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September 13, 2023  
Keio University

## Announcement of The Keio Medical Science Prize 2023

Keio University, Japan's oldest private university located in Tokyo, annually awards The Keio Medical Science Prize to recognize researchers who have made an outstanding contribution to the fields of medicine or the life sciences. It is the only prize of its kind awarded by a Japanese university, and 9 laureates of this prize have later won the Nobel Prize. The 28<sup>th</sup> Keio Medical Science Prize is awarded to **Napoleone Ferrara, M.D.**, from University of California San Diego, and **Kazutoshi Mori, Ph.D.**, from Kyoto University.

### 1. Laureates

#### **Napoleone Ferrara, M.D.**



Distinguished Professor  
of Pathology  
Adjunct Professor of  
Ophthalmology and  
Pharmacology  
University of California  
San Diego  
USA

**“Molecular Basis of Angiogenesis and  
its Application”**

#### **Kazutoshi Mori, Ph.D.**



Professor  
Department of  
Biophysics  
Graduate School of  
Science  
Kyoto University  
Japan

**“Molecular Mechanism of the Unfolded  
Protein Response”**

### 2. Award Events

The award ceremony and commemorative lectures will be held on November 9, 2023 at the Keio University School of Medicine, located on Keio University's Shinanomachi Campus. The events will be live streamed globally online.

#### Award Ceremony and Commemorative Lectures

Date & Time: Thursday, November 9, 2023, 14:00-17:30

Venue: Kitasato Memorial Hall, Keio University School of Medicine, Shinanomachi Campus, Tokyo, Japan

Language: English (Simultaneous translation available)

Admission: Open to the public with online access. On-site participation is limited.

**For more information, please visit the Keio Medical Science Prize website:**

<https://www.ms-fund.keio.ac.jp/en/prize/>





# The Keio Medical Science Prize 2023 Laureate

## “Molecular Basis of Angiogenesis and its Application”

### **Napoleone Ferrara, M.D.**

Distinguished Professor of Pathology  
Adjunct Professor of Ophthalmology and Pharmacology  
University of California San Diego, USA

Blood vessels form a pipeline that delivers oxygen and nutrients to all organs in our bodies. However, how the vascular network spreads during development was unclear. Dr. Napoleone Ferrara first succeeded in explaining the molecular basis of this fundamental process through the discovery of Vascular Endothelial Growth Factor (VEGF), today recognized as the central player in the regulation of blood vessel growth (angiogenesis). Dr. Ferrara developed a neutralizing antibody against VEGF and found that it stops angiogenesis in several pathological conditions, including cancer and eye diseases. At present, VEGF blockers are routinely used as a therapeutic option for various human cancers and represent the first choice for treating age-related macular degeneration, the major cause of adult blindness. The fundamental knowledge originating from his basic research pioneered a number of recent advances in medical science. In view of these seminal contributions to the field of angiogenesis, Dr. Ferrara is awarded with the Keio Medical Science Prize.

#### **Education**

1975-1981 M.D. University of Catania Medical School, Catania, Italy

#### **Positions**

1983-1985 Postdoctoral Fellow, Reproductive Endocrinology Center, University of California, San Francisco, USA  
1985-1986 Intern, Dept. of Obstetrics and Gynecology, Oregon Health Sciences University  
1986-1988 Postdoctoral Fellow, Cancer Research Institute, University of California, San Francisco  
1988-1993 Scientist, Dept. of Cardiovascular Research, Genentech, Inc.  
1993-1997 Senior Scientist, Dept. of Cardiovascular Research, Genentech, Inc.  
1997-2002 Staff Scientist, Dept. of Molecular Oncology, Genentech, Inc.  
2002-2012 Genentech Fellow, Genentech, Inc.  
2013-Present Distinguished Professor of Pathology, University of California, San Diego  
2013-Present Adjunct Professor of Ophthalmology, University of California, San Diego  
2015-Present Adjunct Professor of Pharmacology, University of California, San Diego  
2020-Present Hildyard Endowed Chair in Eye Disease, University of California, San Diego

#### **Major Honors/Awards**

2006 General Motors Cancer Research Award  
2010 Lasker-DeBakey Clinical Medical Research Award  
2013 Breakthrough Prize in Life Sciences  
2014 Antonio Champalimaud Vision Award  
2014 Canada Gairdner International Award

#### **Comment from Napoleone Ferrara, M.D.**

It is a great honor to be an awardee of the 2023 Keio Medical Science Prize, which I am delighted to accept on behalf of my colleagues and collaborators. I was fortunate to discover over thirty years ago vascular endothelial growth factor (VEGF). Studying the VEGF pathway led me to a journey of scientific discovery and clinical translation that resulted in advances in cancer therapy and unprecedented vision preservation in patients with age-related macular degeneration and other blinding disorders.



# The Keio Medical Science Prize 2023 Laureate

## “Molecular Mechanism of the Unfolded Protein Response”

**Kazutoshi Mori, Ph.D.**

Professor, Department of Biophysics, Graduate School of Science, Kyoto University, Japan

Endoplasmic reticulum (ER) stress response (unfolded protein response) is a homeostatic mechanism in which molecular chaperones are transcriptionally activated when secretory and membrane proteins with abnormalities of higher-order structure accumulate in the ER. Dr. Kazutoshi Mori identified IRE1, an ER stress sensor molecule, and HAC1, a transcription factor that undergoes IRE1-dependent splicing, in budding yeast. In mammals, he showed that the IRE1-HAC1 pathway is conserved as the IRE1-XBP1 pathway, and that ATF6 additionally functions as both a sensor and a transcription factor. He has clarified the physiological significance of the ATF6 pathway during early development. With respect to ER-associated degradation, XBP1 transcriptionally induces factors participating in the ubiquitin-proteasome system and mannosidases such as EDEM2 are responsible for the mannose pruning that occurs in the conformationally abnormal glycoproteins. Dr. Mori's pioneering research has clarified the molecular mechanisms of the ER stress response, and the ripple effects are now being spread in diabetes, neurodegenerative disorders and cardiac diseases.

### Education

1977	Graduated from Okayama Prefectural Kurashiki-Seiryō High School
1977	Entered the Faculty of Engineering, Kyoto University
1978	Moved to the Faculty of Pharmaceutical Sciences, Kyoto University
1981	Graduated from the Faculty of Pharmaceutical Sciences, Kyoto University
1981-1983	Master course student of the Graduate School of Pharmaceutical Sciences, Kyoto University
1983-1985	Doctoral course student of the Graduate School of Pharmaceutical Sciences, Kyoto University
1987	Received Ph.D. from Kyoto University

### Professional Appointments

1985-1989	Instructor, Gifu Pharmaceutical University, Gifu, Japan
1989-1993	Postdoctoral Fellow, University of Texas Southwestern Medical Center at Dallas, USA (supervised by Drs. M.-J. Gething and J. Sambrook)
1993-1996	Deputy Research Manager, HSP Research Institute, Kyoto, Japan
1996-1999	Research Manager, HSP Research Institute, Kyoto, Japan
1999-2003	Associate Professor, Graduate School of Biostudies, Kyoto University, Japan
2003-present	Professor, Department of Biophysics, Graduate School of Science, Kyoto University, Japan

### Major Honors/Awards

2009	Canada Gairdner International Award
2014	Albert Lasker Basic Medical Research Award
2014	Shaw Prize in Life Science and Medicine
2016	Imperial Prize and Japan Academy Prize
2017	2018 Breakthrough Prize in Life Sciences

### Comment from Kazutoshi Mori, Ph.D.

It is my great pleasure and honor to receive Keio Medical Science Prize embracing prestigious recipients. Retrospectively, I decided to go to USA simply to learn molecular biology in 1989 when I was 30 years old, and met the Unfolded Protein Response (UPR) at Dallas, Texas. I was fascinated by its novelty as an intracellular signaling, and since then I worked hard to clarify its molecular mechanism and physiological importance. As a result, together with contributions from other researchers, the UPR has grown up as an important field, which is also involved in the development and progression in various diseases. This receipt further encourages me to make every effort for research.



# The Keio Medical Science Prize

## 1. Background

In the fall of 1994, Dr. Mitsunada Sakaguchi, a 1940 alumnus of the School of Medicine, donated five billion yen to Keio University with the expressed desire that it be used to commend outstanding researchers, to encourage medical research and its creative progress at Keio through grants, and to promote worldwide medical advances. In keeping with Dr. Sakaguchi's commitment, Keio launched The Keio University Medical Science Fund on April 1, 1995. Dr. Sakaguchi made an additional donation of two billion yen in July 1999, bringing the fund to a total of seven billion yen.

## 2. Initiatives

- The Keio Medical Science Prize
- Grants for International Activities in Medicine and the Life Sciences
- Keio Medical Science Rising Star Award
- Research Grants for Medicine and the Life Sciences
- Sakaguchi Laboratory

## 3. Objective

The Keio Medical Science Prize gives recognition to the outstanding and creative achievements of researchers in the fields of medicine and the life sciences, in particular those contributing to scientific developments in medicine. It aims to promote worldwide advances in medicine and the life sciences, encourage the expansion of researcher networks throughout the world, and contribute to the well-being of humankind.

## 4. Prize

Laureates receive a certificate of merit, medal, and a monetary award of 10 million yen. The award events and the commemorative lectures are held at Keio University.

## 5. Nomination and Selection

The Keio Medical Science Prize is an international award, and each year academics and researchers from around the world are invited to nominate a candidate. Laureates are then selected through a rigorous review process by about ninety Japanese academics from both within and outside of Keio University.

### Selection Committee 2023

Haruhiko Siomi	Chairperson of the Committee Professor, Department of Molecular Biology, Keio University School of Medicine
Kiyokazu Agata	Director General, National Institute for Basic Biology
Shizuo Akira	Director, Center for Advanced Modalities and Drug Delivery System, Osaka University
Masayuki Amagai	Vice-President, Keio University Professor, Department of Dermatology, Keio University School of Medicine
Makoto Arita	Professor, Division of Physiological Chemistry and Metabolism, Keio University Faculty of Pharmacy
Kenya Honda	Professor, Department of Microbiology and Immunology, Keio University School of Medicine
Yae Kanai	Professor, Department of Pathology, Keio University School of Medicine
Yoshiaki Kubota	Professor, Department of Anatomy, Keio University School of Medicine
Hiroaki Mitsuya	Director General, National Center for Global Health and Medicine Research Institute
Ryozo Nagai	President, Jichi Medical University
Jin Nakahara	Professor, Department of Internal Medicine (Neurology), Keio University School of Medicine
Emi Nishimura	Professor, Division of Aging and Regeneration, The Institute of Medical Science, The University of Tokyo
Tetsuo Noda	Representative Director, Executive Director, and Institute Director, Japanese Foundation for Cancer Research
Yoshiko Takahashi	Professor, Department of Zoology, Graduate School of Science, Kyoto University
Kenji Tanaka	Professor, Division of Brain Sciences, Institute for Advanced Medical Research, Keio University School of Medicine

Masashi Yanagisawa Director, International Institute for Integrative Sleep Medicine (WPI-IIMS),  
University of Tsukuba  
Motoko Yanagita Professor, Department of Nephrology, Graduate School of Medicine,  
Kyoto University

**6. Nobel Prize Winners from the Keio Medical Science Prize Laureates**

1996 Stanley B. Prusiner (The Nobel Prize in Physiology or Medicine 1997)  
Discovery of Prions and Prion Diseases  
1999 Elizabeth Helen Blackburn (The Nobel Prize in Physiology or Medicine 2009)  
Telomeres and Telomerase  
2002 Barry J. Marshall (The Nobel Prize in Physiology or Medicine 2005)  
Establishment of Diagnostic Techniques and Treatment for Helicobacter Pylori  
2004 Roger Y. Tsien (The Nobel Prize in Chemistry 2008)  
Visualization and Control of Molecules within Living Cells  
2006 Thomas A. Steitz (The Nobel Prize in Chemistry 2009)  
Structural Basis of Large Ribosomal Subunit Function and Drug Development  
2010 Jules A. Hoffmann (The Nobel Prize in Physiology or Medicine 2011)  
Discovery of Insect-innate Immune System and Toll Receptors  
2015 Yoshinori Ohsumi (The Nobel Prize in Physiology or Medicine 2016)  
Discoveries of Mechanisms for Autophagy  
2016 Tasuku Honjo (The Nobel Prize in Physiology or Medicine 2018)  
Identification of PD-1 and Establishment of Cancer Immunotherapy Principle by PD-1 Blockade  
2016 Svante Pääbo (The Nobel Prize in Physiology or Medicine 2022)  
Molecular Elucidation of Human Origin

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