



# Aging and Mechanisms of Aging-Related Disease

May 15–19, 2017 | Pacifico Yokohama | Yokohama | Japan

## Scientific Organizers:

**Kazuo Tsubota**, Keio University School of Medicine, Japan

**Shin-ichiro Imai**, Washington University School of Medicine, USA

**Matt Kaerberlein**, University of Washington, USA

**Joan Mannick**, resTORbio, USA

*Sponsored by Astellas Pharma Inc., Journal of Molecular Cell Biology (JMCB) and Nestlé Institute of Health Sciences*

*Populations are aging rapidly worldwide, particularly in Asia, driving a strong interest in aging/longevity research. This Keystone Symposia meeting will capture the cutting-edge front of this exciting field of science, covering essential aspects of aging/longevity research, including critical signaling pathways and regulators, inter-tissue communication, stem cells, stress and damage responses, cellular senescence, physiological rhythms, human genetics and mental well-being (happiness). Because aging is a systemic phenomenon, it is important to address various layers of the aging/longevity-controlling hierarchy, particularly focusing on metabolic regulation, including mitochondria, NAD<sup>+</sup>, oxidative stress, inflammation, protein homeostasis, autophagy and many other age-associated pathophysiological processes. The outcome of these studies needs to be translated to resolve social and economic issues caused by rapidly aging societies. Novel therapeutic and preventive interventions have been explored and developed as a growing attempt to meet the unmet needs of our aging societies, and these new aspects of aging/longevity research and the gaps in knowledge between the basic science and practical applications will also be covered in the meeting. There is a growing body of evidence that our modern lifestyle, such as the heavy use of blue light in smart phones and tablet computers, affects physiological rhythms and metabolism, promoting age-associated diseases such as obesity, diabetes, cancer and depression. Therefore, it is now time to think differently about what we can do to deal with all these problems in light of recent progress in this exciting field of science.*

## Session Topics:

- Signal Transduction I – Evolutionarily Conserved Players
- Workshop 1: Cutting-Edge Front of Aging/Longevity Science
- Signal Transduction II – Mitochondria
- Stem Cell Aging and Humoral Factors
- Workshop 2: Mitochondria and NAD Metabolism
- Intertissue Communication and Rhythm
- Cellular Senescence
- Stress, Damage and Epigenetic Changes
- Age-Associated Complications
- Workshop 3: Epigenetics and Stress Response
- Interventions for Aging and Longevity

**Scholarship Application & Discounted Abstract Deadline: January 17, 2017**

**Abstract Deadline: February 15, 2017**

**Discounted Registration Deadline: March 15, 2017**



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

Meeting Hashtag: #KSaging

For more details, visit [www.keystonesymposia.org/17E2](http://www.keystonesymposia.org/17E2)

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# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

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### MONDAY, MAY 15

#### Arrival and Registration

### TUESDAY, MAY 16

#### Welcome and Keynote Address

\*Joan Mannick, resTORbio, USA

Johan Auwerx, École Polytechnique Fédérale de Lausanne – EPFL, Switzerland

*Cross-species Genetic Mapping of Targets in Mitochondria, Metabolism and Aging*

#### Signal Transduction I – Evolutionarily Conserved Players

\*Shin-ichiro Imai, Washington University School of Medicine, USA

Leonard P. Guarente, Massachusetts Institute of Technology, USA  
*The Role of Sirtuins in Aging and Age-Associated Diseases*

Joan Mannick, resTORbio, USA

*Is mTOR an Evolutionarily Conserved Pathway that Regulates Aging?*

Noboru Mizushima, University of Tokyo, Japan

*Autophagy in Intracellular Quality Control*

Motoshi Hayano, Harvard Medical School, USA

*Short Talk: Do Epigenetic Changes Cause Aging in Animals?*

Louis R. Lapierre, Brown University, USA

*Short Talk: Blocking Lipid Secretion Promotes Lipophagy and Longevity*

#### Workshop 1: Cutting-Edge Front of Aging/Longevity Science

\*Kazuo Tsubota, Keio University School of Medicine, Japan

Naoko Ohtani, Osaka City University Graduate School of Medicine, Japan

*Gut Microbiota Promotes Obesity-Associated Liver Cancer through PGE2-Mediated Suppression of Antitumor Immunity*

Mark S. Lucanic, Buck Institute for Research on Aging, USA  
*Caenorhabditis Intervention Testing Program: Screening Pro-Longevity Chemicals for Reproducible and Robust Positive Effects across Diverse Genetic Backgrounds*

Shuhei Nakamura, Osaka University, Japan  
*Rubicon Regulates Lifespan via Modulating Autophagy Activity*

Kazuto Kawamura, Okinawa Institute of Science and Technology, Japan

*Forward Genetic Screen for Adult-Onset Motor Deficits in C. elegans*

Alaattin Kaya, Harvard Medical School, USA  
*Molecular Basis of Longevity Traits in Yeast Lifespan*

Hiromi Rakugi, Osaka University, Japan  
*From Bench to Society in Geriatric Medicine*

Hiroshi Itoh, Keio University School of Medicine, Japan  
*Application of NMN (Nicotinamide Mononucleotide) to Anti-Aging in Humans*

#### Signal Transduction II – Mitochondria

\*Ana Maria Cuervo, Albert Einstein College of Medicine, USA

Marcia C. Haigis, Harvard Medical School, USA

*The Function of Mitochondrial Sirtuins in Metabolism and Aging*

Matt Kaerberlein, University of Washington, USA

*The Importance of mTOR Signaling in Aging and Longevity Control*

Michael Ristow, ETH Zürich, Switzerland

*Mitochondrial Control of Healthy Aging*

Takashi Kadowaki, University of Tokyo, Japan

*Adiponectin as an Anti-Aging Regulation*

Nicholas L. Bentley, University of New South Wales, Australia

*Short Talk: Elevating Mitochondrial NAD Biosynthesis Enhances Hepatic Energy Metabolism, and Improves Glucose Tolerance in Aged Mice*

#### Poster Session 1

### WEDNESDAY, MAY 17

#### Stem Cell Aging and Humoral Factors

\*Thomas A. Rando, Stanford University School of Medicine, USA

Heinrich Jasper, Buck Institute for Research on Aging, USA

*Inflammation and Immune Modulation: Tackling Age-related Stem Cell Dysfunction*

Rajendra S. Apte, Washington University School of Medicine, USA  
*Photoreceptor Metabolism in the Aging Eye*

Emi K. Nishimura, Tokyo Medical and Dental University, Japan  
*Stem Cells Orchestrate Hair Follicle Aging Program*

Tapash Jay Sarkar, Stanford University, USA

*Short Talk: Scalable Rejuvenation through Transient Reprogramming*

Yaisa Andrews-Zwilling, SanBio, Inc., USA

*Short Talk: Transplanted Modified Bone Marrow-Derived Mesenchymal Stem Cells, SB623, Ameliorate Chronic Behavioral and Pathological Deficits in Stroke Rats*

#### Workshop 2: Mitochondria and NAD Metabolism

\*Johan Auwerx, École Polytechnique Fédérale de Lausanne – EPFL, Switzerland

Mitsukuni Yoshida, Washington University in St. Louis, USA  
*eNAMPT as an Adipose-Derived NAD<sup>+</sup> Biosynthetic Enzyme that Systemically Regulates Aging*

Emi Inagaki, Keio University, Japan

*NAD-Related Metabolites and their Possible Application for Corneal Disease*

Anthony Joseph Covarrubias, Buck Institute, USA

*The Role of Macrophages in NAD<sup>+</sup> Homeostasis during Aging*

Masakatsu Yamashita, Ehime University School of Medicine, Japan  
*Metabolic Regulation of T Cell Senescence by Menin*

Pénélope Andreux, Amazentis, Switzerland

*Translation of Urolithin A Effects on Mitochondria and Muscle from Worms to Rodents to Humans*

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**Caroline C. Escoubas**, Harvard School of Public Health, USA  
*The Role of Mitochondrial Dynamics in AMPK-Mediated Learning and Memory*

### Intertissue Communication and Rhythm

\***Matt Kaerberlein**, University of Washington, USA

**Shin-ichiro Imai**, Washington University School of Medicine, USA  
*Nicotinamide Mononucleotide, a Key Systemic NAD<sup>+</sup> Intermediate in Mammalian Aging and Longevity Control*

**Satchidananda Panda**, The Salk Institute for Biological Studies, USA  
*Circadian Regulation for the Prevention and Treatment of Metabolic Diseases*

**Francisca O. Peixoto**, IRB Barcelona, Spain  
*Short Talk: Aged Stem Cells Reprogram their Daily Rhythmic Functions to Adapt to Tissue-Specific Stress*

**Victoria A. Acosta Rodriguez**, University of Texas Southwestern Medical Center, USA  
*Short Talk: Calorically Restricted Mice Self-Impose a Temporal Pattern of Food Intake*

### Poster Session 2

#### THURSDAY, MAY 18

##### Cellular Senescence

\***Eisuke Nishida**, Kyoto University, Japan

**John Sedivy**, Brown University, USA  
*Activation of Somatic Retrotransposition in Cellular Senescence and Aging*

**Jan M. van Deursen**, Mayo Clinic, USA  
*How Senescent Cells Contribute to Aging and Disease*

**Tohru Minamino**, Niigata University Graduate School of Medical and Dental Sciences, Japan  
*Cellular Senescence and Age-Associated Diseases*

**Yun-Chen Chiang**, University of North Carolina at Chapel Hill, USA  
*Short Talk: The Role of p16INK4a in Shaping the T Cell Receptor Repertoire Diversity*

**Kyoko Miura**, Hokkaido University, Japan  
*Short Talk: Unique Response of Cancer- and Senescence-Resistant Rodent "Naked Mole-Rat" to Cellular Senescence Induction*

##### Stress, Damage and Epigenetic Changes

\***Emi K. Nishimura**, Tokyo Medical and Dental University, Japan

**Rochelle Buffenstein**, Calico Life Sciences LLC, USA  
*Sustained Maintenance of Proteostasis in the Long-Lived Naked Mole-Rat*

**Jan H. J. Hoeijmakers**, Erasmus MC, Netherlands  
*DNA Damage, Aging and Nutritional Interventions*

**Jing-Dong Jackie Han**, Shanghai Institutes of Biological Sciences, China  
*Integrative Data Analysis for Development and Aging*

### Poster Session 3

#### FRIDAY, MAY 19

##### Keynote Address

\***Leonard P. Guarente**, Massachusetts Institute of Technology, USA

**Thomas A. Rando**, Stanford University School of Medicine, USA  
*Epigenetic Regulation of Stem Cell Aging*

### Age-Associated Complications

\***Satchidananda Panda**, The Salk Institute for Biological Studies, USA

**Yousin Suh**, Albert Einstein College of Medicine, USA  
*Enhancer Mechanisms in Human Aging and Aging-Related Disease*

**Kazuo Tsubota**, Keio University School of Medicine, Japan  
*Age-Associated Eye Diseases and their Treatment*

**Masashi Yanagisawa**, University of Tsukuba, Japan  
*Towards the Mysteries of Sleep*

**Ana Maria Cuervo**, Albert Einstein College of Medicine, USA  
*Selective autophagy and age-associated diseases*

**Liang Dai**, L'Oreal Research and Innovation, Singapore  
*Short Talk: The Role of Pre-LaminA in Skin Aging*

**Lauren Tindale**, BC Cancer Agency, Canada  
*Short Talk: Lipid and Alzheimer's Disease Genes Associated with Healthy Aging and Longevity in Healthy Oldest-Old*

### Workshop 3: Epigenetics and Stress Response

\***Jing-Dong Jackie Han**, Shanghai Institutes of Biological Sciences, China

**Clea Barcena**, University of Oviedo, Spain  
*Methionine Restriction Extends Mouse Lifespan by Modulating Bile Acid Signaling*

**Chung-Yi Liang**, National Yang-Ming University, Taiwan  
*Functional Regulation of the DAF-16/FoxO Transcription Factor by Acetylation in Stress Responses and Longevity*

**Nitish Mittal**, Biozentrum, University of Basel, Switzerland  
*The Gcn4 Transcription Factor Reduces Protein Synthesis Capacity to Extend Lifespan*

**Claire H. Wilson**, University of South Australia, Australia  
*Caspase-2, a Regulator of Metabolic and Stress Response Pathways during Aging*

**Harumi Fujita**, Keio University School of Medicine, Japan  
*Genetic Characterization of a Patient with a Progeroid Phenotype and Mosaic Variegated Aneuploidy*

**Min-Hao Kuo**, Michigan State University, USA  
*Intracellular Triacylglycerol Promotes Longevity Independently of Energy Expenditure*

**Parag Kundu**, Nanyang Technological University, Singapore  
*Gut Microbiome of Aging-Host: Friend or Foe?*

### Interventions for Aging and Longevity

\***Masashi Yanagisawa**, University of Tsukuba, Japan

**Eisuke Nishida**, Kyoto University, Japan  
*Life-Span Regulation by Environmental Stresses in C. elegans*

**Hideyuki Okano**, Keio University School of Medicine, Japan  
*Preemptive Medicine for Dementia and Neurodegenerative Diseases using iPSC-Technologies and Genetically Modified Non-human Primates*

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**Gary Krishnan**, Eli Lilly and Company, USA

*Short Talk: Changes in Human Skeletal Muscle Transcriptome after Exercise Provides a Guide-Post for the Identification of Novel Exercise Mimetic Therapies to Treat Aging-Related Loss in Muscle Function*

**Arya Biragyn**, NIA, National Institutes of Health, USA

*Short Talk: Aging Microbiota Change in Primates and Mice Converts Innate B1a Cells into Pathogenic 4BL Cells that Induce Cytolytic CD8+T Cells*

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

**SATURDAY, MAY 20**

Departure