

SAMUEL M. KUNES

Affiliations

Center for Brain Science
Department of Molecular and Cellular Biology
Harvard University

Address and Contact

Rm. 2013, Biological laboratories
16 Divinity Avenue
Cambridge, MA 02138

Education

University of Oregon, Eugene	B.S. 1980	Chemistry
Massachusetts Institute of Technology	Ph.D. 1988	Genetics
Harvard University	M.A. 2000	Honorary

Academic Experience

1979 Studies on adenovirus late gene expression with Dr. Michael Mathews
Cold Spring Harbor Laboratory Undergraduate Research Program

1979-1981 Role of Chi sites in bacteriophage λ recombination with Dr. Gerald R.
Smith, Institute of Molecular Biology, University of Oregon.

1981-1988 Graduate studies with Dr's. David Botstein and Maurice S. Fox,
Department of Biology, Massachusetts Institute of Technology

 Dissertation: *On the Processing of Free DNA Ends in Yeast Transformation.*

1988-1992 Postdoctoral research with Dr. Hermann Steller
Dept. of Biology, Massachusetts Institute of Technology

1993-1996 Assistant Professor, Department of Biochemistry and Molecular Biology,
Harvard University, Cambridge, MA.

1993- Board of Tutors in the Biochemical Sciences, Harvard University

1997-1998 Associate Professor, Department of Molecular and Cellular Biology,
Harvard University, Cambridge, MA.

1998-2000 John L. Loeb Associate Professor of the Natural Sciences, Harvard University

2000- Professor of Molecular and Cellular Biology, Faculty of Arts and Sciences,
Harvard University, Cambridge, MA.

2003- Associate, Center for Brain Science, Harvard University

University Service

1993- Standing Committee on Neuroscience
1993- Graduate Program in Neuroscience
2005- University Committee on Biological Sciences
2006- Committee on Athletic Sports
2006- Curricular Committee on Degrees in Neurobiology
2013- Board of Freshmen Advisors

Awards and Fellowships

1981-1984 National Research Service Predoctoral Award
1984-1986 Swanson Fellow, MIT
1988-1991 Damon Runyon-Walter Winchell Cancer Fellowship
1994-1998 Pew Scholars Award in the Biomedical Sciences

Teaching Responsibilities

1994- Instructor, MCB129: *The Brain: Development, Plasticity and Decline*
1995-2006 Instructor, MCB117: *Experimental Neuroscience; a laboratory course*
2005-2006 Instructor, OEB174: *Topics in Behavioral Ecology: Learning and Memory*

Patent

U.S. and International Patents Pending: "Compositions and Methods to Modulate Memory"
60/726,318.

Selected Publications

Smith, G. R., S. M. Kunes, D. W. Schultz, A. Taylor, and K. L. Triman, 1981. Structure of Chi hotspots of generalized recombination. *Cell* **24**:429-436.

Kunes, S., D. Botstein, and M. S. Fox, 1984. Formation of inverted dimer plasmids after transformation of yeast with linearized plasmid DNA. *Cold Spring Harb. Symp. Quant. Biol.* **49**:617-627.

Kunes, S., D. Botstein, and M. S. Fox, 1985. Transformation of yeast with linearized plasmid DNA: Formation of inverted dimers and recombinant plasmid products. *J. Mol. Biol.* **184**:375-387.

Kunes, S., H. Ma, K. Overbye, M. S. Fox, and D. Botstein, 1987. Fine structure recombinational analysis of cloned genes using yeast transformation. *Genetics* **115**:73-81.

Ma, H., S. Kunes, P. Schatz, and D. Botstein, 1987. Plasmid construction by homologous recombination in yeast. *Gene* **58**:201-216.

Kunes, S., D. Botstein, and M. S. Fox, 1990. Synapsis-mediated fusion of free DNA ends forms inverted dimer plasmids in yeast. *Genetics* **124**:67-80.

Kunes, S., and H. Steller, 1991. Ablation of *Drosophila* photoreceptor cells by conditional expression of a toxin gene. *Genes Dev.* **5**:970-983.

- Kunes, S., C. Wilson, and H. Steller, 1993. Independent guidance of retinal axons in the developing visual system of *Drosophila*. *J. Neuroscience* **13**:752-767.
- Kunes, S., and H. Steller, 1993. Topography in the *Drosophila* visual system. *Curr. Opin. Neurosci.* **3**:53-59.
- Kaphingst, K., and S. Kunes. 1994. Pattern formation in the visual centers of the *Drosophila* brain: *wingless* acts via *decapentaplegic* to specify the dorsoventral axis. *Cell* **78**:437-448.
- Huang, Z., and S. Kunes, 1996. Hedgehog, transmitted along retinal axons, triggers neurogenesis in the developing visual centers of the *Drosophila* brain. *Cell* **86**:411-422.
- Huang, Z. and S. Kunes, (1998) Signals transmitted along retinal axons in *Drosophila*: Hedgehog signal reception and the cell circuitry of lamina cartridge assembly. *Development* **125**:3753-3764.
- Huang, Z., Shilo, B.-Z., and S. Kunes, (1998) A retinal axon fascicle uses Spitz, an EGF receptor ligand, to construct a synaptic cartridge in the brain of *Drosophila*. *Cell* **95**:693-703.
- Kunes S. (1999) Stop or go in the target zone. *Neuron*. **22**:639-640.
- Kunes, S., (2000) Axonal signals in the assembly of neural circuitry. *Curr Opin Neurobiol* **10**:58-62.
- Song, Y., Chung, S., and S. Kunes, (2000) Combgap relays Wingless signal reception to the determination of cortical cell fate in the *Drosophila* visual system. *Mol. Cell* **6**:1143-54.
- Dearborn, R. Jr, He, Q., S. Kunes, Y. Dai, (2002) A role for an Eph receptor tyrosine kinase in the development of the visual system of *Drosophila*. *J Neurosci.* **22**:1338-49.
- Dearborn, R. Jr, and S. Kunes, (2004) An axon scaffold induced by retinal axons directs glia to destinations in the *Drosophila* optic lobe. *Development.* **131**:2291-2303.
- Yang, H., and S. Kunes, (2004) Non-vesicular release of acetylcholine is required for axon targeting in the *Drosophila* visual system. *PNAS*, **101**:15213-15218.
- Ashraf, S.I., McLoon, A.L., Sclarsic, S. and S. Kunes. (2006) Synaptic protein synthesis associated with memory is regulated by the RISC pathway in *Drosophila*. *Cell* **124**:191-205.
- Chu, T., Chiu, M., Zhang, E., and S. Kunes. (2006) A C-terminal motif targets Hedgehog to axons, coordinating assembly of the *Drosophila* eye and brain. *Dev. Cell* **10**:635-646.
- Ashraf, S.I. and S. Kunes (2006) A trace of silence: Memory and microRNA at the synapse. *Curr. Opin. Neurobiol.* **16**:535-539.
- Perlstein, E., de Bivort, B., Kunes, S., and S. Schreiber (2007) Evolutionarily conserved optimization of amino-acid biosynthesis. *J. Mol. Evolution*, **65**:186-196.

de Bivort, B., Perlstein, E., Kunes, S., and S. Schreiber. (2008) Metabolic origin of amino acids exerts evolutionary influence on protein sequence in yeast. *PNAS*, under review.

de Bivort, B.L, Onah, A., and S. Kunes. (2008) Plasticity and Polarity Elements of the *Drosophila* Phototaxis Circuitry. under review

Tokhunts, R., Singh, S., Chu, T., Goetz, J.A., Huang, Z., Yuan, Z., Ascano, M., Kunes, S., and D.J. Robbins (2008) SONIC HEDGEHOG holoprosencephaly mutations reveal a novel role for the unprocessed full-length protein as an active signaling molecule. *J Biol Chem.* 285:2562-2568.

Endocytic pathway is required for *Drosophila* Toll innate immune signaling. Huang HR, Chen ZJ, Kunes S, Chang GD, Maniatis T. (2010) *Proc Natl Acad Sci U S A.* 107:8322-8327.

Optimizing *Drosophila* olfactory learning with a semi-automated training device. (2010) Murakami S, Dan C, Zagaeski B, Maeyama Y, Kunes S, Tabata T. *J Neurosci Methods.* 188:195-204.

Reph, a regulator of Eph receptor expression in the *Drosophila melanogaster* optic lobe. Dearborn RE Jr, Dai Y, Reed B, Karian T, Gray J, Kunes S. (2012) *PLoS One.* 7:e37303. doi: 10.1371/journal.pone.0037303.

Song E, de Bivort B, Dan C, Kunes S. (2012) Determinants of the *Drosophila* odorant receptor pattern. *Dev Cell.* 22:363-76.

Baqri RM, Pietron AV, Gokhale RH, Turner BA, Kaguni LS, Shingleton AW, Kunes S, Miller KE. (2014) Mitochondrial chaperone TRAP1 activates the mitochondrial UPR and extends healthspan in *Drosophila*. *Mech Ageing Dev.* 141-142:35-45. doi: 10.1016/j.mad.2014.09.002.

Daniele JR, Baqri RM, Kunes S. (2017) Analysis of axonal trafficking via a novel live-imaging technique reveals distinct hedgehog transport kinetics. *Biol Open.* 6:714-721.

Daniele JR, Chu T, Kunes S. (2017) A novel proteolytic event controls Hedgehog intracellular sorting and distribution to receptive fields. *Biol Open.* 6:540-550.

Wee CL, Song E, Nikitchenko M, Wang W-C, Luks-Morgan S, Wong S, Gagnon J, Randlett O, Lacoste A, Bianco I, Schier A, Engert F, Kunes S and A. Douglass. Social isolation modulates appetite and defensive behavior via a common oxytocinergic circuit in larval zebrafish [under review]

Wee CL, Song E, Johnson R, Randlett O, Kim J, Kawakami K, Engert F, and S. Kunes. *A bidirectional network for appetite control in zebrafish.* [in preparation]