



September 10, 2014

## Announcement of the Keio Medical Science Prize 2014

Keio University annually awards the Keio Medical Science Prize to recognize researchers who have made an outstanding contribution to the field of medicine or life sciences. It is the only prize of its kind awarded by a Japanese university, and 6 laureates of this Prize have later won the Nobel Prize. The 19th Keio Medical Science Prize has been awarded to Karl Deisseroth, M.D., Ph.D. and Hiroshi Hamada, M.D., Ph.D.

### 1. Laureates

#### **Karl Deisseroth, M.D., Ph.D.**

D.H. Chen Professor of Bioengineering  
and of Psychiatry and Behavioral Sciences  
Investigator, Howard Hughes Medical Institute  
Stanford University

“The Realization of Optogenetics, and Elucidation of Brain Function at the Neuronal Network Level”

#### **Hiroshi Hamada, M.D., Ph.D.**

Professor, Graduate School of Frontier Biosciences, Osaka University  
“Molecular and Cellular Mechanisms of Left-Right Asymmetry”

### 2. Prize

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

### 3. Award Ceremony and Events

The award ceremony and commemorative lectures will be held on November 27, 2014 at the School of Medicine, Shinanomachi Campus, Keio University, Tokyo, Japan.

#### **Award Ceremony and Commemorative Lectures**

Date: November 27, 2014 14:00-17:30  
Venue: *Kitasato* Hall, Shinanomachi Campus, Keio University, Tokyo, Japan  
Language: English and Japanese  
Simultaneous translation available (English-Japanese/Japanese-English)  
Admission: Open to the public

\*Please visit our website at <http://www.ms-fund.keio.ac.jp/prize/index.html> for more details.

**Attachments:** (1) Keio Medical Science Prize  
(2) Keio Medical Science Prize Laureate 2014

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## The Keio Medical Science Prize

### **1. Background**

In Fall 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
- Medical School Faculty and Alumni Grants
- 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, to encourage the expansion of researcher networks throughout the world, and to 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 ceremony and commemorative lectures are held at Keio University.

### **5. Nomination and Selection**

Invitations are sent out to academics and researchers around the world each year, asking them to submit next year's candidates for the Prize. Eighty Japanese academics and researchers within and outside Keio University select laureates through a rigorous review process. The Keio Medical Science Prize is an international award.

### **6. 2013 Prize Laureates**

Dr. Victor R. Ambros, Ph.D. Discovery of microRNAs as a new class of gene regulators

Dr. Shigekazu Nagata, Ph.D. Molecular mechanisms of apoptosis and its physiology

### **7. Nobel Prize Winning Laureates**

2010 Dr. Jules A. Hoffmann (The Nobel Prize in Physiology or Medicine 2011)

Discovery of insect-innate immune system and Toll receptor

2006 Dr. Thomas A. Steitz (The Nobel Prize in Chemistry 2009)

Structural Basis of Large Ribosomal Subunit Function and Drug Development

2004 Dr. Roger Y. Tsien (The Nobel Prize in Chemistry 2008)

Visualization and Control of Molecules within Living Cells

2002 Dr. Barry J. Marshall (The Nobel Prize in Physiology or Medicine 2005)

Establishment of Diagnostic Techniques and Treatment for the Helicobacter Pylori

1999 Dr. Elizabeth Helen Blackburn (The Nobel Prize in Physiology or Medicine 2009)

Telomeres and Telomerase

1996 Dr. Stanley B. Prusiner (The Nobel Prize in Physiology or Medicine 1997)

Discovery of Prions and Prion Diseases



## Keio Medical Science Prize Laureate 2014

“The Realization of Optogenetics, and Elucidation of Brain Function at the Neuronal Network Level”

### **Karl Deisseroth, M.D., Ph.D.**

D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences

Investigator, Howard Hughes Medical Institute, Stanford University

Dr. Karl Deisseroth achieved control of neuronal activity with high temporal and cellular precision through a combination of microbial opsin expression and illumination. This innovative technology, termed optogenetics, has enabled us to address the causal relationship between neuronal circuits and behavior. Thus, Dr. Deisseroth first provided “a method by which all neurons of just one type could be activated or inactivated, leaving the others more or less unaltered” (Francis Crick, 1979), which had been a long-required task in the field of neuroscience. Dr. Deisseroth clarified many unresolved questions, such as the neuronal circuits responsible for anxiety- and depression-like behaviors. Optogenetics has further permitted us to control intracellular signals such as calcium and cAMP signals, and thus it can be widely applied to biomedical and life science research. By making optogenetics a reality and leading this new field, Dr. Deisseroth has made enormous contributions towards the fundamental understanding of brain function in health and disease.

#### • **Education**

- 1988 - 1992 A.B., Biochemical Sciences, *summa cum laude*, Harvard University
- 1992 - 2000 M.D., Stanford University Medical School (MSTP Program)
- 1994 - 1998 Ph.D., Stanford University (Neuroscience)

#### • **Current and Previous Academic and Administrative Appointments**

- 2004 - present Principal Investigator and Laboratory Head, Department of Psychiatry and Behavioral Sciences, Stanford University Clark Center
- 2005 - 2008 Assistant Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University
- 2009 - 2012 Associate Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University
- 2012 - present Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University
- 2012 - present D.H. Chen Professor, Stanford University
- 2013/4 - present Investigator, Howard Hughes Medical Institute
- 2013 - present Foreign Adjunct Professor, Karolinska Institutet, Stockholm

#### • **Comments from Dr. Deisseroth**

It is a tremendous honor to receive the 2014 Keio Medical Science Prize, in recognition of our efforts to develop optogenetics, and to apply this technology to deepen the understanding of the brain in health and disease. This Prize is particularly meaningful because optogenetics originated as a tool to study the basic science of biology, not medical illness, and yet is enabling discovery of insights into disease states, as well as into healthy brain function. From both the neuroscience and psychiatry perspectives, I hope that this story helps further encourage and strengthen fundamental biology research.



## Keio Medical Science Prize Laureate 2014

“Molecular and Cellular Mechanisms of Left-Right Asymmetry”

### **Hiroshi Hamada, M.D., Ph.D.**

Professor, Graduate School of Frontier Biosciences, Osaka University

Establishment of body axes is central to the organization of the vertebrate body plan. However, the molecular basis of left-right (L-R) asymmetry remained totally unknown until recently. In 1996, Dr. Hiroshi Hamada discovered the gene called *Lefty* that is expressed L-R asymmetrically in the mouse embryo, and this discovery served as a breakthrough that made subsequent studies possible. By employing genetic approaches, he has studied the role and regulation of two central signaling molecules (*Lefty* and *Nodal*), has identified other components essential for L-R asymmetry, and has dissected the genetic pathway that establishes L-R asymmetry in the mouse embryo. More recently, he has studied the mechanism of L-R symmetry breaking. Dr. Hiroshi Hamada's continuous contribution to the field of developmental biology makes him well deserving of the Keio Medical Science prize.

#### • **Education**

- 1969 – 1975 Medical School, Okayama University (M.D.)
- 1975 – 1979 Graduate School, Okayama University (Ph.D.)

#### • **Academic Carrier**

- 1979 Visiting Researcher, Cancer Institute (Tokyo, Japan)
- 1979 – 1984 Visiting Associate/Visiting Scientist, National Cancer Institute, NIH (Bethesda, USA)  
(Supervisor: Dr. Takeo Kakunaga, Subject: Malignant Transformation)
- 1985 – 1988 Assistant Professor, Faculty of Medicine,  
Memorial University of Newfoundland, (St. John's, Canada)
- 1988 – 1993 Associate Professor, Department of Biochemistry, Faculty of Medicine, University of Tokyo
- 1993 – 1995 Chief, Division of Developmental Biology & Cancer Prevention,  
Tokyo Metropolitan Institute for Medical Sciences (Tokyo, Japan)
- 1995 – 2002 Professor, Institute for Molecular & Cellular Biology, Osaka University
- 2002 – present Professor, Graduate School of Frontier Biosciences, Osaka University

#### • **Comments from Dr. Hamada**

I am grateful to the selection committee for awarding me Keio Medical Science Prize, by which I was greatly honored. This award recognizes our 20 years' efforts to understand how morphological asymmetries develop in the mouse embryo. I have been fortunate to share a number of exciting findings with many talented colleagues in Tokyo Metropolitan Institute of Medical Science and Osaka University. Also collaborations with many scientists all over the world were essential. My thanks go to those colleagues and collaborators.