BIOGRAPHICAL SKETCH
DO NOT EXCEED FIVE PAGES.

NAME: Henderson, Brandon J.

eRA COMMONS USER NAME (credential, e.g., agency login): hendersonbj

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
The Ohio State University (OSU), Columbus, OH	B.S.	06/2006	Chemistry
The Ohio State University (OSU), Columbus, OH	Ph.D.	08/2011	Pharmacology
California Institute of Technology, Pasadena, CA	Postdoc	Current	Neurobiology

A. Personal Statement

I have the necessary background to be considered as a future junior investigator for this COBRE, which is focused on cellular transport disorders in obesity related conditions. My research has focused on the molecular neuropharmacology of nicotine addiction. I have spent a significant amount of time in my scientific career discovering and designing small molecules that target nicotinic receptors as a means to improve tobacco cessation. My postdoctoral research has focused on the neurobiology of addiction and how nicotine alters midbrain neurons of the nigrostriatal reward pathway. My lab at Marshall University will use pharmacology, medicinal chemistry, electrophysiology, electrochemistry, microscopy, and animal models to: 1) study how addictive drugs modulate neurons involved in reward pathways, 2) study how these drugs alter DA release, and 3) discover novel small molecules that may aid in cessation.

B. Positions and Honors

Positions and Employment

2011-present Postdoctoral Fellow, Division of Biology and Biological Engineering, California Institute of Technology, Pasadena, CA
2011-present Postdoctoral Researcher, National Collaborative Drug Discovery and Development Group, California Institute of Technology, Pasadena, CA
2007-11 Graduate Researcher, Nicotinic Receptor Drug Discovery Group, Columbus, OH
2006-11 Graduate Fellow, Division of Pharmacology, College of Pharmacy, The Ohio State University, Columbus, OH
2004-06 Analytical Chemist, Microscopic Analytical Research Center, Columbus, OH
2004-06 Undergraduate Researcher, Division of Analytical Chemistry, Department of Chemistry, The Ohio State University, Columbus, OH

Other Experience and Professional Memberships

2015-present Reviewing Editor, Neuropharmacology
2012-present Reviewing Editor, Journal of Pharmacology and Experimental Therapeutics
2012-present Reviewing Editor, Journal of Medicinal Chemistry
2012-present Reviewing Editor, European Journal of Medicinal Chemistry

Honors:

2016 K99/ROO Pathway to Independence Award (NIDA)
2015 NIDA Young Investigator Travel Award

2014	WT Young Investigator Award, designated as a distinguished 'young scientist' in the nicotinic field at the 2014 Welcome Trust Meeting, Cambridge,UK
2012-15	NIDA NRSA (F32) Postdoctoral Fellow
2012	TRDRP Postdoctoral Fellowship, awarded but deferred in favor of NIDA F32 award
2009-11	NIDA Diversity Enhancement Fellow, pre-doctoral fellowship
2010	NIDA Pre-doctoral Travel Award
2010-11	Norman J. Uretsky Fellowship in Neuropharmacology
2010	Chauncey D. Leake Memorial Award in Pharmacology
2009-10	Patil Fellowship in Pharmacology
2006	National Collegiate Scholar Athlete, National Dean's List
2002-06	Full Academic Scholarship, The Ohio State University
2002-04	National Collegiate Scholar Athlete, National Dean's List
2002	National Collegiate Honor Roll

C. Contribution to Science

1. I am among the first to show that the common tobacco flavorant menthol, at sub-micromolar concentrations, alters cultured cells and neurons that express nicotinic receptors on dopamine and GABA neurons of the reward pathway. More importantly, I am the first to show that menthol alone alters the function of dopamine neurons in the ventral tegmental area and substantia nigra pars compacta. This work has been featured at the annual meeting for the Society of Neuroscience as a 'Hot Topic', has been featured in a press talk, and has been part of a press release. More importantly, I am among a few scientists who are working to discover why smokers of menthol cigarettes are less likely to quit smoking when compared to smokers of non-menthol cigarette. I am the first to discover that the enhancement of nicotine reward by menthol may be due to changes in nicotinic receptors that reside on GABA and DA neurons of the midbrain (in review).

    a. 2014. New Scientist. Menthol increases nicotine addiction by tweaking brain. http://www.newscientist.com/article/ dn26668-menthol-increases-nicotine-addiction-by-tweaking-brain.html#.VIeHBDHF98G
    b. Henderson, B.J. and Lester H.A. Why smokers of menthol cigarettes may find it harder to quit: menthol's interaction with certain brain receptors may potentiate the addiction to nicotine. Society for Neuroscience Press Conference 2014: Legal Drugs of Abuse. Washington D.C., November 2014.
    c. Henderson, B.J.; Wall, T.; Henley, B.M.; Kim, C.H.; Nichols, W.A.; Xiao, C.; and Lester, H.A. Menthol potentiates nicotine reward, upregulates lower sensitivity a4* and a6* nAChRs, and alone is a candidate chemical chaperone for a4* and a6* nAChRs. Update This
    d. Henderson, B.J.; Wall, T.; Kim, C.H., Henley, B.M.; and Lester, H.A. Menthol enhances nicotine-induced changes in midbrain neurons. In Review.

2. I was the first to document nicotine-induced upregulation of a6-containing nicotinic receptors in dopamine neurons of the nigrostriatal reward pathway (ventral tegmental area) and dopamine neurons of the mesolimbic pathway (substantia nigra pars compacta). This work also led to the important discovery that nicotine-induced upregulation of nicotinic receptors also requires retrograde trafficking, mediated by COPI. This finding was considered sufficiently impacting to the field to be awarded a press release and perspective article.

    a. Henderson, B.J.; Srinivasan, R.; Nichols, W.N.; Dilworth, C.; Gutierrez, D.F.; McKinney, S.; Mackey, E.D.W.; Drenan, R.M.; Richards, C.I.; and Lester, H.A. (2014) Nicotine exploits a COPI-mediated process for chaperone-mediated upregulation of its receptors. J Gen Physiol. 143, 51-56. Cover Article
    b. 2014. Rockefeller University Press. Nicotine exploits COPI to foster addiction. http://www.eurekalert.org/pub releases/2013-12/rup-nec121913.php
    c. Anand, R. COPI polices nicotine-mediated up-regulation of nicotinic receptors. J Gen Physiol. 143, 49-50.

3. I was among the first to use computational modelling to design novel drugs that are selective for a4 2 nAChRs. Our approach was unique, given that we were the first to use an aggressive computational approach with molecular dynamics simulations instead of simply using blind docking or refined docking of ligands to a nAChR homology model. This resulted in the discovery of a novel class of drugs that were selective for a4 2 nAChRs. Using these models, we were also one of the first to use structure-based approaches to successfully screen in silica libraries for novel small molecules that were selective for a4 2 nAChRs. I then use these models, in parallel with ligand-based modeling to prove that the design and synthesis of novel small molecules for a42 nAChRs can be streamlined. Overall this work contributed to the field of Pharmacology and Medicinal Chemistry by providing an additional proof of concept for the use of computational modeling in drug discovery and drug design.

    a. Henderson, B.J.; Gonzalez-Cestari, T.F.; Yi, B.; Pavlovicz, R.E.; Boyd, R.T.; Li, C.; Bergmeier, S.C., and McKay, D.B. (2012) Defining the Putative Inhibitory Site for a Selective Negative Allosteric Modulator of Human a4J32 Neuronal Nicotinic Receptors. ACS Chern Neurosci 3, 682-692.
    b. Henderson, B.J.*; Orac, C.M.; Maciagiewicz, I; Bergmeier, S.B.; and McKay D.B. (2012) QSAR and QSSR models of negative allosteric modulators targeting nicotinic acetylcholine receptors facilitate the design of a novel selective antagonist of nicotinic acetylcholine receptors . Bioorg Med Chern Lett 22, 1797- 1813. *, Contributing (senior) author.
    c. Henderson, B.J.; Carper, DJ.; Gonzalez-Cestari, T.F.; Yi B.; Dalefield, M.L.; Coleman, R.S.; McKay, D.B. (2012) Synthesis and Structure activity relationship studies of novel piperazine analogs as novel negative allosteric modulators of neuronal nicotinic receptors. J Med Chern 54**,** 8681-8692.
    d. Mahasenan, K.V.; Pavlovicz, R.E.; Henderson, B.J.; Gonzalez-Cestari, T.F.; Yi B.; McKay, D.B.; and Li, C. (2011) Discovery of novel a4J32 neuronal nicotinic receptor modulators through structure-based virtual screening. ACS Med Chern Lett 2**,** 855-860.
    e. Pavlovicz, R.E.; Henderson, B.J.; Bonnell, A.B.; Boyd, R.T.; and McKay, D.B.; Li, C. (2011) Identification of a novel negative allosteric site on human a4J32 and a3134 neuronal nicotinic acetylcholine receptors. PLoS ONE 6(9): e24949. doi:10.1371/journal.pone.0024949
    f. Henderson, B.J.; Pavlovicz, R.E.; Allen, J.A.; Gonzalez-Cestari, T.F.; Orac, C.M.; Bonnell, A.B.; Zhu, M.X.; Boyd, R.T.; Li, C.; Bergmeier, S.C., and McKay, D.B. (2010) Negative allosteric modulators that target human a4J32 neuronal nicotinic receptors. J Pharmacal Exp Therap 334, 761-774. Cover Article

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/pubmed/?term=henderson+brandon+j%5Bau%5D

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

K99 DA040447 (Henderson, PI) NIDA 04/16-Current (California Institute of Technology)
Characterization of menthol induced changes on nicotinic receptors and.....

Completed Research Support

F32 DA033721 (Henderson, PI) NIDA 03/12-03/15 (California Institute of Technology)
Expression and Characterization of a6J32133 nicotinic receptors. The goal of this grant was to successfully express a6J32-containing nAChRs in mammalian cells, determine native stoichiometry, and characterize upregulation in vitro and in vivo.