THE JAPAN PRIZE FOUNDATION

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Japan Prize News

No. 69 Jan. 2024

JAPAN PRIZE

2024 Japan Prize Laureates Announced

Prof. Sir Brian J. Hoskins

Professor, Department of Meteorology,
University of Reading

UK

Prof. John Michael Wallace

Professor Emeritus, Department of Atmospheric Sciences,
University of Washington

USA

Prof. Ronald M. Evans

Professor, Director of Gene Expression Laboratory,
The Salk Institute for Biological Studies

USA

Fields Eligible for the Award:
Resources, Energy, the Environment, and Social Infrastructure

Establishment of a scientific foundation for understanding and predicting extreme weather events

The summer of 2023 saw reports of environmental damage due to heat waves, heavy rain, and drought throughout the northern hemisphere. Japan also experienced record heat levels, and the Japan Meteorological Agency released a season forecast in June that predicted that temperatures would continue to trend higher.

Weather and climate are complex phenomena that involve various factors, but the continued advancement of computer, observation, and forecast technologies and techniques have allowed for computational numerical weather and climate forecasting to offer a practical level of accuracy, and it has become an essential element of the social infrastructure. Much progress has also been made in clarifying the actual conditions found when atmospheric circulation changes at various spatiotemporal scales, and in determining their underlying mechanisms. It is now possible to understand not only weather phenomena in specific regions, but also how the effects of changes in atmospheric circulation in distant regions are transmitted through the atmosphere on a global scale.

Since the 1970s, Prof. Sir Brian Hoskins (theoretical and numerical models) and Prof. John Wallace (data analysis) have conducted research in this field, and their almost five decades of work has contributed greatly to these advancements in meteorology and climate dynamics.

The field of numerical weather and climate forecasting is built upon the research of these two scientific allies, and now plays a major societal role in predicting abnormal weather caused by global warming and helping prevent and mitigate disasters.

Fields Eligible for the Award:
Medical Science and Pharmaceutical Science

Discovery of the nuclear hormone receptor family and its application to drug development

Within the human body are a great number of hormones that regulate various functions. Hormones are either water-soluble or fat-soluble, and although it was understood that fat-soluble hormones are able to pass through cell membranes to reach nuclei, the receptors of those hormones were unknown for a long time.

Prof. Ronald Evans was the first researcher in the world to successfully isolate the receptors of fat-soluble hormones and vitamins, and he discovered that these nuclear receptors are a part of a “superfamily” of molecules that have a common structure. He also showed that nuclear receptors function as “transcriptional regulators,” which regulate the transcription (or conversion) of target genes.

These have led to faster drug development, and now roughly 15% of drugs approved by the U.S. Food and Drug Administration (FDA) target nuclear receptors.

Evans’ success in gaining a complete understanding of the 48-member nuclear receptor superfamily has not only contributed greatly to academic research, but also to society as a whole.

JAPAN PRIZE

The establishment of the Japan Prize was motivated by the Japanese government's desire to create an internationally recognized award that would contribute to scientific and technological development around the world. With the support of numerous donations, the Japan Prize Foundation received endorsement from the Cabinet Office in 1983.

The Japan Prize is awarded to scientists and engineers from around the world who have made creative and dramatic achievements that help progress their fields and contribute significantly to realizing peace and prosperity for all humanity.

Researchers in all fields of science and technology are eligible for the award, with two fields selected each year in consideration of current trends in scientific and technological development. In principle, one individual in each field is recognized with the award, and receives a certificate, a medal, and a monetary prize. Each Award Ceremony is attended by the current Emperor and Empress, heads of the three branches of government and other related officials, and representatives from various other elements of society.

Fields of Resources, Energy, the Environment, and Social Infrastructure

Achievement

Establishment of a scientific foundation for understanding and predicting extreme weather events

Prof. Sir Brian J. Hoskins (UK)
Born: May 17, 1945 (Age: 78)
Professor, Department of Meteorology,
University of Reading

Prof. John Michael Wallace (USA)
Born: October 28, 1940 (Age: 83)
Professor Emeritus, Department of Atmospheric Sciences,
University of Washington

Teleconnection – an essential element of numerical weather and climate prediction

One of the most important achievements made by Prof. Sir Brian Hoskins and Prof. John Wallace is their clarification of the conditions and mechanisms underlying "teleconnection," which explain how abnormal weather in one region affects weather in distant regions. Figure 1 illustrates how distinct weather trends are produced from highly persistent fluctuations mainly in the tropical atmosphere-ocean coupled system to affect winter and summer in the mid-high latitudes in the northern hemisphere. The "westerlies" are prevailing winds that blow from the west at mid-latitudes (shown by the dashed yellow line with arrows), and their continuous meandering leads to abnormal weather.

When using numerical weather and climate prediction, it is necessary to understand that atmospheric conditions in one region are constantly susceptible to fluctuations and changes due to the influence of atmospheric, oceanic, and sea ice conditions in distant regions. This is particularly true for seasonal weather prediction in the mid-latitudes on scales greater than two weeks, as it is understood that such predictions can be based upon teleconnection effects from highly persistent climatic fluctuations such as the El Niño/La Niña phenomena – in which trade winds and oceanic changes interact with each other in the equatorial Pacific – and decadal fluctuations in the Pacific Ocean. Those persistent fluctuations in the tropics can therefore act as sources of predictability of mid-latitude weather conditions on seasonal scales via "teleconnection".

Data-based and theoretical explanation for the Pacific-North American Pattern

Figure 2 provides a more detailed look of the left side of Figure 1, and shows Wallace's 1981 discovery of the "Pacific-North American Pattern," which arises out of the teleconnection effects of El Niño. That same year, Hoskins provided a theoretical explanation of the dynamic processes that form such fluctuations in atmospheric patterns. During El Niño, the water becomes warmer than usual across an area of the equatorial Pacific Ocean from around the International Date Line to the Peruvian coast of South America. Precipitation there increases, becoming a source of heat and generating large-scale atmospheric waves called "Rossby waves." Figure 2 illustrates how such waves result in alternating anticyclonic (H– clockwise in the northern hemisphere) and cyclonic (L – counterclockwise in the northern hemisphere) atmospheric circulation anomalies thousands of kilometers wide.

Subtropical and mid-latitude westerlies (or jet streams) play an important role in forming these patterns. The anticyclonic and cyclonic patterns generated by Rossby waves tend to move westwards, but strong westerly winds in winter and other periods halt that westward movement and holding those patterns in place, as is seen in the Pacific-North American Pattern. When this occurs, energy propagates with the pattern, resulting in the effects of El Niño being felt throughout North America and as far as the North Atlantic Ocean. The westerlies (red arrows in Figure 2) meander to a great extent due to their overlapping with Rossby waves, thereby resulting in abnormal weather that is persistent.

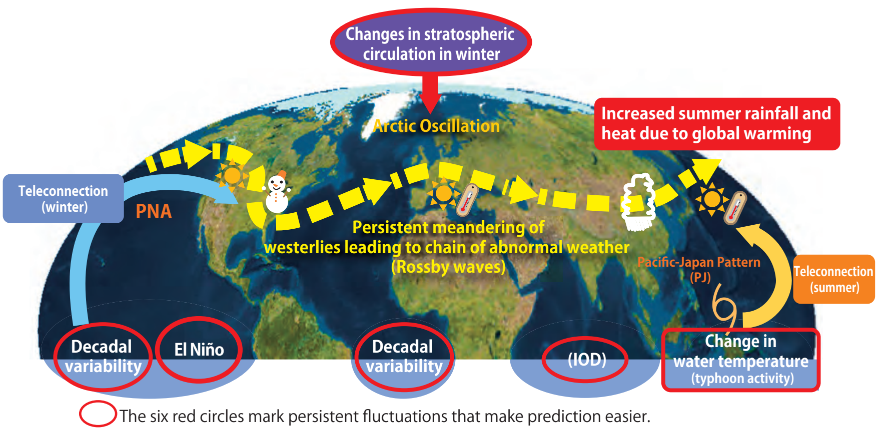
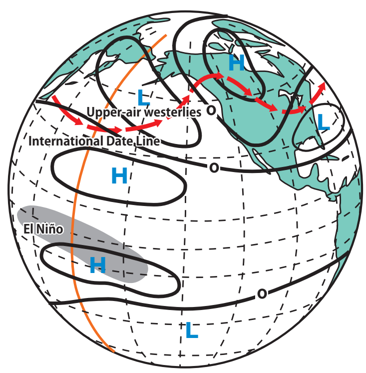


Figure 1: Illustration of how the "teleconnection" phenomenon established by Hoskins and Wallace can be applied to describe natural climate variations

This reveals the teleconnection effects of variations in tropical atmosphere-ocean coupled systems (El Niño/La Niña, Indian Ocean Dipole (IOD), decadal variability) and demonstrates the predictability of seasonal weather events. The IOD is a climate change phenomenon that occurs every few years from summer to autumn in the Indian Ocean tropical region.



J.D.Horel, J.M.Wallace, *Mon. Wea. Rev.* **1981**, *109*, 813.

Figure 2: The Pacific-North American Pattern generated by El Niño.

El Niño generates anticyclonic (H) and cyclonic (L) circulation anomalies through teleconnection.

Making weather and climate prediction possible

Hoskins numerically calculated how stagnant Rossby waves are excited when a simulated heat source with increased precipitation is placed near 15 degrees north latitude, and how that will lead to anticyclonic (H) and cyclonic (L) circulation anomalies forming in the upper atmosphere (see left side of Figure 3).

Meanwhile, Wallace conducted a statistical analysis of roughly fifteen years of objective weather observation data from various regions in the northern hemisphere that had been gathered to provide initial values for numerical weather forecasts. In that data, he discovered several types of atmospheric pressure fluctuation patterns with alternating and persistent anticyclonic and cyclonic circulation anomalies.

The righthand illustration of Figure 3 depicts the typical distribution of pressure anomalies that eventually appear in the middle troposphere after the arrival of an often-observed teleconnection pattern in the western Atlantic. This pattern coincides well with Hoskins' numerical calculations (lefthand illustration of Figure 3), and it was an extremely important discovery that greatly advanced the predictability of persistent weather anomalies.

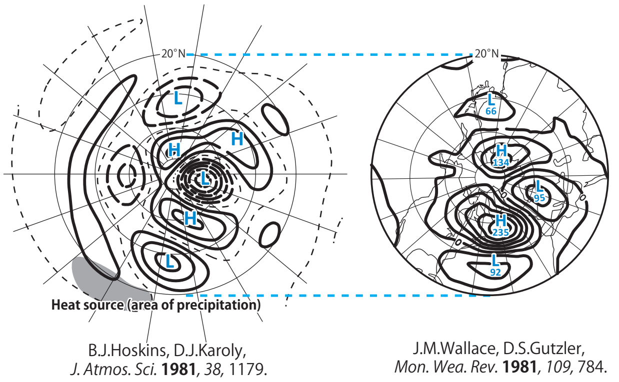


Figure 3: Atmospheric circulation anomalies as derived theoretically (left, Hoskins) and from observational data (right, Wallace). Both views are shown from above the North Pole.

The increasing importance of numerical weather and climate prediction

The primary success of the work of these two researchers was their discovery of global-scale fluctuations in the westerlies driven by El Niño, and this has become one of the foundations of seasonal weather prediction around the world. However, their work resulted in more advancements that could be listed here, but included the identification of mechanisms through which extratropical cyclones are generated and the regions in which they are active, both of are essential for daily weather forecasting; the dynamics behind the formation of blocking anticyclones (or blocking highs) which cause abnormal weather; the discovery of hemisphere-scale fluctuations in the westerlies (the Arctic Oscillation); and the identification of decadal fluctuations in the Pacific atmosphere-ocean coupled system that accelerate and decelerate increases in the global temperature. Many of these successes were achieved through Hoskins constructing theoretical models and Wallace understanding actual conditions using observational data, and their work has become the cornerstone of useful, practical, and promising numerical weather and climate prediction. It also led to the use of atmospheric reanalysis data in monitoring climate change.

In addition, their work is also useful in studying weather anomalies arising from global warming, a subject that is of growing concern, by showing how regional weather effects can be described using the knowledge of meteorology and climate dynamics that has been accumulated over the years. Numerical weather and climate prediction will become an increasingly important part of the social infrastructure that protects human lives.

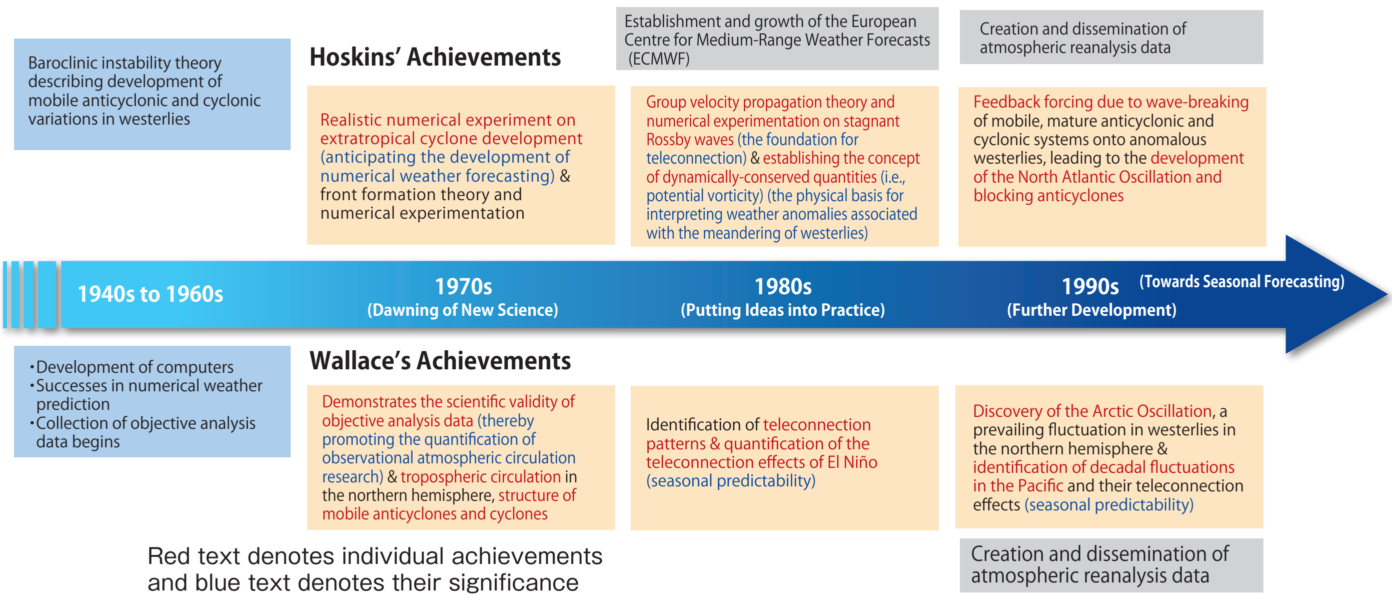


Figure 4: A selection of contributions made by Hoskins and Wallace to the advancement of weather and climate prediction.

Field of Medical Science and Pharmaceutical Science

Achievement

Discovery of the nuclear hormone receptor family and its application to drug development

Prof. Ronald M. Evans (USA)

Born: April 17, 1949 (Age: 74)
Professor, Director of Gene Expression Laboratory,
The Salk Institute for Biological Studies

Nuclear receptors that bind fat-soluble hormones and vitamins

The human body maintains homeostasis through the action of various hormones. Hormones are secreted into the blood, and then transported throughout the body to reach the cells of their target organs. The hormones then bind to "receptors" within the cells, and this acts as a trigger to activate the effects associated with those hormones.

Hormones come in two types: water-soluble and fat-soluble. Water-soluble hormone receptors are present in cell membranes, and when a hormone binds with them, the receptors in the cell membrane transmit information into the cell.

Meanwhile, thyroid and other fat-soluble hormones pass through the cell membrane to enter the cell, and can even travel into the nucleus. That is why it was thought that fat-soluble hormone receptors would be present within cells, including inside the nucleus, but those receptors remained unidentified for a long time.

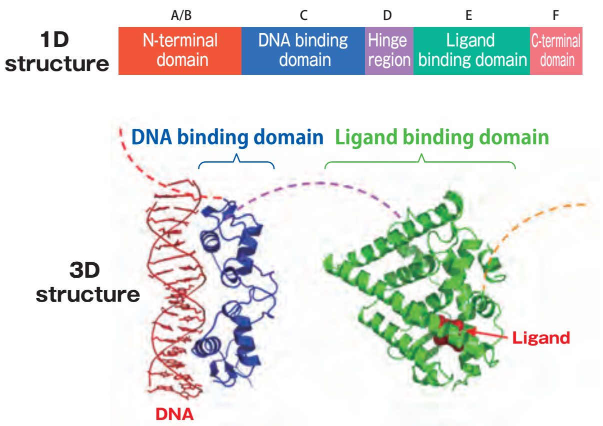
Prof. Ronald Evans was the first researcher in the world to isolate the receptor for the fat-soluble hormone called glucocorticoid, and revealed its structure as a nuclear receptor (Fig. 1).

The functions of the nuclear receptor superfamily

Evans went on to identify a number of new nuclear receptors since isolating the glucocorticoid receptor. He found the receptors for estrogen and thyroid hormones, and also revealed that the receptors for fat-soluble vitamins such as vitamin D and vitamin A are actually nuclear receptors. These led to the understanding that these nuclear receptors are part of a "superfamily" of related molecules with very similar structures and functions.

Nuclear receptors are activated after binding with ligands (hormones, vitamins, and other substances that bind specifically to receptors), and regulate the expression of target genes with specific DNA sequences at the transcription level (Fig.2). Information is transmitted in this way, and this is how hormones and vitamins interact with receptors. In other words, this shows that nuclear receptors act as receptors for fat-soluble hormones, vitamins, and other ligands, and also act as so-called "transcription control factors."

Prior to Evans' work, it was not known that all fat-soluble hormones and vitamins transmit information through a basic shared mechanism. There are 48 types of nuclear receptor within the human body, and his work in clarifying the overall picture surrounding this nuclear receptor superfamily opened the door to new research possibilities in the fields of molecular biology and endocrinology.



Source: https://en.wikipedia.org/wiki/Nuclear_receptor

Figure 1: Structural Organization of Nuclear Receptors

Top: Schematic 1D diagram of a nuclear receptor. All nuclear receptors of fat-soluble hormones and vitamins share this basic structure. Bottom: 3D structure of a nuclear receptor.

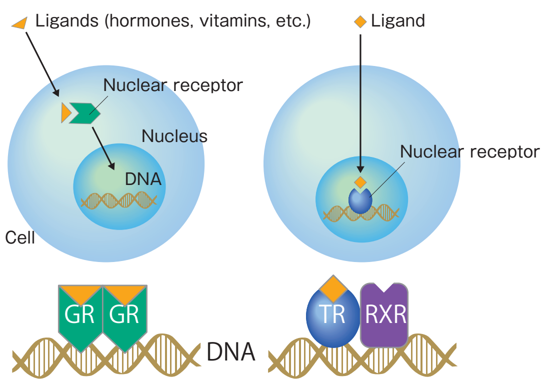


Figure 2: Nuclear receptor function

Nuclear receptors transmit information through one of two mechanisms: through binding with a ligand in the cytoplasm and moving into the nucleus (left), or through binding with a ligand within the nuclear (right). An example of the former is the glucocorticoid receptor (GR), which forms homodimers (a pair of identical molecules bound together) then acts as a transcriptional regulatory factor. An example of the latter is a thyroid hormone receptor (TR), which functions by binding with a retinoid X receptor (RXR) to form a heterodimer (a pair of different molecules bound together). It has also been shown that RXR form dimers with many other nuclear receptors.

Physiological effects and diseases involving nuclear receptors

Members of the nuclear receptor superfamily are present in every tissue in the human body, and they control a variety of physiological activities, including the metabolism, immunity, inflammation, reproduction, bone formation, and cell differentiation and proliferation (Fig. 3). Nuclear receptor functions are associated with a number of diseases, so a number of drugs have been developed to target those nuclear receptors. The United States Food and Drug Administration (FDA) is responsible for approving drugs in the US, and around 15% of the drugs it has approved target nuclear receptors.

For example, clarifying the base of activity mediated by glucocorticoid receptors has led to the development of immunosuppressants and other drugs used to treat various infectious diseases, rheumatoid arthritis, asthma, and more, and these are now being used around the world. In addition, research into vitamin A and vitamin D receptors has revealed the effects of fat-soluble vitamins, which has led to the widespread use of these vitamins in the treatment of leukemia, osteoporosis, psoriasis, and other illnesses.

Opening the door to further drug discovery through an understanding of nuclear receptors

Many members of the nuclear receptor superfamily were referred to as “orphan receptors” when they were first discovered, because the ligands they would bind with were as yet unknown. Evans isolated a number of orphan receptors, including estrogen related receptors (ERR), the retinoid X receptor (RXR), and the peroxisome proliferator-activated receptor γ (PPARγ), and managed to identify some of their associated ligands.

In the case of PPARγ, a nuclear receptor closely associated with adipocyte differentiation and glucose-lipid metabolism, Evans not only identified its endogenous ligands (naturally-occurring ligands present in the body), but he also determined that thiazolidine derivatives used in the treatment of diabetes can act as synthetic ligands for PPARγ.

When controlling transcription, nuclear receptors either activate or suppress transcription by binding to proteins called “transcription coactivators.” Evans was also able to successfully isolate transcription coactivators like SMRT, which play an important role in specific organ and tissue functions. This research led to a better understanding of the basis of action and clinical application of selective estrogen receptor modulators (SERM), which are typically used in the treatment of post-menopausal osteoporosis, and of anti-cancer drugs used in treating hormone-responsive cancers (breast cancer, uterine cancer, prostate cancer, etc.)

In these many ways, Prof. Ronald Evans’ success in clarifying the overall picture of the nuclear receptor superfamily has not only made an immense contribution to academic research, but also to society as a whole, through his research’s impact on drug discovery, clinical medicine, pharmacology, and more.

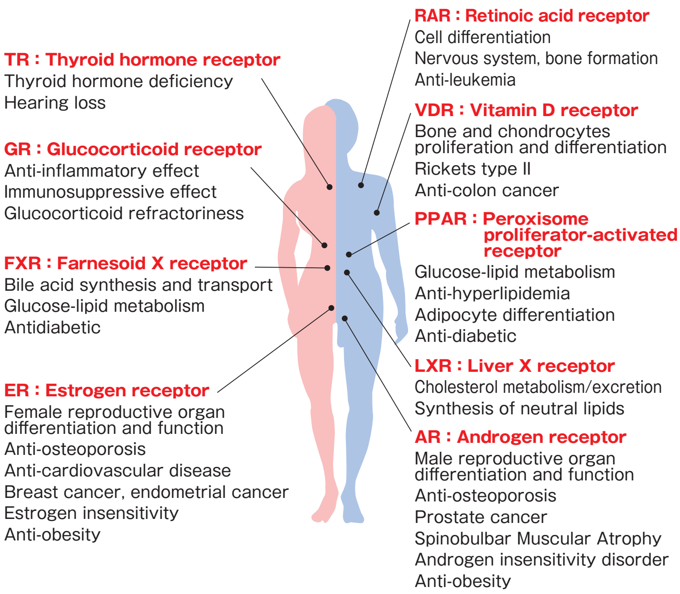


Figure 3: Physiological effects of nuclear receptor superfamily members within the human body, and diseases and therapeutic drugs associated with them.

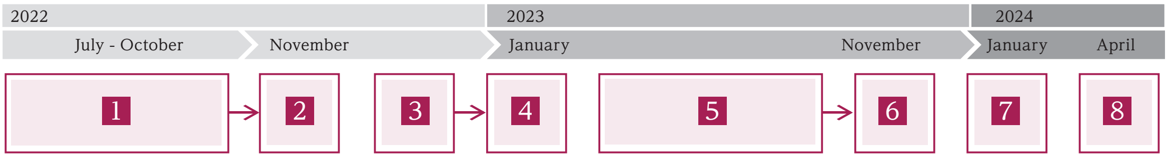
Table 1: History of the discovery of the nuclear receptor superfamily

Year	Event
1985	First NR cloned (GR)
1986	Cloning of receptor Cloning of thyroid hormone receptor
1987	Cloning of VDR, RAR
1988	Concept of NR superfamily proposed
1990	RXR isolated
1991	Direct repeats revealed to be response elements (3-4-5 rule) Isolation of first PPAR
1992	Identification of first orphan receptor ligand (9-cis RA:RXR) Concept of RXR heterodimer proposed
1995	X-ray structural analysis of RXR-TR heterodimer on direct repeat DNA Cloning of SRC family NR transcription co-factors and N-CoR/SMRT Isolation of LXR, FXR
1996	CBP/p300 revealed to be NR co-activators Discovery that N-CoR/SMRTs bind with HDACs
1998	Isolation of PXR and CAR xenobiotic receptor
1999	1st orphan ligand clinically approved (RXR agonist)
2005	First analysis of NR cistrome
2006	Atlas profiling of NR expression & the Ring of Physiology
2008	X-ray structural analysis of intact receptor on DNA

Re-organized excerpt from Evans, R.M. & Mangelsdorf, D.J. (2014). Nuclear Receptors, RXR, and the Big Bang. Cell 157(1), 255–66.

Nomination and Selection Process

- Every November, the Field Selection Committee of The Japan Prize Foundation designates and announces two fields in which the Japan Prize will be awarded two years hence. At the same time, the Foundation calls for over 15,500 nominators, strictly comprised of prominent scientists and researchers from around the world invited by the Foundation, to nominate the candidates through the Web System. The deadline for nominations is the end of January of the following year.
- For each field, a Selection Subcommittee conducts a rigorous evaluation of the candidates' academic achievements. The conclusions are then forwarded to the Selection Committee, which conducts evaluations of candidates' achievements from a wider perspective, including contributions to the progress of science and technology, and significant advancement towards the cause of world peace and prosperity, and finally the selected candidates are recommended for the Prize.
- The recommendations are then sent to the Foundation's Board of Directors, which makes the final decision on the winners.
- The nomination and selection process takes almost two years from the time that the fields are decided. Every January, the winners of that year's Japan Prize are announced. The Presentation Ceremony is held in April in Tokyo.



1 Consider the eligible fields for the 2024 Japan Prize (Board of Directors)
Energy, the Environment, and Social Infrastructure
Medical Science and Pharmaceutical Science

2 Determine the eligible fields for the 2024 Japan Prize (Board of Directors)

3 Invite the nominations

4 Closing of the nominations

5 Japan Prize (Selection Committee)
Energy, Environment, and Social Infrastructure (Selection Subcommittee)
Medical Science and Pharmaceutical Science (Selection Subcommittee)

6 Selecting the Laureates of the 2024 Japan Prize (Board of Directors)

7 Announce the Laureates of the 2024 Japan Prize

8 The 2024 Japan Prize Presentation Ceremony

Members of the 2024 Japan Prize Selection Committee

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Makoto Asashima
Director General
of Advanced Comprehensive Research Organization
Research Professor, Teikyo University
Academic Advisor, Japan Society for the Promotion of Science
Professor Emeritus, The University of Tokyo

Deputy Chairman

Yoichiro Matsumoto
Professor Emeritus
The University of Tokyo

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Professor Emeritus, The Graduate University for Advanced Studies, SOKENDAI

Hiroto Ishida
Adviser
The Japan Prize Foundation

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Center Director, Innovation Center of NanoMedicine (iCONM)
Professor Emeritus, The University of Tokyo

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University of Tsukuba

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Keio University School of Medicine

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Professor, School of Engineering, The University of Tokyo

Hiroto Yasuura
Director General, Fukuoka Asian Urban Research Center
Vice-Director-General, National Institute of Informatics,
Inter-University Research Institute Corporation,
Research Organization of Information and Systems
Professor Emeritus, Kyushu University

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Professor, School of Engineering, The University of Tokyo

Deputy Chairman

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Advanced Institute for Materials Research, Tohoku University

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Kyushu University

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The University of Tokyo

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Professor Emeritus, Hokkaido University

Yoshihiro Mizuguchi
Executive Officer Chief Technology Officer
Sustainability Co-Creation Unit
JGC HOLDINGS CORPORATION

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The University of Tokyo

Hisashi Nakamura
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The University of Tokyo

Nobuko Saigusa
Director
Earth System Division, National Institute for Environmental Studies

Tohru Setoyama
Executive Fellow, Mitsubishi Chemical Corporation

Chiharu Tokoro
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Professor, Graduate School of Engineering, The University of Tokyo

Specialist

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Vice President, Kobe University
Professor, Graduate School of Science, Technology and Innovation, Kobe University

Shunsuke Ono
Associate Professor, School of Computing, Tokyo Institute of Technology

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Keio University School of Medicine

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Professor
Graduate School of Pharmaceutical Sciences
The University of Tokyo

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Atsushi Kumanogoh
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Graduate School of Medicine, Osaka University

Shoen Kume
Professor
School of Life Science and Technology, Tokyo Institute of Technology

Seishi Ogawa
Professor
Graduate School of Medicine, Kyoto University

Hiroyuki Sasaki
University Professor, Institute for Advanced Study, Kyushu University
Specially-Appointed Professor, Medical Institute of Bioregulation
Kyushu University

Tomomi Shimogori
Team Leader
Center for Brain Science, RIKEN

Taisuke Tomita
Professor
Graduate School of Pharmaceutical Sciences, The University of Tokyo

Yasuteru Urano
Professor
Graduate School of Pharmaceutical Sciences, The University of Tokyo

Akihiko Yoshimura
Professor
Keio University School of Medicine

(Names listed in alphabetical order. Titles and positions are valid as of January 2024)

Eligible Fields for the 2025 Japan Prize

Areas of Physics, Chemistry, Informatics, and Engineering

Materials Science and Production

Background and Rationale:

Rapid developments in science and technology have made 21st century society increasingly dependent on the development of new materials and innovative manufacturing technologies. Advanced materials are driving technological innovation in energy, medicine, information and communication, environmental protection, nanotechnology, and a wide range of other fields. Examples of materials under active research include energy-related materials such as high-performance batteries; biomaterials that could help people live longer and healthier lives; optical and semiconductor materials that enable ultrafast information processing and transmission; new functional materials that harness quantum phenomena; and structural materials used to build the infrastructure that forms the backbone of society. The world is also seeing major technological innovations in manufacturing and production, from automated technologies using 3D printers and AI, to energy-saving/zero-emission manufacturing technologies and recycling technologies aimed at building a sustainable society. Materials informatics (MI) is another field that has seen remarkable progress in recent years, and MI research is expected to revolutionize conventional material design and manufacturing technologies. Such advances are extremely important as they will enrich our lives and help build a sustainable society.

Eligible Achievements:

The 2025 Japan Prize in the fields of Materials Science and Production will be awarded for the discovery or development of materials that lead to breakthrough advances in science and technology, or for dramatic advancements in manufacturing technology that result in new products, services, or industries.

Areas of Life Sciences, Agriculture, Medicine, and Pharmacology

Biological Production, Ecology/Environment

Background and Rationale:

Throughout history, by raising crops and livestock and accumulating experience and know-how, humans have improved biological production techniques and made production methods ever more efficient. In more recent times, scientific and technical advances have vastly increased the productivity of those methods and contributed to rapid population growth. On the other hand, biological production’s growth has brought with it increasingly serious deterioration of our planet’s environment and loss of biodiversity.

To take full advantage of ecosystem services and ensure stable and sustainable biological production, innovations in science and technology that emphasize protection of the environment and ecosystems are indispensable. Notable areas of innovation include, for example, development of cultivation systems and plant varieties adapted to different regional climates and operating scales; optimization of farming processes and environmental monitoring through the use of sensing and information and communications technology (ICT); improvement in efficiency and precision of biological production through the utilization of robotics; improvement of food processing techniques and food functionality; reduction of food loss and waste; and diminution of greenhouse gas emissions in all aspects of production, processing, distribution, and consumption. Anticipated are the development of novel “bioproducts” derived from renewable biological material and the development of new production processes that make use of living organisms’ biological functions. Methods must also be found to ensure a more equitable distribution of products among regions and social classes, and to assess fairly the multifaceted values of agriculture, forestry, and fisheries industries with roots in local communities.

Eligible Achievements :

The 2025 Japan Prize in Biological Production and Ecology/Environment will reward achievements that have created, extended, or propagated major steps forward in scientific technology and, by advancing basic science related to ecology and environmental science and biological-production-related science and technology, have made or have the potential to make major contributions to sustainable development of human society in harmony with our ecosystem.

Fields Selection Committee for the 2025 Japan Prize

Chairman

Kohei Miyazono
Executive Director, RIKEN
Distinguished University Professor, Department of Applied Pathology, Graduate School of Medicine, The University of Tokyo

Vice Chairman

Kazuhito Hashimoto
President
Japan Science and Technology Agency

Members

Hiroyuki Arai
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Emeritus Professor, The University of Tokyo

Mutsuko Hatano
Professor, Senior Aide to President Department of Electrical and Electronic Engineering, School of Engineering, Tokyo Institute of Technology

Kazuhiro Hono
President
National Institute for Materials Science (NIMS)

Jinichi Igarashi
Adviser, ENEOS Research Institute, Ltd.
Former Director, Senior Vice President, JXTG Nippon Oil & Energy Corporation

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Professor, Graduate School of Pharmaceutical Sciences, Kyoto University

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The Mainichi Newspapers Co., Ltd.

Toru Nakano
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Osaka University

Taikan Oki
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Graduate School of Engineering, The University of Tokyo

Nobuhiro Tsutsumi
Vice President, The University of Tokyo
Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo

Naonori Ueda
Deputy Director, RIKEN Center for Advanced Intelligence Project
Research Professor (Visiting Fellow), NTT Communication Science Laboratories

Minoru Yoshida
Executive Director, RIKEN
University Professor, Office of University Professors, The University of Tokyo

(Names listed in alphabetical order. Titles and positions are valid as of November 2023)

Schedule (2025-2027)

The eligible fields for the Japan Prize (2025 to 2027) have been decided for the two research areas, respectively.
These fields rotate every year in a three year cycle. Every year the Fields Selection Committee announces the eligible field for the next three years.

Areas of Physics, Chemistry, Informatics, and Engineering

Year	Eligible Fields
2025	Materials Science and Production
2026	Electronics, Information, and Communication
2027	Resources, Energy, Environment, and Social Infrastructure

Areas of Life Sciences, Agriculture, Medicine, and Pharmacology

Year	Eligible Fields
2025	Biological Production, Ecology/ Environment
2026	Life Sciences
2027	Medical Science and Pharmaceutical Science

Projects of the Foundation

For the further development of science and technology...

In addition to selecting and awarding the Japan Prize, the Japan Prize Foundation is engaged in projects designed to contribute to the development of science, technology, and society, including the offering of research grants for the training of young scientists, and our "Easy-to-understand Science and Technology Seminars" aimed at the children who will lead the coming generations.

JAPAN PRIZE

The creation of the Japan Prize was motivated by the Japanese government's desire to "contribute to the development of science and technology worldwide by establishing a prestigious international award." Supported by numerous private donations, the Japan Prize was established in 1983 with a cabinet endorsement. This award honors scientists and researchers worldwide who are recognized for having contributed significantly to the peace and prosperity of humankind through their original and outstanding achievements that have greatly advanced the progress of science and technology.

The eligible fields of this award cover all fields of science and technology. Every year, two fields for the award presentation are chosen by considering the developments in science and technology. As a general rule, one award is given for each field and each laureate receives a certificate of merit, a prize medal, and a cash prize.

The Presentation Ceremony is held annually in the presence of Their Majesties the Emperor and Empress, and is also attended by the Speaker of the House of Representatives, the President of the House of Councillors, the Chief Justice of the Supreme Court, various ministers, as well as eminent figures from various circles.

Heisei Memorial Research Grant Program

The "Heisei Memorial Research Grant Program" is named after Their Majesties the Emperor Emeritus and Empress Emerita, who have been interested in the research activities of young scientists and have encouraged them for many years.

The Foundation provides research grants to scientists mainly under 45 years of age. Every year, the Foundation selects four to eight scientists who undertake knowledge-integrated research that contribute to solving social issues, and gives five to ten million yen.

The Foundation encourages international collaboration of scientists beyond their expertise.

(An applicant must belong to a research organization in Japan.)

Easy-to-Understand Science and Technology Seminars

The Foundation holds a series of public and student seminars on advanced technologies commonly used in everyday life by inviting experts, who will explain state-of-the-art technologies in plain terms.

More than 300 seminars have been held since the program was launched in March 1989.