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Alan Hinnebusch

\$500,000 Gruber Genetics Prize Awarded to Alan G. Hinnebusch for discoveries in the integrated stress response

May 19, 2026, New Haven, CT – The 2026 Gruber Genetics Prize is being awarded to Alan G. Hinnebusch, PhD, a Distinguished Investigator at the National Institutes of Health, for his pioneering work that established both the paradigm and the detailed mechanism of translational control that underlies the Integrated Stress Response, a pivotal mechanism whereby eukaryotic cells reprogram protein synthesis under stress.

In a series of forward genetics screens in budding yeast, Hinnebusch identified mutations in the kinase Gcn2, which phosphorylates the key translation initiation factor eIF2, and Gcn4, a key transcription factor that controls genes involved in amino acid biosynthesis.

Hinnebusch demonstrated that the phosphorylation of eIF2 suppresses global protein synthesis and selectively induces the master transcription factor Gcn4. This translational control mechanism is broadly conserved from yeast to humans.

Hinnebusch's work has led to a greater understanding of how cells respond to stressors such as amino acid starvation and viral infections. Dysregulation of the integrated stress response has been linked to neurodegeneration, metabolic disorders and cancer.

"We are proud to present Dr. Hinnebusch the 2026 Genetics Prize," says Philip Hieter, a professor at the Michael Smith Laboratories at the University of British Columbia and a member of the Selection Advisory Board. "His pioneering studies have led to an understanding of a universal translational control mechanism by which cells respond to stressors such as starvation, viral infections and heme deficiency. These fundamental discoveries using yeast as a model organism have led to potential therapies that are being developed in the clinic."

The 2026 Gruber Genetics Prize, which includes a \$500,000 award, will be presented to Hinnebusch in December in San Diego at Cell Bio 2026, the joint meeting of the American Society for Cell Biology (ASCB) and the European Molecular Biology Organization (EMBO).

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 2026 Genetics Prize to Alan G. Hinnebusch for elucidating the genetic and molecular logic of the Integrated Stress Response, the universal mechanism by which eukaryotic cells reprogram protein synthesis under stress.

Through forward genetic screens in budding yeast, Hinnebusch discovered the kinase GCN2 and showed that its phosphorylation of eIF2 α simultaneously suppresses global protein synthesis and selectively activates the master transcription factor GCN4 through upstream open reading frames in its mRNA. He further showed this circuit is conserved from yeast to humans. These foundational discoveries established the central paradigm for how the cell can adapt to stress using translational control.

The Integrated Stress Response governs cellular responses to amino acid starvation, viral infection, ER stress, and heme deficiency, and its dysregulation contributes to neurodegeneration, cancer, and metabolic disease. Therapies targeting this pathway are now advancing in clinical development.

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The Genetics Prize is presented to a leading scientist, or up to three, in recognition of groundbreaking contributions to any realm of genetics research.

Laureates of the Gruber Genetics Prize:

- **2025: Rotem Sorek**, discoveries of anti-viral defense systems in bacteria and evolutionary connections to our innate immune system
- **2024: Hugo J Bellen** ushered in a new era of model system genetics with direct impact on human disease
- **2023: Allan Jacobson and Lynne Maquat** identified and describing nonsense-mediated mRNA decay
- **2022: Ruth Lehmann, James Priess, and Geraldine Seydoux** for embryogenesis discoveries
- **2021: Stuart H. Orkin**, revolutionized our understanding of genetics of inherited blood disorders
- **2020: Bonnie Bassler**, for pioneering discoveries on bacterial communication
- **2019: Bert Vogelstein**, discoveries of new genetic pathways and processes contributing to cancer
- **2018: Joanne Chory and Elliot Meyerowitz**, for helping revolutionize plant molecular biology, with implications for global agriculture, the environment, and human health and disease
- **2017: Stephen Elledge**, for discovering and characterizing the molecular mechanisms of the DNA damage response pathway in eukaryotic cells
- **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 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 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**, for establishing 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:

Philip Hieter, Michael Smith Laboratories at the University of British Columbia; **Gail Jarvik**, University of Washington; **Jeannie T. Lee**, Harvard Medical School; **Denise Montell**, University of California, Santa Barbara (Chair); **Stuart H. Orkin**, Harvard Medical School; **Alejandro Sánchez Alvarado**, Stowers Institute for Medical Research; and **Geraldine Seydoux**, Johns Hopkins University School of Medicine.

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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 Society of America partners with the Foundation on the Genetics Prize, and nominates the members of the Genetics Selection Advisory Board.

The Gruber Foundation was established in 1993 by the late Peter Gruber and his wife Patricia Gruber. The Foundation began its International Prize Program in 2000, with the inaugural Cosmology Prize.

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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 International Affairs, PO Box 208320, New Haven, CT 06520

Media materials and additional background information on the Gruber Prizes are in our online newsroom: www.gruber.yale.edu/news-media

More information about Cell Bio 2026 can be found at the conference website: <https://www.ascb.org/cellbio2026/>

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