SESSIONS

DAY 1 - 07/03/2023

Registration and Coffee

08:00 - 09:00

Co-Workshop Moderators' Welcome and Opening Remarks

09:00 - 09:15
Workshop #1: Managing CMC Activities for Complex and Emerging Oligonucleotide Therapeutics

Participants

Thomas Rupp - Owner & Principal , Thomas Rupp Consulting, Germany

Marc Lemaitre, PhD - Consultant , ML Consult

Workshop Moderator's Opening Remarks

09:00 - 09:15
Workshop #2: Current Topics in Peptide Discovery and Development: A Focus on Improving Peptide Properties

Workshop Overview:

This workshop will discuss a variety of strategies and techniques to improve the drug-like properties of peptides throughout the product lifecycle from discovery through development and chemical synthesis. Developability and manufacturability considerations will also be discussed. Examples and case studies from a variety of peptide programs will be presented along with challenges encountered, successes achieved and lessons learned.

Participants

Bruce Morimoto, PhD - Vice President, Drug Development , Alto Neuroscience

Workshop Agenda

09:15 - 12:45
Workshop #1: Managing CMC Activities for Complex and Emerging Oligonucleotide Therapeutics

Workshop Overview:

This workshop will address early drug development and CMC of oligonucleotide therapeutics. Preparing for IND/IMPD is a critical and strategic step for successful start of clinical development. A detailed discussion of moving oligonucleotide therapeutics from discovery to clinical trials will include a description of CMC strategies for early clinical development, process development, raw materials selection and control, GMP synthesis, analytical controls and specifications. The workshop will be split into a chemistry part from early synthesis to initial scale-up, addressing impurities and their control and a regulatory part addressing what is needed for the preparation of IND-IMPD dossiers based on existing guidelines. Participants will gain a basic understanding of the considerations and requirements for taking an oligonucleotide therapeutic into first-in-human clinical trials. After the presentations the speakers will jointly chair a panel discussion on CMC aspects.

Topics to be covered and format:

- 2 presentations, 45-minutes each followed by a 15-minute open discussion
- 30 – 60-minute panel discussion on CMC aspects
- CMC activities for complex and emerging oligonucleotide therapeutics
- Impurities and their control
- Preparation of an IND and regulatory aspects

Who should attend?

Anyone interested in development of complex oligonucleotide therapeutics; Anyone interested in outsourcing the manufacturing of oligonucleotide therapeutics to a CMO / CRO. This includes R&D Researchers, Manufacturing Personnel, Quality Assurance, Project Management, Business Development and Scientific Management

Participants

Thomas Rupp - Owner & Principal , Thomas Rupp Consulting, Germany

Marc Lemaitre, PhD - Consultant , ML Consult

Advantages of Using Cyclic Peptides as Therapeutics with a Focus on Improving the Properties of Therapeutic Peptides

09:15 - 09:45
Workshop #2: Current Topics in Peptide Discovery and Development: A Focus on Improving Peptide Properties

Participants

David Craik, PhD - Professor of Biomolecular Structure, Institute for Molecular Bioscience , University of Queensland

Enhancing Peptide Properties by Side-chain and Structural Modification

09:45 - 10:45
Workshop #2: Current Topics in Peptide Discovery and Development: A Focus on Improving Peptide Properties

Peptides have highly attractive biological properties due to their target specificity, but their pharmacological properties are often less favorable. This session takes a tour through a range of structural modifications applied to peptides designed to improve properties and considers manufacturing implications of such modifications.

Participants

Alastair Hay, PhD - Vice President, Peptides , Almac

Networking Refreshment Break

10:45 - 11:15
Workshop #2: Current Topics in Peptide Discovery and Development: A Focus on Improving Peptide Properties

Insights into Cell Penetration: Cyclic Davunetide As a Model System

11:15 - 12:00
Workshop #2: Current Topics in Peptide Discovery and Development: A Focus on Improving Peptide Properties

Davunetide is an 8-amino acid peptide that was in clinical development for the treatment of neurodegenerative diseases. The target for davunetide is intracellular, modulating microtubule dynamics. Additionally, nonclinical, and clinical pharmacokinetics confirmed it could get past the blood-brain-barrier. To better understand the mechanism by which davunetide can penetrate cell membranes and enter the brain, a series of cyclic peptides were synthesized to test various hypotheses.

Participants

Bruce Morimoto, PhD - Vice President, Drug Development , Alto Neuroscience

SCHEDULE

DAY 1 - 07/03/2023

Current Chemical Strategies in Extending Half-Lives of Therapeutic Peptides

12:00 - 12:45
Workshop #2: Current Topics in Peptide Discovery and Development: A Focus on Improving Peptide Properties

Therapeutic peptides have been proven to be very effective in treating critical human diseases. Their number on the pharmaceutical market has significantly increased over the past two decades. Thanks to the chemical modification strategies offering to significantly extend their half live and to overcome the biggest challenge of fast degradation in serum. This presentation gives examples of chemistry applied by the CDMOs and illustrate the evolving complexity of the therapeutic peptides to ensure a long-acting effect.

Participants

El Djouhar Rekaï, PhD - Head of Business Unit Peptide Process Development , PolyPeptide Group

Close of Workshop and Luncheon for Morning Workshop Attendees

12:45 - 13:55

Chairperson's Remarks

13:55 - 14:00
Main Conference Plenary Keynote Session

The Display for Pseudo-Natural Products

14:00 - 14:30
Main Conference Plenary Keynote Session

Participants

Hiroaki Suga, Ph.D. - Professor of Chemistry, School of Science , University of Tokyo, Japan

RNA Therapeutics: A Versatile Drug Discovery Platform

14:30 - 15:00
Main Conference Plenary Keynote Session

In recent years, vast omics information has provided insights into the mechanisms of many diseases, common and rare. RNA therapeutics, which can directly address molecular defects, offer the potential to deliver precision medicines for diseases with significant unmet need. Here I will discuss our efforts at Ionis to develop novel RNA therapeutics for diseases of various nature.

Participants

Shuling Guo, PhD - Vice President, Antisense Drug Discovery , Ionis Pharmaceuticals, Inc.

Using Plants as Biofactories to Produce Therapeutic Peptides

15:00 - 15:30
Main Conference Plenary Keynote Session

We are using gene-editing approaches to optimise host plants for the production of cyclic peptides. This presentation will discuss the advantages of Nicotiana benthamiana as producer plant for making cyclotides of therapeutic interest. Plant based production offers cost advantages and ease of scalability compared to traditional chemical peptide synthesis or cell-based manufacturing systems for peptides.

Participants

David Craik, PhD - Professor of Biomolecular Structure, Institute for Molecular Bioscience , University of Queensland

Networking Refreshment Break

15:30 - 16:00
Main Conference Plenary Keynote Session

RNAi in the Era of Nucleic Acid-based Therapeutics

16:00 - 16:30
Main Conference Plenary Keynote Session

In this presentation, I'll cover the major milestones over last two decades that led to harnessing the power of RNAi technology for molecular medicines. The presentation will include the highlights of current clinical programs and advances in extra-hepatic delivery for expanding the scope of RNAi therapeutics.

Participants

Vasant Jadhav, PhD - Senior Vice President, Head of RNAi Platform , Alnylam Pharmaceuticals

Recent Progress in the Development of Bridged Nucleic Acids

16:30 - 17:00
Main Conference Plenary Keynote Session

Phosphorothioate (PS) linkages play an important role in the development of antisense oligonucleotides (ASOs). However, the PS linkages also have several drawbacks. One solution to the problems may be to reduce the number of PS linkages in ASOs. However, replacing PS linkages with PO linkages greatly decreases in vivo stability of ASOs. We have successfully synthesized ASOs with higher enzymatic resistance than the PS oligonucleotides while maintaining excellent activity by introducing novel nucleoside derivatives we recently developed.

Participants

Satoshi Obika, PhD - Professor, Graduate School of Pharmaceutical Sciences , Osaka University

SESSIONS

DAY 2 - 08/03/2023

TIME	WORKSHOP #1: MANAGING CMC ACTIVITIES FOR COMPLEX AND EMERGING OLIGONUCLEOTIDE THERAPEUTICS	WORKSHOP #2: CURRENT TOPICS IN PEPTIDE DISCOVERY AND DEVELOPMENT: A FOCUS ON IMPROVING PEPTIDE PROPERTIES	MAIN CONFERENCE PLENARY KEYNOTE SESSION
08:00	**08:00** - Registration and Coffee	**08:00** - Registration and Coffee	**08:00** - Registration and Coffee
09:00	**09:00** - Co-Workshop Moderators' Welcome and Opening Remarks **09:15** - Workshop Agenda	**09:00** - Workshop Moderator's Opening Remarks **09:15** - Advantages of Using Cyclic Peptides as Therapeutics with a Focus on Improving the Properties of Therapeutic Peptides **09:45** - Enhancing Peptide Properties by Side-chain and Structural Modification	
10:00		**10:45** - Networking Refreshment Break	
11:00		**11:15** - Insights into Cell Penetration: Cyclic Davunetide As a Model System	
12:00	**12:45** - Close of Workshop and Luncheon for Morning Workshop Attendees	**12:00** - Current Chemical Strategies in Extending Half-Lives of Therapeutic Peptides **12:45** - Close of Workshop and Luncheon for Morning Workshop Attendees	**12:45** - Close of Workshop and Luncheon for Morning Workshop Attendees
13:00			**13:55** - Chairperson's Remarks
14:00			**14:00** - The Display for Pseudo-Natural Products **14:30** - RNA Therapeutics: A Versatile Drug Discovery Platform
15:00			**15:00** - Using Plants as Biofactories to Produce Therapeutic Peptides **15:30** - Networking Refreshment Break
16:00			**16:00** - RNAi in the Era of Nucleic Acid-based Therapeutics **16:30** - Recent Progress in the Development of Bridged Nucleic Acids

Registration and Coffee

08:00 - 08:40

Chairperson's Remarks

08:40 - 08:45
Plenary Session: mRNA Therapeutics and Vaccines

SESSIONS
DAY 2 - 08/03/2023

mRNA Based Approach to Anti-cancer Immunotherapeutics

08:45 - 09:15
Plenary Session: mRNA Therapeutics and Vaccines

One of the biggest challenges in fighting cancer is that every patient has a unique cancer. One reasonable approach to overcome this is to target the unique molecular signature of each cancer and to adapt treatment to the patient's disease and immune system dynamics. The presentation highlights how the mRNA platform technology offers plenty of new options to deliver the genetic information of antigens into antigen-presenting dendritic cells of the immune system.

Participants

Tanja Auth - Director CMC , BioNTech SE

CMC Regulatory Strategies for mRNA Vaccines

09:15 - 09:45
Plenary Session: mRNA Therapeutics and Vaccines

With the development of mRNA vaccines and the role they have played in combatting the global COVID-19 pandemic, regulators are developing guidance to assist manufacturers to navigate the emerging regulatory landscape. This session will provide an update on these and related issues for emerging mRNA vaccines.

Participants

Paul Dawidczyk - VP, Regulatory Affairs CMC , Moderna Therapeutics

Regulatory Approval of mRNA and DNA Vaccines

09:45 - 10:15
Plenary Session: mRNA Therapeutics and Vaccines

Participants

Duu-Gong Wu, PhD - Senior Director, Regulatory and CMC Consulting , PPD/ Evidera

Networking Refreshment Break with Poster and Exhibit Viewing

10:15 - 10:55

Chairperson's Remarks

10:55 - 11:00
mRNA Discovery and Development

Chairperson's Remarks

10:55 - 11:00
CMC Strategies for Oligonucleotides and Peptides

Chemical Synthesis of mRNAs Based on Efficient Capping Reaction

11:00 - 11:30
mRNA Discovery and Development

Site-specific chemical modification of mRNAs can improve their translation efficiency and stability. Therefore, it is desirable to develop a complete chemical synthesis method for chemically modified mRNA. The key step in the synthesis of eukaryotic mRNA is a chemical reaction in which a cap structure is introduced to the chemically synthesized RNA strand. we have developed a capping reaction that proceeds rapidly and quantitatively and synthesized series of chemically modified mRNAs.

Participants

Hiroshi Abe, PhD - Professor, Department of Chemistry, Graduate School , Nagoya University

Synthetic Oligonucleotides Aren't Perfect: bioZen Oligo, Paired with HRMS, Elucidates What You're Missing

11:00 - 11:30
CMC Strategies for Oligonucleotides and Peptides

The ability to understand the relative level of purity of oligonucleotides is of upmost importance for biological applications. In this presentation we are demonstrating the ability of the bioZen Oligo column to provide high quality separation of a variety of oligonucleotide types, including those for therapeutic purposes, from their synthetic impurities, to be profiled using High Resolution Mass Spectrometry. In this talk we discuss the importance of the column for this workflow and the impact of bio-inert hardware in minimizing adduct formation and non-specific binding.

Participants

Michael McGinley - Director of Applications , Phenomenex, USA

Unlimited Potential of mRNA Therapeutics for Human Health

11:30 - 12:00
mRNA Discovery and Development

mRNA therapeutics has emerged as a novel promising modality to protect us against viral infection and for cancer immunotherapy. mRNA medicines possess several advantageous features compared to authentic small molecule drugs and antibody drugs, which enables precision medicine by relatively cheaper cost. Here, I will discuss how mRNA medicine is designed to express the protein of interest efficiently to cure a variety of diseases.

Participants

Akiko Yanagiya, PhD - Scientist , Arcalis

Introduction of Oligonucleotide CDMO Services by Solid Phase Synthesis Technology

11:30 - 12:00
CMC Strategies for Oligonucleotides and Peptides

Participants

Kohei Himeno - Group Leader, GMP Manufacturing Division , Ajinomoto Bio-Pharma Services

mRNA Medicines for Treatment of Various Diseases

12:00 - 12:30
mRNA Discovery and Development

mRNA is an emerging drug modality for protein replacement therapy. Direct delivery of mRNA can be applied not only as an alternative to gene therapy but also for various common diseases such as osteoarthritis. Here I would like to present our recent trials for developing new applications of the mRNA medicines.

Participants

Keiji Itaka, MD, PhD - Professor, Department of Biofunction Research , Tokyo Medical and Dental University

Fujifilm Presentation TBA

12:00 - 12:30
CMC Strategies for Oligonucleotides and Peptides

Networking Luncheon with Poster and Exhibit Viewing

12:30 - 13:40

SESSIONS
DAY 2 - 08/03/2023

Chairperson's Remarks

13:40 - 13:45
mRNA Discovery and Development

Chairperson's Remarks

13:40 - 13:45
CMC Strategies for Oligonucleotides and Peptides

Participants

El Djouhar Rekaï, PhD - Head of Business Unit Peptide Process Development , PolyPeptide Group

Developing mRNA-Based Drugs for Infectious Diseases

13:45 - 14:15
mRNA Discovery and Development

The remarkable potency of mRNA vaccines in reducing the global burden of the ongoing COVID-19 pandemic has been a revelation. The self-transcribing and replicating RNA (STARRTM) technology combined with Arcturus Therapeutics proprietary lipid nanoparticle (LNP) delivery technology has produced a safe and effective vaccine against SARS-CoV-2 virus.

Participants

Pad Chivukula, Ph.D. - Chief Scientific Officer and COO , Arcturus Therapeutics

Implementation of Industry 4.0 Concepts for Manufacturing of Oligonucleotides and Peptides

13:45 - 14:15
CMC Strategies for Oligonucleotides and Peptides

Industry 4.0, or the fourth industrial revolution, refers to the automation and digitalization of traditional industrial processes through smart technology and integration. The "smart factory" concept within Industry 4.0 depicts a state of interconnected and interoperable machines, which are able to process data autonomously and act with very limited human decision making or intervention. The presentation will give an overview and examples about Industry 4.0 concepts along the typical manufacturing processes for TIDES drug substances at Bachem.

Participants

Daniel Samson, PhD - Vice President, Head Oligonucleotides , Bachem AG

mRNA Therapeutics for Regenerative Medicines

14:15 - 14:45
mRNA Discovery and Development

Great success of COVID-19 mRNA vaccines has opened the door for therapeutic uses of mRNA not only prophylactic uses. Local regenerative medicines may be one of the most promising applications of mRNA therapy. Our company is developing the RUNX1 mRNA therapy using our micelles as a carrier for treatment of osteoarthritis. We will update the progress of this and also discuss about other areas of interest.

Participants

Shiro Akinaga, PhD - Board of Directors, CSO, Head of R&D Division , Nanocarrier Co.

Developing the Toolbox for Sustainable Peptide Manufacturing

14:15 - 14:45
CMC Strategies for Oligonucleotides and Peptides

The need for sustainable manufacturing practices is a major challenge for the worldwide industry, and the pharma world is increasingly engaged in this important green transformation. For the synthesis of peptide APIs, where large amounts of hazardous waste is generated and atom efficiency is challenged, new manufacturing concepts is a necessity. The presentation will show how PolyPeptide Group is developing its manufacturing practices to meet the challenges by promoting the greenest solutions for peptide manufacturing.

Participants

Jon Holbech Rasmussen, Ph.D. - Director Global Development , PolyPeptide Group

Late Breaking Presentation

14:45 - 15:15
mRNA Discovery and Development

Peptide API Manufacturing Process Optimization through QbD Strategy

14:45 - 15:15
CMC Strategies for Oligonucleotides and Peptides

Tackling critical peptide impurities poses one of the most demanding challenges to peptide API GMP manufacturing. Intercorrelation of the relevant process parameters significantly complicates the critical impurity formation and precludes the effective suppression strategies through the conventional process optimization tactics. QbD (Quality-by-Design) concept should be wielded to address those critical peptide impurities whose formation is maneuvered by underlying complex forces. Concrete case studies are exhibited in the subject talk, delineating the accomplished critical impurity tackling through QbD strategy, DOE (Design of Experiments) in particular. Employment of DMAIC (Design-Measure-Analyze-Improve-Control) cycle from Lean Six Sigma concept is also exemplified with a successful case study.

Participants

Yi Yang, Ph.D. - Lead Scientist , Ferring Pharmaceuticals A/S

Networking Refreshment Break with Poster and Exhibit Viewing

15:15 - 15:45

ClinGuide 2.0 Agilent ClinGuide CRISPR sgRNA

15:45 - 16:15
Novel Strategies for RNA Molecules

This talk will provide an overview into second generation technical capabilities of Agilent ClinGuide CRISPR sgRNA used for gene editing clinical applications. Insight into our advances for scalable (10-180 g) high-quality cGMP batch production, along with high resolution in process chromatographic controls. In addition, a discussion of the scenario for sequence verification options and Agilent's approach to this critical quality attribute.

Participants

Joe Guiles, PhD - Head of Development - Nucleic Acid Solution Divis , Agilent Technologies

Exploration of PAT and Continuous Flow Applications in Peptide Synthesis

15:45 - 16:15
CMC Strategies for Oligonucleotides and Peptides

In recent years, process analytical technologies (PAT) have been increasingly applied in process chemistry. CordenPharma started the evaluation of a variety of analytical tools that could apply to inline monitoring of peptide synthesis. For example, refractometry was applied to all crucial SPPS steps, such as coupling reactions, deprotection and washing, providing highly promising results toward process optimization regarding overall time and the reduction of required solvents and reagents. This presentation will discuss the findings made by CordenPharma using new PAT from the proof of principle to the application in automated peptide synthesizers and will evaluate the impact of the scale-up on production level.

Participants

Matthieu Giraud, Ph.D. - Global Director Peptide, Lipids and Carbohydrates Platforms , CordenPharma International

TBA

16:15 - 16:45
Novel Strategies for RNA Molecules

Late Breaking Presentation

16:15 - 16:45
CMC Strategies for Oligonucleotides and Peptides

SCHEDULE

DAY 2 - 08/03/2023

TIME	PLENARY SESSION: MRNA THERAPEUTICS AND VACCINES	MRNA DISCOVERY AND DEVELOPMENT	CMC STRATEGIES FOR OLIGONUCLEOTIDES AND PEPTIDES	NOVEL STRATEGIES FOR RNA MOLECULES
08:00	**08:40** - Chairperson's Remarks **08:45** - mRNA Based Approach to Anti-cancer Immunotherapeutics **08:00** - Registration and Coffee	**08:00** - Registration and Coffee	**08:00** - Registration and Coffee	**08:00** - Registration and Coffee
09:00	**09:15** - CMC Regulatory Strategies for mRNA Vaccines **09:45** - Regulatory Approval of mRNA and DNA Vaccines			
10:00	**10:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**10:55** - Chairperson's Remarks **10:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**10:55** - Chairperson's Remarks **10:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**10:15** - Networking Refreshment Break with Poster and Exhibit Viewing
11:00		**11:00** - Chemical Synthesis of mRNAs Based on Efficient Capping Reaction **11:30** - Unlimited Potential of mRNA Therapeutics for Human Health	**11:00** - Synthetic Oligonucleotides Aren't Perfect: bioZen Oligo, Paired with HRMS, Elucidates What You're Missing **11:30** - Introduction of Oligonucleotide CDMO Services by Solid Phase Synthesis Technology	
12:00	**12:30** - Networking Luncheon with Poster and Exhibit Viewing	**12:00** - mRNA Medicines for Treatment of Various Diseases **12:30** - Networking Luncheon with Poster and Exhibit Viewing	**12:00** - Fujifilm Presentation TBA **12:30** - Networking Luncheon with Poster and Exhibit Viewing	**12:30** - Networking Luncheon with Poster and Exhibit Viewing
13:00		**13:40** - Chairperson's Remarks **13:45** - Developing mRNA-Based Drugs for Infectious Diseases	**13:40** - Chairperson's Remarks **13:45** - Implementation of Industry 4.0 Concepts for Manufacturing of Oligonucleotides and Peptides	

SCHEDULE

DAY 2 - 08/03/2023

TIME	PLENARY SESSION: MRNA THERAPEUTICS AND VACCINES	MRNA DISCOVERY AND DEVELOPMENT	CMC STRATEGIES FOR OLIGONUCLEOTIDES AND PEPTIDES	NOVEL STRATEGIES FOR RNA MOLECULES
14:00		**14:15** - mRNA Therapeutics for Regenerative Medicines **14:45** - Late Breaking Presentation	**14:15** - Developing the Toolbox for Sustainable Peptide Manufacturing **14:45** - Peptide API Manufacturing Process Optimization through QbD Strategy	
15:00	**15:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**15:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**15:45** - Exploration of PAT and Continuous Flow Applications in Peptide Synthesis **15:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**15:45** - ClinGuide 2.0 Agilent ClinGuide CRISPR sgRNA **15:15** - Networking Refreshment Break with Poster and Exhibit Viewing
16:00			**16:15** - Late Breaking Presentation	**16:15** - TBA

SESSIONS
DAY 3 - 09/03/2023

Registration and Coffee

08:00 - 08:40

Chairperson's Remarks

08:40 - 08:45
Plenary Session: Delivery Strategies for Macromolecules

Silence Therapeutics' mRNAi GOLD™ Platform and Development of an siRNA Targeting Lipoprotein(a) for Cardiovascular Disease

08:45 - 09:15
Plenary Session: Delivery Strategies for Macromolecules

This presentation will discuss:

1) The evolution of Silence Therapeutics across the last two decades and now poised for transformation with development of a proprietary GalNAc OLigonucleotide Discovery (GOLD) Pipeline;

2) Journey to the clinic with two mRNAi GOLD™ Platform programs for cardiovascular and hematological disorders;

3) Development of SLN360, a GalNAc-conjugated siRNA targeting lipoprotein(a), a novel independent genetically determined risk factor for cardiovascular disease and

4) Recent impressive first in human safety and efficacy data.

Participants

Curtis Rambaran, MD - Vice President and Head, Clinical Science , Silence Therapeutics

Heteroduplex Technology of Decreased CNS Toxicity and Improved Potency of Antisense Oligonucleotide by ICV/IT Injection

09:15 - 09:45
Plenary Session: Delivery Strategies for Macromolecules

We recently developed blood-brain-barrier penetrating heteroduplex oligonucleotide (Nat Biotech 2021). However, intrathecal injection is a gold standard route for treating CNS diseases. Acute toxicities of antisense oligonucleotide (ASO) such as sedation, convulsion, and ataxia limit drug development of ASO. We here achieved marked improvement of these acute toxicities of parent ASO by heteroduplex oligonucleotide technology (HDO) by more than 30-fold as NOAEL. In addition, we also have developed a new class of double-stranded ASO, overhanging heteroduplex oligonucleotide (ODO), which comprise the ASO strand and its complementary RNA strand with overhanging oligonucleotides. ODO enables efficient delivery to mice brain and silencing potency in neurons via the intra-cerebroventricular route compared with parent ASO. This HDO/ODO technology can open new horizon in ASO therapy for neurological diseases.

Participants

Takanori Yokota, MD, PhD - Professor, Neurology and Neurological Science , Tokyo Medical and Dental University

Use of Next Generation AAVs to Target Specific Cell types in the CNS or Nanoparticles to Enhance Drug delivery into the CNS

09:45 - 10:15
Plenary Session: Delivery Strategies for Macromolecules

Current adeno-associated virus (AAV) mediated gene therapy use vectors that have variable tropism for neurons and astrocytes. They typically fail to diffuse appreciable distances if injected directly into the parenchyma. We have developed next generation viral vectors that can selectively target cells of interest that have enhanced diffusion within the brain tissue. We have also used novel nanoparticles to enhance delivery of a small molecule into the CNS and demonstrated treatment effects in a mouse model of ALS.

Participants

Robert Bowser PhD - Chief Scientific Officer , Barrow Neurological Institute

Networking Refreshment Break with Poster and Exhibit Viewing

10:15 - 10:55

Chairperson's Remarks

10:55 - 11:00
Oligonucleotide Discovery and Development

Chairperson's Remarks

10:55 - 11:00
Oligonucleotide Delivery, Development and Regulatory

An Efficient, Modular and Scalable Mitochondrial Delivery Vector System for RNA and DNA

11:00 - 11:30
Oligonucleotide Discovery and Development

Defects of all protein-coding mitochondrial genes have been associated with mitochondrial disease in human. In addition, three major innate immune pathways, i.e., RIG-I MAVS, NLRP3, and TLR9, depend on mitochondria. The long non-coding ß2.7 RNA of the human cytomegalovirus was described to localize to the mitochondria of mammalian cells and to bind and stabilize mitochondrial complex I. We identified four conserved structural subdomains within the ß2.7 RNA which govern the mitochondrial targeting activity. The most active subdomain alone resembled the activity of the full-length ß2.7 RNA. Tetrameric domain repeats arranged in tandem showed three-fold higher activity, depicting the modularity and scalability of this mitochondrial delivery vector system. Targeted mitochondrial delivery of antisense RNA triggered up to 97% knockdown of mitochondrial genes MT-ATP6/8 leading to a reduction of mitochondrial ATP levels and cell viability. Nuclear transcription of ß2.7-mRNA chimera triggered recombinant mitochondrial EGFP expression. Mitochondria-targeting domains attached to a single-stranded circular DNA efficiently co-delivered this 7200 nt DNA into the mitochondria. Finally, the shortest mitochondria-targeting ß2.7 RNA-derived subdomain of 100 nt in length protected human dopaminergic neuroblastoma cells from 6-hydroxidopamine-induced reactive oxygen species in a Parkinson's disease model. This powerful mitochondrial delivery vector system can be explored towards mitochondrial gene therapy of human diseases including cancer, controlling of inflammation and immunity, and for anti-aging.

Participants

Volker Patzel, Ph.D. - Senior Lecturer , National University of Singapore

SESSIONS
DAY 3 - 09/03/2023

Tuning Lipid Nanoparticles for Specific Applications

11:00 - 11:30
Oligonucleotide Delivery, Development and Regulatory

Lipid Nanoparticles (LNP) are now well established for delivery of nucleic acids (NA) systemically to hepatocytes and for vaccine applications. However, many potential applications for diverse NA modalities exist outside of these areas. LNP with altered biodistribution can be achieved by changing route of administration, and modulating lipid composition accordingly. This presentation will describe the latest advances for hepatocyte delivery, as well as specialized LNP designed for extrahepatocyte use, with examples including compositions targeting the hepatic stellate cell, lung, muscle, and CNS.

Participants

Richard Holland, PhD - Director of Chemistry, Technology Development , Genevant Sciences Corporation

Conjugation of Chemical Handles and Functional Moieties to DNA during Solid Phase Synthesis with Sulfonyl Azides

11:30 - 12:00
Oligonucleotide Discovery and Development

Labeling of oligonucleotides with dyes, targeting ligands and other moieties has become ever more essential in life-sciences. Conventionally, modifications are introduced to oligonucleotides during solid phase synthesis by special phosphoramidites functionalized with a chemical handle or the desired functional group. In this presentation, I describe a facile and inexpensive method to introduce modifications to oligonucleotides without the need for special phosphoramidites. The method is compatible with current phosphoramidite-based automated oligonucleotide synthesis and serves as an inexpensive and simple alternative to the unstable and expensive special phosphoramidites currently used for conjugation to oligonucleotides.

Participants

Kurt Vesterager Gothelf, Ph.D. - Professor, Department of Chemistry and iNANO , Aarhus University

Biodegradable Silica Based Delivery of RNA Therapeutics

11:30 - 12:00
Oligonucleotide Delivery, Development and Regulatory

DelSiTech Silica Matrix is a versatile drug delivery vehicle for complex therapeutic molecules, including oligonucleotide drugs such as aptamers and mRNA. Encapsulation of oligonucleotides in nanoporous, biodegradable silica provides an effective method for parenteral administration of oligonucleotides from few days to several months. Basic principles of the technology and case studies will be presented.

Participants

Lasse Leino, PhD - Chief Executive Officer, Adjunct Professor , DelSiTech Ltd.

Recent Progress of Luxna's Chemistry Platform for Antisense Oligonucleotide Therapeutics

12:00 - 12:30
Oligonucleotide Discovery and Development

More than 20 years have passed since 2'-4'-BNA/LNA was investigated, however no antisense therapeutics with 2'-4'-BNA/LNA has been approved. Even the 2'-4'-BNA/LNA incorporated antisense shows high potency of KD effect toward target mRNA, toxicity issue due to back bone modifications e.g., phosphorothioate is remaining to develop the antisense therapeutics. We will present our recent progress of chemistry platform which can reduce the toxicity of the antisense oligonucleotides. The platform contains bridged nucleic acids for wings and modified nucleic acids for gap such as amido-bridged nucleic acid (AmNA, the bridged structure is hydrophilic amide bond), guanidine-bridged nucleic acid (GuNA, the bridged structure has cationic guanidine moiety), 2'-O,4'-C-spirocyclopropylene-bridged nucleic acid (scpBNA, the bridged structure has hydrophobic cyclopropane ring), 5'-cycloropane-DNA (5'-CP, the cyclopropane ring is on the 5'-C of DNA) and nucleobase modifications. The combination of our chemistry reduced toxicity (i.e., hepatotoxicity, cytotoxicity, acute neurotoxicity), without compromising KD effects. The platform will generate less-toxic antisense oligonucleotide which was not achieved by conventional 2'-4'-BNA/LNA.

Participants

Tadashi Umemoto, PhD - General Manager, Research and Development , Luxna Biotech Co., Ltd.

TBA

12:00 - 12:30
Oligonucleotide Delivery, Development and Regulatory

Participants

David Lin, PhD - President and Principal Consultant , TS Pharma Experts LLC

Networking Luncheon with Poster and Exhibit Viewing

12:30 - 13:40

Chairperson's Remarks

13:40 - 13:45
Oligonucleotide Discovery and Development

Chairperson's Remarks

13:40 - 13:45
Peptide Discovery and Development

Participants

El Djouhar Rekaï, PhD - Head of Business Unit Peptide Process Development , PolyPeptide Group

Impact of Guanidine-containing Backbone Linkages on Oligonucleotide Silencing, Splicing and RNA Base Editing Modalities

13:45 - 14:15
Oligonucleotide Discovery and Development

Chemically modified oligonucleotides hold great promise for treating genetically defined diseases. Wave generates stereopure oligonucleotides—those in which the chiral configuration of backbone linkages is precisely controlled at each position—to maximize the activity benefits realized by tuning chemistry throughout the oligonucleotide. We have recently expanded our repertoire of backbones and have developed the capabilities necessary to support synthesis of stereopure oligonucleotides incorporating these guanidine-containing linkages (PN). We have applied these synthetic capabilities across multiple oligonucleotide modalities, including silencing with RNase H or RNA interference, splicing and RNA base editing. We highlight how the PN backbone conveys substantial potency and durability benefits across modalities in preclinical animal models in multiple tissues.

Participants

Chandra Vargeese, PhD - Chief Technology Officer , WAVE Life Sciences

SESSIONS
DAY 3 - 09/03/2023

The Potential and Current Application of Artificial Intelligence in Peptide Drug Discovery

13:45 - 14:15
Peptide Discovery and Development

The lecture will briefly cover past and current techniques and. An emphasis will be made on the characteristics and limitation of “Display” technologies that are currently leading most peptide discovery efforts. Current discovery needs have shifted mainly from modification/optimization of natural peptide hormones to the discovery of completely novel peptides for a given target, this task is of significant complexity and is greatly increased when non-natural amino acids and different cyclization methods are required. The potential of Machine Learning/Artificial Intelligence (ML/AI) enabled peptide design/discovery is focused on the capability of specifically tailoring active peptides to prespecified binding pocket while using different non-natural building blocks and cyclization methods. Moreover, ML/AI approach has the potential of reducing the failure rate of discovery development projects by pre-rejecting problematic peptides solutions. The application of ML/AI in a specific case study for the discovery of IL-17 protein protein interaction inhibitor (PPI) will be discussed.

Participants

Immanuel Lerner, PhD - CEO , Pepticom Ltd

Chemical Approaches for Improving Properties of RNA Therapeutics

14:15 - 14:45
Oligonucleotide Discovery and Development

Advancements in the chemical design of oligonucleotide drugs have improved potency, safety and duration leading to better clinical outcomes. Efforts to expand the boundaries of existing chemical space to further enhance the properties of RNA therapeutics will be presented.

Participants

Thazha P. Prakash, Ph.D. - Executive Research Fellow , Ionis Pharmaceuticals

Genetically-encoded Discovery of Macrocyclic and Bicyclic Inhibitors for Difficult-to-Drug Targets

14:15 - 14:45
Peptide Discovery and Development

Billion-scale genetically-encoded (GE) libraries of polypeptides made of 20 natural amino acids are readily available but have limited structural diversity and practical utility for drug discovery. These peptides can be transformed to useful structures via “late stage” diversification using organic reactions in water. Each transformation, when optimized, can routinely convert billion starting materials to billion products at once. My talk will highlight recent development and utility of chemically-diversified GE macrocyclic libraries for drug discovery for “undruggable targets”. Examples include (i) Macrocyclic structures that antagonize integrin signaling involved in inflammation in gastrointestinal tract; (ii) libraries of macrocycles with covalent warheads that yields inhibitors for targets such as PKM2; (iii) bicyclic antagonists of previously undruggable extracellular targets: immunomodulatory receptors from sialic acid-binding immunoglobulin-type of lectin (Siglec) family.

Participants

Ratmir Derda, PhD - Associate Professor, Department of Chemistry , University of Alberta

mxRNA™: Miniaturized RNAi Triggers Composed Of Single Oligonucleotides

14:45 - 15:15
Oligonucleotide Discovery and Development

Sirnaomics has developed proprietary GalNAc-RNAi therapeutic platform – GalAhead™, with mxRNA™ comprising one of its key technological components. mxRNAs (miniaturized RNAi triggers) are composed of single 30-33 nt long oligonucleotides and demonstrate excellent activity in primary hepatocytes (in vitro) and in mice (in vivo). In addition to the experiments in vitro and with rodents, we will present results of our 26-week study in non-human primates conducted with the candidate molecule for our frontrunner GalAhead™ therapeutic program, aimed to downregulate blood clotting Factor XI. We will also provide a progress report on our other GalAhead™ technologies and programs.

Participants

Dmitry Samarsky, PhD - Chief Technology Officer , Sirnaomics

Bicycles – A Versatile Drug Modality for Precision-guided Therapeutics

14:45 - 15:15
Peptide Discovery and Development

Bicycles (constrained, bicyclic peptides) are highly effective at engaging target proteins selectively and with high affinity. Their favourable PK properties enable a range of routes of administration and their small size and stability allow them to penetrate tissues effectively. In addition to acting as potent pharmaceutical agents, they also make excellent delivery vehicles for targeted therapies. Bicycles are being developed for a range of applications that utilise their unique properties.

Participants

Liuhong Chen, PhD - Vice President, Discovery , Bicycle Therapeutics

Networking Refreshment Break with Poster and Exhibit Viewing

15:15 - 15:45

Anti-FGF2 Aptamer Therapy for Wet Age-Related Macular Degeneration and Achondroplasia

15:45 - 16:15
Oligonucleotide Discovery and Development

RBM-007 is a novel oligonucleotide-based aptamer with potent anti-FGF2 activity. Intravitreal administration of RBM-007 in animals demonstrated anti-angiogenic and anti-scarring effects, consistent with a therapeutic effect desired in the treatment of wet AMD. We have completed phase II clinical trials early in 2022 in the US, showing the efficacy (POC) in treatment-naïve wet AMD. RBM-007 is also effective to cure Achondroplasia (ACH) in animal models. ACH is the most prevalent genetic form of dwarfism in humans, caused by activating mutation in FGFR3 tyrosine kinase. We have successfully completed phase I study and plan to initiate early phase II study of RBM-007 for ACH in 2022.

Participants

Yoshikazu Nakamura, PhD - President and CEO , Ribomic Inc

Modulation of Lymphocyte Potassium Channel KV1.3 by Membrane-penetrating, Joint-targeting Immunomodulatory Plant Defensin

15:45 - 16:15
Peptide Discovery and Development

We describe a cysteine-rich, membrane-penetrating, joint-targeting, and remarkably stable peptide, EgK5, that modulates voltage-gated KV1.3 potassium channels in T lymphocytes by a distinctive mechanism. EgK5 enters plasma membranes and binds to KV1.3, causing current rundown by a phosphatidylinositol 4,5-bisphosphate-dependent mechanism. EgK5 exhibits selectivity for KV1.3 over other channels, receptors, transporters, and enzymes. EgK5 suppresses antigen-triggered proliferation of effector memory T cells, a subset enriched amongst pathogenic autoreactive T cells in autoimmune disease. PET-CT imaging with 18F-labeled EgK5 shows accumulation of the peptide in large and small joints of rodents. In keeping with its arthrotropism, EgK5 treats disease in a rat model of rheumatoid dermatitis. It was also effective in treating disease in a rat model of atopic dermatitis. No signs of toxicity are observed at 10-100 times the in vivo dose. EgK5 shows promise for clinical development as a therapeutic for autoimmune diseases.

Participants

Michael Pennington, PhD - Chief Scientific Officer , AmbioPharm, Inc.

Therapeutic Development Using Chemically Modified Asymmetric siRNAs

16:15 - 16:45
Oligonucleotide Discovery and Development

RNA interference (RNAi)-based gene silencing has become the 3rd therapeutic development platform with multiple FDA-approved RNAi drugs on market. OliX's asymmetric siRNA (asiRNA) triggers efficient target gene silencing with reduced non-specific effects. OliX Pharmaceuticals has developed lipid-conjugated cp-asiRNA for local administration therapeutics, and GalNAc-asiRNA for liver targeting therapeutics. I will describe OliX Pharmaceuticals' pre-clinical and clinical developments against various disease indications including (1) local administration therapeutics such as skin scar, androgenic alopecia, and age-related macular degeneration, (2) liver therapeutics such as hepatitis B virus (HBV), non-alcoholic steatohepatitis (NASH), and diabetes.

Participants

Dong-Ki Lee, PhD - CEO , OliX Pharmaceuticals

Immunogenicity of Therapeutic Proteins: Thirty Years of Lessons from a Regulatory Perspective

16:15 - 16:45
Peptide Discovery and Development

Immunogenicity of protein therapeutics was not well appreciated in the early stages of development of therapeutic proteins and led to failure to develop lifesaving or highly effective therapeutics or, following approval, to serious safety issues as well as tragic loss of efficacy. From 30 years of experience at the FDA, this seminar will highlight key examples that have spurred development of immunogenicity guidances to better assure that lifesaving, and highly effective therapeutic proteins remain safe and effective. The seminar will also highlight immunogenicity risk assessment tools and mitigation strategies to better ensure robust development of novel therapeutic proteins addressing unmet medical need.

Participants

Amy Rosenberg, MD - Senior Director, Immunology and Protein Therapeutics , EpiVax Inc.

SCHEDULE

DAY 3 - 09/03/2023

TIME	PLENARY SESSION: DELIVERY STRATEGIES FOR MACROMOLECULES	OLIGONUCLEOTIDE DISCOVERY AND DEVELOPMENT	OLIGONUCLEOTIDE DELIVERY, DEVELOPMENT AND REGULATORY	PEPTIDE DISCOVERY AND DEVELOPMENT
08:00	**08:40** - Chairperson's Remarks **08:45** - Silence Therapeutics' mRNAi GOLD™ Platform and Development of an siRNA Targeting Lipoprotein(a) for Cardiovascular Disease **08:00** - Registration and Coffee	**08:00** - Registration and Coffee	**08:00** - Registration and Coffee	**08:00** - Registration and Coffee
09:00	**09:15** - Heteroduplex Technology of Decreased CNS Toxicity and Improved Potency of Antisense Oligonucleotide by ICV/IT Injection **09:45** - Use of Next Generation AAVs to Target Specific Cell types in the CNS or Nanoparticles to Enhance Drug delivery into the CNS			
10:00	**10:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**10:55** - Chairperson's Remarks **10:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**10:55** - Chairperson's Remarks **10:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**10:15** - Networking Refreshment Break with Poster and Exhibit Viewing
11:00		**11:00** - An Efficient, Modular and Scalable Mitochondrial Delivery Vector System for RNA and DNA **11:30** - Conjugation of Chemical Handles and Functional Moieties to DNA during Solid Phase Synthesis with Sulfonyl Azides	**11:00** - Tuning Lipid Nanoparticles for Specific Applications **11:30** - Biodegradable Silica Based Delivery of RNA Therapeutics	
12:00	**12:30** - Networking Luncheon with Poster and Exhibit Viewing	**12:00** - Recent Progress of Luxna's Chemistry Platform for Antisense Oligonucleotide Therapeutics **12:30** - Networking Luncheon with Poster and Exhibit Viewing	**12:00** - TBA **12:30** - Networking Luncheon with Poster and Exhibit Viewing	**12:30** - Networking Luncheon with Poster and Exhibit Viewing

SCHEDULE

DAY 3 - 09/03/2023

TIME	PLENARY SESSION: DELIVERY STRATEGIES FOR MACROMOLECULES	OLIGONUCLEOTIDE DISCOVERY AND DEVELOPMENT	OLIGONUCLEOTIDE DELIVERY, DEVELOPMENT AND REGULATORY	PEPTIDE DISCOVERY AND DEVELOPMENT
13:00		**13:40** - Chairperson's Remarks **13:45** - Impact of Guanidine-containing Backbone Linkages on Oligonucleotide Silencing, Splicing and RNA Base Editing Modalities		**13:40** - Chairperson's Remarks **13:45** - The Potential and Current Application of Artificial Intelligence in Peptide Drug Discovery
14:00		**14:15** - Chemical Approaches for Improving Properties of RNA Therapeutics **14:45** - mxRNA™: Miniaturized RNAi Triggers Composed Of Single Oligonucleotides		**14:15** - Genetically-encoded Discovery of Macrocyclic and Bicyclic Inhibitors for Difficult-to-Drug Targets **14:45** - Bicycles – A Versatile Drug Modality for Precision-guided Therapeutics
15:00	**15:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**15:45** - Anti-FGF2 Aptamer Therapy for Wet Age-Related Macular Degeneration and Achondroplasia **15:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**15:15** - Networking Refreshment Break with Poster and Exhibit Viewing	**15:45** - Modulation of Lymphocyte Potassium Channel KV1.3 by Membrane-penetrating, Joint-targeting Immunomodulatory Plant Defensin **15:15** - Networking Refreshment Break with Poster and Exhibit Viewing
16:00		**16:15** - Therapeutic Development Using Chemically Modified Asymmetric siRNAs		**16:15** - Immunogenicity of Therapeutic Proteins: Thirty Years of Lessons from a Regulatory Perspective