

Matthew D. Rannals

CONTACT INFORMATION

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POSTDOCTORAL TRAINING

University of Pittsburgh,
School of Medicine, Pittsburgh, Pennsylvania

Postdoctoral Fellow, Department of Neurobiology, July 2016 to present

Penn State Milton S. Hershey Medical Center,
Department of Medicine, Hershey, Pennsylvania

Postdoctoral Fellow, Division of Pulmonary and Critical Care Medicine, Mar 2015 to July 2016

Lieber Institute for Brain Development,
Johns Hopkins University Medical Campus, Baltimore, Maryland

Fellow, Developmental Neurobiology and Functional Genomics, Dec 2011 to Mar 2015

EDUCATION

University of Virginia, Charlottesville, Virginia

Ph.D., Neuroscience Graduate Program, 2011

Dissertation: *Homeostatic Plasticity at GABAergic Synapses*

Advisor: Dr. Jaideep Kapur

University of Virginia, Charlottesville, Virginia

Engineering Physics Graduate Program, July 2003 - August 2004

Hampden-Sydney College, Hampden-Sydney, Virginia

B.S., Physics, May 2003

summa cum laude, With Honors in Physics

Thesis: *Detecting Carbon Disulfide Gas in a Binary Mixture with Air Using Optoacoustic Techniques*

JOURNAL PUBLICATIONS

Rannals MD, Cerceo-Page S, Campbell M, Hamersky GR, Briley A, Gallo R, Phan B, Jaffe AE, Shin J, Hyde T, Kleinman J, Weinberger DR, Maher BJ. (2016) Psychiatric Risk Gene Transcription Factor 4 Regulates the Intrinsic Excitability of Prefrontal Neurons via Repression of SCN10a and KCNQ1 Ion Channels. *Neuron*. 90(1):43-55. doi:10.1016/j.neuron.2016.02.021

Taniguchi Y, Saito A, Rannals MD, Ballinger MD, Koga M, Ohtani Y, Sedlak TW, Cross A, Moss SJ, Brandon NJ, Maher BJ, Kamiya A. (2016) Early Postnatal GABA_A Receptor Modulation Reverses Deficits in Neuronal Maturation in a Conditional Neurodevelopmental Mouse Model of DISC1. *Molecular Psychiatry*. advanced online publication 5 Jan 2016. doi:10.1038/mp.2015.203

Judenherc-Haouzi A, Zhang X, Sonobe T, Song J, Rannals MD, Wang J, Tubbs N, Cheung JY, Haouzi P. (2016) Methylene Blue Counteracts H₂S Toxicity Induced Cardiac Depression by Restoring L-Type Ca Channel Activity. *American Journal of Physiology - Regulatory, Integrative and Comparative Physiology*. advanced online publication 9 Mar 2016. doi: 10.1152/ajpregu.00527.2015

Rannals MD, Kapur J. (2011) Homeostatic Strengthening of Inhibitory Synapses is Mediated by the Accumulation of GABA_A Receptors. *Journal of Neuroscience* 31(48):17701-17712. doi:10.1523/JNEUROSCI.4476-11.2011

Cheyne SA, McDermott WC, Rannals MD, Vaughan JE (2004) Concentration Determination of a Binary Mixture of Air and Carbon Disulfide Gas Using Optoacoustics. *Acoustics Research Letters Online* 5(2):7-12. doi:10.1121/1.1637051

SELECTED
CONFERENCE
PUBLICATIONS

Rannals MD, Cerceo-Page S, Campbell M, Briley A, and Maher BJ. Schizophrenia and autism associated gene, transcription factor 4 regulates the intrinsic excitability of prefrontal cortical neurons. *Society for Neuroscience Abs.*, 2014, 518.14

Rannals MD and Kapur J. Postsynaptic GABA_A receptors mediate activity-dependent homeostatic scaling of synaptic strength. *Gordon Conference on Mechanisms of Epilepsy and Neuronal Synchronization*, 2010

TEACHING
EXPERIENCE

Cold Spring Harbor Laboratory

Teaching Assistant - Advanced Techniques in Molecular Neuroscience

2013-2014

- Prepared lab equipment for *in utero* electroporation surgery
- Provided demonstration surgery and then instruction for students

University of Virginia, School of Medicine

Teaching Assistant for Labs - Medical Neuroscience Course

2007-2009

- Reviewed lab instructions with course directors
- Provided guidance to medical students during anatomy and imaging labs

RESEARCH
EXPERIENCE

Electrophysiology

Whole-cell patch clamp recording in both cultured neurons and acute slices from rat and mouse
Field LTP recordings from mouse and rat hippocampus
Optogenetic stimulation recordings in acute brain slices
Whole-cell patch clamp of directly reprogrammed fibroblasts and iPSC-derived neurons

Animal Surgery

In Utero Electroporation (IUE) in both rat and mouse
Embryonic neuron harvesting for cell culture

Molecular Biology

Translating Ribosome Affinity Purification (TRAP)
Immunocytochemistry/Immunohistochemistry
Subcloning and CRISPR/shRNA design for constructs used in IUE surgery

Imaging

Live calcium imaging in acute slices using genetically encoded calcium indicators transfected by IUE
Confocal microscopy in both cultured neurons and brain slice

AWARDS

University of Virginia

- Raven Society
- Fine Science Tools Travel Grant, 2009 and 2010
- NASA Graduate Student Research Fellowship, 2003-04
- UVA Dean's Graduate Fellowship, 2003-04
- Virginia's Future Leaders Scholarship, Virginia Cable Telecommunication Association, 2003

Hampden-Sydney College

- Phi Beta Kappa
- Chi Beta Phi (Honorary Academic Fraternity for the Natural Sciences)
- Pi Mu Epsilon (Mathematics)
- Eta Sigma Phi (Classical Studies)
- Omicron Delta Kappa (Leadership)
- Omicron Delta Kappa Award for Leadership, 2001
- President's Award for Academic Achievement in the Sciences, 2003
- Hampden-Sydney College Physics Award, 2003
- Society of '91 Leadership Program, 1999-2000

SERVICE

Graduate Council at the University of Virginia

- *President* 2010, *Treasurer* 2009, *2nd Vice-President* 2008

UVa Graduate Biosciences Society

- *Neuroscience Representative*, 2008-2010

City of Charlottesville, Neighborhood Leadership Institute, 2009

Brain Awareness Week 2006-2010

United Way Day of Caring, UVa Graduate Biosciences group, 2007-2009