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David C. Airey, Ph.D.

Research Assistant Professor

Education

- 2002–2005 • Postdoctoral Research in Neuropharmacology, Vanderbilt University School of Medicine
- 1999–2002 • Postdoctoral Research in Neurogenetics, University of Tennessee Health Sciences Center
- 1992–1999 • Ph.D. Biological Psychology & Neuroscience, Cornell University
- 1989–1992 • B.S. Biological Psychology & Neuroscience, University of Maryland College Park

Professional Experience

Positions

- 2005–2010 • Pharmacology Research Assistant Professor, VUMC
- 2007–2010 • Center for Human Genetics Research Faculty Member, VUMC
- 2010–2011 • Cancer Center Biostatistics Core Adjunct Faculty, VUMC
- 2002–2005 • Research Fellow to Elaine Sanders-Bush, Vanderbilt University Medical Center, Pharmacology
- 1999–2001 • Research Fellow to Robert W. Williams, University of Tennessee, Anatomy & Neurobiology
- 1992–1998 • Graduate Student to Timothy J. DeVoogd, Cornell University, Psychology
- Graduate and Professional Student Government Representative for the Social Sciences, Cornell University

Societies

- 2000–2008 • International Behavioral and Neural Genetics Society
- 2000–2001 • International Mammalian Genome Society
- 1996–2009 • Society for Neuroscience

Teaching

- 2005–2007 • Guest Lecturer: Introduction to Biostatistics, VUMC
- 2004–2006 • Scheduled Lecturer: Genetics of Model Organisms, VUMC
- 2003 • Guest Lecturer: Animal Behavior and Evolutionary Psychology, Vanderbilt University
- 1998 • Section Instructor: Hormones and Neural Circuits, Cornell University

Professional Experience (continued)

- 1994–1997 • Teaching Assistant: Intro. Psychology, Intro. Biopsychology, Learning & Memory, Evolution of Human Behavior, Motivation, Research Methods, Cornell University

Journal Reviewer

- Neuroscience • Journal of Neuroscience, European Journal of Neuroscience, Brain and Behavioral Sciences, BMC Neuroscience, Stress, Biological Reviews
- Genetics • Physiological Genomics, Genes Brain and Behavior, Behavior Genetics, American Journal of Medical Genetics, Genome Research, BMC Genomics, Algorithms for Molecular Biology
- Pharmacology • Neuropsychopharmacology, Neuropharmacology, Analytical Biochemistry
- Statistics • Statistics in Medicine
- Other • American Naturalist, Behavioral Ecology

Grants & Funding

- 2007–2010 • 19% effort, Principle Investigator, David C. Airey, NIMH R21, MH77942-01A1, Genetic analysis of Htr2c RNA editing in amygdala
- 2007–2012 • 39% effort as Res Asst Prof to PI Randy Blakely, NIMH Silvio E. Conte Center, MH78028-03, Genes controlling assembly and function of serotonin networks
- 2009–2010 • 25% effort as Res Asst Prof to PI Chun Li, 5R01HG004517-02, Developing Statistical Methods for Disease Gene Discovery
- 2007–2009 • 15% effort as Res Asst Prof to PI Andries Zijlstra, CA143081-01, Tetraspanin-mediated regulation of tumor cell metastasis PI David C. Airey, Conte Center Pilot Funding
- 2008–2009 • Consultant to PI E. Sanders-Bush, NIDA R01, Hallucinogens and serotonin signal transduction
- 2007–2009 • Consultant to PI E. Sanders-Bush, NIMH R01, Characterization of central serotonin receptors

Publications

Articles

- 2010 • Canal, C. E., U. Da Silva, Gresch, P. J., Watt, E. E., Sanders-Bush E., and **Airey, D. C.**, The serotonin 2C receptor potentially modulates the head-twitch response in mice induced by a phenethylamine hallucinogen. *Psychopharmacology*. Accepted.
- Christine E. Collins*, Nicole A. Young*, David K. Flaherty, **David C. Airey**, and Jon H. Kaas. A rapid and reliable method of counting neurons and other cells in brain tissue: A comparison of flow cytometry and manual counting methods. *Frontiers in Neuroscience*. Accepted.
- 2009 • Overall, R., Kempermann, G., Peirce, J. L., Lu, L., Goldowitz, D., Gage, F. H., Goodwin, S., Smit, G., **Airey, D. C.**, Rosen, G., Schalkwyk, L., Sutter, T., Nowakowski, R., Watley, S., Williams, R. W. Genetics of the hippocampal transcriptome in mouse: A systematic survey and online neurogenomics resource. Accepted Oct 26 to *Frontiers in Neurogenomics*.
- Carneiro, A. M. D., **Airey, D. C.**, Thompson, B., Zhu, C. B., Lu, L., Chesler, E. J., Erikson, K.M., Blakely, R. D. (2009) Functional coding variation in recombinant inbred mouse lines reveals novel serotonin transporter-associated phenotypes. *Proceedings of the National Academy of Sciences*, 106(6):2047-52.

Publications (continued)

- Joan P. Breyer*, Melinda E. Sanders*, **David C. Airey***, Qiuyin Cai, Brian L. Yaspan, Peggy A. Schuyler, Fouad Boulos, Maria G. Olivares, Kevin M. Bradley, Qi Dai, Yu-Tang Gao, David L. Page, William D. Dupont, Wei Zheng, and Jeffrey R. Smith. (2009) Heritable variation of ERBB2 and breast cancer risk. *Cancer Epidemiology, Biomarkers & Prevention* 18(4):1252-8.
- Canal, C. E., Cao, C., Mahautmr, K. C., Sanders-Bush, E., Emeson, R. B., **Airey, D. C.** RNA editing of the serotonin 2C receptor and expression of $G\alpha_q$ protein: genetic mouse models do not support a role for regulation or compensation. *Journal of Neurochemistry* 108(5):1136-42.
- 2008 • Lu, L., Wei, L., Peirce, J. L., Wang, X., Zhou, J., Homayouni, R., Williams, R. W., **Airey, D. C.** Using gene expression databases for classical trait QTL candidate gene discovery in the BXD recombinant inbred genetic reference population: mouse forebrain weight. *BMC Genomics* 2008, 9:444, doi:10.1186/1471-2164-9-444.
- Peirce, J. L., Broman, K. W., Lu, L., Chesler, E. J., Zhou, G., **Airey, D. C.**, Birmingham, A. E., Williams, R. W. (2008) Genome reshuffling for advanced intercross permutation (GRAIP): Simulation and permutation for advanced intercross population analysis. *PLoS ONE* 3(4): e1977. doi:10.1371/journal.pone.0001977.
- 2007 • Myers, R. L., **Airey, D. C.**, Manier, D. H., Shelton, R. C., & Sanders-Bush, E. (2007). Polymorphisms in the Regulatory Region of the Human Serotonin 5-HT(2A) Receptor Gene (HTR2A) Influence Gene Expression. *Biol Psychiatry*. Jan 15. 61(2):167-173.
- 2006 • **Airey, D. C.**, Wu, F., Guan, M., & Collins, C. E., (2006). Geometric morphometrics defines shape differences in the cortical area map of C57BL/6J and DBA/2J inbred mice. *BMC Neurosci*, 7(63).
- **Airey***, **D. C.**, Hackler*, E. A., Shannon, C. C., Sodhi, M. S., & Sanders-Bush, E. (2006). 5-HT(2C) receptor RNA editing in the amygdala of C57BL/6J, DBA/2J, and BALB/cJ mice. *Neurosci Res*, 55(1), 96-104.
- 2005 • **Airey, D. C.**, Robbins, A. I., Enzinger, K. M., Wu, F., & Collins, C. E. (2005). Variation in the cortical area map of C57BL/6J and DBA/2J inbred mice predicts strain identity. *BMC Neurosci*, 6(18).
- Sodhi, M. S., **Airey, D. C.**, Lambert, W., Burnet, P. W., Harrison, P. J., & Sanders-Bush, E. (2005). A rapid new assay to detect RNA editing reveals antipsychotic-induced changes in serotonin-2C transcripts. *Mol Pharmacol*, 68(3), 711-719.
- Tsaih, S. W., Lu, L., **Airey, D. C.**, Williams, R. W., & Churchill, G. A. (2005). Quantitative trait mapping in a diallel cross of recombinant inbred lines. *Mamm Genome*, 16(5), 344-355.
- Zou, F., Gelfond, J. A., **Airey, D. C.**, Lu, L., Manly, K. F., Williams, R. W., et al. (2005). Quantitative trait locus analysis using recombinant inbred intercrosses: theoretical and empirical considerations. *Genetics*, 170(3), 1299-1311.
- 2004 • Cantrell, V. A., Owens, S. E., Chandler, R. L., **Airey, D. C.**, Bradley, K. M., Smith, J. R., et al. (2004). Interactions between Sox10 and EdnrB modulate penetrance and severity of aganglionosis in the Sox10Dom mouse model of Hirschsprung disease. *Hum Mol Genet*, 13(19), 2289-2301.
- 2001 • **Airey, D. C.**, Lu, L., & Williams, R. W. (2001). Genetic control of the mouse cerebellum: identification of quantitative trait loci modulating size and architecture. *J Neurosci*, 21(14), 5099-5109.
- Lu, L., **Airey, D. C.**, & Williams, R. W. (2001). Complex trait analysis of the hippocampus: mapping and biometric analysis of two novel gene loci with specific effects on hippocampal structure in mice. *J Neurosci*, 21(10), 3503-3514.
- Williams, R. W., **Airey, D. C.**, Kulkarni, A., Zhou, G., & Lu, L. (2001). Genetic dissection of the olfactory bulbs of mice: QTLs on four chromosomes modulate bulb size. *Behav Genet*, 31(1), 61-77.
- 2000 • **Airey, D. C.**, Buchanan, K. L., Szekely, T., Catchpole, C. K., & DeVoogd, T. J. (2000). Song, sexual selection, and a song control nucleus (HVC) in the brains of European sedge warblers. *J Neurobiol*, 44(1), 1-6.

Publications (continued)

- **Airey, D. C.**, Castillo-Juarez, H., Casella, G., Pollak, E. J., & DeVoogd, T. J. (2000). Variation in the volume of zebra finch song control nuclei is heritable: developmental and evolutionary implications. *Proc Biol Sci*, 267(1457), 2099-2104.
- **Airey, D. C.** & DeVoogd, T. J. (2000). Greater song complexity is associated with augmented song system anatomy in zebra finches. *Neuroreport*, 11(10), 2339-2344.
- **Airey, D. C.**, Kroodsma, D. E., & DeVoogd, T. J. (2000). Differences in the complexity of song tutoring cause differences in the amount learned and in dendritic spine density in a songbird telencephalic song control nucleus. *Neurobiol Learn Mem*, 73(3), 274-281.

Reviews and Comments

- 2008 • Sanders-Bush, E., **Airey, D. C.** (2008) Centennial Perspective: Serotonin Receptors. *Molecular Interventions*, 8(5):200-3.
- 2006 • **Airey, D. C.** & Shelton, R. C. (2006). Praise for a critical perspective. Commentary to Keller MC and Miller G: Resolving the paradox of common, harmful, heritable mental disorders: Which evolutionary genetic models work best? *Behavioral and Brain Sciences* (2006) 29, 385452.
- 2005 • **Airey, D. C.** & Collins, C. E. (2005). Book Review: Principles of Brain Evolution by George F. Striedter. *Genes, Brain and Behavior*, 4, 272.
- 2004 • Churchill, G. A., **Airey, D. C.**, Allayee, H., Angel, J. M., Attie, A. D., Beatty, J., et al. (2004). The Collaborative Cross, a community resource for the genetic analysis of complex traits. *Nat Genet*, 36(11), 1133-1137.
- 2003 • Palmer, A. A. & **Airey, D. C.** (2003). Inappropriate choice of the experimental unit leads to a dramatic overestimation of the significance of quantitative trait loci for prepulse inhibition and startle response in recombinant congenic mice. *Neuropsychopharmacology*, 28(4), 818; author reply 819.
- 2002 • **Airey, D. C.**, Lu, L., Shou, S., & Williams, R. W. (2002). Genetic sources of individual differences in the cerebellum. *Cerebellum*, 1(4), 233-240.
- 2001 • **Airey, D. C.** & Williams, R. W. (2001). Quantitative genetic perspectives. Commentary to Finlay BL, Darlington RB, Nicastrò N: Developmental structure in brain evolution. *Behavioral and Brain Sciences*, 24(2), 279-280.

Submitted manuscripts

- Michael V. Morabito, Randi J. Ulbricht, Richard T. O'Neil, **David C. Airey**, Pengcheng Lu, Bing Zhang, Lily Wang, Ronald B. Emeson. High-throughput multiplexed transcript analysis yields enhanced resolution of 5HT_{2C} mRNA editing profiles. *Molecular Pharmacology*. Revision in Review.

Honors and Awards

- 2009 • 5-year service award to Pharmacology, VUMC
- 2003–2004 • NIH National Research Service Award, VUMC
- 2002–2003 • NIH Neurogenomics Institutional Training Grant
- 2001–2002 • Vanderbilt Enhancement Award
- 2000–2001 • NIH National Research Service Award, University of Tennessee
- 2000 • Graduate, Sixth International Summer School on Behavioral Neurogenetics: Focus on the Mouse, August 6-11, 2000, Oregon Health Sciences University, Portland, OR, USA

Honors and Awards (continued)

- 1992–1996 • National Science Foundation (NSF) Fellow
- 1992 • Phi Beta Kappa
- 1992 • B.S. with Honors and Summa cum Laude

Letters of Support

- VUMC • Elaine Sanders-Bush, Ph.D., Professor, Pharmacology and Psychiatry
- Randy Blakely, Ph.D., Professor, Pharmacology and Psychiatry
- Michelle Southard-Smith, Ph.D., Assistant Professor, Cell & Developmental Biology
- UTHSC • Robert W. Williams, Ph.D., Professor, Anatomy and Neurobiology
- Cornell • Barbara Finlay, Ph.D., Professor, Psychology
- Timothy DeVoogd, Ph.D, Professor, Psychology