Curriculum Vitae

Personal data:

Name: Bradley Ress Miller, MD, PhD

Address:
New York State Psychiatric Institute
1051 Riverside Drive Room 759
NY, NY 10032

Telephone: (347) 974-3621
Email: bradley.miller@nyspi.columbia.edu

Birthplace: Indianapolis, Indiana
Citizenship: USA

Academic Appointments, Hospital Appointments, and Other Work Experience:

2018-present	Assistant Professor of Clinical Psychiatry. Columbia University. New York, NY.
2018-present	Research Scientist. New York State Psychiatric Institute. New York, NY.
2017-2018	Leon Levy Postdoctoral Fellow. Columbia University. New York, NY.
2015- 2018	Affective Disorders Fellow. Columbia University and NYSPI. New York, NY.
2015- 2018	Assistant Attending Psychiatrist. New York Presbyterian Hospital. New York, NY.
2015- 2018	Postdoctoral Research Fellow. Columbia University and NYSPI. New York, NY. Adviser: René Hen, Ph.D.
2011-2015	Leon Levy Neuroscience Fellow. Columbia University and New York State Psychiatric Institute (NYSPI). New York, NY.
2011-2015	Postdoctoral Residency Fellow in Psychiatry and Leon Levy Neuroscience Fellow. Columbia University and New York State Psychiatric Institute (NYSPI). New York, NY.
2002-2011	M.D., Ph.D. Washington University in Saint Louis. Adviser: Aaron DiAntonio.
2001-2002	Intramural Research Trainee. National Institutes of Health. Bethesda, MD. Advisers: Joseph Frank, M.D. Jeff Bulte, PhD.
1999-2001	Undergraduate Research Associate. New York University. Adviser: Alex Reyes, Ph.D.

Education

7/2002 – 5/2011: MD, PhD. Washington University School of Medicine. Saint Louis, MO.
Thesis title: “Mechanisms of Axonal Degeneration.”
Thesis advisor: Aaron DiAntonio, MD, PhD.

7/1997 – 5/2001: BS. *Summa cum laude*. New York University, College of Arts and Sciences. New York, NY.
Thesis Title: “The Role of Voltage-gated Calcium Channels in Short-term Synaptic Plasticity.”
Thesis advisor: Alex Reyes, PhD.

Training

7/2015 – 7/2018: Affective Disorders T32 Research Fellow. Department of Psychiatry. Columbia University. Postdoctoral Research Fellow. Leon Levy Neuroscience Fellow in the laboratory of Rene Hen, PhD, Columbia University and NYSPI. New York, NY

7/2012 – 6/2015: Psychiatry Resident. Department of Psychiatry, Columbia University. New York State Psychiatric Institute, New York, NY.

7/2011 – 6/2012: Psychiatry Intern. Departments of Psychiatry and Internal Medicine, Columbia University.

8/2001 – 5/2002: National Institutes of Health. Bethesda, MD. Intramural Research Trainee. Advisers: Joseph Frank, MD. Jeff Bulte, PhD.

Licensure and Board Certification
New York State Medical License 266330.
Diplomat of the American Board of Psychiatry and Neurology. Board Certificate #70228.

Honors & Awards

Invited Lecture: Chinese Institute for Brain Research (CIBR). October 2023.
Best Poster Award. NYSPI Science Festival. 2023.
K08 Award. NIMH. 2018.
NARSAD Young Investigator Grant. Brain & Behavior Research Foundation. 2015.
Glassman Award. Columbia University, Department of Psychiatry. For research achievement in psychiatry. 2015.
Samuel W. Perry III, M.D. Distinguished Award in Psychiatric Medicine. Weill Cornell College of Medicine. For research achievement in psychiatry. 2015.
Spencer T. and Ann W. Olin Biomedical Fellow Award, Washington University. "For past achievement and the promise of a distinguished career in the biomedical sciences." 2011.
O'Leary Prize, Washington University. "For the most original and important accomplishments in neuroscience research by a predoctoral or postdoctoral fellow." 2010.
Sherrington Award, NYU. "For the best undergraduate thesis in neural science." 2001.
Summa cum laude, NYU. 2001.
Phi Beta Kappa, NYU. 2001.

Profession Organizations
2013-present Member of Society for Neuroscience
2013-present Member of the American Psychiatric Association
2021-present Society for Biological Psychiatry
2023-present Member CINP (International College of Neuropsychopharmacology)

Fellowship and Grant Support
Present Research Support

Columbia Precision Medicine Award Miller (PI)

Sackler Institute Award Miller (PI)

Past Research Support

Hope For Depression Research Foundation Fellowship Miller (PI) 1/1/2020 – 12/31/2021
HDRF
Circuit Mechanisms of GPR156 Mutation Effects on Emotional Behavior

1K08MH116368 Miller (PI) 07/01/2018 – 6/30/2021

NIMH
Mapping Serotonergic Activity During Emotional Behavior in the Healthy and Stressed Brain.

Columbia Virtual Depression Center Grant Miller (PI) 4/01/19 – 3/31/20
Columbia University

Leon Levy Early Career Neuroscience Fellowship Salzman (PI) 07/01/2017 – 06/30/2019
Leon Levy Foundation
Role: Fellow

NARSAD Young Investigator Grant Miller (PI) 01/15/2016 – 01/14/2018
Brain and Behavior Research Foundation
The Role of Serotonin in Depression and Anxiety: Imaging and Manipulating the Serotonergic System in Behaving Mice.

T32 MH015144 Roose (PI) 06/30/2015 – 06/29/2018
NIMH

Research Training in Mood and Anxiety Disorders: From Animal Models to Patients
Role: Fellow

R25: MH086466-03 Gordon (PI) 7/2012 – 6/2015
NIMH
Priming the Pump: Training Physician---scientists for translational neuroscience.
Role: Fellow

Leon Levy Neuroscience Fellowship Gordon (PI) 7/2011 – 6/2015
Leon Levy Foundation
Role: Fellow

Educational Contributions
Courses
8/2017 – Columbia University and New York Presbyterian Hospital. Co-Instructor. Lab Methods in Translational Research.

1/2016 – 7/2017: Columbia University College of Physicians and Surgeons. Co-Instructor. Medical Student Psychiatry Course.

1/2015 – Present: Columbia University and New York State Psychiatric Institute. Co-Instructor. PGY1 Psychopharmacology course.

7/2005 – 5/2006: Washington University, School of Medicine. Teaching Assistant. Neuroscience course for first year medical students

8/1999 – 5/2000: New York University. Teaching Assistant. General Chemistry.

Clinical Supervision
7/2016 – Present: Columbia University and New York Presbyterian Hospital. Supervisor of psychiatry residents conducting initial outpatient evaluations and ongoing psychopharmacology.

Advising and Mentorship

Postdoctoral fellows (co-mentored with Dr. Jae-eun Kang Miller)

Grace Paquelet, PhD. 2022-2023. I mentored Dr. Paquelet as she finished up her PhD dissertation and then completed a transitional one-year postdoctoral fellowship in my laboratory. She had a highly successful PhD defense and made several fundamental discoveries into the code of serotonergic neurons in vivo during emotional behaviors. She published two first author papers under my mentorship and recently started in a new postdoctoral position with Dr. Conor Liston at Cornell. She is well on her way to a thriving career in translational neuroscience.

Seung Yeon Ko, PhD. 2022 – present Dr. Ko joined our laboratory for her postdoctoral fellowship last year after a productive PhD and transitional postdoctoral fellowship in South Korea. She is investigating how mutations in GPR156 alter neural circuit activity and emotional behaviors. In the past year, she determined that GPR156 knockout mice, and human GPR156 mutation knockin mice, have exaggerated and often maladaptive responses to a wide range of acute stressors. This is a key insight to understand the behavior impact of this depression associated human mutation. She also developed the methods and reagents necessary to knockout GPR156 specifically in the medial habenula, an “emotional circuit hub” with the highest level of GPR156 expression. This is the essential foundation for determining how GPR156 mutations alter circuit activity.

Basak Akdogan, PhD. 2023 – present. Dr. Akdogan joined our laboratory this summer after completing her PhD at Columbia. She is investigating how tauopathy (a key feature of Alzheimer’s disease) degrades information encoding in the hippocampus. This is a key question for understanding the pathophysiology of Alzheimer’s disease and could lead to targeted treatments.

Research technicians (co-mentored with Dr. Jae-eun Kang Miller)

Darvin Huang, BA, Research Technician, 2023-present

Fabliha Hussain, BA, Research Technician, 2022-present

Zaheen Hossain, BA, Research Technician, 2022-2023. Now in medical school.

Hillendna Gregoire, BA, Research Technician, 2021-2022. Now in MD/PhD program.

Undergraduates and high school students (co-mentored with Dr. Jae-eun Kang Miller)

Allison Kleinstein, Barnard student, 2023 June-present

Jamilee Castro, Barnard student, 2023 June-present

Myungin Bae, undergraduate, Columbia College, 2023-present

Melody Jane Lu, undergraduate, Columbia College, 2023-present

William Wu, high school student, Stuyvesant, 2023 Summer

Zaheen Hossain, BA, Research Technician, 2022-2023

Nikhil Patel, a SURF fellowship undergraduate, Columbia College, 2022-2023

Amber Aurora Abud, a SRI fellowship undergraduate, Barnard College, 2022 Summer

Alexander Zhang, undergraduate, Columbia College, 2022 Summer

Mary Salim, Barnard student, 2022 Jan-2023 May. Completed thesis: Alzheimer's Disease: Dissecting the Link Between Neuronal Activity and Pathological Tau Accumulation in the Entorhinal-Cortical Circuits

Maya Rodriguez-Valentín, Barnard student, 2022 Jan-2023 Completed thesis: Implications of tau pathology on spatial memory and navigation in a mouse model of Alzheimer's disease.

Patents & Inventions

Aaron DiAntonio, Bradley R. Miller, Jeffrey D. Milbrandt, Craig A. Press. Methods and compositions for inhibition of axonal degeneration by modulation of the dlk/jnk pathway. US 20100056609 A1.

Publications and Abstracts

Under review:

Bradley R. Miller*, Claudia Gonzaga-Jauregui,*, Karlla W. Brigatti,*, Job de Jong, Robert S. Breese, Erik G. Puffenberger, Cristopher Van Hout,, Millie Young, Victor M Luna, Jeffrey Staples, Michael B. First, Hilledna J. Gregoire, Andrew J. Dwork, Evangelos Pefanis, Shane McCarthy, Jean Endicott, Susannah Brydges, Jose Rojas, Bin Ye, Eli Stahl, Silvio Alessandro Di Gioia, René Hen, Kevin Elwood, Gorazd Rosoklija, Dadong Li, Scott Mellis, David Carey, Susan D. Croll, John D. Overton, Lynn E. Macdonald, Aris N. Economides, Alan R. Shuldiner, Ashley van der Spek, Najaf Amin, Steven A. Kushner, Nicole Alessandri-Haber, Sander Markx, Kevin A. Strauss. A Rare Missense Variant in the Orphan G Protein-Coupled Receptor Gene GPR156 is Associated with Major Depressive Disorder. In revision at *PNAS.*

Paquelet GE, Carrion K, Lacefield CO, Zhou P, Hen R, **Miller BR.** Single cell activity of serotonergic neurons in the dorsal raphe nucleus during emotional behaviors. Society for Neuroscience 2024.

Miller BR, Sharp T, Nagayasu K, Ohmura Y. Functional heterogeneity of the serotonin system. Symposium. CINP World Congress of Neuropsychopharmacology 2024.

Published:

Paquelet GE, Carrion K, Lacefield CO, Zhou P, Hen R, **Miller BR**. Protocol for in vivo imaging and analysis of brainstem neuronal activity in the dorsal raphe nucleus of freely behaving mice. *STAR Protoc*. 2023 Jan 28;4(1):102074. doi: 10.1016/j.xpro.2023.102074. [Epub ahead of print] PubMed PMID: 36853724; PubMed Central PMCID: PMC9922919.

Paquelet GE, Carrion K, Lacefield CO, Zhou P, Hen R, **Miller BR**. Single-cell activity and network properties of dorsal raphe nucleus serotonin neurons during emotionally salient behaviors. *Neuron*. 2022 Aug 17;110(16):2664-2679.e8. doi: 10.1016/j.neuron.2022.05.015. Epub 2022 Jun 13. PubMed PMID: 35700737; PubMed Central PMCID: PMC9575686.

Miller JK, **Miller BR**, O'Neil DA, Yuste R. An increase in spontaneous activity mediates visual habituation. Cell Rep. 2022 Apr 26;39(4):110751. doi: 10.1016/j.celrep.2022.110751. PubMed PMID: 35476991; PubMed Central PMCID: PMC9109218.

Miller BR. A Mechanistic Study of p11 Reveals a Promising New Rapid-Action Antidepressant Target. Biol Psychiatry. 2020 Sep 1;88(5):e23-e24. doi: 10.1016/j.biopsych.2020.06.016. PubMed PMID: 32792054.

Miller BR, Hen R. The current state of the neurogenic theory of depression and anxiety. Curr Opin Neurobiol. 2015 Feb;30:51-8. doi: 10.1016/j.conb.2014.08.012. Epub 2014 Sep 18. Review. PubMed PMID: 25240202; PubMed Central PMCID: PMC4293252.

Shin JE*, **Miller BR***, Babetto E, Cho Y, Sasaki Y, Qayum S, Russler EV, Cavalli V, Milbrandt J, DiAntonio A. SCG10 is a JNK target in the axonal degeneration pathway. Proc Natl Acad Sci U S A. 2012 Dec 26;109(52):E3696-705. doi: 10.1073/pnas.1216204109. Epub 2012 Nov 27. PubMed PMID: 23188802; PubMed Central PMCID: PMC3535671.

Daniels RW, **Miller BR**, DiAntonio A. Increased vesicular glutamate transporter expression causes excitotoxic neurodegeneration. Neurobiol Dis. 2011 Feb;41(2):415-20. doi: 10.1016/j.nbd.2010.10.009. Epub 2010 Oct 14. PubMed PMID: 20951206; PubMed Central PMCID: PMC3014407.

Vohra BP, Sasaki Y, **Miller BR**, Chang J, DiAntonio A, Milbrandt J. Amyloid precursor protein cleavage-dependent and -independent axonal degeneration programs share a common nicotinamide mononucleotide adenylyltransferase 1-sensitive pathway. J Neurosci. 2010 Oct 13;30(41):13729-38. doi: 10.1523/JNEUROSCI.2939-10.2010. PubMed PMID: 20943913; PubMed Central PMCID: PMC3104322.

Grygoruk A, Fei H, Daniels RW, **Miller BR**, Chen A, DiAntonio A, Krantz DE. Vesicular neurotransmitter transporter trafficking in vivo: moving from cells to flies. Fly (Austin). 2010 Oct-Dec;4(4):302-5. doi: 10.4161/fly.4.4.13305. Epub 2010 Oct 1. PubMed PMID: 20855951.

Grygoruk A, Fei H, Daniels RW, **Miller BR**, Diantonio A, Krantz DE. A tyrosine-based motif localizes a Drosophila vesicular transporter to synaptic vesicles in vivo. J Biol Chem. 2010 Mar 5;285(10):6867-78. doi: 10.1074/jbc.M109.073064. Epub 2010 Jan 6. PubMed PMID: 20053989; PubMed Central PMCID: PMC2844137.

Miller BR, Press C, Daniels RW, Sasaki Y, Milbrandt J, DiAntonio A. A dual leucine kinase-dependent axon self-destruction program promotes Wallerian degeneration. Nat Neurosci. 2009 Apr;12(4):387-9. doi: 10.1038/nn.2290. Epub 2009 Mar 15. PubMed PMID: 19287387; PubMed Central PMCID: PMC2696160.

Bloom AJ, **Miller BR**, Sanes JR, DiAntonio A. The requirement for Phr1 in CNS axon tract formation reveals the corticostriatal boundary as a choice point for cortical axons. Genes Dev. 2007 Oct 15;21(20):2593-606. doi: 10.1101/gad.1592107. Epub 2007 Sep 27. PubMed PMID: 17901218; PubMed Central PMCID: PMC2000324.

Arbab AS, Bashaw LA, **Miller BR**, Jordan EK, Bulte JW, Frank JA. Intracytoplasmic tagging of cells with ferumoxides and transfection agent for cellular magnetic resonance imaging after cell transplantation: methods and techniques. Transplantation. 2003 Oct 15;76(7):1123-30. doi: 10.1097/01.TP.0000089237.39220.83. PubMed PMID: 14557764.

Winter PM, Caruthers SD, Yu X, Song SK, Chen J, **Miller B**, Bulte JW, Robertson JD, Gaffney PJ, Wickline SA, Lanza GM. Improved molecular imaging contrast agent for detection of human thrombus. Magn Reson Med. 2003 Aug;50(2):411-6. doi: 10.1002/mrm.10532. PubMed PMID: 12876719.

Kalish H, Arbab AS, **Miller BR**, Lewis BK, Zywicke HA, Bulte JW, Bryant LH Jr, Frank JA. Combination of transfection agents and magnetic resonance contrast agents for cellular imaging: relationship

between relaxivities, electrostatic forces, and chemical composition. Magn Reson Med. 2003 Aug;50(2):275-82. doi: 10.1002/mrm.10556. PubMed PMID: 12876703.

Frank JA, **Miller BR**, Arbab AS, Zywicke HA, Jordan EK, Lewis BK, Bryant LH Jr, Bulte JW. Clinically applicable labeling of mammalian and stem cells by combining superparamagnetic iron oxides and transfection agents. Radiology. 2003 Aug;228(2):480-7. doi: 10.1148/radiol.2281020638. Epub 2003 Jun 20. PubMed PMID: 12819345.

Bulte JW, Ben-Hur T, **Miller BR**, Mizrachi-Kol R, Einstein O, Reinhartz E, Zywicke HA, Douglas T, Frank JA. MR microscopy of magnetically labeled neurospheres transplanted into the Lewis EAE rat brain. Magn Reson Med. 2003 Jul;50(1):201-5. doi: 10.1002/mrm.10511. PubMed PMID: 12815696.

Frank JA, Zywicke H, Jordan EK, Mitchell J, Lewis BK, **Miller B**, Bryant LH Jr, Bulte JW. Magnetic intracellular labeling of mammalian cells by combining (FDA-approved) superparamagnetic iron oxide MR contrast agents and commonly used transfection agents. Acad Radiol. 2002 Aug;9 Suppl 2:S484-7. doi: 10.1016/s1076-6332(03)80271-4. PubMed PMID: 12188316.

Bulte JW, Douglas T, Witwer B, Zhang SC, Strable E, Lewis BK, Zywicke H, **Miller B**, van Gelderen P, Moskowitz BM, Duncan ID, Frank JA. Magnetodendrimers allow endosomal magnetic labeling and in vivo tracking of stem cells. Nat Biotechnol. 2001 Dec;19(12):1141-7. doi: 10.1038/nbt1201-1141. PubMed PMID: 11731783.