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Neuroscientists Carla Shatz, PhD, and Michael Greenberg, PhD, Share $500,000 Gruber Neuroscience Prize for Their Pioneering Work on the Molecular Mechanisms that Control Brain Development and Plasticity

Carla Shatz

Michael Greenberg

June 2, 2015, New Haven, CT – Neuroscientists Carla Shatz, PhD, of Stanford University and Michael Greenberg, PhD, of Harvard Medical School are the joint recipients of the 2015 Neuroscience Prize of The Gruber Foundation. They are being honored for their landmark discoveries regarding the molecular mechanisms through which neural activity controls wiring and plasticity of the brain.

The award will be presented to Shatz and Greenberg in Chicago on Oct. 18 at the 45th annual meeting of the Society for Neuroscience.

"The work of these two remarkable scientists has fundamentally changed our understanding of how neural circuits in the brain develop and function," said Ben Barres, a member of the Selection Advisory Board to the Prize. "As a result, we now have a deeper understanding of how disruptions in those circuits can lead to autism, schizophrenia, Alzheimer's disease, and many other neurobiological disorders."

In her pioneering studies, Shatz demonstrated how neural activity is required for the refinement of connections in early brain development. She also discovered new and unexpected roles for immune molecules in brain circuit tuning and plasticity. Through his groundbreaking research, Greenberg identified how genetic programs are triggered by experience-stimulated neuronal activity. He has also described many of their critical molecular mechanisms and signaling pathways.

Much of what is known today about crucial periods in the development of the brain — and about how and why neural dysfunction occurs — is a direct result of these two researchers' work.

"Both Dr. Shatz and Dr. Greenberg are extraordinary researchers," said Robert Wurtz, chair of the Selection Advisory Board to the Prize. "Both have also served as leaders in the neuroscience community and have been exceptional mentors to countless young people who have gone on to have distinguished careers of their own. It is a great pleasure to be honoring them with this prestigious award."

Additional Information

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

The Gruber Foundation proudly presents the 2015 Neuroscience Prize to Carla Shatz and Michael Greenberg for their elucidation of the molecular mechanisms through which neural activity controls wiring and plasticity of the brain.

Shatz's pioneering studies showed that neural activity is needed for the refinement of connections in early brain development and revealed an unexpected role for immune signaling in neurons.

Greenberg discovered that the "L-type" voltage-gated Ca2+ channel couples membrane excitability to gene transcription, elucidating in elegant detail the signaling pathways responsible.

Together their ground-breaking studies have provided new insight into how neural circuit function regulates brain development and plasticity and how dysfunction can contribute to neuropsychiatric disorders such as autism and schizophrenia.

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Laureates of the Gruber Neuroscience Prize:

- **2014: Thomas Jessell,** for his pioneering work on the differentiation of spinal cord neurons and their wiring into networks
- **2013: Eve Marder,** for her contributions to understanding how circuit dynamics and behavior arise from the properties of component neurons and their synaptic connections
- **2012: Lily and Yuh Nung Jan,** for their fundamental contributions to molecular neurobiology
- **2011: Huda Y. Zoghbi,** for her pioneering work on revealing the genetic underpinnings of neurological disorders
- **2010: Robert H. Wurtz,** for pioneering work concerning the neural bases of visual processing in primates
- **2009: Jeffrey C. Hall, Michael Rosbash,** and **Michael Young,** for revealing the gene-driven mechanism that controls 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

The Prize recipients are chosen by the Neuroscience Selection Advisory Board. Its members are: **Ben Barres,** Stanford University; **Tobias Bonhoeffer,** Max Planck Institute for Neurobiology; **Martin Chalfie,** Columbia University; **Frances Jensen,** University of Pennsylvania; **Erin Schuman,** Max-Planck Institute; **Leslie Ungerleider,** National Institute for Mental Health; and **Robert Wurtz,** National Institutes of Health (Chair).

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By agreement made in the spring of 2011 The Gruber Foundation has now been established at Yale University.

The Gruber International Prize Program honors individuals in the fields of Cosmology, Genetics and Neuroscience, 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 and potentially have a profound impact on our lives.

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

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For more information on the Gruber Prizes, visit www.gruber.yale.edu, e-mail info@gruber.yale.edu or contact A. Sarah Hreha at +1 (203) 432-6231. By mail: The Gruber Foundation, Yale University, Office of Development, PO Box 2038, New Haven, CT 06521.

Media materials and additional background information on the Gruber Prizes can be found at our online newsroom: http://gruber.yale.edu/news-media