: BI RCV provided washed inclusion bodies and only some key information on the industrially relevant product and left the inclusion body process development totally to the academic partner. In this extraordinary talk, you will learn the outcome of this great challenge.

10:55 Identification and Tracking of Problematic Host Cell Proteins through Downstream Bioprocessing of Monoclonal Antibodies

Jonathan Bones, PhD, Principal Investigator, Characterisation and Comparability Laboratory, National Institute for Bioprocessing Research and Training (NIBRT)

We describe the beneficial inclusion of the Emphaze™ AEX Hybrid Purifier from 3M, which was evaluated compared to a conventional clarification process, for removal of problematic HCPs during downstream bioprocessing of mAbs. Total host cell protein and host cell DNA were determined using the ProteinSEQ and ResDNASeq assay kits. Advanced LC-MS-based proteomic methods were used to track and identify known 'problematic' HCPs through a multi-cycle protein A purification process.

11:15 Challenges of the Day-to-Day Lab-Scale Protein Production and How to Overcome Them

Peter Schmidt, PhD, Director, Recombinant Technologies, R&D, CSL Behring GmbH

The increasing number of projects in early R&D, combined with the need to characterize and evaluate potential new therapeutics, result in a continuously increasing number of requests to produce and QC proteins. Each production comes with its own challenges and requires different approaches to generate the requested amount of protein. The presentation will address some of the day-to-day issues in lab-scale protein production and suggest ways to overcome them.

11:35 KEYNOTE PRESENTATION: Evaluating a New Technology in the Context of Historical Successes and Failures: A Case Study on Self-Cleaving Tags

David W. Wood, PhD, Professor, Chemical & Biomolecular Engineering, The Ohio State University

Over the last few decades, several notable innovations have accelerated research and simplified manufacturing of new therapeutic proteins. Other innovations, while appearing promising at first, ultimately failed and have been forgotten. Currently under consideration is the use of self-cleaving tag methods to streamline discovery through commercialization. Considering past successes and failures, will this new technology become a new core method, or be lost in the graveyard of great ideas?

11:55 LIVE PANEL DISCUSSION: Affinity Innovations and Process Improvements

Moderator: Oliver Spadiut, PhD, Associate Professor, Vienna University of Technology (BOKU)

Panelists:

Jonathan Bones, PhD, Principal Investigator, Characterisation and Comparability Laboratory, National Institute for Bioprocessing Research and Training (NIBRT)

Sophia Hober, PhD, Professor, School of Biotechnology, KTH Royal Institute of Technology

Daniel Kronberger, Head, Downstream Pilot, Process Science, Boehringer Ingelheim RCV GmbH & Co. KG

Cecilia Roque, PhD, Associate Professor in Bioengineering, NOVA University of Lisbon

Peter Schmidt, PhD, Director, Recombinant Technologies, R&D, CSL Behring GmbH

David W. Wood, PhD, Professor, Chemical & Biomolecular Engineering, The Ohio State University

12:15 Lunch Break - View Our Virtual Exhibit Hall

CONTINUOUS PROCESSING

12:45 FEATURED PRESENTATION: Continuous Purification of Antibody with Precipitation, a Process with Non-Interrupted Mass Flow of the Product

Alois Jungbauer, PhD, Professor & Head, Biotechnology, Institute of Bioprocess Science and Engineering, University of Natural Resources and Life Sciences (BOKU)

We developed a new continuous precipitation process where the mass flow of the product is not interrupted. This process is robust, because fluctuations in the feed stream can be readily handled and easily realized as a disposable unit, because the necessary equipment are commercially available and do not require surge tanks. This process is truly continuous compared to other, quasi-/semi-continuous chromatography processes, which require cyclic operation.

5th Annual

Protein Purification Technologies | Innovating Processes

13:05 Large-Scale NBEs Continuous Manufacturing: From Concept to Reality

Johan Chami, Associate Manager, Tech Transfer Drug Substance Clinical Operations, Global Healthcare Operations, Biotech Process Sciences, Merck Serono SA

The increased complexity of the new bio-therapeutics, as well as the growing pressure on cost reduction, have led to define new development and production strategies. The COMPAC2T™, an End-to-End Continuous Manufacturing process integrating perfusion bioreactor with continuous purification, is our solution to face these challenges. This approach allows significant reduction in the Cost of Good, while increasing the agility of the biotherapeutics manufacturing and supply models.

13:25 Quality Control of Purified Proteins to Improve Research Data Reproducibility: Improving the Time Efficiency and Quality of Your Results

André Matagne, PhD, Professor, Life Sciences, University of Liège

As the scientific community strives to make published research ever more transparent and reliable, the quality of recombinant proteins used comes into focus. In order to improve the reliability and reproducibility of data using purified proteins in life science research, we have drafted guidelines for improved quality control. These will be presented together with an evaluation of their impact on the success and reproducibility of downstream experiments.

14:05 Refresh Break - View Our Virtual Exhibit Hall

REFINING PURIFICATION

14:20 LPS-Binding Peptides: New Tools for Endotoxin Detection and Removal?

Dirk Linke, PhD, Professor, Molecular Microbiology, Department of Biosciences, University of Oslo

In recent work, we have discovered a peptide that binds bacterial lipopolysaccharides with nano- to picomolar affinity and no observable off-rate. We are currently exploring ways to optimize the binding even further, and to define the binding site on the LPS molecule better. We believe that this peptide could be used in detection applications to replace the current, non-sustainable endotoxin test procedures, and for improved endotoxin removal technologies.

14:40 Ion Exchange Chromatography Coupled to Multi-Angle Light Scattering (IEX-MALS): Applications in Process Development and Protein Characterization

Mario Lebendiker, PhD, Head, Protein Purification Facility, Wolfson Center for Applied Structural Biology, Hebrew University Jerusalem

This talk discusses use of IEX-MALS as an alternative to SEC-MALS for protein characterization (mass, shape, aggregation, oligomerization, interactions, purity). Advantages and disadvantages of IEX-MALS vs. SEC-MALS will be presented. Applicability at low scale during processing development allows fast on-line identification of target with correct oligomeric conformation from other conformations or proteins. Applicability in membrane proteins purification, characterization, and separation from free micelles and other possible applications will be presented.

15:00 Direct Membrane Extraction for Discovery of Novel Therapeutics against GPCRs, Ion Channels & Transporters

Jens Frauenfeld, PhD, Founder & CEO, Salipro Biotech AB

Membrane proteins are important drug targets (GPCRs, ion channels), yet are notoriously difficult to work with. We have developed a novel one-step approach for the incorporation of membrane proteins directly from crude cell membranes into lipid Salipro particles. This direct approach presents new opportunities for the analysis of novel drug targets. Furthermore, we present how the Salipro system enables the generation of antibodies against challenging drug targets.

15:20 Novel Solution For High Throughput Antibody And Protein Purification Using Magnetic Beads

GenScript

Nishant Saxena, Product Manager, CPBU Catalog Product Marketing, GenScript USA Inc.

Magnetic beads-based purification permits the incubation of the beads directly into cell culture (for secreted proteins) or crude lysates regardless of sample volume. This provides a simplified approach to direct target capture while eliminating much of the sample preparation steps and potentially improving the quality of the purified product.

15:40 LIVE PANEL DISCUSSION: From Continuous Processing to Refining Purification

Moderator: Dirk Linke, PhD, Professor, Molecular Microbiology, Department of Biosciences, University of Oslo

Panelists:

Johan Chami, Associate Manager, Tech Transfer Drug Substance Clinical Operations, Global Healthcare Operations, Biotech Process Sciences, Merck Serono SA

Jens Frauenfeld, PhD, Founder & CEO, Salipro Biotech AB

Alois Jungbauer, PhD, Professor & Head, Biotechnology, Institute of Bioprocess Science and Engineering, University of Natural Resources and Life Sciences (BOKU)

Mario Lebendiker, PhD, Head, Protein Purification Facility, Wolfson Center for Applied Structural Biology, Hebrew University Jerusalem

André Matagne, PhD, Professor, Life Sciences, University of Liège

Nishant Saxena, Product Manager, CPBU Catalog Product Marketing, GenScript USA Inc.

16:00 Close of PEGS Europe Summit

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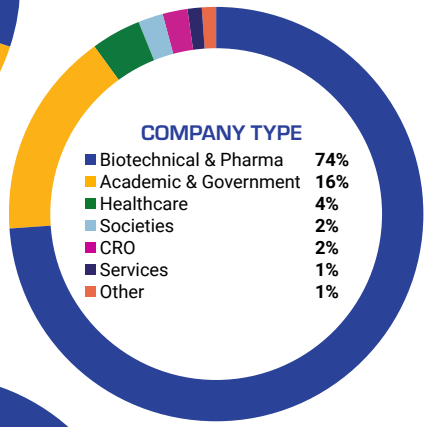

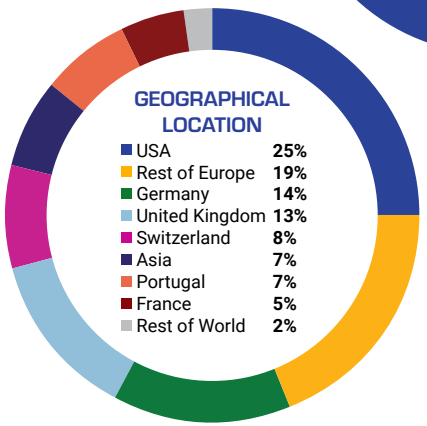

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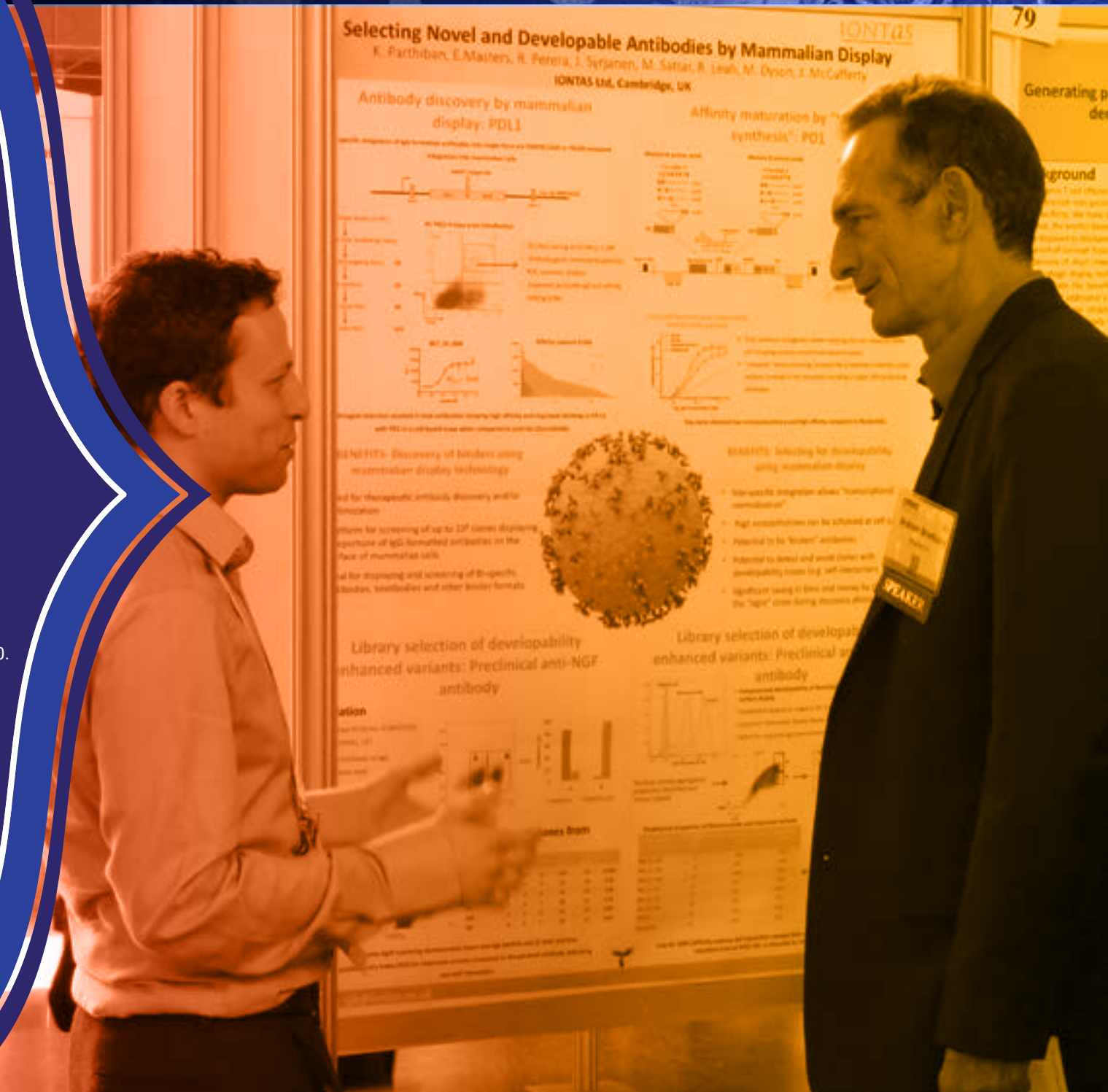

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Registration Rate after 6 November and on-site	€1399	€599	

BASIC REAL-TIME VIRTUAL PRICING (Includes real-time access to one conference, virtual event benefits, plus On-Demand access for one year)			
Advance Registration Rate until 6 November	€799	€449	€199
Registration Rate after 6 November and on-site	€999	€499	

	Monday - 9 November	Tuesday - 10 November	Wednesday - 11 November	Thursday - 12 November
ENGINEERING	Plenary Keynote Session and VIP Networking	C1A: Display of Biologics	C1B: Engineering Antibodies	C1C: Engineering Bispecifics
ONCOLOGY		C2A: Next-Generation Antibody-Drug Conjugates	C2B: Advancing Bispecifics and Combination Therapy to the Clinic	C2C: Novel Targets and Emerging Therapeutic Areas
ANALYTICAL		C3A: Optimisation & Developability	C3B: Analytical Characterisation of Biotherapeutics	C3C: Protein Stability & Aggregation
IMMUNOTHERAPY		C4A: Modulating the Tumour Microenvironment	C4B: Winning Strategies for CAR T, TIL and TCR Therapy	C4C: Targeting Innate Immunity
EXPRESSION		C5A: Cell Line and Systems Engineering	C5B: Optimising Expression Platforms	C5C: Protein Purification Technologies

**Pre-doctoral, full-time student*

> "I found the quality of talks and subjects excellent and would describe it as a must go for anyone in the field of biologics."
>
> **Caroline B.,** PhD, MBA, CEO, Elasmogen Ltd.

Alumni Discount 20% Off
Poster Discount €50 Off
Poster Deadline: 25 September 2020

WANT TO REGISTER BY PHONE?

Contact our Registration department at 781-972-5400 or Toll-free in the US 888-999-6288.

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VIDEO AND/OR AUDIO RECORDING OF ANY KIND IS PROHIBITED AT ALL CHI EVENTS.

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