DAVID JAMES PERKEL

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EDUCATION

9/85 - 3/92 University of California, San Francisco. Ph.D. in Neuroscience, entitled "Excitatory Synaptic Transmission and Long-term Potentiation in the Mammalian Central Nervous System". Laboratory of Prof. Roger A. Nicoll.

9/80 - 6/84 Harvard College, Cambridge, Massachusetts. A. B. in Biology, *Magna cum laude*.

PROFESSIONAL EXPERIENCE

2013 – 2016 Associate Chair for Research, Department of Biology, University of Washington

9/2006 – present Professor, Depts. Biology and Otolaryngology, Univ. Washington. Adjunct Prof., Dept. Physiology & Biophysics. Affiliate, V. M. Bloedel Hearing Research Center.

2012 – present Co-director, Graduate Program in Neurobiology & Behavior.

2014, 2015 Summer Chair, Department of Biology, University of Washington

7/2009 – 6/2010 Invited Professor, Brain Mind Institute, École Polytechnique Fédérale de Lausanne.

2/2003 - 8/2006 Associate Professor, Depts. Biology and Otolaryngology, University of Washington. Adjunct Associate Professor, Dept. of Physiology & Biophysics. Affiliate of the Virginia Merrill Bloedel Hearing Research Center, and member of the Neurobiology and Behavior Graduate Program.

9/2002 - present Associate Professor, Depts. Zoology and Otolaryngology, University of Washington. Affiliate of the Virginia Merrill Bloedel Hearing Research Center, and member of the Neurobiology and Behavior Graduate Program.

8/2000 –9/2002 Assistant Professor, Depts. Zoology and Otolaryngology, University of Washington. Affiliate of the Virginia Merrill Bloedel Hearing Research Center, and member of the Neurobiology and Behavior Graduate Program.

Summer, 2001 Co-instructor, Neural Systems and Behavior Course, Marine Biological Laboratory, Woods Hole, MA. Spent one week in this intensive lecture and laboratory course.

11/95 – 7/2000 Assistant Professor, Dept. Neuroscience, University of Pennsylvania. Member, Mahoney Institute of Neurological Sciences and Neuroscience Graduate Group.

12/92 - 11/95 Postdoctoral Research Fellow, Laboratory of Prof. Masakazu Konishi, Division of Biology, California Institute of Technology. Cellular and synaptic mechanisms of avian song learning.

1/85 - 3/92 Graduate student and postdoctoral fellow. Laboratory of Prof. Roger A. Nicoll, Dept. of Pharmacology, University of California, San Francisco. Synaptic mechanisms in the central nervous system.

9/84 - 8/85 Laboratory of Prof. Marc Jeannerod, INSERM, Lyon, France. Anatomical studies of the connections among visual structures in the macaque.

7/83 Cold Spring Harbor Laboratory, Cold Spring Harbor, New York. Intensive three-week lecture/discussion course in Molecular and Cellular Neurobiology.

11/82 - 4/84 Laboratory of Prof. Simon LeVay, Dept of Neurobiology, Harvard Medical School. Anatomy and electrophysiology of the visual claustrum of the cat.

9/82 – 6/84	Tutor, Bureau of Study Counsel, Harvard University.
6/82 - 8/82	Laboratory of Prof. Donald H. Perkel, Dept. of Biological Sciences, Stanford University. Theoretical studies on the functional role of dendritic spines.
6/81 - 8/81	Laboratory of Prof. U. J. McMahan, Dept of Neurobiology, Stanford University. Schwann-cell division at the frog motor endplate following denervation.

GRANTS

Current

2015-2018	NSF IOS Collaborative Research: Defining the Neurobiological Requirements for Vocal Learning in Birds (Perkel Co-PI)
2012-2017	T32 "Auditory neuroscience training grant". PI since June 2012.
2012 – 2017	NINDS R01NS075331 "Hormones and Brain Protection" (PI Brenowitz; 10% effort 2012-2014).
2011 – 2016	NIH Computational Neuroscience Training Grant (PI Fairhall; Perkel member of leadership team)
2014-2019	NIDCD R01DC013102 "Neuromodulation in the Auditory System" (Multi-PI, C. Portfors & D. Perkel)
2015-2016	UW Royalty Research Fund "Genetic models of vocal communication disorders: from behavior to circuitry" Perkel PI

Pending

2016-2019	NSF IOS Preliminary Proposal: Sensorimotor processing for perching in birds. Perkel PI.
2017-2022	NINDS "Cellular and synaptic mechanisms of skill learning" (Perkel PI)

Completed

2011 – 2016	NIMH R01MH053032 "Comparative Studies of vocal control" (PI Brenowitz; 10% effort 2011- 2013).
2004-2015	NIH P30DC004661 "Core Center – NIDCD Research Core Center P30" (Rubel, PI). Perkel is Director, Computer Core, 4% effort.
2009-2014	NIH R01MH066128 "Synaptic processing in the basal ganglia". Total direct costs $1,000,000.
2003-2008	NIH R01 MH066128 "Synaptic processing in the basal ganglia". Total direct costs $775,000.
2004-2007	NIH R21 MH068530 "A telencephalic pattern generator for song". Total direct costs $200,000.
2002-2006	NSF IBN-0213122 "Synaptic connections in the avian basal ganglia". Total direct costs approx. $200,000.
2003-2005	University of Washington Royalty Research Fund "Forebrain mechanisms of pattern generation". Total direct costs $31,951.
1999 - 2003	NSF Grant IBN-0196104 "Synaptic processing in a forebrain pathway essential for vocal learning". Total direct & indirect costs $285,527. 4/1/1999 – 6/30/2003.
1998 - 2003	NIH R01 MH56646 "Cellular mechanisms of vocal learning in songbirds". Total direct costs $576,985. 8/1/1998 – 7/31/2003.
2008-2009	NIH R56MH066128 "Synaptic processing in the basal ganglia". Total direct costs $250,000.

2005-2010 NIH R01 MH053032 “Comparative studies of vocal control” (Brenowitz, PI)
Perkel has 10% effort during first 2 years.

HONORS/AWARDS

2015-2018 Bloedel Scholar
2009 - 2010 Virginia Merrill Bloedel Traveling Scholar Award
2009-2010 Invited Professor, Swiss Federal Institute of Technology, Lausanne, Switzerland
2006 Scholar-in-Residence, Neuroscience Graduate Program, University of Pennsylvania
2001 - 2002 Finalist, John Merck Scholar Award, The John Merck Fund.
1996 - 1997 McCabe Fund Pilot Award “Cellular and Molecular Mechanisms of Vocal Learning"
1996 - 1997 Penn Research Foundation Grant “Effects of Altered Vocal Production on Song Learning in Songbirds"
1994 - 1996 NIH Small Grant (R03) “Synaptic Correlates of Vocal Learning in Songbirds”
1993 - 1995 Helen Hay Whitney Postdoctoral Research Fellowship.
1992 - 1993 National Institutes of Health Postdoctoral Fellowship
1990 - 1991 University of California Chancellor's Graduate Research Fellowship.
1989 - 1990 University of California Regents Fellowship.
1987 - 1988 University of California Regents Fellowship.
1984 - 1987 National Science Foundation Graduate Fellowship.
1984 - 1985 ITT Corp. International Fellowship. Neurobiology research, Lyon, France.

INVITED LECTURES (1993 - present)

October 25, 1993 Department of Brain and Cognitive Sciences, MIT
June 27, 1994 Department of Neurobiology, Harvard University
October 14, 1994 Cold Spring Harbor Meeting on Learning and Memory
December 15, 1994 Department of Biology, University of Utah
December 8, 1995 Department of Zoology, University of Maryland
January 29, 1996 Center for Neural Science, New York University
February 7, 1996 Department of Neuroscience, University of Pennsylvania
January 8, 1997 Department of Neurobiology and Anatomy, Allegheny University
October 14, 1997 Department of Biological Sciences, Columbia University
April 27, 1999 Department of Zoology, University of Washington
October 10, 1999 Department of Otolaryngology, University of Washington
December 1, 1999 International Symposium in Biology, Nagoya, Japan
February 9, 2000 Department of Psychology, Johns Hopkins University
April 1, 2000 Emory University, Atlanta Chapter of Society for Neuroscience
October 17, 2000 Rockefeller University
November 21, 2000 Department of Zoology, University of Washington
March 12, 2001 Neurobiology and Behavior Program, University of Washington
April 21, 2001 3rd European Conference on Comparative Neurobiology, Murcia, Spain
July 30, 2001 Neural Systems & Behavior course, Marine Biological Laboratory, Woods Hole, MA
January 16, 2002 Department of Neuroscience, Albert Einstein College of Medicine
June 6-8, 2002 National Academy of Sciences German-American Frontiers of Science, Irvine, CA
July, 2002 International Avian Brain Nomenclature Workshop, Duke University
December 2002 Symposium on the Behavioral Biology of Birdsong, Hunter College, New York

December 17, 2002 Oregon Hearing Research Institute/OHSU, Portland Oregon
June 10, 2003 Mathematical Biosciences Institute, Workshop on Basal Ganglia. Ohio State University, Columbus, OH
October 28, 2003 Neuroscience Graduate Program, University of California, San Diego.
February 26, 2004 Winter Conference on Brain Research.
May 24, 2004 Neuroscience Institute, University of Tennessee Health Science Center, Memphis.
September 6, 2004 Invited plenary speaker, International Basal Ganglia Society, Crieff, Scotland, UK
September 28, 2004 Neuroscience Graduate Program, University of Arizona, Tucson, AZ
May 4, 2005 Kennedy Center, Vanderbilt University, Nashville, TN
May 26, 2005 Neuroscience Graduate Program, University of California, San Francisco, CA
October 25, 2005 Department of Biology, University of Washington, Seattle, WA
May 8, 2006 Department of Physiology & Neuroscience, New York University, New York, NY
May 22, 2006 Neuroscience Graduate Program, University of Pennsylvania, Philadelphia, PA
June 16, 2006 Department of Otolaryngology, University of Washington, Seattle, WA
November 16, 2006 American Speech-Language-Hearing Association, Miami Beach, FL
February 6, 2007 Brain Research Institute, University of California, Los Angeles, CA
May 15, 2007 Neuroscience Seminar Series, University of Texas, Southwestern, Dallas, TX
November 11, 2007 Neural Coding Meeting, Montevideo, Uruguay
November 21, 2007 Brain-Mind Institute, Ecole Polytechnique Fédérale de Lausanne, Switzerland
July 11, 2008 International Conference on Advances in Laryngeal Biophysiology, Madison, WI
October 17, 2008 Dept. Biology, Indiana University, Bloomington, IN
May 6, 2010 Swiss Federal Institute of Technology, Zürich, Switzerland.
October 1, 2010 Kavli Institute of Theoretical Physics, Santa Barbara, CA
January 3, 2011 National Institutes of Health, Bethesda, MD
March 21, 2011 Howard Hughes Medical Institute, Janelia Farm, Ashburn, VA
November 3, 2011 Dept. Biology, University of Texas, San Antonio
December 14, 2011 University Descartes, Paris, France
January 19, 2012 Center for Molecular and Behavioral Neuroscience, Rutgers University, NJ
March 23, 2012 Center for Integrative Brain Research, Seattle Children's Research Institute
July 12, 2013 Virginia Merrill Bloedel Hearing Research Center
October 8, 2013 Dept. Neuroscience, Jefferson Medical School
October 9, 2013 Mahoney Institute of Neurological Sciences, University of Pennsylvania
May 12-16, 2104 Plenary speaker, CSH Asia meeting on Neural Circuit Basis of Behavior and its Disorders, Suzhou, China.
November 4, 2015 Neuroscience Graduate Program, Florida State University
March 15, 2016 Neuroscience Graduate Program, University of Virginia
Sept. 29, 2016 Northeast Ohio College of Medicine

EDITORIAL SERVICE

2013 – present Senior Editor, Journal of Neuroscience
2012 – present Senior Editor, Neuroscience, Wiley Encyclopedia of Life Science
2006 – 2013 Reviewing Editor, Journal of Neuroscience
2011 – 2013 Senior Editor, Brain Research
2009-2011 Academic Editor, Public Library of Science ONE
2003 – 2006. Associate Editor, Journal of Neuroscience
Ad-hoc reviewer for Nature, Science, Nature Neuroscience, Neuron, Journal of Neurophysiology,

Biophysical Journal, European Journal of Neuroscience, Behavioral Neuroscience, Journal of Neuroscience Methods, Neuroscience, Journal of Neurobiology.

PROFESSIONAL SERVICE

2004-2008 NIH review panel Learning and Memory. Regular member
NIH review panel IFCN-7, SMI. Ad-hoc member, January, October 2003, June 2004, Feb. 2011.
2003-2004 Chapter Representative, Pacific Cascade Chapter of the Society for Neuroscience
2005-2008 Member, Program Committee, Society for Neuroscience

TRAINEES MENTORED

Undergraduate: Huan Vu (1996 – 1998), currently at MCP Hahnemann Medical School; Maria Lehtinen (1999 – 2000), currently in Neurobiology Ph.D. program at Harvard; Chris Vaaga, currently in PhD program at OHSU; Semonti Hossain, currently at MD/PhD program at Tufts, Madison Feil, Dominic Fischer, Matt Elzinga, Peter Osseward.

Graduate: Minmin Luo (1996 – 2000), currently at National Institute for Biological Studies, Beijing, China; Michael A. Farries (1996-2002), currently at Univ. of Texas, San Antonia; Long Ding (currently at University of Pennsylvania); Abigail L. Person,(2001-2007), currently at Univ. Colorado; Samuel Gale (2003-2009) currently at Allen Institute for Brain Science; John Meitzen (2003-2008) currently at North Carolina St. Univ.; Max Sizemore (2004-2010) currently Bastyr University; William Wood (currently at UC Berkeley), Agata Budzillo (), C. Andrew Williams (current).

Postdoctoral: Laura Stark Malisheski (1996 – 1999), currently at Office of Career Services, Harvard; Kevin H. J. Park, currently postdoc in Dept. Pathology, UW, Michael Farries, currently at Univ. Texas San Antonio, Michele M. Solis (2001-2007; currently science writer, Seattle, WA); Adam Weaver (2004-2007, currently Asst. Prof. St. Michael's College), NH; Arthur Leblois (currently at Univ. Paris Déscartes); Agnes Bodor (currently at Allen Institute of Brain Sciences); John Thompson (currently at University of Colorado).

ACADEMIC SERVICE

Committees: Penn Neuroscience Curriculum (1996-2000); Penn Neuroscience Seminar (Chair, 1997 –2000); UW Otolaryngology Resident Research (2000- present); UW Otolaryngology Funding Facilitation (Co-chair; 2000 - present); UW Zoology Summer Session (2000 - 2002); UW Zoology Faculty Appointments (2001-2002); Neurobiology and Behavior Graduate Program Admissions (2001-2003), UW Biology Graduate Program Committee. UW Royalty Research Fund Review Panel (2003-2005), UW Biology Strategic Planning Committee, 2006; UW Biology Promotion and Tenure Committee (Chair, 2006-2009); Chair, UW Biology Safety Committee, (2010-2011); UW Biology Promotion and Tenure Committee (2011-2012); UW Otolaryngology Research Committee (2007-present), UW Neurobiology & Behavior Curriculum Committee 2006-2010 (Co-chair); UW Neurobiology & Behavior Program Committee (2008-2012); Co-Director, Neurobiology & Behavior Graduate Program (2012-present); Chair, Biology Research Committee (2013-present)

Thesis committees (Ph.D. completed, all at University of Pennsylvania): Shelley Lenz Kendrick, Julia Wenniger, Dawn Blitz, Michael Kisley, Lori Kisley, Minmin Luo, Gloster Aaron, Michael A. Farries, Long Ding, Mark Beenhakker, Jessica Cardin.

Thesis committees, completed, University of Washington: Victoria Hsu, Applied Math; Jordanna

Sprayberry (Biology); Josh Gittelman (Neuro&Behav); Siobhan Robinson (N&B), Staci Sorensen (N&B), Jane Lauckner (Neuro&Behav), Zachary Scheiner (Neuro&Behav), Christopher Thompson (Neuro&Behav), Jonathan Ting (Neuro&Behav), Felice Dunn (Neuro&Behav), Dennis Dever (Psychology), Grant Storey (Physiol &Biophysics), Jon Cafaro (Physiol&Biophysics), Travis Lilley (Biology), Julia Lemos (Neuro&Behav), Andrew Hart (Neuro&Behav), Melissa Caras (Neuro&Behav), Simina Popa (Molec & Cell Biol.), Tracy Larson (Biology), Katherine Manbeck (Neuro&Behav), Matthew Soleiman (Neuro&Behav), Alison Mehravari (Neuro&Behav), Ayoub Daliri (Speech & Hearing Sciences),

Thesis committees (Ph.D. current): Tyler Libey (Bioengineering), Mishaela DiNino (Neurosci), Sarah Pickett (Neurosci), Aaron Garcia (Neurosci), Kwang Kim (Speech & Hearing Sciences), Matthew Elzinga (Neurosci), Alison Duffy (Physics), Jesse Resnick (Neurosci), Philip Mardoum (Neurosci), Lomajohn Pendergraft (Environmental & Forest Sciences), C. Andrew Williams (Biology).

PEER-REVIEWED PUBLICATIONS

1. Perkel DJ, LeVay S (1984) Effects of strabismus and monocular deprivation on the eye preference of neurons in the visual claustrum of the cat. J Comp Neurol 230:269-277.
2. Perkel DH, Perkel DJ (1985) Dendritic spines: Role of active membrane in modulating synaptic efficacy. Brain Res 325:331-335.
3. Perkel DJ, Bullier J, Kennedy H (1986) Topography of the afferent connectivity of area 17 in the Macaque monkey: A double-labeling study. J Comp Neurol 253:374-402.
4. Malenka RC, Kauer JA, Perkel DJ, Mauk MD, Kelly PT, Nicoll RA, Waxham MN (1989) Long-term potentiation: An essential role for postsynaptic calmodulin and protein kinase activity. Nature 340:554-557.
5. Hestrin S, Nicoll R, Perkel DJ, Sah P (1990) Analysis of excitatory synaptic action in pyramidal cells using whole-cell recording from rat hippocampal slices. J Physiol 422:203-225.
6. Perkel DJ, Hestrin S, Sah P, Nicoll RA (1990) Excitatory synaptic currents in Purkinje cells. Proc R Soc Lond B 241:116-121.
7. Lancaster B, Nicoll RA, Perkel DJ (1991) Calcium activates two types of potassium channels in rat hippocampal neurons in culture. J Neurosci 11:23-30.
8. *Kullmann DM, Perkel DJ, Manabe T, Nicoll RA (1992) Calcium entry via voltage-sensitive calcium channels can transiently potentiate excitatory synaptic transmission in the hippocampus. Neuron 9:1175-1183.
9. Perkel DJ, Nicoll RA (1993) Evidence for all-or-none regulation of neurotransmitter release: implications for long-term potentiation. J Physiol 471:481-500.
10. Manabe T, Wyllie DJA, Perkel DJ, Nicoll RA (1993) Modulation of synaptic transmission and long-term potentiation: effects on paired pulse facilitation and EPSC variance in the CA1 region of the hippocampus. J Neurophysiol 70:1451-1459.
11. Perkel DJ, Petrozzino JJ, Nicoll RA, Connor JA (1993) The role of calcium entry via synaptically-activated NMDA receptors in the induction of long-term potentiation. Neuron 11:817-823.
12. Schmidt MF, Perkel DJ (1998) Slow synaptic inhibition in nucleus HVc of the adult zebra finch. J Neurosci 18:895-904.

* First three authors contributed equally to this work

13. Dutar P, Vu HM, Perkel DJ (1998) Multiple cell types distinguished by physiological and pharmacological properties in nucleus HVc of the adult zebra finch. J Neurophysiol 80:1828-1838.
14. Luo M, Perkel DJ (1999a) A long-range GABAergic projection in a circuit essential for vocal learning. J Comp Neurol 403:68-84.
15. Dutar P, Vu HM, Perkel DJ (1999) Pharmacological characterization of mGluR-mediated activation of GIRK channels. Neuropharmacol 38:467-475.
16. Luo M, Perkel DJ (1999b) A GABAergic, strongly inhibitory projection to a thalamic nucleus in the zebra finch song system. J Neurosci 19:6700-6711.
17. Stark LL, Perkel DJ (1999) Two-stage, input-specific synaptic maturation in a nucleus essential for vocal production in the zebra finch. J Neurosci 19:9107-9116.
18. Nealen PM, Perkel DJ, (2000) Sexual dimorphism in the song system of the Carolina Wren, *Thryothorus ludovicianus*. J Comp Neurol 418:346-360.
19. Dutar P, Petrozzino JJ, Vu HM, Schmidt MF, Perkel DJ (2000) Slow synaptic inhibition mediated by metabotropic glutamate receptors activating GIRK channels. J Neurophysiol 84:2284-2290.
20. Farries MA, Perkel DJ (2000) Electrophysiological properties of avian basal ganglia neurons recorded in vitro. J Neurophysiol 84:2502-2513.
21. Kopp DM, Perkel DJ, Balice-Gordon RJ, (2000) Changes in the probability of neurotransmitter release during synaptic competition at developing neuromuscular junctions. J Neurosci 20:8771-8779.
22. Luo M, Ding L, Perkel DJ (2001) Parallel, closed loops in an avian basal ganglia pathway essential for vocal learning. J Neurosci 21:6836-6845.
23. Farries MA, Perkel DJ (2002) A telencephalic nucleus essential for song learning contains neurons with physiological characteristics of both striatum and globus pallidus. J Neurosci 22:3776-3787.
24. Ding L, Perkel DJ (2002) Dopamine modulates spiny neuron excitability in the avian basal ganglia. J Neurosci 22:5210-5218.
25. Luo M, Perkel DJ (2002) Intrinsic and synaptic properties in an avian thalamic nucleus during song learning. J Neurophysiol 88:1903-1914.
26. Ding L, Perkel DJ, Farries MA (2003) Presynaptic depression of glutamatergic synaptic transmission by D1-like dopamine receptor activation in the avian basal ganglia. J Neurosci 23:6086-6095.
27. Ding L, Perkel DJ (2004) LTP in an avian basal ganglia nucleus essential for vocal learning. J Neurosci 24:488-494.
28. Reiner A, Perkel DJ et al. (2004) Revised nomenclature for avian telencephalon and some related brainstem nuclei. J Comp Neurol 473:377-414.
29. Farries MA, Ding L, Perkel DJ (2005) Evidence for "Direct" and "Indirect" pathways through the song system basal ganglia. J Comp Neurol 484:93-104.
30. Solis MM, Perkel DJ (2005) Rhythmic synaptic activity in a forebrain vocal control nucleus in vitro. J Neurosci 25:2811-2822.
31. Gale S, Perkel DJ (2005) Properties of dopamine release and uptake in the songbird basal ganglia. J Neurophysiol 93:1871-1879.
32. Person AL, Perkel DJ (2005) Unitary IPSPs drive precise thalamic spiking in a circuit required for learning. Neuron 26:129-140.
33. Park KHJ, Meitzen J, Moore I, Brenowitz E, Perkel DJ (2005) Seasonal-like plasticity of spontaneous firing rate in a songbird pre-motor nucleus. J Neurobiol. 64:181-191.

34. Farries MA, Meitzen J, Perkel DJ (2005) Electrophysiological properties of neurons in the basal ganglia of the domestic chick: conservation and divergence in the evolution of the avian basal ganglia. J Neurophysiol. 94:454-467.
35. Solis MM, Perkel DJ (2006) Noradrenergic modulation of activity in a vocal control nucleus *in vitro*. J. Neurophysiol. 95:2265-2276.
36. Gale S, Perkel DJ (2006) Physiological properties of zebra finch ventral tegmental area and substantia nigra pars compacta neurons. J. Neurophysiol. 96:2295-2606.
37. Meitzen J, Perkel DJ, Brenowitz (2007) Seasonal changes in intrinsic electrophysiological activity of song control neurons in wild song sparrows. J. Comp. Physiol. A. 193:677-683.
38. Person AL, Perkel DJ (2007) Pallidal neuron activity increases during sensory relay through thalamus in a songbird circuit essential for learning. J. Neurosci. 27:8687-8698.
39. Meitzen J, Moore IT, Lent K, Brenowitz EA, Perkel DJ (2007) Steroid hormones act transsynaptically within the forebrain to regulate neuronal phenotype and song stereotypy, J. Neurosci. 27:12045-12057.
40. Gale S, Person AL, Perkel DJ (2008) A novel basal ganglia pathway forms a loop between a vocal learning circuit and its dopaminergic input, J. Comp. Neurol. 508:824-839.
41. Person AL, Gale S, Farries MA, Perkel DJ (2008) Organization of songbird basal ganglia, including Area X, J. Comp. Neurol. 508:840-866.
42. Sizemore M, Perkel DJ (2008) Differential neurotransmitter-induced modulation of excitatory synaptic transmission in nucleus RA of the juvenile zebra finch, J. Neurophysiol. 100:8-18.
43. Meitzen J, Thompson CK, Choi H, Perkel DJ, Brenowitz EA (2009) Time course of changes in Gambel's white-crowned sparrow song behavior following transitions in breeding condition, Hormones Behav 55:217-227. PMCID: PMC2648829.
44. Meitzen J, Weaver AL, Brenowitz EA, Perkel DJ (2009) Plastic and stable electrophysiological properties of adult avian forebrain song-control neurons across changing breeding conditions. J Neurosci. 29:6558-67. PMCID: PMC2722045.
45. Leblois A, Bodor AL, Person AL, Perkel DJ (2009) Millisecond timescale disinhibition mediates fast information transmission through an avian basal ganglia loop. J. Neurosci. 29:15420-15433. PMCID: PMC2819911.
46. Bhama PK, Hillel AD, Merati AL, Perkel DJ (2010) A Novel Model for Examining Recovery of Phonation after Vocal Nerve Damage. J. Voice 25:275-282.
47. Gale SD, Perkel DJ (2010) A basal ganglia pathway drives selective auditory responses in songbird dopaminergic neurons via disinhibition. J. Neurosci. 30:1027-1037. PMCID: PMC2824341.
48. Leblois A, Wendel B, Perkel DJ (2010) Striatal dopamine modulates basal ganglia output and regulates social context-dependent behavioral variability through D1 receptors. J. Neurosci. 30:5730-5743. PMCID: PMC2866011.
49. Thompson JA, Perkel DJ (2011) Endocannabinoids mediate synaptic plasticity at glutamatergic synapses on spiny neurons within a basal ganglia nucleus necessary for song learning. J. Neurophysiol. 105:1159-1169. PMCID: PMC3074416.
50. Wood WE, Lovell, P, Mello C, Perkel DJ (2011) Serotonin, via HTR2 receptors, excites neurons in a cortical-like pre-motor nucleus necessary for song learning and production. J Neurosci. 31:13808-13815. PMCID: PMC3220194.
51. Sizemore M, Perkel DJ (2011) Premotor synaptic plasticity limited to the critical period for song learning. Proc Natl Acad Sci USA. 108:17492-17497. PMCID: PMC3198345.
52. Leblois A, Perkel DJ (2012) Striatal dopamine modulates song spectral but not temporal features through D1 receptors. Eur. J. Neurosci. 35:1771-81. PMCID: PMC3370102.

53. Thompson CK, Meitzen J, Replogle K, Drnevich J, Lent KL, Wissman AM, Farin FM, Bammler TK, Beyer RP, Clayton DF, Perkel DJ, Brenowitz EA (2012) Seasonal Changes in Patterns of Gene Expression in Avian Song Control Brain Regions PLoSONE 7:e35119. PMCID: PMC2648829.
54. Wood WE, Roseberry T, Perkel DJ (2013) HTR2 receptors in a songbird premotor cortical-like area modulate spectral characteristics of zebra finch song, J. Neurosci. 33:2908-2915. PMCID: PMC3711768.
55. Mahrt E, Perkel DJ, Tong L, Rubel EW, Portfors CV (2013) Engineered deafness reveals that mouse courtship vocalizations are innate. J. Neurosci. 33:5573-83. PMCID: PMC3691057.
56. Michalski N, Babai N, Renier N, Perkel DJ, Chédotal A, Schneggenburger R (2013) Robo3-driven axon midline crossing conditions functional maturation of a large commissural synapse. Neuron 78:855-868.
57. Gittelman JX, Perkel DJ, Portfors CV (2013) Dopamine modulates auditory responses in the inferior colliculus in a heterogeneous manner. J. Assoc. Res. Otolaryngol. PMCID: PMC3767870.
58. Larson TA, Wang TW, Gale SD, Miller KE, Thatra NM, Caras ML, Perkel DJ, Brenowitz, EA (2013) Post-synaptic neural activity regulates neuronal addition in the adult avian song control system. Proc. Natl. Acad. Sci. USA. 110:16640-16644. PMCID: PMC3799304.
59. Wood WE, Osseward, P, Roseberry T, Perkel DJ (2013) A daily oscillation in fundamental frequency and amplitude of harmonic syllables of zebra finch song. PLoS ONE 8: e82327. PMCID: PMC3846747.
60. Larson TA, Lent KL, Bammler TK, MacDonald JW, Wood WE, Caras ML, Thatra NM, Budzillo A, Perkel DJ, Brenowitz EA (2015) Network analysis of microRNA and mRNA seasonal dynamics in a highly plastic sensorimotor neural circuit. BMC Genomics. 6;16:905. doi: 10.1186/s12864-015-2175-z. PubMed Central PMCID: PMC4636775.
61. Nevue AA, Elde CJ, Perkel DJ, Portfors CV (2016) Dopaminergic Input to the Inferior Colliculus in Mice. Front Neuroanat.;9:168. doi:10.3389/fnana.2015.00168. eCollection 2015. PubMed CentralPMCID: PMC4720752.
62. Bodor A, Uo T, MacDonald G, Morrison RS, Perkel DJ (in revision) Biotin body - a novel subcellular structure in vertebrate neurons.
63. Budzillo A, Duffy A, Fairhall Al, Perkel DJ (in revision) Dynamic modulation of basal ganglia output by a novel cell type.

REVIEW ARTICLES AND CHAPTERS

Malenka RC, Kauer JA, Perkel DJ, Nicoll RA (1989) The impact of postsynaptic calcium on synaptic transmission - its role in long-term potentiation. Trends Neurosci 12:444-450.

Malenka RC, Kauer JA, Perkel DJ & Nicoll RA (1990) Long-term potentiation in the hippocampus. In: Regulation of Membrane Function: Short-term and Long-term (Magistrettti PJ, Ritchie JM, eds), New York: Alan R. Liss.

Kauer JA, Malenka RC, Perkel DJ, Nicoll RA (1990) Postsynaptic mechanisms involved in long-term potentiation. Advances in Experimental Medicine and Biology 268:291-299.

Hestrin S, Perkel DJ, Sah P, Manabe T, Renner P, Nicoll RA (1990) Physiological properties of excitatory synaptic transmission in the central nervous system. Cold Spring Harb Symp Quant Biol 55:87-93.

Perkel DJ, Nicoll RA (1991) The role of protein kinase activity in long-term potentiation. In: Long-term Potentiation Eds. (Baudry M, Davis J, eds), Cambridge: MIT Press.

Nicoll RA, Wyllie DJA, Manabe T, Perkel DJ (1994) Current physiological models for long-term potentiation in the CA1 region of the hippocampus. In: Cellular and Molecular Mechanisms Underlying Higher Neural Functions (Selverston AI, Ascher P, Chichester, eds), Wiley and Sons.

Perkel DJ, Farries MA (2000) Complementary "bottom-up" and "top-down" approaches to basal ganglia function. Curr Opin Neurobiol 10:725-731.

Perkel DJ, Farries MA, Ding L, Luo M (2002) Electrophysiological analysis of a songbird basal ganglia circuit essential for vocal learning. Brain Res Bull 57:529-532.

Reiner A, Perkel DJ, Mello CV, Jarvis ED (2004) Songbirds and the revised avian brain nomenclature. In: Behavioral Biology of Birdsong (Zeigler HP, Marler P, eds), a special issue of the NY Acad Sci 1016:77-108.

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