

NAME Stephen L. Helfand	POSITION TITLE Professor		
eRA COMMONS USER NAME Shelfand			
EDUCATION/TRAINING ( <i>Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.</i> )			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR (s)	FIELD OF STUDY
SUNY Binghamton, Binghamton NY		1971-1973	
Stanford University, Stanford, CA	B.Sc.	1973-1975	Biology
Albert Einstein College of Medicine, Bronx, NY	M.D.	1975-1979	Medicine

**Professional Experience**

1980	Medical Intern, Internal Medicine, Montefiore Hospital and Medical Center
1981	Visiting Scholar, Neuroimmunology, Queens University
1980-1983	Clinical Resident, Neurology, Massachusetts General Hospital, Clinical Fellow, Neurology, Harvard Medical School
1983-1984	Postdoctoral Fellow, Dept. of Biological Sciences, Stanford University
1984-1985	Research Associate, Dept. of Biological Sciences, Stanford University
1985-1990	Associate Research Scientist, Dept. of Biology, Yale University
1990-1997	Assistant Professor, Dept. of BioStructure and Function, Univ. Conn. Health Center
1997	Associate Professor, Dept. of BioStructure and Function, Univ. Conn. Health Center
1998-2004	Director, Developmental Biology/Genetics Graduate Program, Univ. Conn. Health Center
2000-2003	Associate Professor, Dept. of Genetics and Developmental Biology, Univ. Conn. Health Center
2003-2005	Professor, Department of Genetics and Developmental Biology, Univ. Conn. Health Center
2005-	Professor, Department of Molecular Biology, Cell Biology, and Biochemistry, Brown Univ.

**Fellowships, Awards, and Honors**

1973-75	Woods Scholarship, Stanford University
1974	Henry Rushton Fairclough Prize for Classics at Stanford University
1975	Distinction, Departmental Honors (Biology) Stanford University
1975	NSF Undergraduate Fellowship (Advisor: N.K. Wessells) Stanford University
1976	Predoctoral Trainee Fellowship (Advisor: D.P. Purpura and N.K. Wessells) Stanford University and Albert Einstein College of Medicine
1977	Roche Award in Neuroscience; American Medical Student Association-National Research Meeting Award
1978	Albert Cass Scholarship for Research in Neuroimmunology
1979	Medical Research Council Fellowship in Neuroimmunology (Advisor: M.C. Raff), Department of Zoology, University College, London
1981	Queen's University Development Fund Award-Neuroimmunology (Advisor: J.C. Roder), Department of Biology, Queen's University, Kingston, Ontario
1983	Boston Society of Psychiatry and Neurology Sandoz Award for Medical Research, Department of Neurology, Massachusetts General Hospital
1983-84	NIH Postdoctoral Fellowship, Stanford University
1984-89	NIH Physician Scientist Award, Stanford University and Yale University
1986	Diplomate, American Board of Psychiatry and Neurology
1990	University of Connecticut Research Initiation Program Grant
1991	American Cancer Society Institutional Research Grant Award
1991	University of Connecticut Faculty Research Grant
1992	American Federation of Aging Research Award

1993	Sandoz Award for Gerontological Research
1993	University of Connecticut Faculty Research Grant
1994-96	The Patrick & Catherine Weldon Donaghue Medical Research Foundation Award, mentor for Dr. Blanka Rogina.
1995	Gordon Conference Travel Award
1995	1995 Summer Training Course in Experimental Aging Research, National Institutes on Aging
1995	American Federation of Aging Research Fellowship, mentor for Mr. Timothy Kuwada.
1995	American Federation of Aging Research Award
1995	Nathan W. and Margaret T. Shock Aging Research Foundation Award
1998	University of Connecticut Faculty Research Grant
2000-2005	The Donaghue Foundation Investigator Program for Health-Related Research Award
2000	Burroughs Wellcome Travel Grant to study in UK
2001-2005	Ellison Medical Foundation Senior Investigator Award
2003	American Federation of Aging Research Fellowship, mentor for Mr. Brian Silvia.
2004	American Federation of Aging Research Fellowship, mentor for Mr. Sanchez-Blanco.
2004-2014	R-37 NIH MERIT Award, National Institutes on Aging
2005-09	KO1 mentor for Dr. Yih-Woei Fridell
2005-07	American Federation of Aging Research Fellowship, mentor for Postdoctoral Fellowship for Dr. Johannes Bauer
2007-	NIA K99—mentor for Dr. Johannes Bauer
2007	Keynote speaker at Biology of Aging Gordon Conference, Switzerland
2007-09	Glenn Award for Research in Biological Mechanisms of Aging
2009-11	Glenn Award for Research in Biological Mechanisms of Aging

## **Publications**

Helfand, S.L., Smith, G.A., and Wessells, N.K. Survival and development in culture of dissociated parasympathetic neurons from ciliary ganglia. *Dev. Biol.* 1976; 50: 541-7.

Helfand, S.L., Riopelle, R.J., and Wessells, N.K. Non-equivalence of conditioned medium and nerve growth factor for sympathetic, parasympathetic and sensory neurons. *Exp. Cell Res.* 1978; 113: 39-45.

Helfand, S.L., Werkmeister, J., and Roder, J.C. The relationship between target cell binding, chemiluminescence and cytolysis. *J. Exp. Med.* 1982; 156: 492-505.

Roder, J.C., Helfand, S.L., Werkmeister, J., McGarry, R., Beaumont, T.J., and Duwe, A. Oxygen intermediates are triggered early in the cytotoxic pathway of human NK cells. *Nature* 1982; 298: 569-72.

Werkmeister, J.A., Helfand, S.L., Rubin, P., Haliotis, T., Pross, H., and Roder, J.C. Tumor cell differentiation modulates susceptibility to natural killer cells. *Cell. Immun.* 1982; 69: 122-27.

Helfand, S.L., Werkmeister, J., and Roder, J.C. The role of free oxygen radicals in the activation of the NK cytotoxic pathway. In: Herberman, R., editor. *NK Cells and Other Natural Effector Cells*. New York: Academic Press; 1982 p. 1011-20.

Werkmeister, J., Helfand, S.L., Haliotis, T., Pross, H., and Roder, J.C. (1982) Specificity of natural killer (NK) cells: nature of target cell structure. In: Herberman, R., editor, *NK Cells and Other Effector Cells*. New York: Academic Press; 1982 p. 743-750.

Roder, J.C., Todd, R.F., Rubin, P., Haliotis, T., Helfand, S.L., Werkmeister, J., Pross, H.F., Boxer, L.A., Schlossman, S.F., and Fauci, A.S. The Chediak-Higashi gene in humans III. Studies on the mechanism of NK impairment. *Clinical Exp. Immunol.* 1983; 51: 359-68.

Helfand, S.L., Werkmeister, J., Pross, H., and Roder, J.C. Oxygen intermediates are required for interferon activation of NK cells. *J. Interferon Res.* 1983; 2: 143-51.

Werkmeister, J., Helfand, S.L., Roder, J., and Pross, H. The chemiluminescence response of human natural killer cells. II. Association of a decreased response with low natural killer activity. *Eur. J. Immunol.* 1983; 13: 514-20.

McGarry, R.C., Helfand, S.L., Quarles, R.H., and Roder, J.C. Recognition of myelin-associated glycoprotein by the monoclonal antibody HNK-1. *Nature* 1983; 306: 376-8.

Goodman, C.S., Bastiani, M.M., Doe, C.Q., du Lac, S., Helfand, S.L., Kuwada, K.Y., Thomas, J.B. Neuronal recognition during development: cellular and molecular approaches. *Science* 1984; 225: 1271-9.

Bastiani, M.J., Doe, C.Q., Helfand, S.L., and Goodman, C.S. Neuronal specificity and growth cone guidance in grasshopper and *Drosophila* embryos. *Trends in Neuroscience* 1985; 84: 257-66.

Beachy, P.A., Helfand, S.L. Hogness, D.S. Segmental distribution of bithorax complex proteins during *Drosophila* development. *Nature* 1985; 313: 545-51.

Hogness, D.S., Lipshitz, H.D., Beachy, P.A., Peattie, D.A., Saint, R.A., Goldschmidt-Clermont, M., Harte, P.J., Gavis, E.R., and Helfand, S.L. Regulation and products of the Ubx domain of the bithorax complex. *Cold Spring Harbor Symp. Quant. Biol.* 1985; 50: 181-94.

Helfand, S.L. and Carlson, J. Isolation and characterization of an olfactory mutant in *Drosophila* with a chemically specific defect. *Proc. Natl. Acad. Sci. USA* 1989; 86: 2908-12.

Woodward, C., Huang, T., Sun, H., Helfand, S.L., and Carlson, J. Genetic analysis of olfactory behavior in *Drosophila*: A new screen yields the ota mutants. *Genetics*. 1989; 123: 315-26.

McKenna, M., Monte, P., Helfand, S.L., Woodward, C., and Carlson, J. A novel chemosensory response in *Drosophila* and the isolation of the acj mutations which affect it. *Proc. Natl. Acad. Sci. USA* 1989; 86: 8118-22.

Irvine, K.D., Helfand, S.L. and Hogness, D.S. The large upstream control region of the *Drosophila* homeotic gene *Ultrabithorax*. *Development* 1991; 111: 407-24.

\*Helfand, S.L., Blake, K.J., Rogina, B., Stracks, M.D., Centurion, A. and Naprta, B. Temporal patterns of gene expression in the antenna of the adult *Drosophila melanogaster*. *Genetics* 1995; 140: 549-55.

Blake, K.J., Rogina, B., Centurion, A. and \*Helfand, S. L. Changes in gene expression during post-eclosion development in the olfactory system of *Drosophila melanogaster*. *Mechanisms of Development* 1995; 52: 179-85.

Rogina, B. and \*Helfand, S. L. Regulation of gene expression is linked to life span in the adult *Drosophila*. *Genetics* 1995; 141: 1043-48.

Blake, K. J., Hoopengardner, B., Centurion, A. and \*Helfand, S. L. A molecular marker shows that adult maturation is independent of the rate of pre-adult development in *Drosophila melanogaster*. *Developmental Genetics* 1996; 18: 125-30.

\*Helfand, S. L. and Naprta, B.. The expression of a reporter protein,  $\beta$ -galactosidase, is preserved during maturation and aging in some cells of the adult *Drosophila melanogaster*. *Mechanisms of Development* 1996; 55:45-51.

Rogina, B. and \*Helfand, S. L. Timing of expression of a gene in the adult *Drosophila* is regulated by mechanisms independent of temperature and metabolic rate. *Genetics* 1996; 143: 1643-51

Rogina, B. and \*Helfand, S. L. Spatial and temporal pattern of expression of the wingless and engrailed genes in the adult antenna is regulated by age-dependent mechanisms. *Mechanisms of Development* 1997; 63: 89-97.

Rogina, B., Benzer, S., and \*Helfand, S. L. *Drosophila* drop-dead mutations accelerate the time course of age-related markers. *Proc. Natl. Acad. Sci. (USA)* 1997; 94: 6303-6.

Rogina, B., Vaupel, J. W., Partridge, L., \*Helfand, S. L. Regulation of gene expression is preserved in aging *Drosophila melanogaster*. *Current Biology* 1998; 8: 475-8.

Rogina, B. and \*Helfand, S.L. Cu, Zn superoxide dismutase deficiency accelerates the time course of an age-related marker in *Drosophila melanogaster*. *Biogerontology* 2000; 1: 161-7.

Rogina, B. Reenan, R. A., Nilsen S. P. and \*Helfand, S. L. Extended life-span conferred by cotransporter gene mutations in *Drosophila*. *Science* 2000; 290: 2137-40.

\*Helfand, S. L. and Rogina, B. Regulation of gene expression during aging. In: Hekimi, Siegfried, editor. *Molecular Genetics of Aging: Results and Problems in Cell Differentiation*, vol. 29. Germany: Springer-Verlag; 2000. p. 67-80.

Hoopengardner, B and \*Helfand, S. L. Temperature Compensation and Temporal Expression Mediated by an Enhancer Element in *Drosophila*. *Mechanisms of Development* 2002; 110: 27-37.

Knauf, F., Rogina, B., Jiang, Z., Aronson, P. A., and \*Helfand, S. L. Functional Characterization and Immunolocalization of the Novel Transporter Encoded by the Life-Extending Gene *Indy*. *Proc. Natl. Acad. Sci. (USA)* 2002; 99:14315-19.

Rogina, B., Helfand, S. L. and Frankel, S. Longevity regulation by *Drosophila* Rpd3 deacetylase and caloric restriction. *Science* 2002; 298: 1745.

\*Helfand, S. L. Chaperones Take Flight. *Science*, 2002, 295: 809-10.

\*Helfand, S. L. and Rogina, B. Molecular genetics of aging: Is this the end of the beginning? *BioEssays* 2003; 25: 134-41.

\*Helfand, S. L. and Rogina, B. Genetics of aging in the fruit fly, *Drosophila melanogaster*. *Annual Review of Genetics* 2003; 37: 329-48.

\*Helfand, S. L. and Inouye, S. L. Aging, life span, genetics and the fruit fly. *Clinical Neuroscience Research* 2003; 2: 270-278.

Butler, R. N., Austad, S. N., Barzilai, N., Braun, A., Helfand, S.L., Larsen, P. L., McCormick, A. M., Perls, T. T., Shuldiner, A. R., Sprott, R. L., and Warner, H. R. Longevity genes: from primitive organisms to humans. *J Gerontol A Biol Sci Med Sci*. 2003; 7: 581-4

\*Helfand, S. L. and Rogina, B. From genes to aging in the *Drosophila*. In: Hall, J.C., Dunlap, J. C., Friedman, T., editors. *Advances in Genetics*. San Diego: Academic Press; 2003 vol. 49, p 67-109.

\*Helfand, S. L. and Rogina, B. Genetics of aging in the fruit fly, *Drosophila melanogaster*. *Annual Review of Genetics* 2003; 37: 329-48.

Marden, J.H., Rogina, B., Montooth, K.L. and \*Helfand, S. L. Conditional tradeoffs between aging and organismal performance of *Indy* long-lived mutant flies. *Proc. Natl. Acad. Sci. (USA)* 2003; 100: 3369-73.

Fridell, Y-W., Sánchez-Blanco, Silvia, B. A. and \*Helfand, S. L. Functional Characterization of a Drosophila Mitochondrial Uncoupling Protein. *Journal of Bioenergetics and Biomembranes* 2004; 36 (3): 219-28.

Woods, J, Rogina, B, Lavu, S., Howitz, K., \*Helfand, S. L, \*Tatar, M., and \*Sinclair, D. (2004) Sirtuin activators mimic calorie restriction and delay aging in metazoans. *Nature* 2004; 430 (7000): 686-9.

Bauer, J., Goupil, S., Garber, G., and \*Helfand, S. L. An accelerated assay for the identification of life span extending interventions in *Drosophila melanogaster*. *Proc. Natl. Acad. Sci. (USA)* 2004; 101:12980-85.

Rogina, B. and \*Helfand, S. L. Sir2 mediates longevity in the fly through a pathway related to calorie restriction. *Proc. Natl. Acad. Sci. (USA)* 2004; 101: 15998-6003.

Fridell, Y-W, Sanchez-Blanco, A., Silvia, B. and \*Helfand, S. L. Targeted Expression of the Human Uncoupling Protein 2 (hUCP2) to Adult Neurons Extends Life Span in the Fly. *Cell Metabolism* 2005; 1: 145-52.

Zheng, J-Y, Mutcherson, R, and \*Helfand, S. L. Calorie restriction delays lipid oxidative damage in *Drosophila melanogaster*. *Aging Cell* 2005; 4: 209-16.

Bross, TG, Rogina, B, and \*Helfand SL. (2005) Behavioral, physical, and demographic changes in *Drosophila* populations through dietary restriction. *Aging Cell*. 4: 309-17. (Cover picture)

Bauer JH, Poon PC, Glatt-Deeley H, Abrams JM, and \*Helfand S.L. (2005) Neuronal Expression of p53 Dominant-Negative Proteins in Adult *Drosophila melanogaster* Extends Life Span. *Curr Biol*. 15:2063-8.

Sanchez-Blanco A, Fridell YW, and \*Helfand SL (2006) Involvement of *Drosophila* Uncoupling Protein 5 in Metabolism and Aging. *Genetics* 172:1-12.

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Bauer, JH and \*Helfand, S. L. The humble fly: what a model system can reveal about the human biology of aging. (2006) *Rhode Island Medical Journal*, 89(9): 314-5.

Bauer, JH and \*Helfand, SL. (2006) New tricks of an old molecule: lifespan regulation by p53. *Aging Cell* 5: 437-40.

Bauer JH, Chang C, Morris SNS, Hozier S, Andersen S, Waitzman JS, \*Helfand S.L. (2007) Expression of dominant-negative Dmp53 in the adult fly brain inhibits insulin signaling. *Proc. Natl. Acad. Sci. (USA)*, 14; 104(33):13355-60 Aug 8; [Epub ahead of print]

\*Helfand, S. L., Bauer, J. H. and Wood, J. G. (2008) Calorie Restriction in lower organisms in *Molecular Biology of Aging* edited by L. Guarente, L. Partridge, and D. Wallace. Cold Spring Harbor Laboratory Press, New York.

Bauer J.H., Morris SNS, Chang C, Flatt T, Wood JG and \*Helfand SL. (2009) dSir2 and Dmp53 interact to mediate aspects of CR-dependent life span extension in *D. melanogaster*. *Aging* 1: 38-48.

Neretti N, Wang PY, Brodsky AS, Nguyen HH, White KP, Rogina B, \*Helfand SL. (2009) Long-lived Indy induces reduced mitochondrial reactive oxygen species production and oxidative damage. *Proc Natl Acad Sci U S A*. 2009 Jan 21. [Epub ahead of print]

Wang PY, Neretti N, Whitaker R, Hosier S, Chang C, Lu D, Rogina B, \*Helfand SL. (2009) Long-lived Indy and calorie restriction interact to extend life span. *Proc Natl Acad Sci U S A*. 2009 Jun 9;106(23):9262-7. Epub 2009 May 22.

Fridell, Y-W, Hoh, M, Kreneisz, Orsolya, Hosier, S, Chengyi, C, Scantling D, Mulkey, D and \*Helfand SL. Increased Uncoupling Protein (UCP) activity in Drosophila Insulin-Producing neurons attenuates Insulin signaling and extends lifespan. *Aging* (2009).

Bauer, JH and \*Helfand, SL. (2009) Sir2 and longevity: the p53 connection. *Cell Cycle*. Jun 15;8(12):1821. Epub 2009 Jun 15.

**\* Contributing/Corresponding Author**

**Research Projects**

**Current**

1R01 AG025277 Helfand (PI) 9/30/05-6/30/10  
NIH/NIA  
"Oxidative Damage, Aging and Life Span"  
Role: Investigator  
The major goals are to understand the role of oxidative damage in aging and life span.

2R37 AG16667 Helfand (PI) 3/31/09-3/31/14  
NIH/NIA  
"Single Gene Mutants that Confer Longevity in Drosophila"  
Role: Investigator  
The major goals are to study the molecular genetic mechanisms of the Indy gene.

2R37 AG16667 Helfand (PI) ARRA Supplement 7/31/09-8/1/11  
NIH/NIA  
"Single Gene Mutants that Confer Longevity in Drosophila"  
Role: Investigator  
The major goals are to study the molecular genetic mechanisms of the Indy gene.

2R37 AG16667 Helfand (PI) Underrepresented minority supplement 7/1/09-6/1/10  
NIH/NIA  
"Single Gene Mutants that Confer Longevity in Drosophila"  
Role: Investigator  
The major goals are to study the molecular genetic mechanisms of the Indy gene.

1R01 AG24353 Helfand (PI) 8/1/09 - 7/31/14  
NIH/NIA  
"Control of Gene Expression and Life Span"  
Role: Investigator  
The major goals are study the role of Rpd3 and Sir2 in life span determination.

Glenn Award for Research in Biological Mechanisms of Aging Helfand (PI) 9/09-9/11  
Role: Investigator  
The goal of this project is to use biomarkers to identify new longevity mutants in Drosophila.

**Completed**

1991-92 University of Connecticut Research Initiation Program Grant, PI, Molecular genetics of olfaction.  
1991-92 American Cancer Society Institutional Research Grant Award, PI, Genetic Studies of Signal Transduction in Olfaction.

1992-94 University of Connecticut Faculty Research Award, PI, Molecular and Genetic Analysis of Olfaction.

1992-96 National Science Foundation, PI, Molecular and Genetic Analysis of Olfaction in Drosophila.

1992-94 American Federation for Aging Research, PI, Regulation of Gene Expression During Aging

1993-94 Sandoz Foundation for Gerontological Research, PI, Gene regulation during aging

1994-96 University of Connecticut Faculty Research Award, PI, Regulation of Gene Expression During Aging

1995-96 American Federation for Aging Research, PI, Control of Gene Expression During Aging

1994-96 The Patrick & Catherine Weldon Donaghue Medical Research Foundation Award, Postdoctoral Mentor for Dr. Blanka Rogina

1995 Gerontology Society of America, Nathan W. and Margaret T. Shock Aging Research Foundation Award

1997-98 University of Connecticut Interim HCRAC Award, PI, Genetics of Aging in the Olfactory System of Drosophila Melanogaster

1997-99 RO3 NIH/NIA, PI.

2000 Burroughs Wellcome Research Travel Grant, PI

1999-2004 NIH/NIA, PI, Single Gene Mutant that Confer Longevity in Drosophila

2000-2004 The Patrick & Catherine Weldon Donaghue Medical Research Foundation, PI, Molecular Genetics of Aging

2001-2008 Ellison Medical Foundation, PI, Isolation of Single Gene Mutations in Drosophila Melanogaster

2007-2009 Glenn Award for Research in Biological Mechanisms of Aging, PI

2004-2009 NIH/NIA, Co-PI, Molecular Genetics of Caloric Restriction in Aging Flies

2004-2009 NIH/NIA, PI, MERIT Award, Single Gene Mutant that Confer Longevity AG16667

2004-2009 NIH/NIA, PI, Control of Gene Expression and Life Span AG24353