

Program

Sunday, 26 August

- 15:00 Registration Opens
- 18:00 Opening
Chris Meier
- 18:05 Jean-Louis Imbach: In Memoriam
Jean-Jacques Vasseur
- 18:10 Keynote Lecture
Introduction: Ulrich Mueller
Gerald Joyce, Salk Institute, USA
RNA-Targeted drug discovery

19:00 RECEPTION

Kindly sponsored by TriLink Biotechnologies



Monday, 27 August

8:00 CONTINENTAL BREAKFAST

Session 1

Session Chair: **Natasha Paul**

- 8:30 Invited Lecture (IL1)
Suzanne Peyrottes, Institut des Biomolécules Max Mousseron, France
One-Pot synthesis of nucleotides in water-medium
- 9:00 Invited Lecture (IL2)
Troels Koch, Roche Innovation Center Copenhagen, Denmark
Stereodefined LNA phosphorothioates: Design, synthesis and properties
- 9:30 Oral Presentation (OP1)
Olivia Schmidt, University of Zurich, Switzerland
Metallo base pair mediates dynamic isomerization of a duplex DNA
- 9:50 Oral Presentation (OP2)
Akira Ono, Kanagawa University, Japan
Preparations and structure elucidations of metallo-DNAs: DNA nanowire with uninterrupted one-dimensional silver ion array

10:10 COFFEE BREAK

Session 2

Session Chair: Masad Damha

- 10:40 Award Lecture (**AW1**)
Michael Sofia, Arbutus Biopharma Corporation, USA
Viral hepatitis: the search for a cure
- 11:20 Invited Lecture (**IL3**)
Charles McKenna, University of Southern California, USA
DNA polymerases: mechanistic insights from designed substrate analogues
- 11:50 Oral Presentation (**OP3**)
Stéphane Bogen, Merck & Company, USA
Design and optimization of novel nucleoside prodrug clinical candidates for the treatment of HCV – Impact on metabolism and delivery to target tissue

12:10 LUNCH BREAK

Session 3

Session Chair: Sergei Gryaznov

- 13:20 Invited Lecture (**IL4**)
Joanna Kowalska, University of Warsaw, Poland
Phosphate-modified nucleotides as molecular tools for probing and modulating protein activity
- 13:50 Invited Lecture (**IL5**)
Luigi Agrofoglio, University of Orleans, France
Overview of (E)-4-phosphono-but-2-en-1-yl acyclic nucleosides – synthesis and antiviral activity
- 14:20 Oral Presentation (**OP4**)
Rakesh Veedu, Murdoch University, Australia
Novel chemically modified oligonucleotides as potential molecules for precision therapy of neuromuscular diseases
- 14:40 Oral Presentation (**OP5**)
Christelle Dupouy, University of Montpellier, France
RNA hairpin-duplex conversion controlled by a reduction-responsive 2',2'-disulfide-bridged dinucleotide

15:00 COFFEE BREAK

Session 4**Session Chair: Byron Purse**15:30 Oral Presentation (**OP6**)**Mattias Bood**, Gothenburg University, Sweden*Emissive quadra- and pentacyclic adenine derivatives*15:50 Oral Presentation (**OP7**)**Takehiko Wada**, Tohoku University, Japan*Remarkable enhancement of RNaseH cleavage activities of RNA complexed with peptide ribonucleic acid (PRNA)—Novel backbone modification strategy for nuclease cleavage activity improvements***16:10 POSTER SESSION****17:00 BEER GARDEN**

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**Tuesday, 28 August****8:00 CONTINENTAL BREAKFAST****Session 5****Session Chair: Steven Dowdy**8:30 Invited Lecture (**IL6**)**Punit Seth**, Ionis Pharmaceuticals, USA*Engineering selectivity into therapeutic oligonucleotides through chemical design*9:00 Invited Lecture (**IL7**)**Muthiah Manoharan**, Alnylam Pharmaceuticals, USA*RNAi for human therapeutics: the end of the beginning*9:30 Oral Presentation (**OP8**)**Erik Rozners**, Binghamton University, SUNY, USA*Amide-modified RNA: synthesis, structure and RNAi activity*9:50 Oral Presentation (**OP9**)**David Perrin**, University of British Columbia, Canada*Chemically modified DNazymes as sequence-specific ribonuclease-A mimics – From potential therapeutics to the origin of life***10:10 COFFEE BREAK**

Session 6

Session Chair: Tammy Dwyer

10:40 Invited Lecture (IL8)

Claudia Höbartner, Universität Würzburg, Germany

DNA catalysts and RNA aptamers for synthesis and analysis of modified RNA

11:10 Oral Presentation (OP10)

Amanda Garner, University of Michigan, USA

High-throughput platform assay technology for the discovery of pre-microRNA-selective small molecule probes

11:30 Oral Presentation (OP11)

Daniel O'Reilly, McGill University, Canada

Synergistic effects of DNA-like and RNA-like modifications in antisense oligonucleotides

11:50 Oral Presentation (OP12)

Pawan Kumar, Alnylam Pharmaceuticals, USA

Passenger strand carrying morpholino moiety at the 5' end improves guide strand selection and RNAi activity

12:10 LUNCH BREAK

Session 7

Session Chair: Barbara Nawrot

13:20 Invited Lecture (IL9)

Amanda Bryant-Friedrich, University of Toledo, USA

Oxidative damage at a modified ribonucleic acid

13:50 Invited Lecture (IL10)

Izzat Raheem, Merck & Company, USA

HIV nucleoside reverse transcriptase translocation inhibitors (NRTTIs) for extended duration dosing

14:20 Oral Presentation (OP13)

Mélanie Etheve-Quelquejeu, University of Paris Descartes, France

Post-functionalization of RNAs for specific conjugations with peptides and proteins

14:40 Oral Presentation (OP14)

Stefan Vogel, University of Southern Denmark, Denmark

DNA and PNA programmed fusion of Lipid-Nanoreactors

15:00 COFFEE BREAK

Session 8

Session Chair: Anil Kore

- 15:30 Oral Presentation (**OP15**)
Ozlem Yaren, Foundation for Applied Molecular Evolution, USA
A multiplexed isothermal amplification platform to detect emerging pathogens
- 15:50 Oral Presentation (**OP16**)
Christian Ducho, Saarland University, Germany
Nucleoside antibiotics targeting bacterial peptidoglycan biosynthesis

16:10 **POSTER SESSION (with drinks and snacks)**

Wednesday, 29 August

8:00 **CONTINENTAL BREAKFAST**

Session 9

Session Chair: Neal Devaraj

- 8:30 Invited Lecture (**IL11**)
Shana Sturla, ETH Zurich, Switzerland
Finding the genomic Achilles' heel with chemistry arrows
- 9:00 Invited Lecture (**IL12**)
Hiroshi Sugiyama, Kyoto University, Japan
Chemical biology of nucleic acids: DNA origami and artificial genetic switch
- 9:30 Oral Presentation (**OP17**)
Dong Wang, University of California, San Diego, USA
Transcriptional recognition principles of naturally and synthetic modified nucleic acids: from natural biology to synthetic biology
- 9:50 Oral Presentation (**OP18**)
Marcel Hollenstein, Institut Pasteur, France
Expansion of the genetic code through the enzymatic construction of artificial metal base pairs

10:10 **COFFEE BREAK**

Session 10

Session Chair: Piet Herdewijn

- 10:40 Awards Lecture (**AW2**)
Naoki Sugimoto, Konan University, Japan
Noncanonical world of nucleic acids under molecular crowding: To B or not to B
- 11:20 Invited Lecture (**IL13**)
Andreas Marx, University of Konstanz, Germany
Elucidating the information layer beyond the genome sequence
- 11:50 Oral Presentation (**OP19**)
Serge Beaucage, Center for Drug Evaluation and Research, FDA, USA
Solid-phase purification of synthetic DNA sequences

12:10 LUNCH BREAK

Session 11

Session Chair: Katherine Seley-Radtke

- 13:20 Invited Lecture (**IL14**)
Yves Mély, University of Strasbourg, France
Characterization of an environment sensitive nucleoside analogue, thienoguanosine, and its application for monitoring base flipping
- 13:50 **Chu Awards**
- 14:20 Oral Presentation (**OP20**)
Maksim Royzen, University at Albany, USA
Controlled in-cell activation of siRNA using biorthogonal chemistry
- 14:40 Oral Presentation (**OP21**)
Alexandre Lebedev, TriLink Biotechnologies, USA
Efficient initiation of in vitro mRNA transcription with Cap 0, Cap 1 and Cap 2 oligonucleotide primers

15:00 COFFEE BREAK

Session 12**Session Chair: Frank Seela**

- 15:30 Oral Presentation (**OP22**)
Jussara Amato, University of Naples Federico II, Italy
Development and application of high throughput screening methods for the identification of conformation-selective nucleic acids ligands
- 15:50 Oral Presentation (**OP23**)
David Horning, Salk Institute, USA
Toward RNA life: Synthesis and replication of RNA by RNA
- 16:10 Oral Presentation (**OP24**)
Jesper Wengel, University of Southern Denmark, Denmark
Novel DNA-mimicking monomers for gapmer antisense oligonucleotides

18:00 GALA BANQUET AT BIRCH AQUARIUM

- 19:30 Poster Awards
 Kindly sponsored by ChemGenes

**Thursday, 30 August****8:00 CONTINENTAL BREAKFAST****Session 13****Session Chair: Daniela Montesarchio**

- 8:30 Invited Lecture (**IL15**)
Steven Benner, Foundation for Applied Molecular Evolution, USA
Darwinism from artificial genetic systems
- 9:00 Invited Lecture (**IL16**)
Ichiro Hirao, Institute of Bioengineering and Nanotechnology, A*STAR, Singapore
High-affinity and high-stability DNA aptamer generation using genetic alphabet expansion for SELEX (ExSELEX) and extraordinarily stable mini-hairpin technology
- 9:30 Oral Presentation (**OP25**)
Nicholas Hud, Georgia Institute of Technology, USA
Glycosylation of model proto-RNA nucleobases with various sugars: Implications for the prebiotic synthesis of nucleosides
- 9:50 Oral Presentation (**OP26**)
John Chaput, University of California, Irvine, USA
Structural basis for TNA synthesis by an evolved TNA polymerase

10:10 COFFEE BREAK

Session 14

Session Chair: Roger Strömberg

10:40 Invited Lecture (**IL17**)

William Lee, Gilead Sciences, USA

Remdesivir (GS-5734): An antiviral nucleotide analog for the treatment of Ebola virus

11:10 Short Oral Poster Presentations (TBA)

11:50 Closing, Next IRT, Announcements

12:00 LUNCH TO GO

Poster abstracts may be found online at <http://irt2018.ucsd.edu/>