Aging is the greatest risk factor for most human diseases, yet the underlying reasons for this are not clear and hence remain under intense investigation. Mitochondria have long been associated with aging as the cornerstones of the “mitochondrial” and “free radical” theories of aging. However, that the role of mitochondria in aging is simply due to declines in ATP production and increased oxidative stress via reactive oxygen species production is giving way to more complex hypotheses. These are driven by the realization that mitochondria are dynamic and have multiple additional roles in cell and organismal physiology (e.g., signaling and immunity). The goal of this conference is to bring together investigators working at the interface of mitochondria and aging to begin to develop network theories of mitochondrial contributions to aging and age-related diseases that take into account both “old” and “new” functions of mitochondria. Topics covered will include neurodegeneration, cancer, metabolic diseases, inflammation and mitochondrial signaling pathways. This conference is being held jointly with that on “Mitochondrial Biology in Heart and Skeletal Muscle,” allowing in-depth coverage of mitochondria in cardiovascular aging and sarcopenia. It is expected that this conference will facilitate new interactions and collaborations at the interface of aging and mitochondrial biology. This should catalyze new research toward therapies for age-related diseases based on selectively targeting mitochondrial functions and signaling pathways in specific physiological and disease contexts. Workshops will highlight work from exciting new investigators so they can receive constructive feedback and develop new collaborations and research networks.

Session Topics:
- Mitochondria in Cardiovascular Aging and Disease (Joint)
- Workshop 1 (Joint)
- Mitochondrial Quality Control in Aging and Longevity
- Mitochondria in Age-Related Pathology
- Mitochondrial Metabolism in Aging
- Mitochondrial Signaling in Aging
- Mitochondria in Immunity and Inflammation
- Mitochondria in Aging Muscle (Joint)
- Workshop 2 (Joint)
- Mitochondria Dynamics and Aging

Scholarship/Discounted Abstract Deadline: Oct 9, 2018; Abstract Deadline: Oct 17, 2018; Discounted Registration Deadline: Nov 14, 2018

Visit www.keystonesymposia.org/19J2 for more details.
SUNDAY, JANUARY 13
Arrival and Registration

MONDAY, JANUARY 14
Welcome and Keynote Session (Joint)
Andrew G. Dillin, University of California, Berkeley, USA
Mitochondrial Regulation of Longevity
Vamsi K. Mootha, Massachusetts General Hospital, USA
Hypoxia as a Therapy for Mitochondrial Disease

Mitochondria in Cardiovascular Aging and Disease (Joint)
Hesham A. Sadek, University of Texas Southwestern Medical Center, USA
Heart Regeneration via Inhibition of Aerobic Respiration
Zoltan P. Arany, University of Pennsylvania, USA
New Players in Mitophagy
Timothy S. Luongo, University of Pennsylvania, USA
Short Talk: Cardiac Nicotinamide Adenine Dinucleotide Depletion Results in Myocardial Dysfunction Despite Normal or Enhanced Mitochondrial Respiratory Capacity

Workshop (J1)
Helena C. Kenny, University of Iowa, USA
Inducible Deletion of OPA1 in the Heart Induces ER stress that Precedes Mitochondrial and Contractile Dysfunction
Martin Picard, Columbia University, USA
Human Mitochondrial 3D Network Organization and Nanotunnels in mtDNA Disease
Michael J. Jurczak, University of Pittsburgh, USA
SGLT2 Inhibition Restores Mitochondrial Metabolic Flexibility in Heart and is Associated with Reduced Ischemia-Induced Cardiac Injury
Brad Willingham, National Institutes of Health, USA
mitoRACE: In Vivo Assessment of Mitochondrial Function using Multiphoton NADH Fluorescence
Paul J. Wrighton, Brigham and Women’s Hospital, USA
Novel pH-Sensitive Biosensor Zebrafish Enable the in vivo Visualization and Interrogation of Mitophagy during Development and Metabolic Stress
Antonietta Franco, Washington University in St. Louis, USA
Mfn-2 Shape Shifting Mutation Causes Cardiomyopathy
María Concepción Jiménez Gómez, National Center of Cardiovascular Research, Spain
Development of OMA1 Inhibitor to Protect against Heart Failure in Mice

Mitochondrial Quality Control in Aging and Longevity (J2)
Cole M. Haynes, University of Massachusetts Medical School, USA
Mitochondrial UPR in Organisal Homeostasis and Aging
Richard J. Youle, NINDS, National Institutes of Health, USA
Mitophagy and Inflammation during Exercise and Aging
Rong Li, Johns Hopkins University School of Medicine, USA
Mitochondrial Degradation of Cytosolic Proteins by MAGIC
Short Talk(s) Chosen from Abstracts

Skeletal Muscle Mitochondria and Metabolic Regulation (J1)
Anu Suomalainen Wartiovaara, University of Helsinki, Finland
Mitochondrial Myopathies and FGF21
Deborah M. Muoio, Duke University Medical Center, USA
Mitochondrial Acetylation and Skeletal Muscle Metabolism
K. Sreekumaran Nair, Mayo Clinic, USA
Mitochondrial Protein Turnover and Metabolic Regulation
Matthijs K. Hesselink, Maastricht University Medical Center, Netherlands
Short Talk: Day-Night Rhythm in Mitochondrial Network Morphology in Human Skeletal Muscle

Poster Session 1

TUESDAY, JANUARY 15
Mitochondria in Immunity and Inflammation (J2)
Judith Campisi, Buck Institute for Research on Aging, USA
Cellular Senescence, Mitochondrial Function and Aging
Katja Simon, University of Oxford, UK
Autophagy, Mitochondria and Telomeres in Aged Lymphocytes
Michael Karin, University of California, San Diego, USA
Mitochondrial DNA in Macrophage Immune Signaling
Short Talk(s) Chosen from Abstracts

Calcium Signaling in Muscle Mitochondria (J1)
Anna Raffaello, University of Padova, Italy
Role of Mitochondrial Calcium in the Maintenance of Skeletal Muscle Homeostasis
György Hajnóczky, Thomas Jefferson University, USA
Mitochondrial Dynamics and Excitation Contraction Coupling
Toren Finkel, University of Pittsburgh/UPMC, USA
Mitochondrial Calcium Uptake Mechanisms in the Heart
Stefan Feske, New York University School of Medicine, USA
Store Operated Calcium and Mitochondrial Metabolism
Denis Vecellio Reane, University of Padova, Italy
Short Talk: A MICU1 Splice Variant Confers High Sensitivity to the Ca2+ Uptake Machinery of Skeletal Muscle

* Session Chair † Invited but not yet accepted  Program current as of November 15, 2018. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/19J2 and www.keystonesymposia.org/19J1.
**Mitochondria in Aging and Age-Related Disease (J2)**

Scientific Organizers: Gerald S. Shadel and Holly Van Remmen
Sponsored by Astellas Pharma Inc.

**Mitochondrial Biology in Heart and Skeletal Muscle (J1)**

Scientific Organizers: E. Dale Abel and Andrea L. Hevener

January 13-17, 2019 • Keystone Resort • Keystone, Colorado, USA

Supported by the Directors’ Fund

Abstract & Scholarship Deadline: October 9, 2018 / Abstract Deadline: October 17, 2018 / Discounted Registration Deadline: November 14, 2018

---

**Short Talk(s) Chosen from Abstracts**

**Mitochondrial Metabolism in Aging (J2)**

- **Lan Wei-LaPierre**, University of Rochester Medical Center, USA
  - **Short Talk**: Regulation of Mitoflash and pHlash Activity in Skeletal Muscle by Uncoupling Protein 3

- **Luiz H M Bozi**, University of São Paulo, Brazil
  - **Short Talk**: Inhibition of mitochondrial unfolded protein response (mtUPR) mediates doxorubicin-induced cardiotoxicity

**Mitochondrial Metabolism in Aging (J2)**

- **Marcia C. Haigis**, Harvard Medical School, USA
  - **Mitochondrial Metabolism and Proteomics in Aging**

- **Matthew D. Hirschey**, Duke University, USA
  - **Sirtuins Control Mitochondrial Metabolism and Aging**

- **Hazel H. Szeto**, Social Profit Network Research Lab, USA
  - **Cardiolipin-targeted peptides rejuvenate mitochondrial function, remodel mitochondria, and promote tissue regeneration during aging**

**Mitochondrial Metabolism in Aging (J2)**

- **Jose M. Cuezva**, Universidad Autónoma de Madrid, Spain
  - **ATPase Inhibitory Factor 1 (IF1), a Driver of Mitochondrial/Nuclear Genome Signaling Pathways**
  - **Short Talk(s) Chosen from Abstracts**

**Mitochondria and Cell Death (J1)**

- **Junichi Sadoshima**, Rutgers New Jersey Medical School, USA
  - **Autophagy and Mitochondrial Dysfunction in Heart Failure**

- **Ása B. Gustafsson**, University of California, San Diego, USA
  - **Beclin1 as a key regulator of mitochondrial quality control**

- **Gerald W. Dorn, II**, Washington University School of Medicine, USA
  - **Cardiomitopathy – Novel Cardiomyopathy of Dysfunctional Mitochondria**

- **Hiromi Sesaki**, Johns Hopkins University School of Medicine, USA
  - **Mitochondrial Dynamics and Mitophagy**

**Mitochondria and Cell Death (J1)**

- **Payam Anthony Gammage**, University of Cambridge, UK
  - **Short Talk**: The Nuclear Receptor RORα Plays Critical Roles in Mitochondrial Quality Control

**Workshop**

- **Short Talks Chosen from Abstracts**

**Mitochondria Dynamics and Metabolism (J1)**

- **E. Dale Abel**, University of Iowa, Carver College of Medicine, USA
  - **Paracrine Regulation of Metabolism by OPA1**

- **Robert S. Balaban**, NHLBI, National Institutes of Health, USA
  - **The Mitochondria Reticulum of Muscle Cells**

- **Antonio Zorzano**, Instituto de Investigación en Biomedicina, Spain
  - **Mitochondrial Fusion Proteins, Metabolism and Inflammation**

- **Brian Glancy**, NHLBI and NIAMS, National Institutes of Health, USA
  - **Short Talk**: Intra- and Inter-Organelle Interactions within the Muscle Mitochondrial Reticulum

- **Sandra S. Zinkel**, Vanderbilt University, USA
  - **Short Talk**: Bid Maintains Mitochondrial Cristae Structure and Function and Protects against Cardiac Disease in an Integrative Genomics Study

**Mitochondria in Age-Related Pathology (J2)**

---

*Session Chair † Invited but not yet accepted     Program current as of November 15, 2018. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/19J2 and www.keystonesymposia.org/19J1.*
Keynote Address: "Mitochondria and Sarcopenia"
David J. Glass, Novartis Institutes for Biomedical Research, USA

Session Chair: "Mitochondria in Aging Muscle (J1)"
Scientific Organizers: E. Dale Abel and Andrea L. Hevener

Panel Session 3

THURSDAY, JANUARY 17

Mitochondria in Aging Muscle (Joint)

- David J. Glass, Novartis Institutes for Biomedical Research, USA
  Mitochondria Pathways in Aging and Sarcopenia
- Holly Van Remmen, Oklahoma Medical Res Fndn, USA
  Is mitochondrial oxidative stress a determining factor in sarcopenia?
- Michael P. Murphy, University of Cambridge, UK
  Therapeutic Targeting of Mitochondria
- Johan Auwerx, École Polytechnique Fédérale de Lausanne – EPFL, Switzerland
  New Insights into the Genetics of Mitochondria and Aging

Short Talk(s) Chosen from Abstracts

- Mitchell Allen, Virginia Tech, USA
  Short Talk: The Cardiolipin-Aggregating Peptide Elamipretide Protects Mitochondrial Structure-Function

Mitochondria Dynamics and Aging (J2)

- Liza A. Pon, Columbia University Medical Center, USA
  Inheritance of the Fittest Mitochondria and Lifespan Control in Budding Yeast
- Monica Driscoll, Rutgers University, USA
  Throwing It Away: Neuronal Extrusion of Trashy Mitochondria as a Mito-Stasis Strategy
- Lisa Norquay, Janssen, USA
  Mitochondrial Dynamics and Mitophagy in Metabolic Disease

Short Talk Chosen from Abstracts

Mitochondria, Energy Expenditure and Insulin Sensitivity (J1)

- Patrick Schrauwen, Maastricht University, Netherlands
  Human Skeletal Muscle Mitochondrial function and Insulin Sensitivity
- Mary-Ellen Harper, University of Ottawa, Canada
  Skeletal Muscle Mitochondrial Energetics in Diet-resistant and Diet-sensitive Obesity