



# GRUBER FOUNDATION

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FOR IMMEDIATE RELEASE

## Neuroscientist Robert H. Wurtz Receives the \$500,000 Gruber Neuroscience Prize for His Pioneering Work in the Neurophysiology of Visual Cognition

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**Robert Wurtz**

*June 15, 2010, New York, New York* – Robert H. Wurtz, PhD, a pioneer and leader in the field of neurophysiology, is the recipient of the 2010 Neuroscience Prize of The Peter and Patricia Gruber Foundation. His discoveries of how the brain processes visual information and controls eye movements laid the groundwork for subsequent research into the neurophysiology of visual cognition. This research has led scientists to a deeper understanding of how the brain is organized to produce behavior.

Wurtz, who has spent most of his professional life at the National Institutes of Health in Bethesda, Md., is also being honored for mentoring and inspiring the research of many others in the broad field of cognitive neuroscience. Wurtz currently serves as an NIH Distinguished Investigator at the National Eye Institute's Laboratory of Sensorimotor Research, a laboratory that he helped establish in 1973 and then headed for its first 24 years.

He will receive the award November 14 in San Diego at the Annual Meeting of the Society for Neuroscience and will deliver a lecture on "Brain Circuits for Active Vision."

"Wurtz opened up the primate brain for analyses of cognitive phenomena at the cellular level," says Sten Grillner, chair of the Selection Advisory Board. "This was a very important step in providing insights into the workings of the brain - an astounding information-processing biological structure that allows for perception, reasoning and action."

Before Wurtz began publishing his seminal studies in 1969 on the physiology of the visual system in the awake monkey, research showing how single neurons in the brain processed visual information was conducted only in anesthetized animals. Wurtz was the first to demonstrate that these experiments could be done successfully in the awake primate. He did this by training monkeys to hold their eyes still for a few seconds while he recorded their neurons as they reacted to moving objects and other visual stimuli.

This technique (now used by scientists around the world) meant that researchers could record the activity of a primate's visual neurons without anesthetizing the animal—a process that had previously limited such research. For the first time, the physiology of visual behavior itself could be studied.

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Wurtz went on to make other unprecedented discoveries. He mapped fields of individual neurons in the awake brain that receive visual information. He elucidated how different cortical areas and subcortical cell groups contribute to visual processing and how subcortical brain structures, such as the superior colliculus and the basal ganglia, initiate eye movements. He also discovered and described some of the complex pathways by which these various structures interact.

Wurtz's work has inspired the research of many others in the broad field of cognitive neuroscience, and he can be regarded as one of the founders of this area of neuroscience (a science that did not even exist when he began his research). As a result, scientists now have a deeper understanding of how the brain processes the sensory signals that underlie perception and the control of movement—an understanding that has also helped to unlock some of the neurophysiological mysteries of various brain diseases and conditions, including stroke, Parkinson's disease and Huntington's disease.

"Dr. Robert Wurtz is one of those rare individuals in science who invented a field," says Michael E. Goldberg, M.D., David Mahoney Professor of Brain and Behavior in the Departments of Neuroscience, Neurology, Psychiatry and Ophthalmology at Columbia University College of Physicians and Surgeons. "Before he discovered how to record the activity of visual neurons in awake, behaving monkeys, the study of how the brain processes vision was only done in anesthetized animals, most dramatically by the Nobel-prizewinning research of David Hubel and Torsten Wiesel. Dr. Wurtz realized that vision involved not only visual processing, but also behavior - that attention and spatial processing were as important to the brain's analysis of the visual world as the isolated computation of the visual signal. He first showed that the feature detection properties of the visual system discovered by Hubel and Wiesel were present in the awake animal, but more importantly, that attention and motor events interacted with the pure visual processing in critical ways.

"These advances have inspired hundreds of scientists to study the physiology of cognition, and have provided key insights into normal processes like attention and corollary discharge which go awry in psychiatric diseases including schizophrenia and attention deficit disorder. It is important to emphasize that Dr. Wurtz's work has depended upon the sensitive, humane, and appropriate use of monkeys in neuroscientific research. No other technique could have enabled the discoveries which Dr. Wurtz has made about the physiological foundations of cognitive processes, and his work is applicable to humans as well as monkeys."

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## Additional Information

In addition to the cash award, the recipient will receive a gold medal and a citation that reads:

*The Peter and Patricia Gruber Foundation proudly presents the 2010 Neuroscience Prize to Robert Wurtz for his pioneering work concerning the neural bases of visual processing in primates.*

*Robert Wurtz was the first to realize that neurons in the visual system could be studied at both the cortical and subcortical level in awake primates trained to generate different forms of eye movements. All current work on visual cognition, looking at phenomena like attention, motion perception, and motivation, was made possible through these initial studies. Dr. Wurtz's studies have elucidated how different forebrain structures contribute to visual processing, and how subcortical structures initiate eye movements.*

*Robert Wurtz's work has inspired the research of many others in the broad field of cognitive neuroscience and serves as an exemplar of physiological approaches to the understanding of complex forms of behavior.*

## Laureates of the Gruber Neuroscience Prize

**2009: Jeffrey C. Hall, Michael Rosbash and Michael Young**, for revealing the gene-driven mechanism that controls circadian rhythm in the nervous system

**2008: John O'Keefe**, for discovering place cells, which led to important findings in cognitive neuroscience

**2007: Shigetada Nakanishi**, for pioneering research into communication between nerve cells in the brain

**2006: Masao Ito and Roger Nicoll**, for work on the molecular and cellular bases of memory and learning

**2005: Masakazu Konishi and Eric Knudsen**, for work on the neural basis of sound localization

**2004: Seymour Benzer**, for applying the tools of molecular biology and genetics to the fruit fly, *Drosophila*, and linking individual genes to their behavioral phenotypes

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The Prize recipients are chosen by the Neuroscience Selection Advisory Board. Its current members are:

**Carol A. Barnes**, University of Arizona; **Sten Grillner**, Karolinska Institute; **Stephen Heinemann**, Salk Institute; **H. Robert Horvitz**, Massachusetts Institute of Technology; **Masao Ito**, RIKEN Brain Institute; **Erwin Neher**, Max-Planck Institute; **Li-Huei Tsai**, Massachusetts Institute of Technology.

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The Gruber International Prize Program honors contemporary individuals in the fields of Cosmology, Genetics, Neuroscience, Justice and Women's Rights, whose groundbreaking work provides new models that inspire and enable fundamental shifts in knowledge and culture. The Selection Advisory Boards choose individuals whose contributions in their respective fields advance our knowledge, potentially have a profound impact on our lives, and, in the case of the Justice and Women's Rights Prizes, demonstrate courage and commitment in the face of significant obstacles.

The Neuroscience Prize honors scientists for major discoveries that have advanced the understanding of the nervous system.

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The Peter and Patricia Gruber Foundation honors and encourages educational excellence, social justice and scientific achievements that better the human condition. For more information about Foundation guidelines and priorities, please visit [www.gruberprizes.org](http://www.gruberprizes.org).

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**For more information on the Gruber Prizes** email [media@gruberprizes.org](mailto:media@gruberprizes.org) or contact Berneticia Akin of the Gruber Foundation at +1 (340) 775-4430 or by mail 140 W 57th St Suite 10C New York, NY 10019.

Media materials and additional background information on the Gruber Prizes can be found at **our online newsroom:** [www.gruberprizes.org/Press.php](http://www.gruberprizes.org/Press.php)

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