

REGINALD D. CANNADY, Ph.D.

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EDUCATION

Medical University of South Carolina Postdoctoral Research Fellow	Charleston, SC 2014 – Present
University of North Carolina – Chapel Hill Ph.D. Neurobiology	Chapel Hill, NC 2008 – 2013
Fayetteville State University B.S. Biology; minor: Chemistry	Fayetteville, NC 2001 – 2005

RESEARCH EXPERIENCE

Medical University of South Carolina Postdoctoral Research Fellow; Advisor: Dr. Patrick J. Mulholland Project: <i>Regulation of potassium channel subtypes by alcohol experience, withdrawal, and alcohol-associated cues.</i> <ul style="list-style-type: none">➤ Examining Kv3, Kv7, and K_{Ca}2 potassium channel function in cortical regions and the basal ganglia of alcohol-dependent and non-dependent rodent models via slice electrophysiology and <i>in vivo</i> calcium imaging.➤ Investigating potential therapeutic targets of Kv3 potassium channels to disrupt heavy drinking in mice.➤ Investigated the role of and K_{Ca}2 potassium channels in regulating extinction of alcohol-seeking behavior.	Charleston, SC 2014 – Present
University of North Carolina at Chapel Hill Predoctoral Graduate Student Advisors: Drs. Clyde W. Hodge and Joyce Besheer Dissertation: <i>Molecular mechanisms of excessive alcohol consumption and relapse-like behavior.</i> <ul style="list-style-type: none">➤ Investigated the role of glutamate receptor subtypes in modulating the reinforcing and discriminative stimulus properties of alcohol in rodent models of addiction.➤ Assessed drinking behaviors after systemic and sight-specific pharmacological manipulation using operant and Pavlovian conditioning procedures.➤ Examined plasticity markers after alcohol and cue exposure using protein biochemistry techniques.	Chapel Hill, NC 2008 – 2013
Duke University Postbaccalaureate Research Program (PREP) Scholar Advisor: Dr. Edward Levin Project: <i>Role of thalamic nicotinic receptors in regulating memory in rodents.</i> <ul style="list-style-type: none">➤ Examined the role of $\alpha 4\beta 2$ and $\alpha 7$ nicotinic receptor subtypes in regulating cognitive function in rodent models.➤ Determined functional neuroanatomical specificity of chronic nicotinic receptor blockade in regulating memory.	Durham, NC 2006 – 2008
Morehouse School of Medicine Neuroscience Summer Intern; Advisor: Dr. Chiaki Fukuhara Project: <i>The role of ERK-1/2 kinase in the synchronization of circadian rhythms in Rat-1 Fibroblasts.</i>	Atlanta, GA 2005
Fayetteville State University Intramural Undergraduate Researcher; Advisor: Dr. Shirley Chao Project: <i>The role of organophosphate pesticide and herbicide exposure in regulating neuronal development in vitro.</i>	Fayetteville, NC 2004 – 2005

Wake Forest University
Cardiovascular Science Summer Intern; Advisor: Dr. David Averill
Project: *Augmented baroreflex function in adult sheep*

Winston-Salem, NC
2004

Wake Forest University
Cardiovascular Science Summer Intern; Advisor: Dr. Michael Callahan
Project: *Effects of unilateral carotid artery ligation on baroreflex function in mice.*

Winston-Salem, NC
2003

GRANTS, FELLOWSHIPS, & RESEARCH SUPPORT

- NIH Pathway to Independence Award (K99/R00) Grant# K99AA026642 (2018 – 2023)
Exploring Neuronal Subtype-specific Mechanisms of Ethanol Dependence and Reward: Contributions of Voltage-gated Potassium Channels
- NIH Institutional NRSA Fellowship (T32) Postdoctoral Awardee: Medical University of SC (2014 – 2017)
Grant# T32AA007474 (to MUSC; competitive application)
- Ruth L. Kirschstein Predoctoral National Research Service Award (NRSA) (2011 – 2013) Grant# F31AA021063
Molecular Mechanisms of Excessive Alcohol Consumption and Relapse-like Behavior
- NIH Institutional NRSA Fellowship (T32) Predoctoral Awardee: UNC Curriculum in Neurobiology (2009 – 2010)
Grant# T32NS007431 (to UNC; competitive application)
- UNC Initiative for Maximizing Student Diversity Graduate Fellowship (2008 – 2009)

AWARDS & HONORS

- Neuroscience Scholars Program Fellowship and Travel Award - Society for Neuroscience (SFN) (2018 – 2020)
- Research Society on Alcoholism (RSA) Student Merit Travel Award (2013)
- UNC Pierre Morell Research Day Selected Abstract and Honored Student Speaker (2012)
- Research Society on Alcoholism (RSA) Student Merit Travel Award (2011)
- Alcohol Center Director's Meeting Travel Award (2010)
- UNC Office of Undergraduate Research: Graduate Student Mentor Support Award (2010)
- Duke University Post-Baccalaureate Research Education Program (PREP) Scholar (2006 – 2008)
- MBRS FSU-Research Initiative for Scientific Enhancement Scholar (2002 – 2005)
- Fayetteville State University Chancellor's Scholarship (2001 – 2005)

PEER-REVIEWED PUBLICATIONS

1. McGuire, N.S., Rinker, J.A., **Cannady, R.**, Fulmer, D.B., Jones, S.R., Hoffman, M., Mulholland, P.J. (2018) Identification and validation of midbrain *Kcnq4* regulation of heavy alcohol consumption in rodents. *Neuropharmacology*. May 15; S0028-3908(18)30243-0. PMC6054890
2. **Cannady, R.**, McGonigal, J., Woodward, J.J., Mulholland, P.J., Gass, J.T. (2017) Prefrontal cortex KCa2 channels regulate mGlu5-dependent plasticity and extinction of alcohol-seeking behavior. *J. Neuroscience*. Apr 19; 37(16):4359-4369. PMC5413180
3. **Cannady, R.**, Fisher, K.R., Graham, C., Crayle, J., Besheer, J., Hodge, C.W. (2017) Potentiation of amygdala AMPA receptor activity selectively promotes ethanol self-administration in a CaMKII-dependent manner. *Addiction Biology*. May;22(3):652-664. PMC4935658
4. Randall, P.A., **Cannady, R.**, Besheer, J. (2016) The nicotine + alcohol interoceptive drug state: Contribution of the components and effects of varenicline in rats. *Psychopharmacology*. Aug;233(15-16):3061-74. PMC4990784
5. Padula, A.E., Griffin III, W.C., Lopez, M.F., Nimitvilai, S., **Cannady, R.**, McGuire, N.S., Chesler, E.J., Miles, M.F., Williams, R.W., Randall, P.K., Woodward, J.J., Becker, H.C., Mulholland, P.J. (2015) KCNN genes that encode small-

- conductance Ca²⁺-activated K⁺ channels influence alcohol and drug addiction. *Neuropsychopharmacology*, Jul;40(8):1928-39. PMC4839516
6. Besheer, J., Fisher, K.R., Jaramillo, A., Frisbee, S., **Cannady, R.** (2014) Stress hormone exposure reduces mGluR5 expression in the nucleus accumbens: Functional implications for interoceptive sensitivity to alcohol. *Neuropsychopharmacology*, Sep;39(10):2376-86. PMC4138747
 7. Besheer, J., Fisher, K.R., Lindsay, T. G., **Cannady, R.** (2013) Transient increase in alcohol self-administration following a period of chronic exposure to corticosterone. *Neuropharmacology*, Sep;72:139-47. PMC3696398
 8. **Cannady, R.**, Fisher, K.R., Durant, B.A., Besheer, J., Hodge, C.W. (2013) Enhanced AMPA receptor activity increases operant alcohol self-administration and cue-induced reinstatement. *Addiction Biology*, Jan;18(1):54-65. PMC3535558
 9. Besheer, J., Fisher, K.R., **Cannady, R.**, Grondin, J.J., Hodge, C.W. (2012) Intra-amygdala inhibition of ERK(1/2) potentiates the discriminative stimulus effects of alcohol. *Behav Brain Res*. Mar 17;228(2):398-405. PMC3268949
 10. Besheer, J., Fisher, K.R., Grondin, J.J., **Cannady, R.**, Hodge, C.W. (2012) The effects of repeated corticosterone exposure on the interoceptive effects of alcohol in rats. *Psychopharmacology (Berl)*, Apr;220(4):809-22. PMC3422726
 11. **Cannady, R.**, Grondin, J. M., Fisher, K.R., Hodge, C.W., Besheer, J. (2011) Activation of Group II metabotropic glutamate receptors inhibits the discriminative stimulus effects of alcohol via selective activity within the amygdala. *Neuropsychopharmacology*, Oct;36(11):2328-38. PMC3176569
 12. Besheer, J., Grondin, J.J., **Cannady, R.**, Sharko, A.C., Faccidomo, S., Hodge, C.W. (2010) Metabotropic glutamate receptor 5 activity in the nucleus accumbens is required for the maintenance of ethanol self-administration in a rat genetic model of high alcohol intake. *Biological Psychiatry*, May 1;67(9):812-22. PMC2854174
 13. Sanders, D., Simkiss, D., Braddy, D., Baccus, S., Morton, T., **Cannady, R.**, Weaver, N., Rose, J.E., Levin, E.D. (2010) Nicotinic receptors in the habenula: importance for memory. *Neuroscience*, Mar 17;166(2):386-90 PMID: 20034548
 14. **Cannady, R.**, Weir, R., Wee, B., Gotschlich, E., Kolia, N., Lau, E., Brotherton, J., Levin, E.D. (2009) Nicotinic antagonist effects in the mediodorsal thalamic nucleus: Regional heterogeneity of nicotinic receptor involvement in cognitive function. *Biochemical Pharmacology*, Oct 11;78(7):788-94. PMID: 19477167

BOOK CHAPTERS

1. **Cannady, R.**, Rinker, J.A., Nimitvilai, S., Woodward, J.J., Mulholland, P.J. (2018) Chronic Alcohol, Intrinsic Excitability, and Potassium Channels: Neuroadaptations and Drinking Behavior. *Handbook of Experimental Pharmacology*. Springer, Berlin, Heidelberg. 248:311-343 doi: 10.1007/164_2017_90. PMID: 29374839

ACCEPTED ABSTRACTS & POSTER PRESENTATIONS

1. **Cannady, R.**, Mulholland, P.J. Activation of interneuron-enriched KV3 potassium channels reduces binge-like ethanol consumption in mice. (2019) 42nd Annual Scientific Meeting of the Research Society on Alcoholism (RSA), Minneapolis, MN.
2. **Cannady, R.**, Mulholland, P.J. Plasticity of cingulate cortex intrinsic excitability following voluntary ethanol consumption. (2018) The Society for Neuroscience (SFN) Annual Meeting, San Diego, CA.
3. **Cannady, R.**, Mulholland, P.J. A history of voluntary ethanol consumption transiently alters intrinsic excitability in the cingulate cortex of C57BL/6J mice. (2018) 41st Annual Scientific Meeting of the Research Society on Alcoholism (RSA), San Diego, Ca.
4. **Cannady, R.**, Mulholland, P.J. Capturing cortical neuronal activation and excitability after voluntary ethanol consumption. (2018) Gordon Research Conference: Alcohol and the Nervous System, Galveston, TX.
5. **Cannady, R.**, McGonical, J., Woodward, J.J., Gass, J.T., Mulholland, P.J. Reduced KCa₂ channel activity in the infralimbic cortex underlies mGluR5-dependent enhanced synaptic plasticity and cue-associated extinction learning. (2016) 39th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), New Orleans, LA.

6. **Cannady, R.**, Gass, J.T., Mulholland, P.J. Modulation of extinction learning by KCa2 channels: Possible mechanism for mGluR5-mediated extinction of ethanol-associated memories. (2015) 38th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), San Antonio, TX.
7. **Cannady, R.**, Crayle, J., Fisher, K.R., Graham, C., Besheer, J., Hodge, C.W. Ethanol reinforcement is selectively facilitated by enhanced glutamate activity of amygdala AMPA receptors. (2013) 36th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), Orlando, FL.
8. **Cannady, R.**, Fisher, K.R., Durant, B.A., Besheer, J., Hodge, C.W. Positive modulation of amygdala AMPA receptors selectively increases operant alcohol self-administration in alcohol-preferring rats. (2012) The Society for Neuroscience (SFN) Annual Meeting, New Orleans, LA.
9. **Cannady, R.**, Fisher, K.R., Durant, B.A., Besheer, J., Hodge, C.W. "Increased alcohol self-administration following positive modulation of AMPA receptors in the amygdala." (2012) 35th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), San Francisco, CA.
10. **Cannady, R.**, Fisher, K.R., Durant, B.A., Besheer, J., Hodge, C.W. "Enhancement of AMPA receptor activity potentiates alcohol self-administration and cue-induced reinstatement in alcohol-preferring rats." (2011) 34th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), Atlanta, GA.
11. **Cannady, R.**, Fisher, K.R., Hodge, C.W., Besheer, J. "ERK inhibition in the amygdala, but not the nucleus accumbens, potentiates the interoceptive effects of alcohol". (2011) 34th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), Atlanta, GA.
12. **Cannady, R.**, Fisher, K.R., Grondin, J.J., Hodge, C.W., Besheer, J. "Examination of the role of mGlu2/3 receptors within limbic brain regions on the discriminative effects of alcohol". (2010) 33rd Annual Scientific Meeting of the Research Society on Alcoholism (RSA), San Antonio, TX.
13. **Cannady, R.**, Weir, R., Wee, B., Gotschlich, E., Kolia, N., Levin, E.D. "Blockade of alpha4beta2 nicotinic innervation of the mediodorsal thalamic nucleus improves working memory in rats". (2008) The Society for Neuroscience (SFN) Annual Meeting, Washington, D.C.
14. **Cannady, R.**, Ross, J., Umantsev, A., Chao, S. "The structural impact of diazinon and molinate on neurite outgrowth in N1E-115 neuroblastoma cells". (2005) 44th Society of Toxicology (SOT) Annual Meeting, New Orleans, LA.

ORAL PRESENTATIONS & SEMINARS

1. "Cell and Molecular Mechanisms of Extinction Learning." Honored Alumni Speaker. 3rd Annual Diversity in S.T.E.M. Conference, UNC, Chapel Hill, NC, March 23, 2018.
2. "*Prefrontal Cortex Fast-spiking interneurons and Ethanol Drinking*". 40th Annual Scientific Meeting of the Research Society on Alcoholism (RSA), Denver, CO, June 25, 2017.
3. "*KCa2 channel inhibition in the infralimbic prefrontal cortex is required for mGluR5-dependent enhancement of extinction of alcohol-seeking behavior and synaptic plasticity*". Annual Perry V. Halushka MUSC Research Day, Medical University of SC, Charleston, SC, November 13, 2015.
4. "*Alcohol self-administration and relapse-like behavior: A functional role for enhanced activity at AMPA receptors*". Special Departmental Seminar: Medical University of SC, December 13, 2013.
5. "*AMPA receptor signaling promotes alcohol self-administration and relapse-like behavior*". UNC Initiative for Maximizing Student Diversity (IMSD) Luncheon. UNC, Chapel Hill, NC, August 8, 2013.
6. "*A novel role for AMPA receptor signaling in promoting alcohol self-administration and relapse-like behavior*". Special Seminar: Bilbo Laboratory, Duke University, Durham, NC, February 22, 2013.
7. "Positive modulation of amygdala AMPA receptors selectively potentiates operant alcohol self-administration". Pierre Morell Research Day: Honored Student Speaker, UNC, Chapel Hill, NC June 15, 2012.
8. "Increased alcohol self-administration and seeking behavior with enhanced excitatory neurotransmission." UNC Dept. of Neuroscience Student Mini-Series, UNC, Chapel Hill, NC September 20, 2011.

TEACHING EXPERIENCE & EDUCATIONAL OUTREACH

- MUSC Summer Undergraduate Research Program (SURP) Neuroscience Specialized Curriculum Guest Lecturer: *"A Cross-examination of Addiction and Neuropharmacology"* (July 2019)
- MUSC Summer Undergraduate Research Program (SURP) Neuroscience Specialized Curriculum Guest Lecturer: *"The Neuropharmacology of Addiction"* (July 2018)
- Poster Judge: 3rd Annual Diversity in S.T.E.M. Conference. UNC, Chapel Hill, NC (March 2018)
- Fundamentals of Neuroscience (NSCS 730; *Grad level*): MUSC Guest Lecturer: Electrophysiology lab demonstration (February 2018 & 2017 and January 2016)
- MUSC SURP Neuroscience Specialized Curriculum Guest Lecturer: *"Addiction: A Neuroscience Perspective"* (July 2016 & 2017)
- Brain Awareness Week and Alcohol Center Outreach Volunteer Instructor: *"The Brain Lab"* at the NC Museum of Natural Sciences, Raleigh, NC (2012)
- Brain Awareness Week and Alcohol Center Outreach Volunteer Instructor: *"The Brain Lab"* at the NC Museum of Life & Science, Durham, NC (2010 and 2011)
- Recruiter for UNC School of Medicine Graduate Training Programs at the Society for Advancement of Chicanos and Native Americans in Science National Conference Anaheim, CA (2010)

ACADEMIC SERVICE AND PROFESSIONAL ASSOCIATIONS

- UNC Initiative for Maximizing Student Diversity (IMSD) Advisory Committee (2009 – 2013)
- UNC Curriculum in Neurobiology Student Representation Committee (2009 – 2012)
- Society for Advancement of Chicanos and Native Americans in Science (SACNAS; Member 2010 – 2011)
- Research Society on Alcoholism (member)
- Society for Neuroscience (member)
- National Postdoctoral Association (member)