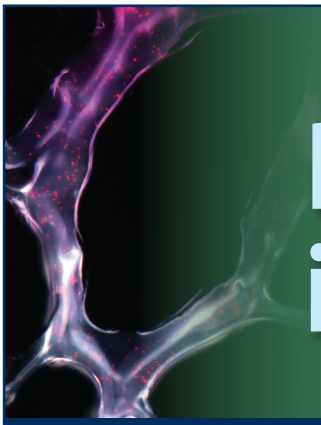

RNA-Based Approaches in Cardiovascular Disease

March 26–30, 2017 | Keystone Conference Center | Keystone, Colorado | USA

Scientific Organizers:
Thomas Thum, Medical School Hannover, Germany
Roger J. Hajjar, Mount Sinai School of Medicine, USA

Joint with the meeting on ***Molecular Mechanisms of Heart Development***

Cardiac diseases are the leading cause of death worldwide. RNA-based mechanisms and therapeutic approaches are emerging fields in cardiovascular science. This meeting will present and discuss latest developments using both coding RNA and noncoding RNA (such as microRNAs, long noncoding RNAs and circular RNAs) -based approaches to better understand and develop new therapeutic strategies for cardiac diseases. Attendees will benefit from workshops, specific sessions and industrial perspectives covering everything from basic science to clinical translation employing RNA therapeutics in cardiovascular medicine.

Session Topics:
- Common RNA-Based Mechanisms in Cardiovascular Development and Pathology (Joint)
- Workshop 1: Basic and Novel Tools for RNA Research
- Fundamentals in RNA Diagnostics and Paracrine Effects
- Noncoding RNA Therapeutics: What Have We Learned?
- Novel Approaches in RNA Detection and Networks
- Noncoding RNAs Going Looooong…
- Preclinical Approaches Using RNA Therapeutics
- Mechanisms of Cardiovascular Regeneration (Joint)
- Workshop 2: Cardiovascular Repair Mechanisms (Joint)
- RNA Therapeutics in Clinical Translation

***Scholarship Application & Discounted Abstract Deadline:* November 30, 2016**
***Abstract Deadline:* December 11, 2016**
***Discounted Registration Deadline:* January 26, 2017**

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted.

Upper image of miRNA courtesy of National Cancer Institute, NIH / Koch Institute for Integrative Cancer Research at MIT

Meeting Hashtag: #KSrnacardio

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KEYSTONE SYMPOSIA
on Molecular and Cellular Biology

RNA-Based Approaches in Cardiovascular Disease (X8)

Scientific Organizers: Thomas Thum and Roger J. Hajjar

Sponsored by AstraZeneca

Molecular Mechanisms of Heart Development (X7)

Scientific Organizers: Benoit G. Bruneau, Brian L. Black and Margaret E. Buckingham

March 26-30, 2017 • Keystone Resort • Keystone, Colorado, USA

Supported by the Directors' Fund

Abstract & Scholarship Deadline: November 30, 2016 / Abstract Deadline: January 11, 2017 / Discounted Registration Deadline: January 26, 2017

SUNDAY, MARCH 26

Arrival and Registration

MONDAY, MARCH 27

Welcome and Keynote Address (Joint)

*__Benoit G. Bruneau__, Gladstone Institute of Cardiovascular Disease, USA

*__Thomas Thum__, Medical School Hannover, Germany

Eric N. Olson, University of Texas Southwestern Medical Center, USA
Following the Heart

Common RNA-Based Mechanisms in Cardiovascular Development and Pathology (Joint)

*__Benoit G. Bruneau__, Gladstone Institute of Cardiovascular Disease, USA

*__Thomas Thum__, Medical School Hannover, Germany

Stefanie Dimmeler, University of Frankfurt, Germany
Non-coding RNAs in Cardiovascular Repair and Aging

William C. Sessa, Yale University School of Medicine, USA
Vascular Therapeutics Approaches using miRNAs

Laurie A. Boyer, Massachusetts Institute of Technology, USA
Long Noncoding RNAs in Heart Development and Differentiation

Tilman Ziegler, Klinikum rechts der Isar der TU München, Germany
Short Talk: LNA Mediated Inhibition of miR-132 Prevents Hypertrophy Induced Cardiomyopathy in Pigs

Workshop 1: Basic and Novel Tools for RNA Research (X8)

*__Carlos Fernandez-Hernando__, Yale School of Medicine, USA

*__Leon Johannes De Windt__, Maastricht University, Netherlands

Esther E. Creemers, Academic Medical Center, Netherlands
Circular RNA Profiling and Implications for Cardiac Disease

Mark Mercola, Stanford University, USA
High Throughput Screening as a Massive Omics Approach to Understand the Heart

Lior Zangi, Icahn School of Medicine at Mount Sinai, USA
Gene Therapy Approach for Cardiac Regeneration using Modified mRNA

Cristina Espinosa-Diez, Oregon Health and Science University, USA
A MicroRNA Regulated Incoherent Feedforward Loop Drives Vascular Senescence

Workshop 1: Gene Regulatory Mechanisms (X7)

*__Eric Small__, University of Rochester, USA

Nicole Schlüßler, Goethe University Frankfurt, Germany
A LncRNA Locus in the Genomic Region of Hand2 is Essential for Cardiac Development

Alexandre R. Colas, Sanford-Burnham Medical Research Institute, USA
Id Genes Are Essential For Early Heart Formation

Sunil K. Verma, University of Texas Medical Branch, USA
Role of the RNA Binding Protein Rbfox2 in Hypoplastic Left Heart Syndrome

Christian Mosimann, University of Zürich, Switzerland
An Ancient Regulatory Program Controls the Emergence of Cardiogenic Lateral Plate Mesoderm

Li Qian, University of North Carolina at Chapel Hill, USA
Single Cell Transcriptomics Reveals a Deterministic Trajectory of Cell Fate Conversion during Direct Cardiac Reprogramming

Min Zhang, Shanghai Children's Medical Center, China
Atrial Fibrillation-Associated Functional Element Regulates Pitx2 Expression via CTCF-Mediated Long-Range Interaction

Fundamentals in RNA Diagnostics and Paracrine Effects (X8)

*__Manuel Mayr__, King's College, University of London, UK

*__Susmita Sahoo__, Icahn School of Medicine at Mount Sinai, USA

Carlos Fernandez-Hernando, Yale School of Medicine, USA
Noncoding RNAs as Paracrine Players in Vascular Inflammation and Lipid Metabolism

Denise Hilfiker-Kleiner, Medizinische Hochschule Hannover, Germany
Pathophysiology of Peripartum Cardiomyopathy Links Prolactin to the PAI-1/uPAR System: Modulation of NF-kB Signaling and miR146a as Therapeutic Options

Paula da Costa Martins, Maastricht University, Netherlands
Short Talk: Cardiomyocyte-Derived Exosomes Mediate Pathological Cardiac Microvascular Remodeling

Yuri D'Alessandra, Centro Cardiologico Monzino, Italy
Short Talk: Circulating MicroRNAs as Biomarkers of Long-Term Doxorubicin-Induced Cardiotoxicity

Stefanie Novakowski, University of British Columbia, Canada
Short Talk: Engineering Platelets for the Delivery of RNA

Christa L. Trexler, University of Colorado Boulder, USA
Short Talk: Cardiomyocyte Function and Gene Expression are Influenced by Biological Sex

Cardiac Lineages (X7)

*__Kristy Red-Horse__, Stanford University, USA

Margaret E. Buckingham, Institut Pasteur, France
Cardiac Cell Lineages and the Second Heart Field

Lionel Christiaen, New York University, USA
Regulation of Cardiopharyngeal Multipotency and Early Fate Specification in a Simple Chordate

Caroline E. Burns, Harvard Medical School, Massachusetts General Hospital, USA
Development of the Cardiopharyngeal Lineage in Zebrafish

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Nicole Dubois, Icahn School of Medicine at Mount Sinai, USA
Short Talk: Foxa2 Marks a Ventricular Progenitor Population during Heart Development

Poster Session 1

TUESDAY, MARCH 28

Keynote Address (X8)

*__Roger J. Hajjar__, Mount Sinai School of Medicine, USA

*__Gerald W. Dorn, II__, Washington University School of Medicine, USA

Manuel Mayr, King's College, University of London, UK
A Systems Biology Approach: Circulating Noncoding RNAs as Innovative Diagnostic and Prognostic Markers of Cardiovascular Disease

Noncoding RNA Therapeutics: What Have We Learned? (X8)

*__Roger J. Hajjar__, Mount Sinai School of Medicine, USA

*__Gerald W. Dorn, II__, Washington University School of Medicine, USA

Susmita Sahoo, Icahn School of Medicine at Mount Sinai, USA
Exosomes as a Diagnostic and Therapeutic Tool in Cardiovascular Disease

Eva van Rooij, Hubrecht Institute, Netherlands
Advances in Targeting miRNAs in the Heart

Gianluigi Condorelli, Humanitas University, Italy
Chheaf1: A Novel lncRNA Regulating Cardiac Hypertrophy and Failure

Elizabeth M. McNally, Northwestern University, USA
Targeting Muscular Dystrophy

Robin Verjans, Maastricht University, Netherlands
Short Talk: Downregulation of the microRNA-221/222 Family Upon Heart Failure Contributes to Adverse Cardiac Fibrotic Remodeling

Christine Wahlquist, Stanford University, USA
Short Talk: Modulation of Cardiomyocyte Physiology by Stretch-Induced miRNAs

Epicardium and Coronaries (X7)

*__Kelly Smith__, University of Queensland, Australia

Kristy Red-Horse, Stanford University, USA
Cell Fate Decisions during Coronary Artery Development

Kenneth D. Poss, Duke University Medical Center, USA
Cardiac Regeneration

Bin Zhou, Albert Einstein College of Medicine, USA
Developmental Mechanisms of Coronary Artery Formation

Paul R. Riley, University of Oxford, UK
Developmental Programming of the Cardiac Lymphatics

Michael A. Trembley, University of Rochester Medical Center, USA
Short Talk: Novel Mechanisms of Epicardial-Derived Cell Mobilization

Novel Approaches in RNA Detection and Networks (X8)

*__Gianluigi Condorelli__, Humanitas University, Italy

*__Christian Kupatt__, Technical University Munich, Germany

Stefan Engelhardt, Institut for Pharmacologie & Toxicologie der TUM, Germany
Approaches to Identify Crucial miRNA Mechanisms of Action

Arthur A. Levin, Avidity Biosciences, USA
Toxicological Considerations in Oligonucleotide Therapeutics Development

Anne Katrine Johansen, Hubrecht Institute, Netherlands
Short Talk: CRISPR/Cas9-based Postnatal Gene Editing to Study Cardiac Gene Function in vivo

Prabhu Mathiyalagan, Icahn School of Medicine at Mount Sinai, USA
Short Talk: Dynamic Regulation of m6A RNA methylation is a Novel Remodeling Mechanism of the Ischemic Heart

Gene Regulatory Mechanisms (X7)

*__Laurie A. Boyer__, Massachusetts Institute of Technology, USA

Vincent M. Christoffels, Academic Medical Center, Netherlands
Transcriptional Regulation of the Electrical Activity Pattern of the Heart

Benoit G. Bruneau, Gladstone Institute of Cardiovascular Disease, USA
Transcriptional Regulation of Heart Development

Brian L. Black, University of California, San Francisco, USA
Cooperative Activation of Cardiac Transcription through Myocardin Bridging of Paired MEF2 Sites

Rangarajan Nadadur, University of Chicago, USA
Short Talk: Differential Enhancer Transcription Defines a Disease-Associated Gene Regulatory Network

Poster Session 2

WEDNESDAY, MARCH 29

Non-Coding RNAs Going Looooong…. (X8)

*__Stefan Engelhardt__, Institut for Pharmacologie & Toxicologie der TUM, Germany

Gerald W. Dorn, II, Washington University School of Medicine, USA
Orchestration of Smoothened/Hedgehog/GATA Transcriptional Activity by GRKs 2, 5, and 6 in Developing Mouse Hearts

Yibin Wang, University of California, Los Angeles, David Geffen School of Medicine, USA
A lncRNA-Dependent Epigenetic Check-Point for Cardiac Hypertrophy and Remodeling

Thomas Thum, Medical School Hannover, Germany
lncRNAs in Cardiac Remodeling

Venkata Naga Srikanth Garikipati, Temple University, USA
Short Talk: Long Noncoding Circular RNA mmu_circ_008396 Modulates Cardiac Repair After Myocardial Infarction

Da-Zhi Wang, Children's Hospital Boston, USA
Short Talk: Genome-Wide Identification and Characterization of Cardiac Hypertrophy-Related Long Noncoding RNAs

Samir Ounzain, University of Lausanne, Switzerland
Short Talk: Transposable Elements Contribute to the Functional and Regulatory Characteristics of Cardiovascular lncRNAs

Congenital Heart Disease: Genes and Pathways (X7)

*__Vincent M. Christoffels__, Academic Medical Center, Netherlands

Christine E. Seidman, Harvard Medical School, USA
Steps and Missteps in Building the Heart

Ivan P. Moskowitz, University of Chicago, USA
A Timing Switch for Cardiac Progenitor Differentiation

William T. Pu, Children's Hospital, Harvard Medical School, USA
iPSC-CM Models of Congenital Heart Disease

Richard P. Harvey, University of New South Wales, Victor Chang Cardiac Research Institute, Australia
Transcriptional Targets and Off-Targets in Congenital Heart Disease

Zhe Han, Children's National Medical Center, USA
Short Talk: High Throughput in vivo Functional Validation of Candidate Congenital Heart Disease Genes in Drosophila

Preclinical Approaches Using RNA Therapeutics (X8)

*__Yibin Wang__, University of California, Los Angeles, David Geffen School of Medicine, USA

*__Patrick Most__, University of Heidelberg, Germany

Rusty Montgomery, miRagen Therapeutics, Inc., USA
Pharmacokinetic/Dynamic Aspects of Oligonucleotide Therapeutics

Christian Kupatt, Technical University Munich, Germany
Micro-RNAs based Therapeutics in Porcine Cardiac Disease Models

Rabea Hinkel, Klinikum rechts der Isar, TUM, Germany
Short Talk: Cardio-Protective Potential of miR-92a Inhibition in Myocardial Ischemia

Dongtak Jeong, Ichan School of Medicine at Mount Sinai, USA
Short Talk: AAV9 miR-25 Tough Decoy Transfer Improves Cardiac Function in HF and Aged MDX/UTRN KO Mice

Adam E. Mullick, Ionis Pharmaceuticals, Inc., USA
Short Talk: Characterization of Cardiac Gen 2.5 Antisense Oligonucleotide Activity

Deepak Prabhu Ramanujam, Institute of Pharmakologie und Toxikologie, Technische Universitaet Muenchen, Germany
Short Talk: Inhibition of microRNA-21 Prevents Myocardial Remodeling in a Pig Model of Ischemia/Reperfusion Injury

Mechanisms of Cardiac Growth and Morphogenesis (X7)

*__Caroline E. Burns__, Harvard Medical School, Massachusetts General Hospital, USA

Anthony B. Firulli, Wells Center for Pediatrics Research, USA
Characterization of a Hand1 Left Ventricular Enhancer and Development of a Left Ventricular Specific Cre Driver

Katherine E. Yutzey, Cincinnati Children's Hospital Medical Center, USA
Developmental Mechanisms of Heart Valve Disease

James F. Martin, Baylor College of Medicine, USA
The Hippo Pathway in Heart Development and Regeneration

Daniela Panakova, Max Delbrück Center for Molecular Medicine, Germany
Short Talk: Planar Cell Polarity Pathway Links Mechanosensitive Feedback between Cardiac Remodeling and Muscle Differentiation

Poster Session 3

THURSDAY, MARCH 30

Mechanisms of Cardiovascular Regeneration (Joint)

*__Mauro Giacca__, International Center for Genetic Engineering, Italy

Deepak Srivastava, Gladstone Institute of Cardiovascular Disease and University of California, San Francisco, USA
Cellular Reprogramming Approaches for Cardiovascular Disease

Nadia Mercader, Institut of Anatomy, University of Bern, Switzerland
Plasticity of Cardiomyocyte Fate during Heart Regeneration in Zebrafish

Leon Johannes De Windt, Maastricht University, Netherlands
Fetal miRNAs Play Large at Heart Failure

Andrew H. Baker, University of Edinburgh, UK
Non Coding RNA Therapeutics in Cardiovascular Pathophysiology

Chen Gao, University of California, Los Angeles, USA
Short Talk: Cytosolic RBFox1 In Cardiac Fibrosis Regulation

Workshop 2: Cardiovascular Repair Mechanisms (Joint)

*__Masaki Ieda__, Keio University School of Medicine, Japan

*__Eva van Rooij__, Hubrecht Institute, Netherlands

Monika M. Gladka, Hubrecht Institute, Netherlands
Zeb2 Protects the Heart from Ischemic Damage

Ajit Magadum, Icahn School of Medicine, Mount Sinai Hospital, USA
Cardiomyocyte-Specific Expression of Cell Cycle Inducer modRNA Induces Cardiac Regeneration

Shin Watanabe, Icahn School of Medicine at Mount Sinai, USA
miR-146a Regulates Cardiac Function by Targeting SUMO1/SERCA2a Pathway

Lina A. Shehadeh, University of Miami Miller School of Medicine, USA
Osteopontin RNA Aptamer Can Prevent and Reverse Pressure Overload-Induced Heart Failure

C. Geoffrey Burns, Harvard Medical School, Massachusetts General Hospital, USA
Cardiomyocyte Polyploidization Creates a Barrier to Heart Regeneration in Zebrafish

Honghai Liu, Children's Hospital of Pittsburgh of UPMC, USA
Repression of Epithelial Cell Transforming 2 (Ect2) Induces Binucleation of Cardiomyocytes

Thomas J. Cahill, University of Oxford, UK
Macrophages Activate Distinct Programs of Regeneration and Scar Formation to Direct Repair following Myocardial Infarction

Hamid el Azzouzi, Maastricht University, Netherlands
Targeted Deletion of ADAR1 in the Adult Heart Causes Severe Cardiac Dysfunction and Increased Lethality

RNA Therapeutics in Clinical Translation (X8)

*__Wolfram Hubertus Zimmermann__, University Medical Center Göttingen, Germany

Roger J. Hajjar, Mount Sinai School of Medicine, USA
Gene Therapy and Genome Editing for Heart Failure

Patrick Most, University of Heidelberg, Germany
Development of Nucleic-Acid Therapeutics for Cardiac and Vascular Disorder Treatment

Mauro Giacca, International Center for Genetic Engineering, Italy
Small RNA Therapy for Cardiac Regeneration

Modeling Human Heart Development (X7)

*__Benoit G. Bruneau__, Gladstone Institute of Cardiovascular Disease, USA

Christine L. Mummery, Leiden University Medical Center, Netherlands
Developmental Patterning of Human Pluripotent Stem Cells: From Beating Cardiomycoytes to Heart Disease Models

Charles E. Murry, University of Washington, USA
Networks Underlying Human Cardiovascular Differentiation

Gordon M. Keller, University Health Network, MaRS Centre, Canada
Modeling Cardiovascular Development with Human Pluripotent Stem Cells

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X8)

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X7)

FRIDAY, MARCH 31

Departure