



# GRUBER FOUNDATION

**Media Contact:**  
Alyson O'Mahoney  
+1 (914) 241-0086 ext. 13  
aomahoney@robinleedyassociates.com

**Foundation Contact:**  
Bernetia Akin  
+1 (340) 775-8035  
media@gruberprizes.org

Online Newsroom: [www.gruberprizes.org/Press.php](http://www.gruberprizes.org/Press.php)

FOR IMMEDIATE RELEASE

## PIONEERING NEUROSCIENTISTS HALL, ROBASH, AND YOUNG SHARE GRUBER PRIZE TRIO TO DELIVER JOINT LECTURE ON CIRCADIAN RHYTHMS

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October 15, 2009, New York – Tiny fruit flies, the common mouse, human beings and virtually all their relatives each pulse to the beat of a genetic drummer known as circadian rhythms. Three men who pioneered discoveries about how these daily rhythms impact metabolic, physiological, hormonal and behavioral systems will share their insights at the Society for Neuroscience Annual Meeting in Chicago, on Sunday, October 18, when they receive the international 2009 Gruber Neuroscience Prize. One of the largest and most influential scientific organizations in the world, SfN is celebrating its 40th anniversary this year.

Jeffrey Hall, professor of neurogenetics at the University of Maine; Michael Rosbash, professor and director of the National Center for Behavioral Genomics at Brandeis University; and Michael Young, professor and head of the Laboratory of Genetics at Rockefeller University, will share the \$500,000 Prize which is awarded by The Peter and Patricia Gruber Foundation. In a collaborative presentation, the three also will deliver the Gruber lecture "Circadian rhythms, the Transcriptional Feedback Loop and Neuroscience" to an audience of a few thousand scientists. Their joint talk will describe some early work as well as the contemporary interface between neuroscience and circadian rhythm research.

In a separate presentation, Eva Pastalkova, PhD, Rutgers University, and Mingshan Xue, PhD, University of California-San Diego, will be honored with the Peter and Patricia Gruber International Research Award in Neuroscience, a \$50,000 fellowship administered by SfN and shared equally by the two recipients, both promising young scientists.

Hall, Rosbash and Young are receiving the Prize for groundbreaking research in circadian rhythms. Their combined discoveries were the first to establish a simple relationship between genes and a complex behavior.

"These researchers began with a complicated animal behavior, established that single genes can define specific aspects of this behavior and determined mechanistically how such genes act" said H. Robert Horvitz, a member of the Gruber selection panel whose own work received the Nobel Prize in Physiology or Medicine in 2002.

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Before Hall, Rosbash, and Young published their seminal studies on the molecular underpinnings of the circadian rhythms of the fruit fly, *Drosophila melanogaster*, many people questioned whether a compelling relationship between genes and behavior could be established. In the early 1970s, the first fruit fly mutants with altered circadian rest/active cycles had been identified, making a case for the genetic control of behavior. But the mechanism running the internal biological clock remained a mystery.

The breakthrough came when Hall and Rosbash, working at Brandeis University, and Young, working at Rockefeller University, simultaneously cloned the *period (per)* gene of *Drosophila*. That pivotal discovery led to subsequent studies from all three labs that unmasked the general molecular mechanism for circadian clocks – the transcriptional feedback loop that oscillates during the 24-hour cycle.

They also discovered other genes and protein products that play critical roles in regulating the loop and found that mutations affecting any of these genes had effects on molecular rhythms – and behavior. They identified how certain stimuli, most notably the light-dark cycle, help regulate the feedback loop in order to reset the clock every day to operate in synch with natural environmental cycles, a key, universal feature of daily rhythms.

### Additional Information

The official citation reads:

*The Peter and Patricia Gruber Foundation proudly presents the 2009 Neuroscience Prize to Jeffrey Hall, Michael Rosbash, and Michael Young for their pioneering discoveries of molecular mechanisms that control circadian rhythms in the nervous system.*

*These investigators established that in the fruit fly *Drosophila melanogaster* circadian rhythms are driven by a transcriptional feedback loop that controls the expression of the period gene. They discovered a set of interacting genes that control this process, including the light-sensing protein that establishes circadian rhythms in response to the day-night light cycle.*

*Subsequent work by others demonstrated that these findings apply broadly to both invertebrates and vertebrates and that a mutation in the human counterpart of the period gene causes a human circadian sleep disorder. These discoveries reveal a striking solution to the problem of how genes control a higher-order behavior.*

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## Laureates of the Gruber Neuroscience Prize:

- **2008: John O'Keefe**
- **2007: Shigetada Nakanishi**
- **2006: Masao Ito and Roger Nicoll**
- **2005: Masakazu Konishi and Eric Knudsen**
- **2004: Seymour Benzer**

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

**Carol A. Barnes**, University of Arizona; **Linda S. Buck**, Fred Hutchinson Cancer Research Center; **Sten Grillner**, Karolinska Institutet; **H. Robert Horvitz**, Massachusetts Institute of Technology; **Masao Ito**, RIKEN Brain Science Institute; **Donald Price**, Johns Hopkins University School of Medicine; and **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 ground-breaking 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.

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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 Bernetia Akin of the Gruber Foundation at +1 (340) 775-8035 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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