Angiogenesis is critical to both the growth and repair of tissues as well as for the progression of several pathologies. Progress in our molecular understanding of vascular growth has facilitated the development of therapies that have been successfully applied in diseases such as retinopathy and cancer. Notwithstanding these advancements, much remains to be harnessed from the basic molecular mechanisms that control vascular growth. This conference will bring together leaders of research from basic science, translational science, biotechnology and pharmaceutical areas, to discuss progress in clinical and translational research areas. The goal of the conference is to highlight new discoveries, technological advances and therapeutic possibilities. Both established and up-and-coming investigators will have ample opportunities to interact informally and share views with junior investigators and trainees in a collegial and relaxed atmosphere. By promoting cross-disciplinary interactions, the meeting will enhance vascular biology research and applications to clinical medicine.

Session Topics:

- Metabolism and Disease (Joint)
- Metabolite Signaling in Angiogenesis and Vascular Disease
- Transcriptional Control of Endothelial Fate
- Epigenetic Regulation of Vascular Growth
- Hypoxia Sensing Mechanism and Mitophagy (Joint)
- Vascular Stability and Cell-Cell Interactions
- Organ Specific Vasculature
- Lymphangiogenesis

Scholarship Application & Discounted Abstract Deadline: January 11, 2017
Abstract Deadline: February 8, 2017
Discounted Registration Deadline: March 8, 2017

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted.
MONDAY, MAY 8
Arrival and Registration

TUESDAY, MAY 9
Welcome and Keynote Session (Joint)
* Luisa Iruela-Arispe, University of California, Los Angeles, USA
  Therapeutic Potential of Vascular Growth Factors

Luisa Iruela-Arispe, University of California, Los Angeles, USA

Junichi Sadoshima, Rutgers New Jersey Medical School, USA

Kari K. Alitalo, University of Helsinki, Finland

Therapeutic Potential of Vascular Growth Factors

David C. Chan, California Institute of Technology, USA

Mitochondria Dynamics

Metabolism and Disease (Joint)
Robert E. Gerszten, Beth Israel Deaconess Medical Center, USA

Metabolic Profiles and the Risk of Cardiometabolic Diseases

* Andrew G. Dillin, University of California, Berkeley, USA

Mitochondria Mitokines and Aging

Peter F. Carmeliet, University of Leuven, VIB, Belgium

Angiogenesis Revisited: Role and (Therapeutic) Implications of Endothelial Metabolism

Anup Chowdhury, University of Göttingen, Germany

Short Talk: Oxidative Stress and Altered Mitochondrial Signaling in Barth Syndrome Models

Nicholas Sibinga, Albert Einstein College of Medicine, USA

Short Talk: Control of Mitochondrial Function by Atypical Cadherins

Workshop 1: Current Strategies for Funding Angiogenesis and Vascular Disease Research (Z3)
* Luisa Iruela-Arispe, University of California, Los Angeles, USA

Yunling Gao, NHLBI, National Institutes of Health, USA

Angiogenesis Research: The Extramural Portfolio Supported by the National Heart, Lung, and Blood Institute, 2008-2015

Morris J. Birnbaum, Pfizer Inc., USA

Control of Hepatic Lipid Metabolism

Chris Betsholtz, Uppsala University, Sweden

Pericytes as Regulators of Vascular Stability

J. David Symons, University of Utah, USA

Short Talk: Endothelial Cell Autophagy Maintains Shear-Stress-Induced Nitric Oxide Generation via Glycolysis-Dependent Purinergic Signaling to eNOS

Andreas M. Beyer, Medical College of Wisconsin, USA

Short Talk: Autophagy is a Novel Regulatory Mechanism in the Human Microcirculation

Workshop 1: How to Evaluate Metabolism in the Heart: From the Langendorff Perfusion to Metabolome Analyses (Z4)
* Toren Finkel, University of Pittsburgh, UPMC, USA

Larissa Pfisterer, University of Freiburg, Germany

Regulation of Endothelial Cell Metabolism by Long Noncoding RNA IncRNA2

Jessica M. Pfleger, Temple University, USA

Bioenergetics as a Tool for Assessing Cardiomyocyte Response to β-Adrenergic Stimulation and Insulin Resistance

Paul M. Schumacker, Northwestern University, USA

Mitochondrial Complexes I and III Regulate Cardiomyocyte Proliferation in Adult Mouse Hearts

Junco Shibayama Warren, University of Utah, USA

The Histone Methyltransferase Smyd1 Regulates Mitochondrial Energetics in Cardiomyocytes

Yuan Zhang, University of Iowa, USA

Ketogenic Diet Rescues Cardiac Hypertrophy and Heart Failure Induced by Loss of the Mitochondrial Pyruvate Carrier 1

Dan Shao, University of Washington, USA

Glucose Promotes Cell Growth by Suppressing Branched-Chain Amino Acid Degradation

Metabolite Signaling in Angiogenesis and Vascular Disease (Z3)
* William C. Sessa, Yale University School of Medicine, USA

Morris J. Birnbaum, Pfizer Inc., USA

Control of Hepatic Lipid Metabolism

Chris Betsholtz, Uppsala University, Sweden

Pericytes as Regulators of Vascular Stability

J. David Symons, University of Utah, USA

Short Talk: Endothelial Cell Autophagy Maintains Shear-Stress-Induced Nitric Oxide Generation via Glycolysis-Dependent Purinergic Signaling to eNOS

Andreas M. Beyer, Medical College of Wisconsin, USA

Short Talk: Autophagy is a Novel Regulatory Mechanism in the Human Microcirculation

Mitochondria Quality Control (Z4)
Gerald W. Dorn, II, Washington University School of Medicine, USA

The Cardiomyopathy of Defective Mitochondrial Fusion

* Junichi Sadoshima, Rutgers New Jersey Medical School, USA

Mitophagy in the Heart

R. Luke Wiseman, The Scripps Research Institute, USA

Stress-Responsive Regulation of Mitochondria Inner Membrane Proteostasis

Ana Victoria Lechuga Vieco, Spanish National Center for Cardiovascular Research, Spain

Short Talk: Conflict between Mitochondrial DNA Variants

Poster Session 1

WEDNESDAY, MAY 10

* Session Chair † Invited but not yet accepted  Program current as of January 8, 2019. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/17Z3 and www.keystonesymposia.org/17Z4.
Transcriptional Control of Endothelial Fate (Z3)

*Courtney Griffin*, Oklahoma Medical Research Foundation, USA
William T. Pu, Children's Hospital, Harvard Medical School, USA
Transcriptional and Epigenetic Regulation of Endothelial Gene Expression

Michael Potente, Max Planck Institute for Heart and Lung Research, Germany
EMBO Young Investigator Lecture: Metabolism, Metabolites and Endothelial Plasticity

Brian L. Black, University of California, San Francisco, USA
Identification of Injury- and Regeneration-Responsive Cardiac Endothelium Enhancer Elements

William C. Sessa, Yale University School of Medicine, USA
New Insights into Endothelial Lipid Metabolism

Manu Beerens, Brigham and Women's Hospital, Harvard Medical School, USA
Short Talk: Prdm16 Modifies the Canonical Notch Output to Establish Proper Arterial Development

Akiko Mammoto, Medical College of Wisconsin, USA
Short Talk: YAP1 in Angiogenesis and Lung Regeneration

Autophagy and Metabolism (Z4)

Heidi M. McBride, McGill University, Canada
Emerging Functions of Mitochondrial-Derived Vesicles in Health and Disease.

*Ana Maria Cuervo*, Albert Einstein College of Medicine, USA
Control of Metabolism by Chaperone-Mediated Autophagy

Daniel P. Kelly, University of Pennsylvania, USA
Mitochondrial Remodeling in the Developing and Diseased Heart

E. Dale Abel, University of Iowa, Carver College of Medicine, USA
Myocardial Autophagy and Metabolic Regulation

Helena C. Kenny, University of Iowa, USA
Short Talk: Inducible Deletion of OPA1 Causes Heart Failure in Part by mTOR - Mediated Suppression of Autophagy

Iain Scott, University of Pittsburgh, USA
Short Talk: Acetylation of Mitochondrial Proteins by Gcn5/1 Promotes Enhanced Fatty Acid Oxidation in the Heart

Epigenetic Regulation of Vascular Growth (Z3)

*Brian L. Black*, University of California, San Francisco, USA
Stefanie Dimmelner, University of Frankfurt, Germany
Function of Long Noncoding RNAs in the Regulation of the Vasculature

Philip Tagari, Amgen, Inc., USA
Pharmacological and Genetic Inhibition of Hypoxia-Inducible Factor Prolyl Hydroxylases

Courtney Griffin, Oklahoma Medical Research Foundation, USA
Chromatin Remodeling and Vascular Development

Federico Bussolino, University of Torino, Italy
Short Talk: Transcription Factor EB Regulates VEGFR2 Function

Cell Signaling and Metabolism (Z4)

Pinchas Cohen, University of Southern California, USA
Mitochondrial-Derived Peptides and their Role in Vascular Disease

Xiang-Dong Fu, University of California, San Diego, USA
A Novel Strategy to Inhibit Angiogenesis in Cancer

Arieh Moussaieff, Hebrew University of Jerusalem, Israel
The Metabolic Switch of Cells Exiting Pluripotency

*Lorrie A. Kirshenbaum*, University of Manitoba, Canada
Short Talk: Alternative Spliced Form of Bnip3 Preferentially Interacts with Mitofusion2 and Endoplasmic Reticulum for Cell Survival

Poster Session 2

THURSDAY, MAY 11

Hypoxia Sensing Mechanism and Mitophagy (Joint)

*Stefanie Dimmelner*, University of Frankfurt, Germany
Ása B. Gustafsson, University of California, San Diego, USA
Parkin-Dependent Degradation of Mitochondria by a Rab5 Endosomal Pathway

*Kenneth Walsh*, University of Virginia School of Medicine, USA
Clonal Hematopoiesis and Cardio-metabolic Disease: New Mechanisms, New Therapeutic Opportunities

Marlene Rabinovitch, Stanford University, USA
A BMP-Notch Axis Coordinates Mitochondrial Function, Chromatin Remodeling and Gene Regulation to Regenerate Endothelium in Response to Injury

M. Celeste Simon, University of Pennsylvania, USA
Balancing Cell Growth with Homeostasis in the Tumor Microenvironment

Ivan Menendez-Montes, Fundacion CNIC, Spain
Short Talk: Cardiac HIF/VHL Signaling Regulates Glycolytic and Oxidative Metabolic Programs and Is Essential for Myocardial Maturation during Heart Development

Erin Reineke, Houston Methodist Research Institute, USA
Short Talk: Coordination of Cellular Function by Steroid-Receptor Coactivator 2 in Stress-Induced Cardiac Angiogenesis

* Session Chair † Invited but not yet accepted  Program current as of January 8, 2019. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/17Z3 and www.keystonesymposia.org/17Z4.
Workshop 2: Intracellular Signaling and Vascular Function (Z3)
*George E. Davis*, University of Missouri School of Medicine, USA
Christopher D. Kontos, Duke University Medical Center, USA
Caskin2: A Novel Regulator of Endothelial Cell Quiescence
Qing Robert Miao, Medical College of Wisconsin, USA
Ras Signaling Is Required for Preventing Cerebrovascular Malformation
Sarah J. Parker, Cedars Sinai Medical Center, USA
Proteomics Reveals Context-Dependent Shifts in Mitochondrial Protein Expression and Novel Non-Canonical TGFβ Signaling Activation in the Aorta of Marfan Syndrome Mice
Vivek Venkataramani, University Medical Center Göttingen, Germany
CD31 Expression Determines Redox Status and Chemoresistance in Human Angiosarcomas
Ruowen Ge, National University of Singapore, Singapore
Extracellular Antiangiogenic Proteins Target Mitochondria through a Novel Route of Protein Trafficking via Endocytosis and Direct Endosome-Mitochondrion Fusion

Vascular Stability and Cell-Cell Interactions (Z3)
*Ralf H. Adams*, Max Planck Institute for Molecular Biomedicine, Germany
Harry (Hal) C. Dietz, Johns Hopkins University School of Medicine, USA
TGFbeta in Inherited Vasculopathies: A Matter of Aneurysmic Proportions
George E. Davis, University of Missouri School of Medicine, USA
Molecular Determinants Governing EC-Pericyte Tube Co-Assembly and Stability
Luisa Iruela-Arispe, University of California, Los Angeles, USA
Vascular Stability and Cell-Cell Interactions during Endothelial Regeneration
Arie Horowitz, Thomas Jefferson University, USA
Short Talk: Dynamic Equilibrium of Endothelial Cell Junctions Is Required for Vascular Morphogenesis

Metabolic Regulation of Cell Signaling (Z4)
*Guido Kroemer*, Cordeliers Research Center, France
Metabolic Regulation of Autophagy
Michael N. Sack, NHLBI, National Institutes of Health, USA
Nutrient Sensing, Mitochondria and the Inflammasome
Stephen Y. Chan, University of Pittsburgh School of Medicine, USA
The Emerging Nexus between Matrix Stiffness and Cellular Metabolism in the Diseased Pulmonary Vasculature: New Targets for Treating Pulmonary Hypertension
Jianhua Xiong, NHLBI, National Institutes of Health, USA
Short Talk: Fatty Acid Oxidation Regulates Endothelial Cell Fate

Poster Session 3

FRIDAY, MAY 12

Organ Specific Vasculature (Z3)
*Kathleen M. Caron*, University of North Carolina at Chapel Hill, USA
Ralf H. Adams, Max Planck Institute for Molecular Biomedicine, Germany
Organ-Specific and Functional Specialization of Blood Vessels
Susan Quaggin, Northwestern University, USA
Unique Molecular and Functional Requirements of the Renal Vasculature
Anne C. Eichmann, Yale University School of Medicine, USA
Cross-Talk between Vessels and Nerves
Paul S. Frenette, Albert Einstein College of Medicine, USA
Bone Marrow Vascular Niche
Lisandra Vila Ellis, MD Anderson Cancer Center, USA
Short Talk: Investigating Alveolar Angiogenesis in the Developing Mouse Lung
Ching-Ling Ellen Lien, Saban Research Institute, Children’s Hospital, USA
Short Talk: Coordinated Development of Coronary Vessels, Cortical Cardiomyocytes and Cardiac Lymphatics Supports Heart Morphogenesis and Regeneration

Regulation of mPTP Opening (Z4)
Toren Finkel, University of Pittsburgh, UPMC, USA
Mouse Models of the Mitochondrial Calcium Uniporter Complex
Elizabeth A. Jonas, Yale University, USA
The Mitochondrial Permeability Transition Pore: Molecular Structure and Function in Health and Disease
John W. Elrod, Temple School of Medicine, USA
Mitochondrial Calcium Exchange in Heart Disease
*Jeffery D. Molkentin*, Cincinnati Children’s Hospital Medical Center, USA
Mitochondrial Calcium Regulated by MCU Underlies Skeletal Muscle Adaptation
Amit U. Joshi, Stanford University SOM, USA
Short Talk: Mitochondrial Dynamics in Neurodegeneration in Patient-Derived Cells and in Animal Models
Vivian Werlinger Rodrigues de Moraes, The Scripps Research Institute, USA
Short Talk: PERK Activation Regulates Mitochondrial Quality Control during Endoplasmic Reticulum Stress

Workshop 2: How to Evaluate Mitophagy and Mitochondrial Function in the Cardiovascular System (Z4)
*Åsa B. Gustafsson*, University of California, San Diego, USA
KEYSTONE SYMPOSIA
on Molecular and Cellular Biology

Angiogenesis and Vascular Disease (Z3)
Scientific Organizers: Luisa Iruela-Arispe, Timothy T. Hla and Courtney Griffin
Sponsored by Janssen R&D: Pharmaceutical Companies of Johnson & Johnson and Journal of Molecular Cell Biology (JMCB)

Mitochondria, Metabolism and Heart (Z4)
Scientific Organizers: Junichi Sadoshima, Toren Finkel and Åsa B. Gustafsson
May 8-12, 2017 • Eldorado Hotel & Spa • Santa Fe, New Mexico, USA
Supported by Bayer HealthCare Pharmaceuticals

Brian Glancy, NHLBI and NIAMS, National Institutes of Health, USA
The Mitochondrial Reticulum of the Heart

Knut Lauritzen, Oslo University Hospital, Norway
Impaired Dynamics and Function of Mitochondria Caused by mtDNA Damage Leads to Heart Failure

Xiyuan Lu, University of California, Davis, USA
Mitochondrial Subpopulations and Heterogeneity in Adult Cardiac Myocytes Revealed by Confocal Imaging

Liming Pei, Children's Hospital of Philadelphia/University of Pennsylvania, USA
A Heart-Derived Hormone that Regulates Body Growth

Venkatesh Sundararajan, Rutgers New Jersey Medical School, USA
Mitochondrial Lon Protease Protects the Heart in vivo Against Ischemia-Reperfusion Injury by Reducing Oxidative Damage

Nuo Sun, NHLBI, National Institutes of Health, USA
Measuring Cardiac Mitophagy and the Role of USP30 in Heart Failure

Lymphangiogenesis (Z3)
*Anne C. Eichmann, Yale University School of Medicine, USA
Regulation of Postnatal Lymphatic Vessel Development by Foxc1 and Foxc2

Tsutomu Kume, Northwestern University, USA
Mechanisms of Lymphatic Vessel Specialization

Tatiana V. Petrova, CHUV, University of Lausanne, Switzerland
Lymphatics in Myocardial Injury and Repair

Metabolism and Heart Failure (Z4)
*Richard N. Kitsis, Albert Einstein College of Medicine, USA
Chaperone-Mediated Autophagy in the Regulation of Mitochondrial Function and Heart Failure

Rong Tian, University of Washington, USA
The Signaling Role of Branched Chain Amino Acids

Stephen L. Archer, Queen's University, Canada
Role of Acquired Abnormalities in Mitochondrial Dynamics and the Mitochondrial Calcium Uniporter (MCU) in Pulmonary Hypertension

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Z3)
Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Z4)

SATURDAY, MAY 13