

BIOGRAPHICAL SKETCH

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NAME Leslie B. Vosshall, Ph.D.	POSITION TITLE Investigator, Howard Hughes Medical Institute Robin Chemers Neustein Professor		
eRA COMMONS USER NAME (credential, e.g., agency login) LESLIEVOSSHALL			
EDUCATION/TRAINING (<i>Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.</i>)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Columbia College, Columbia University	A.B.	06/87	Biochemistry
HHMI—The Rockefeller University	Ph.D.	06/93	Molecular Genetics
HHMI—Columbia University	Postdoc	1993-1997	Molecular Neurobiology

A. Personal Statement

I am a molecular neurobiologist with 30 years of experience as a biomedical researcher and 15 years of experience running my own independent laboratory. The main focus of my laboratory is to understand the genetic basis of behavior, with particular emphasis on how organisms perceive and respond to external sensory stimuli and how these responses are modulated by the internal physiological state of the animal. Our early work concerned olfactory perception and we discovered two large families of insect chemosensory receptors (ORs and IRs) and we have described general principles regarding their function, expression, and the connectivity of the sensory neurons that express them to primary processing centers in the brain. We also investigate the molecular mechanisms underlying a diverse array of stereotyped innate behaviors – including the host-seeking behavior of mosquitoes, feeding and courtship behaviors of *Drosophila*, and the genetics and psychophysics of human smell perception. I have a successful history of launching trainees into biomedical careers and have created an environment that fosters creativity and high-risk/high-reward research.

B. Positions and Honors**Positions and Employment**

2010-Present	Robin Chemers Neustein Professor, and Head of the Laboratory of Neurogenetics and Behavior, The Rockefeller University, New York, NY
2008-Present	Investigator, Howard Hughes Medical Institute
2006-2010	Chemers Family Associate Professor and Head of the Laboratory of Neurogenetics and Behavior, The Rockefeller University, New York, NY
2005-2007	Faculty, Neural Systems and Behavior Course, Marine Biological Laboratory, Woods Hole, MA
2003-2006	Chemers Family Assistant Professor and Head of the Laboratory of Neurogenetics and Behavior, The Rockefeller University, New York, NY
2000-2003	Annenberg Assistant Professor and Head of the Laboratory of Neurogenetics and Behavior, The Rockefeller University, New York, NY
1997-2000	Associate Research Scientist, Center for Neurobiology and Behavior, Howard Hughes Medical Institute, Columbia University, New York, NY. In the laboratory of Dr. Richard Axel
1994	Instructor, Neurobiology Course, Marine Biological Laboratory, Woods Hole, MA

Other Experience and Memberships**a. Editorial**

2013-Present	Member, Simons Foundation Quanta Magazine board
2013-Present	Member, BioRxiv advisory board
2012-Present	Member, PLoS Biology Editorial Board
2008-2013	Associate Editor, Frontiers in Neural Circuits
2007-Present	Member, Chemical Senses Editorial Board

2007-2009 Member, PLoS ONE Editorial Board
2007-2012 Associate Editor, Journal of Neuroscience
2006-2010 Reviewing Editor, HFSP Journal
2005-Present Associate Editor, The FASEB Journal
2005-Present Member, Current Biology Editorial Board

b. Grant and Peer Review

2012-Present HHMI Investigator Selection Panel
2011-Present Member of the Scientific Advisory Board, Institute of Molecular Pathology, Vienna, Austria
2010-2014 Board of Scientific Counselors, NIH, NIDCR
2008-Present Member of the Group Leader Selection Committee, HHMI-Janelia Farm Research Campus
2008-Present Jury Member for the Vilcek Prize for Creative Promise
2008-2015 Member, McKnight Scholar Award Selection Committee
2008-2015 Member, Program Committee of the Alfred P. Sloan Research Fellowships in Neuroscience
2008-Present External Reviewer, Radcliffe Institute Fellows Program
2008-2009 Member, NINDS Basic Module Advisory Panel
2007-2014 External Review Committee Member, Max Planck Institute of Chemical Ecology
2007-2008 TMF/Patterson Trust Fellowship Program in Brain Circuitry External Reviewer
2007 MRC Young Investigator Grant External Reviewer
2006 HHMI International Research Scholar Program Panelist
2006-2009 Beckman Young Investigator Program Panelist
2006 German Volkswagen Stiftung External Reviewer
2002-Present NIH Grant Review: Ad Hoc Member, NIH CSR review panels (NIDCD ZDC1 SRB-S, NIDCD ZDC1 SRY-Y, NIDCD CDRC, NIH/CSR SCS, NIH SCS CBSS)
2002-2007 NSF Grant Review: MCB, IBN, and CAREER Award Reviewer
2002-2006 Norwegian Technology Foundation External Reviewer

c. Conference and Association Service

2017 Co-chair (with Richard Benton), EMBO/EMBL Meeting on Neural Circuits
2016 Co-chair (with Kazushige Touhara and Wolfgang Meierhof), 17th Annual International Symposium on Olfaction and Taste, Yokohama, Japan
2010 Organizer (with Kazushige Touhara), 2010 Janelia Farm Research Conference: Form and Function of the Olfactory System
2009 Organizer (with Peter Mombaerts), 2009 Keystone Meeting. "Chemical Senses: Receptors & Circuits"
2007 Co-organizer (with Peter Mombaerts), 2007 Keystone Meeting. "Chemical Senses: From Receptors to Perception"
2006, 2015 Association for Chemoreception Sciences (AChemS) Election Committee Member
2004, 2005 Chemosensory Receptors Symposium Session Co-Chair, AChemS
2003, 2005 Sensory Systems Session Chair, Cold Spring Harbor Neurobiology of *Drosophila* meeting
2002 Olfaction Session Chair, Society for Neuroscience meeting
2001, 2006, 2008 Program Committee Member, AChemS

d. Consulting

2011-Present Member, Scientific Advisory Board, International Flavors and Fragrances, Inc.
2000-2004 Member, Scientific Advisory Board, Sentigen Biosciences
1999 Participant, *Drosophila* Genome Annotation Jamboree, Celera Genomics

Honors

2015 Election to the National Academy of Sciences
2014 AAAS Fellow Election
2011 Gill Center Young Investigator Award
2010 Dart/NYU Biotechnology Alumnae Achievement Award
2009 Lawrence C. Katz Prize, Duke University

2008	The International Society of Chemical Ecology Silverstein-Simeone Lecture Award
2007	Winner, Blavatnik Awards for Young Scientists from the New York Academy of Sciences
2005	New York City Mayor's Young Investigator Award for Excellence in Science and Technology
2005	Rockefeller University Teaching Award
2002	Presidential Early Career Award for Scientists and Engineers (PECASE)
2002	John Merck Fund Award
2001	Beckman Young Investigator Award
2001	National Science Foundation CAREER Award
2001	McKnight Scholar Award
1987	John Jay Scholar, Columbia College of Columbia University

C. Selected Peer-reviewed Publications (selected from 53)

1. Keller, A and **LB Vosshall**. 2004. A Psychophysical Test of the Vibration Theory of Olfaction. Nat. Neurosci. 7:337-338. PMID: 15034588
2. Larsson MC, Al Domingos, WD Jones, ME Chiappe, H Amrein, and **LB Vosshall**. 2004. *Or83b* encodes a broadly expressed odorant receptor essential for *Drosophila* olfaction. Neuron 43:703-714. PMID: 15339651
3. Fishilevich E, and **LB Vosshall**. 2005. Genetic and functional subdivision of the *Drosophila* antennal lobe. Curr. Biol. 15:1548-1553. PMID: 16139209
4. Fishilevich E., Al Domingos, K Asahina, F Naef, **LB Vosshall**, and M Louis. 2005. Chemotaxis behavior mediated by single larval olfactory neurons in *Drosophila*. Curr. Biol.15:2089-2096. PMID: 16332533
5. Benton R, S Sachse, SW Michnick, and **LB Vosshall**. 2006. Atypical membrane topology and heteromeric function of *Drosophila* odorant receptors *in vivo*. PLoS Biol. 4:e20. PMID: 16402857
6. Keller A and **LB Vosshall**. 2007. Influence of odorant receptor repertoire on odor perception in humans and fruit flies. PNAS 104:5614-5619. PMID: 17372215
7. Sachse, S, Rueckert, E, Keller, A, Okada, R, Tanaka, NK, Ito, K and **LB Vosshall**. 2007. Activity-dependent plasticity in an olfactory circuit. Neuron 56:838-850. PMID: 18054860
8. Jones, WD, P. Cayirlioglu, I Grunwald Kadow, and **LB Vosshall**. 2007. Two chemosensory receptors together mediate carbon dioxide detection in *Drosophila*. Nature 445:86-90. PMID: 17167414
9. Benton, R, KS Vannice, and **LB Vosshall**. 2007. An essential role for a CD36-related receptor in pheromone detection in *Drosophila*. Nature 450:289-293. PMID: 17943085
10. Keller A*, H Zhuang*, Q Chi, **LB Vosshall**, and H Matsunami. 2007. Genetic variation in a human odorant receptor alters odour perception. Nature 449:468-472. *equal contribution PMID: 17873857
11. Louis, M, Huber, T, Benton, R, Sakmar, TP, and **LB Vosshall**. 2007. Bilateral olfactory sensory input enhances chemotaxis behavior. Nat. Neurosci. 11:187-199. PMID: 18157126
12. Ditzen, M., M Pellegrino, and **LB Vosshall**. 2008. Insect odorant receptors are molecular targets of the insect repellent DEET. Science 319:1838-1842. PMID: 18339904
13. Sato, K., M Pellegrino, T Nakagawa, T Nakagawa, **LB Vosshall**, and K Touhara. 2008. Insect olfactory receptors are heteromeric ligand-gated ion channels. Nature 452:1002-1006. PMID: 18408712
14. Benton, R, KS Vannice, C Gomez-Diaz, and **LB Vosshall**. 2009. Variant ionotropic glutamate receptors as chemosensory receptors in *Drosophila*. Cell 136:149-162. PMID: 19135896
15. Asahina, K, M Louis, S Piccinotti, and **LB Vosshall**. 2009. A circuit supporting concentration-invariant odor perception in *Drosophila*. J. Biol. 8:9. PMID: 19171076, PMCID:2656214
16. Pellegrino, M, N Steinbach, MC Stensmyr, BS Hansson, and **LB Vosshall**. 2011. A natural polymorphism alters odour and DEET sensitivity in an insect odorant receptor. Nature 478:511-514 PMID: 21937991, PMCID: 3203342
17. Farhadian SF, M Suárez-Fariñas, CE Cho, M Pellegrino, **LB Vosshall**. 2011. Post-fasting olfactory, transcriptional, and feeding responses in *Drosophila*. Physiol. Behav. 105:544-553. PMID: 21945372
18. Nakagawa, T, M Pellegrino, K Sato, **LB Vosshall**, and Kazushige Touhara. 2012. Amino acid residues contributing to function of the heteromeric insect olfactory receptor complex. PLoS ONE, 7(3):e32372. PMID: 22403649

19. DeGennaro M, CS McBride, L Seeholzer, T Nakagawa, EJ Dennis, C Goldman, N Jasinskiene, AA James, and **LB Vosshall**. 2013. *orco* mutant mosquitoes lose strong preference for humans and are not repelled by volatile DEET. Nature 498:487-491 PMID: 23719379
20. Gasque G, Conway W, Huang J, Rao Y, and **LB Vosshall**. 2013. Small molecule drug screening in *Drosophila* identifies the 5HT2A receptor as a feeding modulation target. Sci. Rep. 3:srep02120. doi: 10.1038/srep02120. PMID: 23817146
21. Liesch J, LL Bellani, and **LB Vosshall**. 2013. Functional and Genetic Characterization of Neuropeptide Y-Like Receptors in *Aedes aegypti*. PLoS Negl Trop Dis, 7: e2486. PMID: 24130914
22. Crickmore MJ and **LB Vosshall**. 2013. Opposing dopaminergic and GABAergic neurons control the duration and persistence of copulation in *Drosophila*. Cell, 155:881-893. PMID: 24209625
23. McMeniman CJ, RA Corfas, BJ Matthews, Ritchie SA, and **LB Vosshall**. 2014. Multimodal integration of carbon dioxide and other sensory cues drives mosquito attraction to humans. Cell 156:1060-1071. PMID: 24581501
24. Bushdid C, MO Magnasco, **LB Vosshall**, and A Keller. 2014. Humans can discriminate more than 1 trillion olfactory stimuli. Science 343:1370-1372. PMID: 24653035
25. Bussell JJ, N Yapici, SX Zhang, BJ Dickson, and **LB Vosshall**. 2014. Abdominal-B neurons control *Drosophila* virgin female receptivity. Curr Biol 24:1584-1595 PMID: 24998527
26. McBride CS, F Baier, AB Omondi, SA Spitzer, J Lutomiah, R Sang, R Ignell, and **LB Vosshall**. 2014. Evolution of mosquito preference for humans linked to an odorant receptor. Nature 515:222-227. PMID: 25391959

D. Research Support

Ongoing

- [1] HHMI Investigator Award (PI: Vosshall) 7/1/2008-8/31/2018
Title: Modulation of Behavior by Internal Physiological State
Goal: To understand how internal physiological states alter behavior
- [2] NIH NIDCD RO1 Award (PI: Joel Mainland; Vosshall, co-PI) 7/12/2013-6/30/2016
Title: Perceptual Effects of Genetic Variation in Human Odorant Receptors
Goal: To examine the relationship between variation in odorant receptor genes and human smell perception
- [3] NIH NIDCD RO1 Award (PI: Vosshall) 12/1/2014-11/30/2019
Title: Neuropeptide Regulation of Mosquito Host-Seeking Behavior
Goal: Identify neuropeptide signaling mechanisms that modulate female mosquito behavior

Completed

- [1] Grants Program in Eating Disorders Research (PI: Vosshall) 6/1/2012-5/31/2014
The Klarman Family Foundation
Title: G Protein-Coupled Receptors Regulating the Sensation of Hunger and Satiety
Goal: To understand how GPCRs participate in the sensation of hunger or satiety and the promotion or suppression of feeding
- [2] Grand Challenge 8, #786 (PI: Axel, co-PI: Vosshall) 9/15/2005-9/14/2013
FNIH CU08-7037/Bill and Melinda Gates Foundation
Title: Molecular Approaches to Alter Olfactory-Driven Behaviors of Insect Disease Vectors
Goal: To develop novel insect repellents that target the olfactory system of vector insects
- [3] NIH/NIDCD 5 R01 DC008600-05 (PI: Vosshall) 12/04/2006-11/30/2012
Title: Molecular biology of the odorant receptors
Goal: To investigate the molecular structure and function of the insect odorant receptor complex
- [4] NIH/NIAID Vectorbase DBP Subcontract (PI: Vosshall) 10/1/2010-9/30/2012
Title: Comparative Neurotranscriptome of *Aedes aegypti*
Goal: To use RNAseq techniques with Illumina technology to decode the transcriptome of neural tissues of the yellow fever mosquito under different regimes of host-seeking behavior
- [5] NIH/NCRR/R 2 UL1 RR024143-06 (Subaward PI: Vosshall) 10/5/2011-6/30/2012
Title: Isolation of Cues that Drive Mosquito Preference for Certain Human Hosts
Goal: To collect data on interindividual variation in attractiveness of human subjects to mosquitoes, by behavioral phenotyping, collection of blood samples, and skin microbiome samples