

Gary Ruvkun

Professor of Genetics, Harvard Medical School
 Department of Molecular Biology, Massachusetts General Hospital
 Simches Research Building, 7th Floor, CPZN-7250
 185 Cambridge Street, Boston, MA 02114
 phone 617-726-5959 fax 617-726-5949,
ruvkun@molbio.mgh.harvard.edu

Major Research Interests

microRNA and RNA interference mechanisms, neuroendocrine control of metabolism and aging, microbial diversity.

Home page: <http://ccib.mgh.harvard.edu/ruvkunlab-research.htm>

Honors

1998	Nippon Telephone and Telegraph Science Forum Public Lecture, Tokyo
2002 - present	NIH Merit Award
2003	Harvey Lecturer, Rockefeller University
2003	NIH Director's Lecture
2005	Rosenstiel Award, Brandeis University, with Victor Ambros, Andy Fire, Craig Mello.
2007	Warren Triennial Prize, Massachusetts General Hospital, with Victor Ambros
2008	Benjamin Franklin Medal, Franklin Institute, with Victor Ambros and David Baulcombe
2008	Gairdner International Prize, with Victor Ambros
2008	National Academy of Sciences

Academic trajectory

1985 - present	Asst, Assoc., Professor of Genetics, Harvard Medical School
1982 - 1985	Junior Fellow, Society of Fellows, Harvard University Postdoctoral research with Bob Horvitz at MIT and Walter Gilbert at Harvard
1982	Ph.D. Harvard University (Biophysics), with Fred Ausubel
1973	A.B. University of California at Berkeley (Biophysics)

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2. Ruvkun G., Ausubel F.M. 1981. A general method for site-directed mutagenesis in prokaryotes. Nature 289: 85-88.
3. Ruvkun G., Long, S.R., Meade, H.M., Ausubel, F.M. 1981. Molecular genetics of symbiotic nitrogen fixation. Cold Spring Harbor Symposium on Quantitative Biology 45: 492-500.
4. Meade H.M., Long S.R., Ruvkun G., Brown S.E., Ausubel F.M. 1982. Physical and genetic characterization of symbiotic and auxotrophic mutants of *Rhizobium meliloti* induced by transposon Tn5 mutagenesis. J Bacteriol 149: 114-122.
5. Ruvkun G., Sundaresan V., Ausubel F.M. 1982. Specific protection of nucleotides in the *lac* operator from dimethyl sulfate (DMS) methylation of DNase I nicking by crude bacterial extracts. Gene 18: 245-255.
6. Ruvkun G., Sundaresan V., Ausubel F.M. 1982. Directed transposon Tn5 mutagenesis and complementation analysis of the *Rhizobium meliloti* symbiotic nitrogen fixation (*nif*) genes. Cell 29: 551-559.
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 113. Kim N, Dempsey C, Kuan CJ, Zoval J, O'Rourke E, Ruvkun G, Madou M, Sze J. 2007. Gravity force transduced by the MEC-4/MEC-10 DEG/ENaC channel modulates DAF-16/FoxO activity in *C. elegans*. *Genetics*. Aug 24; [Epub ahead of print]
 114. Samuelson, A. V., Carr, C. E., and G. Ruvkun. 2007. Gene activities that mediate increased lifespan of *C. elegans* insulin-like signaling mutants. *Genes and Development*, Nov 15;21(22):2976-94.
 115. Parry, D.H., Xu, J. and G. Ruvkun. 2007. A whole-genome RNAi screen for *C. elegans* miRNA pathway genes. *Current Biology*, Nov 13; [Epub ahead of print]
 116. Isenbarger, T. A., M. Finney, C. Ríos-Velázquez, J. Handelsman, and G. Ruvkun. 2007. Mini primer PCR, a new lens for viewing the microbial world. *Applied and Environmental Microbiology*, in press.

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118. Samuelson, A.V., R. R. Klimczak, D. Thompson, C. E. Carr, and G. Ruvkun. 2008 Identification of *C. elegans* genes regulating longevity using enhanced RNAi-sensitive strains . *Cold Spring Harbor Symp Quant Biol.*; 73:. Circadian Rhythms.
119. Gabel, H. W. and G. Ruvkun. 2008. The exonuclease ERI-1 plays a conserved dual role in RNA interference and ribosomal 5.8S RNA processing. *Nature Structural Biology*, in press.

Papers reviewed and in revision:

120. Wang, M. C., E. O'Rourke and G. Ruvkun. Germline Stem Cell regulation of fat storage and longevity
121. Hayes, G. D. and G. Ruvkun *Caenorhabditis elegans somi-1* encodes a zinc-finger protein that mediates microRNA activity of the *let-7* paralog *mir-84*
122. Fischer, S.E.J., M. D. Butler, Q. Pan and G. Ruvkun RNA duplex-mediated *trans*-splicing between independent mRNAs generates *C. elegans* ERI-6/7, a helicase that regulates RNAi.

Research support

2 R01GM44619-16 05/01/1991 - 06/30/2008 \$304,758 per year direct costs, \$533,327 total costs
NIH Control of *C. elegans* lineage by heterochronic genes

5 R01 AG16636-08 04/01/1999 - 07/31/2009 \$287,692 per year direct costs, \$513,057 total costs
NIH Genetic and molecular basis of longevity

4 R37 AG014161-12 05/01/1996 - 08/31/2011 \$277,697 per year direct costs, \$531,034 total costs
NIH Inositol signaling in *C. elegans* senescence and diapause

5 R01 DK070147-04 09/15/2004 - 08/31/2008 \$213,341 per year direct costs, \$373,347 total costs
NIH Genetic Studies of Obesity-Related Traits in Model Organisms

National Aeronautics and Space Administration NRA-01-01-ASTID-020 06/01/05-5/31/08 (administered through the Center for Space Research at MIT). Gary Ruvkun Harvard/MGH PI. Maria Zuber, MIT PI. SETG, a Search for Extraterrestrial Genomes An in situ PCR Detector For Life on Mars Ancestrally Related to Life on Earth \$281,424 year 1. \$245,414 year 2. \$246,399 year 3. MGH funding about 1/4. Center for Space Research engineering about 3/4.

Broad SPARC grant: Dramatically Enhancing the Throughput of *C. elegans* RNAi and Drug Screens
Gary Ruvkun, Eyleen O' Rourke, Fred Ausubel, David Sabatini, Jon Clardy, co PI's 8/1/2006 to 9/30/2007
\$392,744 per year direct costs.

Patents

1. Issued 5/1/2001 US Patent # 6,225,120 Therapeutic and Diagnostic Tools for Impaired Glucose Tolerance Conditions.
2. Issued 10/8/2002 US Patent # 6,461,854 Methods of Screening Compounds Useful For Prevention of Infection or Pathogenicity.
2. Pending US Patent, AGE-1 polypeptides and related molecules and methods.
3. Pending US Patent, Polynucleotide and Polypeptide Fat Metabolism regulators and uses thereof
4. Pending US Patent, Polynucleotide and Polypeptide molting regulators and uses thereof
5. Pending US Patent, Compositions and methods that enhance RNA interference.
6. Pending US Patent, Compositions and methods that modulate RNA interference.

The Ruvkun lab

The lab currently has 14 postdoctoral fellows and 6 graduate students. Postdocs: Andy Samuelson PhD from the Lowe lab at Cold Spring Harbor, Sylvia Fischer PhD from the Plasterk lab in Utrecht, Eyleen O' Rourke PhD

from the Radicella in Paris and the Ielpi lab in Bueno Aires, Sean Curran PhD from the Koehler lab at UCLA, Justine Melo PhD from the Toczyski lab at UCSF, Xiaoyun Wu, PhD from the Hanes lab at Albany, Meng Wang, PhD from the Bohmann lab at Rochester, Chi Zhang PhD, from the Beachy lab at Johns Hopkins, Alex Soukas, MD, PhD, from the Friedman lab at Rockefeller, Susana Garcia, PhD, from the Morimoto lab at Northwestern, Christian Riedel, PhD from the Nasymth lab in Vienna, Buck Samuel, PhD from the Gordon lab at Washington University, Carolyn Phillips PhD from the Dernburg lab at Berkeley, and Gabe Hayes, PhD from my lab is finishing a project before moving onto a proper postdoc. Graduate students Maurice Butler, Sascha Russel, Dave Shore, Liz Kane, and Harrison Gabel are PhD students from the Harvard Medical School BBS program. Working jointly in the Ruvkun lab and Maria Zuber's lab at MIT on microbial detection instrumentation is Chris Carr, PhD from the Department of Aeronautical Engineering at MIT and the MIT Department of Earth and Planetary Sciences and Sarah Stewart Johnson, graduate student in the MIT Department of Earth and Planetary Sciences. Working jointly with the Broad Institute are Annie Conery, PhD, a project manager from the Meyer lab at UC Berkeley, and Jonah Larkins Ford, a technician.

Former Ruvkun lab postdocs (in order of departure)

Devin Parry	Teacher, The Lakeside School, Seattle
Julie Huang	Postdoc in Samara Reck-Peterson lab, Harvard
Alison Frand	Assistant Professor of Biochemistry, UCLA
Ho Yi Mak	Assistant Investigator, Stowers Institute
John Kim	Assistant Professor, Life Sciences Institute at U Michigan
Ilya Ruvinsky	Assistant Professor, Dept. Ecology and Evolution, University of Chicago
Qi Pan	Research scientist at Zymogenetics
Patrick Hu	Assistant Professor, Life Sciences Institute at U Michigan
Weiqing Li	Assistant Professor, Dept of Biological Structure, U Washington
Scott Kennedy	Assistant Professor, Dept of Pharmacology, U Wisconsin
Tom Isenbarger	University of Wisconsin School of Law
Sylvia Lee	Assistant Professor, Dept of Molecular Biology and Genetics, Cornell University (Searle)
Kaveh Ashrafi	Assistant Professor, Dept of Physiology, UCSF (Burroughs Wellcome Award)
Amy Pasquinelli	Assistant Professor, Dept of Biology, UC San Diego (Searle, Rosalind Franklin Award)
Cathy Wolkow	Assistant Professor, National Institute of Aging, Baltimore (Ellison Scholar)
Sarah Pierce	Senior Research Associate, King lab at University of Washington
Raymond Lee	Curator, C. elegansbase C. elegans database, Caltech
Frank Slack	Assoc. Professor, Biology Dept, Yale University (Ellison Scholar)
Oliver Hobert	Professor of Biochemistry and HHMI at Columbia University P&S (Searle)
Ji Ying Sze	Assoc. Professor of Pharmacology, Albert Einstein School of Medicine
Ilho Ha	Professor of Biochemistry, Inje University, Korea
Scott Ogg	Director of Project Management, Arresto Biosciences, Palo Alto
Koutarou Kimura	Assistant Professor, National Institute of Genetics, Mishima, Japan
Garth Patterson	Assistant Dean at Rutgers University
Ralf Baumeister	Professor, University of Freiburg, Germany
Ann Sluder	Director of Biology, Scynexis, Research Triangle Park
Tom Barnes	Director of Research, GeneLogic Pharmaceuticals
Shoshanna Gottlieb	School teacher in Philadelphia.
David Greenstein	Assoc. Professor of Genetics, Univ of Minnesota
Prema Arasu	Assoc. Prof Veterinary Medicine, U North Carolina
Thomas Bürglin	Assoc. Professor Karolinska Institute, Södertörns högskola, Stockholm
Michael Finney	Former Chief Scientist & Principal, MJ Research, now venture capital.

Former Ruvkun lab graduate students (in order of departure)

Tian Tian	Law student at Harvard Law School
Duo Wang	Strategic Decisions Group, New York
Gisela Sandoval	Resident in Psychiatry at Univ of Chicago

Brenda Reinhart postdoctoral research with Kathy Barton at Stanford
 Suzanne Paradis Assistant Professor, Brandeis University
 Heidi Tissenbaum Associate Professor, Univ of Massachusetts at Worcester (Burroughs Wellcome Award)
 Jason Morris Assistant Professor, Fordham University, NYC.
 Allison Kowcek personal organizer
 Bruce Wightman Associate Professor of Biology, Muhlenberg College

Professional Activities

1995 - present Editor, Developmental Biology
~~2004 - present NIH National Advisory Council on Aging,~~

Honors

~~1982 Society of Fellows, Harvard University~~
~~2002 - present NIH Merit Award~~
~~2003 - present Harvard Microbial Science Initiative Organizing Committee~~
 2004 - present Harvard Origins of Life Initiative
~~2003 - present Associate Member, Broad Institute, MIT/Harvard~~
~~2004 - 2007 NIH National Advisory Council on Aging~~
 2005 - present Steering Committee for the Glenn Foundation Aging labs at HMS ~~2003 - present~~
~~Harvard University Microbial Science Initiative Committee~~
~~2003 - present Associate Member, Broad Institute, Harvard/MIT~~

Recent Teaching

Spring 2003 Genetics 206 (with Perrimon, Vidal). Course director. 6 lectures and discussion.
~~Spring 2005 Genetics 206 (with Perrimon, Vidal). 6 lectures and discussion.~~
 Spring 2007 Genetics 206 (with Perrimon, Vidal). 6 lectures and discussion.
 Fall 2007, Life Sciences 190, Course director, with Schrag, Kolter, Pearson, Clardy, Ausubel, Church, Cavanaugh. 4 lectures and discussion.

Invited Presentations 2005 to ~~2004~~2008

2005 Keystone meeting, Diverse Roles of RNA, Breckenridge

Scheduled

2005 Keystone meeting, Development, Banff
 2005 Cancer center MGH
 2005 NovoNordisk diabetes meeting, Copenhagen
 2005 Utrecht, Netherlands
 2005 Physiology Annual meeting, San Diego
 2005 University of Nebraska
 2005 University of Geneva
 2005 Gerontology Society of America Annual Meeting
 2005 International Developmental Biology meeting, Sydney Australia
 2005 Gordon Research Conference, Developmental Biology
 2005 MGH Cancer Center Annual Retreat, Keynote speaker
 2005 Stowers Institute, Kansas City
 2005 Nestle meeting Switzerland
 2005 Center for Genomics Opening Symposium, University of Lausanne
 2005 Department of Genetics, Harvard Medical School
 2005 Cancer UK, London
 2006 Institute for Advanced Study, Princeton University
 2006 Cold Spring Harbor Symposium on Quantitative Biology, Regulatory RNAs

2006 Banbury Conference on Obesity
 2006 Arolla Meeting, Switzerland
 2006 Fredrich Meischer Institute, Basel
 2006 Cold Spring Harbor Aging Meeting
 2007 Kyote Riken meeting on Developmental Biology
 2007 Keynote Address, International C. elegans Meeting, Los Angeles
 2007 Kavli Institute, Santa Barbara
 2007 American Society for Clinical Investigation/Association of American Physicians, Chicago
 2007 Cold Spring Harbor Symposium on Clocks and Rhythms
 2007 Biology of Aging, Woods Hole
 2007 Gordon Conference on Cancer Models and Mechanisms, Les Diablerets, Switzerland
 2007 Rockefeller Cancer and miRNA meeting
 2007 Stem Cells Summit Meeting, Boston
 2007 Royal Society, London
 2008 Yale Developmental Biology Symposium
 2008 Keystone Symposium on Obesity
 2008 Miami Winter Symposium on Regulatory RNA
 2008 Keystone Symposium on miRNAs and siRNAs
 2008 CCBR Mars meeting University of Toronto, Regulatory RNA
 2008 Franklin Institute Benjamin Franklin Award Symposium

Scheduled

2008 UCSF Department of Biochemistry and Biophysics
 2008 Jean Mitchell Watson Lecture, University of Chicago
 2008 MIT Biology Department
 2008 Janelia Farm Circadian Rhythms Symposium
 2008 Rockefeller University Lecture
 2008 University of Michigan, Life Sciences Institute
 2008 Warren Triennial Symposium, MGH
 2008 Gairdner International Prize Canada Tour, three lectures in various provinces