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Education

University of Florida	B.S.	1993	Zoology
Florida Atlantic University Advisor: Peter Lutz	M.S.	1997	Biological Sciences
University of Maryland School of Medicine Advisor: Scott M. Thompson	Ph.D.	2002	Neurophysiology

Postgraduate

University of Maryland School of Medicine Advisor: Bradley E. Alger	2002 – 2003	Dept. of Physiology
Baylor College of Medicine Advisor: Daniel Johnston	2003 – 2005	Dept. of Neuroscience

Academic Appointments

2020 – present	Research Associate Professor, Department of Neuroscience University of Texas at Austin
2015 – 2020	Senior Research Scientist, Department of Neuroscience University of Texas at Austin
2005 – 2015	Research Scientist, Department of Neuroscience University of Texas at Austin

Research Interests

Cellular mechanisms of learning and memory, Modulation of synaptic function, Plasticity of voltage-gated ion channel function, Synaptic and neuronal dysfunction in neurological disorders

Invited Seminars

October 2020	Cincinnati Children's Hospital, Neuroscience Seminar Series
January 2020	University of Texas at Austin, Department of Neuroscience
January 2020	Miami University, Department of Biology
November 2019	Wake Forest University School of Medicine, Department of Physiology and Pharmacology
September 2019	Tulane University School of Medicine, Department of Pharmacology
August 2019	University of Tennessee Health Science Center, Department of Neurobiology and Anatomy

April 2019	Univ. of Texas at Austin, Austin Conference on Learning and Memory
March 2019	University of Washington, Department of Physiology and Biophysics
June 2018	Marine Biological Laboratory Neuroimaging Seminar
March 2018	Rhodes College, Department of Neuroscience
June 2017	National Epilepsy Center of Excellence, Basic Research Seminar Series
January 2015	Univ. Texas Health Science Center San Antonio, Dept. of Physiology
October 2011	FRAXA Investigators Meeting, South Hampton MA

Dissertation and Thesis

- Brager D. Activity-dependent modulation of neurotransmitter release during short-term synaptic plasticity. Ph.D. dissertation, University of Maryland School of Medicine, 2002.
- Brager D. Long-term stress-induced changes in brain monoamines of the gray snapper, *Lutjanus griseus*. Neurotransmitters as indicators of physiological stress. Master's Thesis. Department of Biology, Florida Atlantic University, 1997.

Peer-reviewed publications

- Hewitt LT, Ordemann G, and **Brager DH**. High and low expression of the hyperpolarization activated current (I_h) in mouse CA1 stratum oriens interneurons. *submitted*. Preprint available:
<https://www.biorxiv.org/content/10.1101/2021.02.26.433114v1>
- Ordemann G, Apgar C, Chitwood RA and **Brager DH**. Altered A-type potassium channel function impairs dendritic spike initiation and temporammonic long-term potentiation in Fragile X syndrome. *under revision*.
Preprint available: <https://www.biorxiv.org/content/10.1101/2021.01.06.425593v1>
- Kalmbach BE and **Brager DH**. (2020) Fragile X Mental Retardation Protein modulates somatic D-type K⁺ channels and action potential threshold in the mouse prefrontal cortex. *Journal of Neurophysiology*. Sep 30;. doi: 10.1152/jn.00494.2020. [Epub ahead of print] PMID: 32997566.
- Brandalise F, Kalmbach BE, Mehta P, Thornton O, Johnston D, Zemelman BV and **Brager DH**. (2020) FMRP bidirectionally controls dendritic I_h in a cell-type specific manner between mouse hippocampus and prefrontal cortex. *Journal of Neuroscience*, 40(27):5327-5340. PMCID: PMC7329306
- Tiwari D, **Brager DH**, Rymer JK, Bunk AT, White AR, Elsayed NA, Krzeski JC, Snider A, Schroeder Carter LM, Danzer SC, and Gross C. (2019) MicroRNA inhibition upregulates hippocampal A-type K⁺ current and reduces seizure frequency in a mouse model of epilepsy. *Neurobiology of Disease*, 130:104508. doi:

10.1016/j.nbd.2019.104508. PMID: 31212067

Ordemann G, Apgar C, and **Brager DH**. (2019) D-type potassium channels normalize action potential firing between dorsal and ventral CA1 neurons of the mouse hippocampus. *Journal of Neurophysiology* 121(3): 983-995. PMID: 30673366

Routh B, Rathour R, Baumgartner M, Kalmbach BE, Johnston D and **Brager DH**. (2017) Increased transient Na⁺ conductance and action potential output in layer 2/3 prefrontal cortex neurons of the *fmr1*^{-y} mouse. *Journal of Physiology*. 595: 4431-4448, 2017. doi: 10.1113/JP274258. PMID: 28370141

Kim CS, **Brager DH**, and Johnston D. (2017) Perisomatic changes in h-channels regulate depressive behaviors following chronic unpredictable stress. *Molecular Psychiatry*. 23(4): 892-903. PMID: 28416809

Kalmbach BE, Johnston D, and **Brager DH**. (2015) Cell-type specific channelopathies in the prefrontal cortex of the *fmr1*^{-y} mouse model of Fragile X syndrome. *E Neuro* 2(6). pii: ENEURO.0114-15.2015. doi: 10.1523/ENEURO.0114-15. PMID: 26601124

Sosanya NM, **Brager DH**, Wolfe S, Nierre F, Raab-Graham KF. (2015) Rapamycin reveals an mTOR-independent repression of Kv1.1 expression during epileptogenesis. *Neurobiology of Disease*, 73: 96-105. PMID: 25270294

Routh B, Johnston D, and **Brager DH**. (2013) Loss of function A-type K⁺ channels in the dendrites of CA1 pyramidal neurons from a mouse model of Fragile X syndrome. *Journal of Neuroscience* 33(50): 19442-19450. PMID: 24336711

Brager DH, Lewis AS, Chetkovich DM, Johnston D. (2013) Short- and long-term potentiation in CA1 neurons from a mouse lacking the h-channel auxiliary subunit TRIP8b. *Journal of Neurophysiology*, 110(10): 2350-2357. PMID: 23966674

Brager DH, Akhavan AR, and Johnston D. (2012) Impaired dendritic expression and plasticity of h-channels in the *fmr1*^{-y} mouse model of Fragile X syndrome. *Cell Reports* 1(3): 225-233. PMCID: PMC3363364

Lewis AS, Vaidya SP, Blaiss CA, Liu Z, Stoub TR, **Brager DH**, Chen X, Bender RA, Estep CM, Popov AB, Kang CE, Van Veldhoven PP, Bayliss DA, Nicholson DA, Powell CM, Johnston D, Chetkovich DM. (2011) Deletion of the hyperpolarization-activated cyclic nucleotide-gated channel auxiliary subunit TRIP8b impairs hippocampal Ih localization and function and promotes antidepressant behavior in mice. *Journal of Neuroscience* 31(20): 7424-7440. PMCID: PMC3169171

Shin M, **Brager DH**, Jaramillo TC, Johnston D, and Chetkovich DM. (2008) Redistribution of h-channels increases excitability in temporal lobe epilepsy. *Neurobiology of Disease*, 32(1): 26-36. PMCID: PMC2626192

Brager DH and Johnston D. (2007) Plasticity of intrinsic excitability during long-term depression is mediated through mGluR-dependent changes in Ih in hippocampal CA1 pyramidal neurons. *Journal of Neuroscience* 27(51): 13926-13937. PMID: 18094230

Fan Y[†], Fricker D[†], **Brager DH**, Chen X, Chitwood RA, Johnston D. (2005) Activity-

dependent regulation of intrinsic excitability in hippocampal CA1 pyramidal neurons. *Nature Neuroscience* 8(11):1542-1551. †These authors contributed equally to this study. PMID: 16234810

Heinbockel T†, **Brager DH**†, Reich C, Zhao J, Muralidharan S, Kao JPY, and Alger BE. (2005) Endocannabinoid signaling dynamics probed with optical tools. *Journal of Neuroscience* 25(41): 9449-9459. †These authors contributed equally. PMID: 16221855

Brager DH Luther PW, Erdélyi F, Szabó G and Alger BE. (2003) Regulation of exocytosis from single visualized GABAergic boutons in hippocampus. *Journal of Neuroscience* 23(33): 10475-10486. PMID: 14627631

Brager DH, Cai X and Thompson SM. (2003) Activity-dependent activation of presynaptic protein kinase C mediates post-tetanic potentiation. *Nature Neuroscience* 6(6): 551-552. PMID: 12754518

Brager DH and Thompson SM. (2003) Activity-dependent release of adenosine contributes to short-term depression at CA3-CA1 synapses in rat hippocampus. *Journal of Neurophysiology* 89(1): 22-26. PMID: 12522156

Brager DH, Capogna M, and Thompson SM. (2002) Short-term synaptic plasticity, simulation of nerve terminal dynamics, and the effect of protein kinase C activation in rat hippocampus. *Journal of Physiology (Lond)* 541(2): 545-559. PMCID: PMC2290341

Varma N, **Brager D**, Morishita W, Lenz RA, London B, and Alger BE. (2002) Presynaptic mechanisms of DSI expression in hippocampus. *Neuropharmacology* 43(4): 550-562. PMID: 12367601

Brager DH, Sickel MJ, and McCarthy MM. (2000) Sex differences in calbindin-D28K and calretinin immunoreactivity in the neonatal rat hypothalamus. *Journal of Neurobiology* 42(3): 315-322. PMID: 10645971

Invited Reviews

Brager DH and Johnston D. (2014) Channelopathies and dendritic dysfunction in Fragile X syndrome. *Brain Research Bulletin* **103**:11-17. PMID: 24462643

Professional Memberships

1999 – present	Society for Neuroscience
2007 – 2009	American Epilepsy Society

Referee Experience

2019 – present	Reviewing Editor for Frontiers in Cellular Neuroscience
2016	Reviewer for Wellcome Trust Fellowship Program

- 2015 – present Reviewer for Discovery and Independent Investigator Awards for Peer-reviewed Medical Research Program, Congressionally Directed Medical research Program, Department of Defense
- Ongoing Frequent reviewer for many journals including: *Journal of Neuroscience*, *Journal of Neurophysiology*, *Learning and Memory*, *European Journal of Neuroscience*, *PLOS One*, *Scientific Reports*, *Neuropharmacology*, *Cerebral Cortex*

Trainees

Current

- Greg Ordemann, graduate student UT Institute for Neuroscience
expected graduation: May 2021
- Lauren Hewitt, graduate student UT Institute for Neuroscience
expected graduation May 2022

Previous

- Federico Brandalise PhD, postdoctoral fellow (2017-2018)
current position Dept. Fundamental Neuroscience, University of Geneva
- Brain Kalmbach PhD, postdoctoral fellow (2015-2017)
current position Scientist II Allen Institute for Brain Science Postdoctoral Fellows
- Christopher Apgar, undergraduate student (2018-2020)
current position, Research Technician Max Plank Florida Institute for Neuroscience
- Michael Baumgartner, undergraduate student (2011-2014)
current position, PhD student Cellular and Molecular Medicine University of Bristol
- Arvin Akhavan MD, undergraduate student (2010-2012)
current position, Emergency Medicine Resident University of Washington

Administrative Activities

- 2018 – present Department of Neuroscience Faculty Awards Committee (UT)
- 2017 – present Member of the Graduate Curriculum Committee (UT)
- 2012 – present University of Texas Institutional Biosafety Committee
- 2005 – present Coordinator for Neurophysiology Journal Club (UT)

Teaching Activities

- 2019 – present Neurobiology Laboratory (NEU365L), UT-Austin
- 2015 – present Lecturer/coordinator for Principles of Neuroscience (NEU482T/383T), UT-Austin
- 2008 – 2017 Lecturer for Synaptic Physiology and Plasticity (NEU366D) UT-Austin
- 2000 – 2003 Small Group Leader for Synaptic Physiology, University of Maryland School of Medicine

- 1998 – 2001 Lecturer and Laboratory instructor for Anatomy and Physiology
Howard Community College, Columbia MD
- 1998 – 2001 Lecturer and Laboratory instructor General Biology
Howard Community College, Columbia MD
- 1996 – 1997 Graduate Teaching Assistant for Anatomy and Physiology and
General Biology, Department of Biology Florida Atlantic University

Other Research Activities

- 2018 Whitman Center Associate Marine Biological Laboratory, Woods Hole MA
- 1995 – 1997 Graduate Research Assistant, Dept. of Biology, Florida Atlantic University
- 1993 – 1994 Research Assistant, Dept. of Wildlife, University of Florida
- 1993 Research Assistant, Dept. of Zoology, University of Florida

Current Research Support

- Title: Physiological mechanisms underlying disrupted hippocampal function in Fragile X syndrome
- Role: Principal Investigator (multi-PI)
- Agency: NIMH (R56 MH125655) 11/16/2020 – 10/31/2022
- Goal: The objective of this proposal is to investigate the subcellular, cellular, circuit, and network mechanisms of social and spatial memory operations in the hippocampus are impaired in rodent models of Fragile X syndrome.
- Title: Hippocampal channelopathies in Fragile X Syndrome
- Role: Principal Investigator
- Agency: NIMH (R01/R56 MH100510) 12/05/2014 – 11/30/2020 (NCE)
- Goal: The objective of this proposal is to identify specific channelopathies associated with the behavioral phenotypes in FXS.

Pending Research Support

- Title: Control of hippocampal synaptic structure and function by the microRNA miR-324-5p
- Role: Principal Investigator (multi-PI)
- Agency: NIH
- Goal: The objective of this proposal is to identify the impact of microRNA signaling on neuronal structure, voltage-gated ion channels and synaptic plasticity.

Previous Research Support

- Title: Molecular Studies Investigating the Link between Dendritic mRNA Translation and Repression leading to Epilepsy in TSC
- Role: Collaborator (PI: Kimberley Raab-Graham)
- Agency: DOD 04/15/2014 - 04/14/2017
- Goal: Our long-term goal is to discover novel strategies to regulate mTOR activity by regulating its activity in a site-specific manner.