



JAPAN PRIZE

2015 (31st) Japan Prize Presentation Ceremony

Awards were presented to three laureates from the U.S., France and Japan
in the presence of Their Majesties the Emperor and Empress



The 2015 (31st) Japan Prize laureates were honored at an award presentation ceremony held on April 23 at the Tokyo International Forum in Yurakucho, Tokyo, in the presence of Their Majesties the Emperor and Empress. The Japan Prize is awarded annually to scientists and researchers in two fields who made substantial contributions to their fields as well as society to serve the cause of peace and prosperity of mankind. Dr. Yutaka Takahasi of Japan, the laureate in the “Resources, Energy and Social Infrastructure” field, was recognized for his contribution to “development of innovative concept on river basin management and reduction of water-related disasters.” Dr. Theodore Friedmann of the United States and Prof. Alain Fischer of France were the laureates in the “Medical Science and Medicinal Science” field for their “proposal of the concept of gene therapy and its clinical applications.” Japan Prize laureates are selected from among the candidates who are recommended by prominent researchers and scientists around the world. For the 2015 Japan Prize, 152 recommendations were sent in for the “Resources, Energy and Social Infrastructure” field, and the other field received 276 recommendations. Dr. Takahasi, Dr. Friedmann and Prof. Fischer were deemed well worthy of the prize after almost a year-long, fair and rigid selection process.

JAPAN PRIZE

The Japan Prize is awarded to scientists and researchers, regardless of nationality, who have made significant contributions to the progress of science and technology as well as society to serve the cause of peace and prosperity of mankind.

While the prize encompasses all categories of science and technology, two fields of study are designated for the prize each year in consideration of developments in science and technology. Each Japan Prize laureate receives a certificate of merit and a prize medal. A cash prize of 50 million yen is also awarded to each prize field.

"Resources, Energy and Social Infrastructure" field

Contribution to development of innovative concept on river basin management and reduction of water-related disasters

Dr. Yutaka Takahasi

Born: January 28, 1927
Professor Emeritus, University of Tokyo



"Medical Science and Medicinal Science" field

Proposal of the concept of gene therapy and its clinical applications

Dr. Theodore Friedmann

Born: June 16, 1935
Professor of Pediatrics, University of California San Diego,
School of Medicine



Prof. Alain Fischer

Born: September 11, 1949
Professor at Collège de France,
Director of Institute Imagine,
Hôpital Necker-Enfants malades



Message from the laureate

It is truly an honor to stand before Your Majesties the Emperor and Empress of Japan, distinguished guests, and representatives from various fields to receive the internationally recognized Japan Prize.

Since I was a student in my twenties, I have been studying river engineering by conducting fieldworks on numerous floods and water-related disasters each year. I've also had the privilege of researching rivers and water-related disasters not only in Japan but also around the world, including in China, Europe and the Middle East.

From these research studies, I've come to the conclusion that, in order to promote river improvement policies and water resource development and conservation, one must take a comprehensive approach that takes into account the entire river basin, including the upstream source, the middle reaches, and the river mouth.

I would like to extend my thanks to the rich and diverse Japanese rivers, which have fostered my vision of nature over the years, as well as to the Japanese homeland that nurtured them.

Due to the nature of my research, my findings do not receive much public exposure, and may seem esoteric to the general public. Therefore, I am truly grateful to the members of the Japan Prize Foundation and the Selection Committee for acknowledging such a difficult subject.

Finally, I would like to express my best wishes to the Japan Prize Foundation and hope it will continue to recognize innovative research achievements into the future.

Thank you.

Yutaka Takahashi

Message from the laureate

Your Majesties the Emperor and Empress of Japan, honored guests and ladies and gentlemen.

It is with the deepest pride that I thank you and the Japan Prize Foundation for so graciously bestowing the 2015 Japan Prize in Medical Science and Medicinal Science on me, my colleague Alain Fischer and the field that we represent - human gene therapy. The Japan Prize is one of the highest honors that can come to a scientist.

Most human disease results from a combination of genetic and environmental factors and Medicine has certainly developed effective biochemical and symptomatic treatments for some disorders. However, most of humanity's most serious diseases including cancer, heart and neurological disease and many others remain resistant to the traditional tools and concepts of Medicine.

We are now living through a remarkable revolution that is making possible entirely new understanding of disease and new kinds of therapy that are aimed specifically at the defects in the

genetic machinery of the cell that cause disease - an approach that we have called gene therapy.

This 2015 Japan Prize in Medical Science and Medicinal Science recognizes this new form of specific and targeted Medicine that allows us to attack disease at its most basic level to produce definitive cures rather than just manage the symptoms of disease.

I am deeply grateful for the gracious recognition by the Japan Prize Foundation of the efforts that Dr. Fischer and I have made to help give birth to this new era of Medicine. We recognize that our many colleagues, funding agencies and patients have also contributed enormously to the development of this new kind of Medicine.

To all of them, to the Japan Foundation and especially to Your Majesties, the Emperor and Empress of Japan, I want to say thank you - Doumo Arigato Gozaimasu.

Theodore Friedmann

Message from the laureate

It is a great honor to stand here this afternoon in the presence of their Majesties the Emperor and Empress of Japan, with so many distinguished guests and several of my dear Japanese friends and colleagues. I feel both humbled and proud to share the award of the Japan Prize with Ted Friedmann. This award comes as recognition of the work performed by a fantastic group of talented scientists and physicians, with whom I have formed close personal bonds.

Following my training in pediatrics in Paris (notably with Claude Griscelli) and in immunology in London (with Marc Feldmann and Peter Beverley), I focused my work on understanding and treating a group of rare inherited diseases called primary immunodeficiencies. These disorders variously lead to chronic infections, autoimmunity, allergy, inflammation and cancer. Studying these immunodeficiencies provided important information on the human immune system but also paved the way for therapeutic progress. That is how my field encountered gene therapy - a concept that Ted Friedmann developed in the early 1970s. Based on our understanding of the pathophysiology of primary immunodeficiencies, my colleagues Marina Cavazzana and Salima Hacein-Bey-Abina and I

considered gene therapy to be a suitable approach for correcting X-linked severe combined immunodeficiency. This was achieved for the first time in 1999 by using engineered retroviral vectors to insert the therapeutic gene into the genome of hematopoietic progenitor cells. This success was mitigated by the occurrence of unanticipated adverse events. An international effort helped us to understand the causes of these events and to develop a remedy that has now been used in several centers. It thus appears that gene therapy can be used with a satisfactory benefit/risk ratio in a growing number of diseases. At the Imagine Institute in Paris (which is dedicated to research on genetic diseases), we shall continue to develop this type of approach.

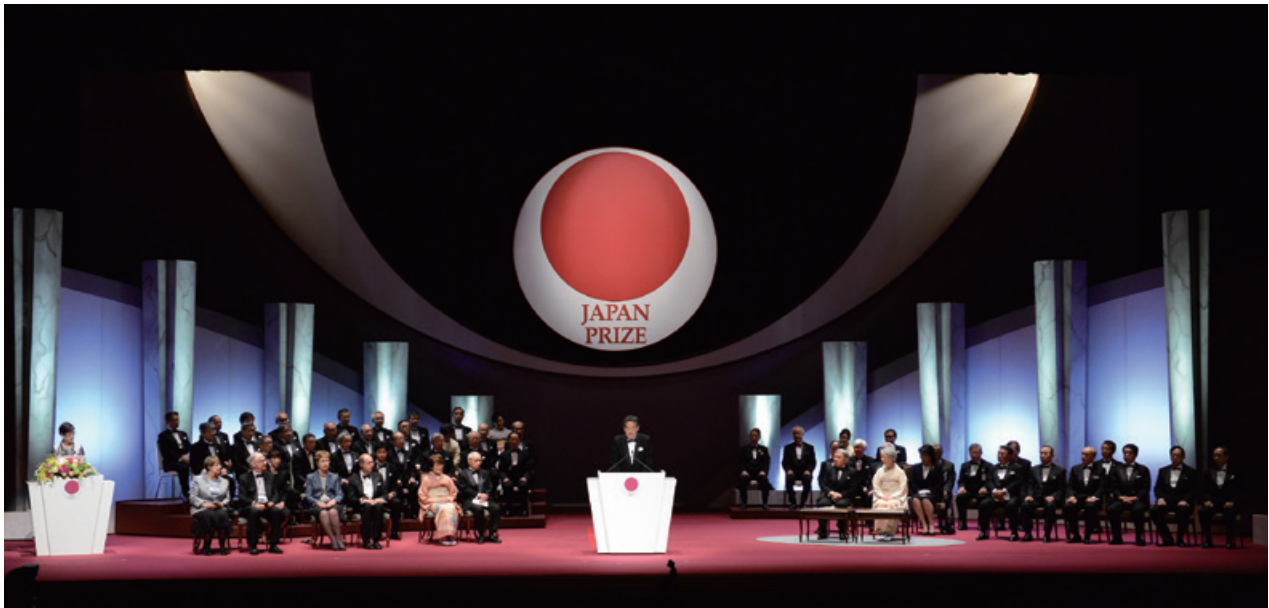
Before closing, I must say a few words in acknowledgement of the longstanding support that our patients and their families have provided. Their courage, enthusiasm and generosity have encouraged us to perform this research.

Again, I would like to wholeheartedly thank the Japan Prize Foundation for their generous attribution of this award.

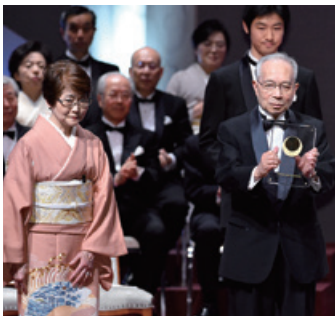
Lastly, I wish to thank my family for their constant support.

Alain Fischer

Presentation Ceremony



The Japan Prize Presentation Ceremony was a grand occasion during the Japan Prize Week, graced with the presence of Their Majesties the Emperor and Empress and attended by roughly 1,000 audience members including dignitaries from government, industry and academia, as well as families and friends of the laureates. During the ceremony, Dr. Takahasi, Dr. Friedmann and Prof. Fischer each received a certificate of recognition and a commemorative gold medal. By holding the medal high, the laureates acknowledged the applause of the packed audience. Dr. Hiroyuki Yoshikawa, Chairman of the Japan Prize Foundation, also presented bouquets of flowers to the wives of the laureates, who were on the stage as well. In the commemorative concert following the award presentation, the Tokyo Geidai Symphony Orchestra played numbers requested in advance by the laureates, including movements from Mozart's Symphony No. 38 in D major, K. 504 "Prague," Smetana's symphonic poem "Moldau" and Brahms' Symphony No. 4 in E minor, Op. 98. Every year, the ceremony is opened with an orchestral performance of Minoru Miki's "Overture to Japan Prize Ceremony - Overture Japan" since 1990 - at the sixth annual ceremony - when the internationally renowned Japanese composer dedicated the piece to Japan Prize laureates.



Dr. & Mrs. Yutaka Takahasi



Dr. & Mrs. Theodore Friedmann



Prof. & Mrs. Alain Fischer



Their Majesties the Emperor and Empress attending the commemorative concert



Congratulatory address by H.E. Mr. Tadamori Oshima, Speaker of the House of Representatives



Opening remarks by Dr. Yoshio Yazaki, President of the Japan Prize Foundation



Selection results by Dr. Hiroshi Komiyama, Chairman of the Selection Committee



Commemorative concert by the Tokyo Geidai Symphony Orchestra

Banquet



Following the Presentation Ceremony, a banquet was held at a hotel in Tokyo. The banquet, which was attended by more than 300 people, was opened by His Majesty the Emperor proposing a toast to the laureates. In a graceful atmosphere, with a string quartet and a harpist playing music live in the background, the laureates sitting at the center table enjoyed the dinner and conversations with Their Majesties the Emperor and Empress. The banquet lasted about an hour and a half and was concluded with a congratulatory address by Masaaki Yamazaki, President of House of Councillors, and courteous acknowledgements by the laureates. Dr. Takahasi told how he has come to develop the concept of an integrated river basin management and expressed a feeling of gratitude toward the rich and diverse Japanese rivers that fostered his vision of nature and the Japanese homeland that nurtured such rivers. Dr. Friedmann and Prof. Fischer, co-winners of the Medical Science and Medicinal Science award, told how they gave birth to an innovative medicine and its potentials. Showing respect for each other, the two scientists also expressed their appreciation for their patients and patients' families and colleagues in the scientific community.



|| Toast by His Majesty the Emperor of Japan



|| Congratulatory address by H.E. Mr. Masaaki Yamazaki, President of House of Councillors



|| Opening address by Prof. Hiroyuki Yoshikawa, Chairman of the Japan Prize Foundation



|| Acknowledgment by Dr. Yutaka Takahasi



|| Acknowledgment by Dr. Theodore Friedmann



|| Acknowledgment by Prof. Alain Fischer

Commemorative Lectures

Prior to the prize presentation ceremony, Dr. Takahasi, Dr. Friedmann and Prof. Fischer gave lectures commemorating their receipt of the Japan Prize at Ito Hall on the campus of the University of Tokyo on April 21. Before a packed audience of about 300, Dr. Takahasi presented the history of river engineering in Japan with examples of flood control measures taken in the country. He also introduced leaders who have driven progress in the field. Dr. Friedmann looked back how his innovative concept of gene therapy has become a reality, and Prof. Fischer explained how the therapy works and its potentials as a medical treatment beyond genetic diseases and refractory diseases. The laureates also conveyed messages to young scientists in their respective fields. It was also revealed that the publisher of Dr. Takahasi's book titled "Transformation of National Land and Water-related Disasters" has decided to revive it in the wake of his winning of the Japan Prize. The book was first published in 1971.

Resources, Energy and Social Infrastructure" field



Theme

The History of the Japanese People and River Engineering (Dr. Yutaka Takahasi)

Dr. Takahasi began his career as a researcher at a time when Japan was suffering a succession of major flood disasters brought about by Typhoon Kathleen (1947) and Isewan Typhoon (1959). He scientifically analyzed the effect that modernizations and river improvement from the Meiji era onwards have had on water-related disasters. The findings were published in his 1971 publication "Transformation of National Land and Water-related Disasters," thoroughly proposing the concepts which became the foundation of today's comprehensive flood control.

At this year's commemorative lecture by Dr. Takahasi titled "The History of the Japanese People and River Engineering," he pointed out that the origin of river engineering can be traced back to mankind's struggle against flood disasters since ancient times.

For example, Japan's first full-fledged river engineering project is said to be Shingen-zutsumi, a dike built by warlord Takeda Shingen during the Warring States period in the 16th century. Modeled after the Dujiangyan irrigation system built in China during the 3rd century BC, its purpose was to prevent flood disasters in the Kofu Basin in Shingen's domain, caused by overflowing of Fuji River. Dr. Takahasi said: "The entire Shingen-zutsumi can be seen if you climb to the top of a nearby cliff called Takaiwa. Standing here and overlooking the river, I think Takeda Shingen came up with a strategy to allow for natural flooding but prevent it where it was crucial." This is in line with the present concept of river improvement.

Dr. Takahasi then introduced Japanese experts who led the advancement of river engineering in Japan, showing examples of their achievements. With firm beliefs and a high sense of morality that public works projects should be carried out for the benefit of mankind, the leaders engaged in heated but constructive discussions. Dr. Takahasi reiterated the importance of exchanging opinions, saying that the serious debates of our predecessors served as the cornerstone of a safer homeland.

In concluding his lecture, Dr. Takahasi urged young researchers to take the trouble of visiting rivers themselves and observe a river carefully through the five physical senses.

"Medical Science and Medicinal Science" field



Theme

Gene Therapy – A 45 Year Journey from Concept to a New Medicine (Dr. Friedmann)

Gene Therapy, from Primary Immunodeficiencies to Diversified Indications (Prof. Fischer)

Gene therapy is a treatment method in which genes are artificially transferred into patient's cells in order to cure diseases. In 1972, Dr. Theodore Friedmann published an important paper outlining the concept of gene therapy and proposed a way forward in research. He also shed light on the ethical issues surrounding gene therapy, and has been an opinion leader on its social impact. At Dr. Friedmann's commemorative lecture titled "Gene Therapy – A 45 Year Journey from Concept to a New Medicine," he talked about the Lesch-Nyhan syndrome, which originally led him in the direction of gene therapy.

Dr. Friedmann hypothesized that clinical application would be a possibility if genes could be transferred efficiently and safely into many cells at once, and went on to evaluate and systematize various techniques. His 1972 paper, "Gene Therapy for Human Genetic Disease?" is the result of this research, which had a huge influence on researchers.

The first to come out with a breakthrough was the research team led by Prof. Alain Fischer. In 1999, Prof. Fischer conducted gene therapy on patients suffering from X-linked severe combined immunodeficiency and verified its clinical effectiveness for the first time. Prof. Fischer at his commemorative lecture titled "Gene Therapy, from Primary Immunodeficiencies to Diversified Indications" stressed the importance of developing a treatment for congenital immunodeficiency.

Today, gene therapy is on the brink of a rapid progression. Dr. Friedmann also introduced new possibilities in gene therapy, such as the treatment of cancer, retinal disease and even a gene therapy based HIV vaccine. Talking about the future, Prof. Fischer shared his vision of a "more elegant" form of gene therapy which would not only transfer therapeutic genes into cells, but also repair the patient's abnormal genes.

Japan Prize Week

J A P A N P R I Z E W E E K P H O T O S

4/20
(Mon.)

Welcome Reception



French Embassy Party



4/21
(Tue.)

Courtesy Call on the Japan Academy



Courtesy Call on the Prime Minister



Commemorative Lectures



4/22
(Wed.)

Tea Party hosted by U.S. Embassy



Academic Roundtable Discussion



4/23
(Thu.)

Presentation Ceremony



Banquet



4/25
(Sat.)

Sightseeing in Kyoto



In Katsura Imperial Villa



In Matsushita Shinshin-An

Fields Eligible for the 2016 Japan Prize

Area of
Physics, Chemistry and Engineering

Materials and Production

Background and rationale:

Discoveries and inventions of new materials with nonconventional functionality and characteristics as well as of advanced production technologies have brought about numerous technological innovations, thereby contributing greatly to the advancement of society.

For instance, we have designed and successfully synthesized artificial materials with new functions, such as semiconductors, polymers, nano-materials, and catalysts, and discovered new natural products. We have also developed new fields of industrial engineering such as design and manufacturing technologies supported by high-performance computers, precision measurement techniques, and robotics that contribute to the efficiency of production process.

In order to make effective use of finite resources and build a sustainable society for the future, a new paradigm for the development of materials with new functions and groundbreaking technologies for industrial design, production and operation are necessary.

Achievement eligible:

The 2016 Japan Prize in the fields of “Materials and Production” will be awarded to individuals who have made significant contributions to society by achieving momentous scientific and technological breakthroughs that improve the quality and safety of people’s lives while ensuring the sustainability of society by designing and developing materials with new functions, or by advancing the technologies for industrial design, production and operation, that will create new products, services and industries.

Area of
Life Science, Agriculture and Medicine

Biological Production and Biological Environment

Background and rationale:

The existence of human beings is completely dependent on the continuous and diverse use of Earth’s biological resources. In recent years, however, the biological environment of our planet, which fosters indispensable biological resources, is deteriorating rapidly. Despite many technological innovations that have dramatically increased our food production capacity, the human race is set to outgrow that capacity at an even greater pace and environmental issues are on the rise.

In order to maintain the precious biological environment of our global society, there is an ever-growing need for development of sustainable and environmentally conscious biological production technologies, as well as creation of environmental technologies for the conservation of biodiversity.

Achievement eligible:

The 2016 Japan Prize in the fields of “Biological Production and Biological Environment” will be awarded to individuals who have made significant contributions to the welfare of society by achieving momentous scientific and technological breakthroughs in the improvement of biological production of food and other useful materials to overcome hunger and poverty as well as to assure their safety, or in the development of technologies that will measure and evaluate the effects of human activity on the environment or serve as environmental countermeasures, thereby helping to protect and conserve the biological environment and biodiversity.

The Japan Prize Foundation

The Japan Prize Foundation was established in 1982, with the aim of contributing to the further development of science and technology. In addition to recognizing outstanding achievements with the Japan Prize, the Foundation has been promoting science and technology by hosting the "Easy-to-understand Science and Technology Seminars" and awarding Research Grants to help nurture young scientists.



Research Grants

The Foundation provides research grants to scientists and researchers under 35 years of age. Every year, the Foundation selects projects in the same fields as the corresponding Japan Prize and gives one million Japanese yen for a project. In 2015, studies in “Clean & Sustainable Energy” were added as an eligible field of study to the two fields designated for the 2015 Japan Prize. Including the 20 recipients in 2015, the Foundation awarded research grants to 181 young scientists since the program’s inception in 2006.



“Easy-to-Understand Science and Technology Seminars”

For junior and senior high school students, the Foundation holds a series of seminars on advanced technologies commonly used in everyday life by inviting Research Grant recipients as lecturers. They explain state-of-the-art technologies in plain terms. The program began in March 1989 and has since executed 252 seminars across Japan by the end of 2014.



Stockholm International Youth Science Seminar (SIYSS)

Each year, the Japan Prize Foundation provides an opportunity for young scientists to exchange opinions with their peers on an international level by sending two students to the Stockholm International Youth Science Seminar hosted by the Swedish Federation of Young scientists with the support of the Nobel Foundation. Young scientists from Japan and elsewhere in the world attend various events during Nobel Week in Stockholm. Since the program started in 1987, the Japan Prize Foundation has provided this valuable opportunity to 54 undergraduate/ graduate students.