Media Contact:
A. Sarah Hreha
+1 (203) 432-6231
info@gruber.yale.edu
Online Newsroom: www.gruber.yale.edu/news-media

Stephen Elledge

Geneticist Stephen J. Elledge Receives $500,000 Gruber Genetics Prize for His Groundbreaking Discoveries Regarding the Molecular Mechanisms of the DNA-Damage Response Pathway

May 17, 2017, New Haven, CT – Stephen J. Elledge is the recipient of the 2017 Gruber Genetics prize for discovering and characterizing the molecular mechanisms of the DNA-damage response pathway, findings of profound importance to the understanding of the pathophysiology of cancer and other diseases. Elledge, who is the Gregor Mendel Professor of Genetics and Medicine at Harvard Medical School, will be presented with the award this fall.

"Dr. Elledge's seminal work has elucidated how cells from yeasts to humans sense and respond to DNA damage. His work has transformed our understanding of fundamental genetics and has provided key insights into mechanisms underlying cancer, neurologic diseases and aging," says Richard Lifton, president of The Rockefeller University and member of the Selection Advisory Board to the Prize. "The scope, rigor and elegance of his work is extraordinary, and the impact of his numerous discoveries is profound."

The DNA-damage response pathway is a complex molecular process that cells of living organisms use to detect and repair the constant attacks on their DNA from endogenous and exogenous sources. If such repairs aren't made, the alterations to the DNA can lead to the development of cancer and other diseases. Working first with yeast and then with mammalian cells, Elledge discovered a family of genes that become activated when DNA is damaged or fails to copy itself properly. He then went on to discover and describe — in elegant detail — the intricate sequence of molecular activity that a cell uses not only to detect assaults on its DNA, but also to marshal its defenses to repair the damage.

In addition to his contributions to understanding the molecular mechanisms of the DNA-damage response pathway, Elledge has been a leader in inventing various genetic technologies, including genome-wide genetic screens that are used in the development of targeted therapies for cancer and other disorders.

"His accomplishments are as broad as they are deep," says Huda Zoghbi, Investigator, Howard Hughes Medical Institute at Baylor College of Medicine and chair of the Selection Advisory Board to the Prize.

"Few scientists have made such surprising and important discoveries with such metronomic regularity. We're honored to be awarding him with the Gruber Genetics Prize."

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 2017 Genetics Prize to Stephen Elledge for discovering and characterizing the molecular mechanisms of the DNA damage response pathway in eukaryotic cells, findings critical for understanding pathogenesis and developing therapies for cancer and other diseases.

Dr. Elledge used clever genetic screens in yeast to identify mechanisms by which cells sense DNA damage and direct effector molecules to initiate efforts to repair the damage and halt progression of the cell cycle until repair is completed. He also showed that this process is conserved in mammals, with orthologous genes playing similar roles. Mutations in many of these genes drive cancer in humans, while others contribute to premature aging or neurological disorders.

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Laureates of the Gruber Genetics Prize:

- **2016: Michael Grunstein and David Allis** for the discovery of the role of histone proteins and their covalent modification in the regulation of eukaryotic gene expression
- **2015: Emmanuelle Charpentier and Jennifer Doudna,** for establishing a framework for universal genome editing
- **2014: Victor Ambros, David Baulcombe, and Gary Ruvkun,** for pioneering the study of small non-coding RNA's, molecules that are recognized as playing a critical role in regulating gene expression
- **2013: Svante Pääbo,** for pioneering the analysis of ancient DNA
- **2012: Douglas C. Wallace,** for his groundbreaking contributions to mitochondrial genetics
- **2011: Ronald Davis,** for his pioneering development and application of recombinant-DNA techniques
- **2010: Gerald Fink,** whose work in yeast genetics advanced the field of molecular genetics
- **2009: Janet Davison Rowley,** for her seminal discoveries in molecular oncology
- **2008: Allan C. Spradling,** for his work on fly genomics
- **2007: Maynard V. Olson,** for his contributions to genome science
- **2006: Elizabeth H. Blackburn,** for her studies of telomeres and telomerase, and her science advocacy
- **2005: Robert H. Waterston,** for his pivotal role in the Human Genome Project
- **2004: Mary-Claire King,** for three major findings in modern genetics: the similarity of the human and chimpanzee genomes, finding a gene that predisposes to breast cancer, and forensic genetics.
- **2003: David Botstein,** a driving force in modern genetics who established the ground rules for human genetic mapping
- **2002: H. Robert Horvitz,** who defined genetic pathways responsible for programmed cell death
- **2001: Rudolf Jaenisch,** who created the first transgenic mouse to study human disease

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

Victor Ambros, University of Massachusetts Medical School; **Utpal Banerjee,** University of California Los Angeles; **Marlene Belfort,** University at Albany, SUNY; **Kay Davies,** University of Oxford; **Helen Hobbs**, University of Texas Southwestern; **Richard Lifton,** Yale School of Medicine; and **Huda Zoghbi,** Baylor College of Medicine (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 Genetics Prize is presented to a leading scientist, or up to three, in recognition of groundbreaking contributions to any realm of genetics research.

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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: www.gruber.yale.edu/news-media

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