September 9, 2025

The 41st (2025) International Prize for Biology Awarded to Dr. Giacomo Rizzolatti, Emeritus Professor, Full Professor of Human Physiology – University of Parma, Italy

On August 5, the Committee on the International Prize for Biology (chaired by Dr. FUJIYOSHI Yoshinori, Distinguished University Professor, Institute of Science Tokyo) decided to award the 41st (2025) International Prize for Biology to Dr. Giacomo Rizzolatti, Emeritus Professor, Full Professor of Human Physiology – University of Parma, Italy.

1. International Prize for Biology

The International Prize for Biology was instituted in April of 1985 by the Committee on the International Prize for Biology. From its establishment, the Prize has commemorated the 60-year reign of Emperor Showa and his longtime devotion to biological research. Now it also pays tribute to the His Majesty the Emperor Emeritus Akihito, who has contributed for many years to advance our understanding of the systematics of gobioid fish, and who has enhanced the reputation and recognition of the biological sciences by developing this Prize.

The Prize, consisting of a certificate, a medal, and a purse of 10-million yen, is given to the recipient together with an Imperial Gift.

2. Recipient of the 41st Prize

Dr. Giacomo Rizzolatti (born 1937, Emeritus Professor, University of Parma)

Awarded the 41st International Prize for Biology in the field of neurobiology. Through his discovery of mirror neurons, Dr. Rizzolatti elucidated the neural basis for understanding others at various levels, behavior included. His work has contributed significantly to the development of the field of social neuroscience, as well as having a major impact on cognitive neuroscience as a whole. Dr. Rizzolatti's numerous research achievements are lauded for underpinning crucial advances in neurobiology.

3. Presentation Ceremony and Commemorative Symposium

The presentation ceremony in honor of the Prize recipient will be held around December at The Japan Academy. The date will be announced in due course. Their Imperial Highnesses Crown Prince and Crown Princess Akishino are expected to be present at the ceremony.

To celebrate the award to Dr. Rizzolatti a commemorative symposium for the 41st International Prize for Biology is planned to be held on December 20th (Sat) and 21st (Sun) in Tokyo.

The recipient of the 41st (2025) International Prize for Biology was announced.

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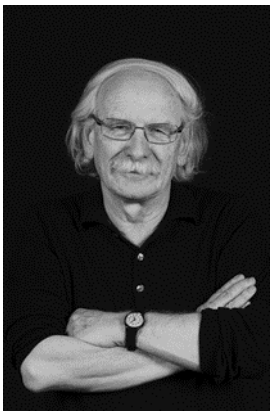
1. Report on the Process of Selection

The Selection Committee, chaired this year by Dr. TERASHIMA Ichiro and composed of 20 members, including four overseas members, functioned under the auspices of the Committee on the International Prize for Biology. The Selection Committee reviewed all of the nominated candidates.

This year, the applicable area of the Prize was stipulated as "Neurobiology." The committee distributed a total of 1,508 nomination forms to various Japanese and overseas universities and institutions engaged in the subject field of Biology. In response, the committee received a total of 60 recommendations. As there was some overlap, the actual number of individuals recommended was 46, residing in 18 countries and regions throughout the world.

The Selection Committee carefully reviewed all the candidates through a total of five times screening process. Ultimately, the members decided to recommend Dr. Giacomo Rizzolatti, as the recipient of the 2025 International Prize for Biology. Based on the recommendation of the Selection Committee, the Committee on the International Prize for Biology decided at its August 5 meeting to select Dr. Rizzolatti as the recipient for the 2025 Prize.

2. Recipient of the 41st Prize



Name: Dr. Giacomo Rizzolatti
Date of Birth: April 28, 1937
Nationality: Italy
Position: Emeritus Professor, Full Professor of Human Physiology – University of Parma

Education and Professional Positions:

1961	Degree in Medicine, University of Padua
1964	Degree in Neurology, University of Padua
1965–68	Assistant in Physiology, University of Pisa
1969	Assistant Professor, University of Parma
1970–71	Visiting Scientist, Department of Psychology, McMaster University
1972–	Professor of Human Physiology, University of Parma

Main Awards and Distinctions:

1982	Golgi Award for Studies in Neurophysiology
2000	Feltrinelli Prize for Medicine
2005	Herlitzka Prize for Physiology
2007	Grawemeyer Prize for Psychology
2007	Neuronal Plasticity Prize, Fondation IPSEN
2010	Signoret Neuropsychology Prize, Fondation IPSEN
2011	Prince of Asturias Award for Technical & Scientific Research
2014	Brain Prize, Lundbeck Foundation
2017	International Prize “Lombardia è Ricerca”
2024	Ottorino Rossi Award

And many others.

3. Achievements Recognized by the Award

A neurobiologist at the University of Parma, Italy, Dr. Rizzolatti is known worldwide for discovering mirror neurons, which play a crucial role in enabling higher animals to understand the behavior of others, and for proposing the mirror mechanism. He has published more than 500 papers in international journals, and these papers have been cited 161,600 times, leading to an h-index of 144.

Mirror neurons are a class of neuron that are activated equally when we perform an action and when we observe the same action performed by others, literally “mirroring” the observed action. They were first discovered in the ventral premotor cortex of macaque monkeys. Subsequent research also found these neurons in the monkey inferior parietal lobule. The brain mechanism enabling the activation is called the “mirror mechanism.” The discovery of mirror neurons and the mirror mechanism was a groundbreaking moment, opening up a whole new field in systems neuroscience and cognitive neuroscience—social neuroscience, which explores the neural structures underlying the understanding of others’ actions.

Dr. Rizzolatti has also addressed the human mirror mechanism, using brain imaging to demonstrate that the human ventral premotor cortex and inferior parietal lobule are activated when we observe others’ actions. He has shown that the human mirror mechanism is involved in imitation behavior through strong activation of the frontal lobe where the mirror neuron system is located, during an imitation task. In terms of the relation to emotions too, he has demonstrated that the parts of the brain that are activated, for example, when an unpleasant odor elicits feelings of disgust (the anterior insular cortex and the anterior cingulate cortex) are activated in the same way when observing someone else expressing disgust, thereby revealing that the mirror mechanism is also involved in human understanding of the emotions of others. Further development of this research has also given rise to the hypothesis that the mirror mechanism also contributed substantially to the evolution of language.

Through his discovery of mirror neurons, Dr. Rizzolatti has elucidated the neural basis for understanding others at various levels, behavior included. Where all prior neuroscience research

focused on the individual, the discovery of mirror neurons expanded the realm of neuroscience to include relationships among multiple individuals, or, in other words, society. Dr. Rizzolatti's work has consequently not only contributed significantly to the advance of the new field of social neuroscience, but has also had a major impact on cognitive neuroscience along with biology as a whole. In light of these research achievements, Dr. Rizzolatti was deemed to be the most appropriate recipient of the 41st International Prize for Biology.

4. Presentation Ceremony

The presentation ceremony in honor of the Prize recipient will be held around December at The Japan Academy. The date will be announced in due course. Their Imperial Highnesses Crown Prince and Crown Princess Akishino are expected to be present at the ceremony.

5. Commemorative Symposium

To celebrate the award to Dr. Rizzolatti, a commemorative symposium will be held Sat-Sun, December 20–21, 2025 in Tokyo. Presentations on the latest research findings will be given by Dr. Rizzolatti along with Japanese and international researchers pursuing pioneering work in the field of neurobiology.

6. Dr. Rizzolatti's Research Achievements and Major Publications

Research Achievements

Dr. Rizzolatti is a neuroscientist renowned for his major accomplishments in the study of how the brain controls behavior and engages in cognition, with much of his work concerning the motor system. He originally discovered the neurons in area F5 (a sector of the premotor cortex) that encode the goal of the grasping action, as well as those encoding peripersonal space in area F4 another sector of the premotor cortex. Dr. Rizzolatti also proposed the premotor theory of attention, which explains the selective attention mechanism based on motor preparation. His foremost contribution is the discovery of the mirror neuron, the evolution of research on which is described below.

In the 1990s, Dr. Rizzolatti and his colleagues discovered that some neurons in area F5 of macaque monkey brains activate not just when the monkey itself grasps an object but also when it observes another monkey grasp the same object (Publication 1 below). They also observed neurons similarly responding to the actions of manipulating and placing an object. However, simply looking at that object did not cause the neurons to respond. They named these neurons "mirror neurons" and the responsible brain mechanism the "mirror mechanism." Further, noting that mirror neurons are involved in the perception of others' behaviors, and that the area of the brain where the mirror neurons were found is close to Broca's area of the motor speech area, they proposed that the neurons are also involved in language generation (Publication 2).

In the case of humans too, Dr. Rizzolatti and his colleagues (Publication 3) published a paper in 1999 to demonstrate the role of the mirror neuron system in imitation behavior by using functional magnetic

resonance imaging (fMRI) to record brain activity when a normal human participant observed or imitated a finger movement, or performed the same movement after spatial or symbolic cues. They found that the left inferior frontal cortex (opercular region) and the rostral-most region of the right superior parietal lobule became active when the participant performed a particular finger movement, regardless of how it was evoked, and that these same brain regions also activated when the participant observed an identical movement made by another individual. The study showed that mirror neurons are present in the above areas of the human brain and are involved in imitation of the actions of others.

Since that first discovery, Dr. Rizzolatti and his colleagues have argued that the mirror mechanism plays a fundamental role in understanding the goal and intention behind an observed action. The same motor representation is generated in the brain from observing an action as from the actual performance of that action. This demonstrates that the motor system is not just an execution system activated by commands from other brain centers, but rather also contributes to understanding the actions of others through motor-related activation—a major discovery that has changed the perception of the brain's motor system.

Next, a 2002 paper published by Dr. Rizzolatti and his colleagues (Publication 4) reported auditory mirror neurons in area F5 of the monkey brain that activate both during the execution of a particular movement and when the monkey hears a sound associated with that movement, suggesting a link between the mirror neuron system and language development.

A 2003 paper by Dr. Rizzolatti and his colleagues (Publication 5) published an fMRI study in which participants inhaled odorants producing a strong feeling of disgust. The same participants observed video clips showing the emotional facial expression of disgust. Observing those faces and actually feeling disgust activated the same sites in the anterior insula and to a lesser extent in the anterior cingulate cortex. It was therefore found that, as in the case of hand actions, the mirror mechanism involved in the neural representation of both experiencing and observing an emotion exists in the anterior insula cortex.

These research findings have been compiled and published in multiple highly influential review articles (see, for example, Publications 6 and 7). Dr. Rizzolatti is the author of Mirroring Brain (Oxford University Press, 2023) and numerous other publications, and is also studying children with autism in the context of mirror neurons. Today, the relationship between autism and mirror mechanism impairment has become the subject of active research, with many researchers working in this area. Dr. Rizzolatti has consequently played an unmatched and groundbreaking role in the creation and advance of social neuroscience as a field.

Representative Publications

1. Rizzolatti G, Fadiga L, Gallese V, Fogassi L (1996) Premotor cortex and the recognition of motor actions. Cognitive Brain Research 3: 131-141 (Number of citations: 8,204)
2. Gallese V., Fadiga L., Fogassi L and Rizzolatti G. Action recognition in the premotor cortex, Brain 119: 593-609. (Number of citations: 8,040)

3. Iacoboni M, Woods RP, Brass M, Bekkering H, Mazziotta JC, Rizzolatti G (1999) Cortical mechanism of human imitation. Science 286:2526-2528 (Number of citations: 4,193)
4. Kohler E., Keysers C, Umiltà M.A, Fogassi L, Gallese V, Rizzolatti G. Hearing sound, understanding actions: action representation in mirror neurons. Science 297 (2002) 846-848 (Number of citations: 2,908)
5. Wicker B., Keysers C., Plailly J. Rouet JP, Gallese V., Rizzolatti G. Both of us disgusted in My insula: the common neural basis of seeing and feeling disgust. Neuron 40 (2003) 655-664 (Number of citations: 3,667)
6. Rizzolatti G., Craighero L. The Mirror Neuron System. Annual Rev. Neurosci. 27 (2004) 169-192. (Number of citations: 13,013)
7. Rizzolatti G, Fogassi L., Gallese V. Neurophysiological mechanism underlying the understanding and imitation of actions. Nature Reviews Neurosci. 2 (2001) 661-670
(Number of citations: 5,007)

Source: Google Scholar (as at August 2025)