

Matthew C. Weston, Ph.D.

CURRICULUM VITAE

Position: Associate Professor
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EDUCATION

2004-2009	Baylor College of Medicine, Houston, TX	Ph.D. Neuroscience
1993-1997	University of Virginia, Charlottesville, VA	B.A. Echols Interdisciplinary Studies concentration in Writing, English, German

FACULTY POSITIONS HELD

Years	Institution	Academic Title	Department
2022-Present	Virginia Polytechnic Inst, Fralin Biomedical Research Institute	Associate Professor	School of Neuroscience
2015-2022	University of Vermont Burlington, VT	Assistant Professor	Neurological Sciences

OTHER POSITIONS HELD

Years	Institution	Role
2010-2015	Baylor College of Medicine Neurological Research Institute Houston, TX	Postdoctoral Fellow
2009-2010	Baylor College of Medicine Department of Neuroscience Houston, TX	Postdoctoral Associate
2004-2009	Baylor College of Medicine Department of Neuroscience Houston, TX	Graduate Student
2001-2004	University of Virginia Department of Pharmacology Charlottesville, VA	Laboratory Specialist

HONORS AND AWARDS

Year	Name of Award
2005	Professor John J. Trentin Scholarship award for Outstanding Coursework

2007-2008	Rush and Helen Record Neuroscience Fellowship for Outstanding Graduate Student at Baylor College of Medicine
2011	Coming Together on Epilepsy Genetics Meeting, Travel Award Jackson Labs, Bar Harbor, ME
2010-2012	Fellow, NIH-NINDS Brain Disorders and Development Training Grant
2013-2014	Epilepsy Foundation Postdoctoral Research Fellowship
2014	American Epilepsy Society Young Investigator Workshop Invited Speaker and Travel Award
2014	Citizens United for Research in Epilepsy (CURE) Young Investigator Travel Award GRC
2014	K99 Pathway to Independence Award, NIH/NINDS

RESEARCH AND SCHOLARLY ACTIVITIES

RESEARCH AWARDS AND GRANTS

Ongoing Research Support

R01 NS130042 10/01/2022 -09/30/2027
 “Cell type-specific roles of the sodium-activated potassium current in KCNT1-related epilepsy”
 Role: PI

R01 NS110945 03/01/2019 -02/28/2024
 “Synaptic changes and hypersynchronous network activity in mTORopathies”
 Role: PI

R01 NS031348 08/01/2021 -07/30/2026
 “Genetic Determinants of Epilepsy in Murine Systems”
 Role: Subcontract PI: Dr. Wayne Frankel

R01MH097949 04/01/2022 -03/31/2027
 “The impact of PTEN signaling on neuronal form and function”
 Role: Subcontract PI: Dr. Bryan Luikart

PTEN Research Foundation 11/01/2022 -10/30/2024
 “PTEN Loss Increases Neuronal Burst Firing and Seizures Independently of mTOR”
 Role: Multi-PI

Completed Research Support

K99/R00 Pathway to Independence, NIH/NINDS 05/01/2014 - 04/31/2019
 K99 NS087095
 “Regulation of Synapse and Network Dynamics by mTOR”
 Role: PI

Epilepsy Foundation Individual Postdoctoral Fellowship 01/01/2013 - 01/01/2014
 “Development of a Two-Neuron Microcircuit System to Investigate Pre- and Postsynaptic Dynamics in a Genetic Model of Epilepsy”
 Role: PI

T32 NS 43124 NIH – NINDS 07/01/10 – 06/30/12
 “Multidisciplinary Training in Brain Disorders and Development”
 Role: Trainee

SCHOLARSHIP

Original Research

1. Guyenet PG, Sevigny CP, **Weston MC**, Stornetta RL (2003). Neurokinin-1 receptor-expressing cells of the ventral respiratory group are functionally heterogeneous and predominantly glutamatergic. Journal of Neuroscience. 22, 3806-16
2. Stornetta RL, Rosin DL, Wang H, Sevigny CP, **Weston MC**, Guyenet PG (2003). A group of glutamatergic interneurons expressing high levels of both neurokinin-1 receptors and somatostatin identifies the region of the pre-Botzinger complex. Journal of Comparative Neurology. 455, 499-512.
3. Rosin DL, **Weston MC**, Sevigny CP, Stornetta RL, Guyenet PG (2003). Hypothalamic orexin (hypocretin) neurons express vesicular glutamate transporters VGLUT1 or VGLUT2. Journal of Comparative Neurology. 465, 593-603.
4. Wang H, **Weston MC**, McQuiston TJ, Stornetta RL, Guyenet PG (2003). Neurokinin-1 receptor-expressing cells regulate depressor region of rat ventrolateral medulla. American Journal of Physiology Heart Circ Physiol. 285, H2757-69.
5. **Weston M**, Wang H, Stornetta RL, Sevigny CP, Guyenet PG (2003). Fos expression by glutamatergic neurons of the solitary tract nucleus after phenylephrine-induced hypertension in rats. Journal of Comparative Neurology. 460, 525-41.
6. **Weston MC**, Stornetta RL, Guyenet PG (2004). A neuronal projection from the marginal layer of the medulla oblongata to respiratory centers in rats. Journal of Comparative Neurology. 473, 73-85.
7. Mulkey DK, Stornetta RL, **Weston MC**, Simmons JR, Parker A, Bayliss DA, Guyenet PG (2004). Respiratory control by ventral surface chemoreceptor neurons in rats. Nature Neuroscience. 7, 1360-9.
8. **Weston MC**, Gertler C, Mayer ML, Rosenmund C (2006). Interdomain interactions in AMPA and kainate receptors regulate affinity for glutamate. Journal of Neuroscience. 26, 7650-8
9. Moechars D*, **Weston MC***, Leo S*, Callaerts-Vegh Z, Goris I, Daneels G, Buist A, Cik M, van der Spek P, Kass S, Meert T, D'Hooge R, Rosenmund C, Hampson RM (2006). Vesicular glutamate transporter VGLUT2 expression levels control quantal size and neuropathic pain. Journal of Neuroscience. 26, 12055-66.
10. **Weston MC**, Schuck P, Ghosal A, Rosenmund C, Mayer ML (2006). Conformational restriction blocks glutamate receptor desensitization. Nature Structural and Molecular Biology. 13, 1120-7.
11. Albright MJ, **Weston MC**, Inan M, Rosenmund C, Crair MC (2007). Increased thalamocortical synaptic response and decreased layer IV innervation in GAP-43 knockout mice. Journal of Neurophysiology. 98, 1610-25.
12. Martens H, **Weston MC**, Boulland JL, Grønborg M, Grosche J, Kacza J, Hoffmann A, Matteoli M, Takamori S, Harkany T, Chaudhry FA, Rosenmund C, Erck C, Jahn R, Härtig W (2008). Unique luminal localization of VGAT-C terminus allows for selective labeling of active cortical GABAergic synapses. Journal of Neuroscience. 28, 13125-31.

13. Chaudhry C*, **Weston MC***, Schuck P, Rosenmund C, Mayer ML (2009). Stability of ligand-binding domain dimer assembly controls kainate receptor desensitization. EMBO Journal. 28, 1518-30.
14. **Weston MC**, Nehring RB, Wojcik SM, Rosenmund C (2011). Interplay between VGLUT isoforms and Endophilin A1 regulates neurotransmitter release and short-term plasticity. Neuron 69,1147-59.
15. **Weston MC**, Chen H, Swann JW (2012). Multiple roles for mTOR signaling in both glutamatergic and GABAergic synaptic transmission. Journal of Neuroscience. 32,11441-52.
16. **Weston MC**, Chen H, Swann JW (2014). Loss of mTOR repressors Tsc1 or Pten has divergent effects on excitatory and inhibitory synaptic transmission in single hippocampal neuron cultures. Frontiers in Molecular Neuroscience. 7:1. doi: 10.3389/fnmol.2014.
17. Shore AN, Chang CH, Kwon OJ, **Weston MC**, Zhang M, Xin L, Rosen JM. (2015) PTEN is required to maintain luminal epithelial homeostasis and integrity in the adult mammary gland. Developmental Biology 409(1):202-17. doi: 10.1016/j.ydbio.2015.10.023.
18. John Lin CC, Yu K, Hatcher A, Huang TW, Lee HK, Carlson J, **Weston MC**, Chen F, Zhang Y, Zhu W, Mohila CA, Ahmed N, Patel AJ, Arenkiel BR, Noebels JL, Creighton CJ, Deneen B. (2017) Identification of Diverse Astrocyte Populations and their Malignant Analogs. Nature Neuroscience. Mar;20(3):396-405. doi: 10.1038/nn.4493
19. Barrows CM, McCabe MP, Chen H, Swann JW, **Weston MC**. (2017) Hyperactivation of mTOR via Pten loss increases the connectivity of fast synaptic motifs and synchrony in a developing hippocampal network. Journal of Neuroscience. Sep 6;37(36):8595-8611. doi: 10.1523/JNEUROSCI.0878-17.2017.
20. McCabe MP, Cullen ER, Barrows CM, Shore AN, Tooke KI, **Weston MC** (2020) mTORC1 and mTORC2 regulate distinct aspects of glutamatergic synaptic transmission. eLife 2020;9:e51440 doi: 10.7554/eLife.51440. PMID: 32125271
21. Sah M, Shore AN, Petri S, Kanber A, Yang M, **Weston MC**, Frankel WN. (2020) Altered excitatory transmission onto hippocampal interneurons in the IQSEC2 mouse model of X-linked neurodevelopmental disease. Neurobiology of Disease. Apr;137:104758.
22. Shore AN, Columbo S, Tobin WF, Petri S, Cullen ER, , Bostick C, Peng Y, Beaumont MA, Williams D, Yang M, Boland MJ, Goldstein DB, Frankel WN, **Weston MC**. (2020) Reduced GABAergic neuron excitability, altered synaptic connectivity, and seizures in a KCNT1 gain-of-function mouse model of childhood epilepsy. Cell Reports. 33: 108303.
23. McCabe MP, Shore AN, Frankel WN, **Weston MC**. (2021) Altered fast synaptic transmission in a mouse model of DNMT1-associated developmental epileptic encephalopathy. eNeuro. Mar 10;8(2):eNEURO.0269-20.2020.
24. Tobin WF, **Weston MC**. (2021) Excess interictal activity marks seizure prone cortical areas and mice in a genetic epilepsy model. bioRxiv. doi: <https://doi.org/10.1101/2021.12.23.473545>

25. Tariq K, Cullen E, Getz SA, Conching AK, Goyette AR, Prina ML, Wang W, Li M, **Weston MC**, Luikart BW. (2022) Disruption of mTORC1 rescues neuronal overgrowth and synapse function dysregulated by Pten loss. Cell Reports. Nov 1;41: 111574.
26. Cullen ER, Tariq K, Shore AN, Luikart BW, **Weston MC**. (2022) mTORC2 inhibition improves morphological effects of PTEN loss, but does not correct synaptic dysfunction or prevent seizures. Journal of Neuroscience. Dec 16. doi: 10.1523/JNEUROSCI.1354-22.2022. Epub ahead of print. PMID: 36526374.

Review Articles

1. McCabe MP and **Weston MC**. Riding the Calcium Wave to a Better Understanding of Ictal Events. (2016), Epilepsy Currents. Sep-Oct;16 (5):333-334.
2. **Weston M**. Putting the Horse Before the Cart: Looking to Presynaptic Mechanisms in Genetic Models. (2016) Epilepsy Currents. Jul-Aug;16(4):266-7. doi: 10.5698/1535-7511-16.4.266.
3. **Weston M**. The Dynamics of Excitation and Inhibition Govern Epileptic Encephalopathies and Their Comorbidities. (2016) Epilepsy Currents. May-Jun;16(3):172-3. doi: 10.5698/1535-7511-16.3.172.
4. **Weston MC**. *GRIN* and Bear the Diverse Functional Effects of Rare NMDA Receptor Variants. (2017) Epilepsy Currents. Nov-Dec;17(6):381-383. doi: 10.5698/1535-7597.17.6.381.
5. **Weston MC**. Two Targets Are Better Than One: A New Strategy to Increase the Specificity of Anti-Epileptic Drugs. (2017) Epilepsy Currents. Jul-Aug;17(4):235-236. doi: 10.5698/1535-7597.17.4.235.
6. Tobin WF and **Weston MC**. Focusing on the Big Picture: Induced Focal Seizures Propagate Along Synaptic Pathways. (2018) Epilepsy Currents. 2018 Jan-Feb;18(1):47-48. doi: 10.5698/1535-7597.18.1.47
7. **Weston M**. Trading up to a New Model of *STXBPI*-Encephalopathy. (2018) Epilepsy Currents. Jul-Aug;18(4):257-259. doi: 10.5698/1535-7597.18.4.257.
8. **Weston M**. Jumping to Conclusions About Focal Seizure Spread. (2019) Epilepsy Currents. Nov-Dec;18(6):394-395. doi: 10.5698/1535-7597.18.6.394.
9. **Weston M**. Getting Sucker Punched by *Depdc5* Really Hurts. (2020) Epilepsy Currents. Sep 14;20(6):378-380. doi: 10.1177/1535759720956992.
10. **Weston MC**. The Heated Relationship Between Neural Activity and Seizures. (2020) Epilepsy Currents. Dec 8;21(1):62-63. doi: 10.1177/1535759720976371.
11. **Weston MC**. A tRNA Variant Translates Into Seizure Resistance. (2021) Epilepsy Currents. Jan 29;21(2):126-128. doi: 10.1177/1535759721990043

Books and Chapters

Potassium Channels in Epilepsy: A Functional Perspective. **Weston MC** and Tzingounis AV (2022) Jasper's Basic Mechanisms of the Epilepsies (5th Edition).

SELECTED PRESENTATIONS

November 2015	Scientific and Clinical Foundation for Precision Medicine in Epilepsy. “Pre- and postsynaptic contributions of hyperactive mTOR signaling to synaptic and microcircuit dysfunction.”	Cold Spring Harbor, NY
December 2015	University of Vermont, Department of Pharmacology “Regulation of Synaptic Transmission by mTORC1 and mTORC2.”	Burlington, VT
May 2016	University of Vermont, Neurology Grand Rounds “Pre- and postsynaptic contributions of hyperactive mTOR signaling to microcircuit dysfunction.”	Burlington, VT
June 2017	Dartmouth Medical School, Department of Molecular and Systems Biology. ““Synaptic dysfunction in genetic models of epilepsy”	Hanover, NH
December 2018	American Epilepsy Society Annual Meeting “Altered synaptic transmission in genetic models of mTOR dysfunction.”	New Orleans, LA
December 2019	American Epilepsy Society Annual Meeting “Interneuron dysfunction and synaptic reorganization underly cortical hyperexcitability in a precision genetic K ⁺ channel GOF model of neurodevelopmental disease.”	Baltimore, MD
August 2020	Targeted Therapies for Neurodevelopmental Disorders “Interneuron dysfunction and synaptic reorganization and seizures in a precision genetic K ⁺ channel GOF model of neurodevelopmental disease.”	Virtual Symposium organized by Children's Hospital of Philadelphia
December 2021	Lennox Gastaut Syndrome Foundation Symposium “Mechanisms of inhibitory neuron failure in DNMI-related DEE.”	Chicago, IL
December 2021	American Epilepsy Society Annual Meeting “Synaptic reorganization in a new mouse model of an mTORopathy, biallelic <i>Szt2</i> loss.”	Chicago, IL
January 2022	Fralin Biomedical Research Institute	Roanoke, VA

	“K ⁺ Channel Gain-of -function in Epilepsy: From Currents to Networks”	
October 2022	University of Connecticut “K ⁺ Channel Gain-of -function in Epilepsy: From Currents to Networks”	Storrs, Connecticut
November 2022	Cincinnati Children’s Hospital “Synaptic mechanisms underlying network hyperexcitability in seizure disorders caused by mTOR hyperactivation.”	Cincinnati, OH
November 2022	KCNT1 Epilepsy Foundation Scientific Conference “Cellular and network insights into KCNT1-related epilepsy from mouse models.”	Virtual
International		
August 2016	Gordon Research Conference Poster Presentation: “Genetic Inactivation of mTORC1, but not mTORC2, rescues the synaptic effects of Pten loss.”	Girona, Spain
October 2020	University College London Experimental Epilepsy Seminar “K ⁺ Channel Gain-of -function in Epilepsy: From Currents to Networks”	London, England

PROFESSIONAL SERVICE

DEPARTMENTAL SERVICE

Years	Department	
2016-2017	UVM, Neurological Sciences	Grand Rounds Selection Committee
2022	UVM, Neurological Sciences	Tenure Track Faculty Search Committee
2022	FBRI, School of Neuroscience	Tenure Track Faculty Search Committee

COLLEGE SERVICES

2015-2017	University of Vermont	Neuroscience Graduate Program Admissions Committee
2018-2022	University of Vermont	Chair, Neuroscience Graduate Program Admissions Committee

MEDICAL CENTER SERVICE

2019-2022	Larner College of Medicine	Internal Grant Review Study Section
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PUBLIC SERVICE

2020-present	KCNT1 Epilepsy Foundation	Scientific Advisory Board
September 2021	Lennox Gastaut Syndrome Foundation	“Meeting of the Minds” panelist

SOCIETY MEMBERSHIPS

2004-present	Society for Neuroscience
2012-present	American Epilepsy Society
2020-2022	Treasurer, Society for Neuroscience, Vermont Chapter

SERVICE TO PROFESSIONAL ORGANIZATIONS

2017	NJ Governor's Council for Medical Research and Treatment of Autism	Grant Review
2019	Einstein Foundation, Berlin Germany	Grant Review
2020-2021	American Epilepsy Society	Vice Chair, Basic Mechanisms of Epilepsy Special Interest Group
2020-present	American Epilepsy Society	Early Career Grant review Committee.
2022	UK Medical Research Council	Grant Review
2021	Autism Speaks	Grant Review
2022	French Foundation for Epilepsy Research	Grant Review
2022	American Epilepsy Society	Chair, Basic Mechanisms of Epilepsy Special Interest Group
2022-present	American Epilepsy Society, NIH/NINDS	NIH/NINDS Benchmarks for Epilepsy Research Stewards Committee

SERVICE TO PROFESSIONAL PUBLICATIONS

2015-2021	<i>Epilepsy Currents</i>	Associate Editor
2015-present	<i>Scientific Reports, PLoS Genetics, Journal of Neuroscience, Progress in Neurobiology, Neuron, British Journal of Pharmacology, eNeuro and more.</i>	Peer Reviews

TEACHING

FORMAL SCHEDULED CLASSES

YEAR	COURSE TITLE	COURSE		HOURS	NUMBER OF LEARNERS	LEARNER LEVEL
		R	E			
2016-18	Neuropharmacology lecture series for Residents		X	10	15	Residents
2017-21	Cellular Neurophysiology		X	75	15	U,G

2018	Neurochemistry		X	75	8	U,G
2019-22	Neural Science	X		10	120	Medical Students

R-required; E-elective; Hours-approximate per semester; G-graduate studies (instruction as per the COM Teaching Academy Portfolio)

POSTGRADUATE AND OTHER COURSES

2010	Neurobiology Course, Woods Hole Marine Biological Laboratory	Teaching Assistant
2005	Integrative Neuroscience Course, Baylor College of Medicine	Teaching Assistant
1998-1999	Fulbright Scholar Teaching Fellow in Teterow, Germany	Teaching Fellow

PREDOCTORAL STUDENTS SUPERVISED OR MENTORED

DATES	NAME	PROGRAM SCHOOL	ROLE	CURRENT POSITION
Jan-Feb 2016	Megan Perkins	Neuroscience Graduate Program, UVM	Research Rotation Mentor	PhD.
Jan 2016-present	Patrick Mullins	Neuroscience Graduate Program, UVM	Research Rotation Mentor, Committee	Teaching Faculty, UVM
June-August 2016	Brianna Marsh	Neurological Sciences	SNURF Research Advisor	Unknown
July-Sept 2016	Katherine Tooke	Neuroscience Graduate Program, UVM	Research Rotation Mentor	Bioscience Writer, Palladian Partners
July-Sept 2016	Mahafuza Aktar	Neuroscience Graduate Program, UVM	Research Rotation Mentor	PhD Candidate, Psychology
May 2016 - Present	Willie Curry	Neuroscience Graduate Program, UVM	Thesis Committee Member	PhD.
Dec 2016 – July 2020	Matthew McCabe	Neuroscience Graduate Program, UVM	Thesis Advisor	Research Scientist, Q-State Biosciences
Jan 2017-May 2018	Anthony Spinella	Neuroscience, UVM	Undergraduate Honors Thesis Advisor	MD/PhD Candidate, Ohio State
Jan 2017-2018	Rose Warren	Bioengineering, UVM	Research Rotation Mentor	Undergraduate
June-August 2017	Gabriella Nisly	Neurological Sciences	SNURF Research Advisor	Undergraduate
May 2017 - Present	John McGinnis	Neuroscience Graduate Program, UVM	Thesis Committee Chair	Postdoc, Sanofi
Nov. 2017-May 2018	Lia Aftandilian	Biology, UVM	Research Rotation Mentor	Undergraduate
May 2017 – May 2019	Elise Prehoda	Neuroscience, UVM	Undergraduate Honors Thesis Advisor	MD Candidate UVM

Dec 2018 - Present	Adrian Dutkiewicz	Neuroscience Graduate Program, UVM	Thesis Committee Chair	Postdoc, Eurofins Scientific
May 2017 - Present	Erin Cullen	Neuroscience Graduate Program, UVM	Thesis Advisor	PhD, Postdoc, Columbia University
January 2019-present	Robert O'Connor	Neuroscience, UVM	Undergraduate research mentor	M.P.T. candidate
January 2019- July 2021	Joshua Powers	Computer Science, UVM	Thesis Committee Chair	Faculty, Milwaukee School of Engineering
January 2021-present	Pranav Mathkar	Neuroscience Graduate Program, UVM	Thesis Advisor	PhD Candidate
September 2022-present	Charlotte Madden	Neuroscience, Virginia Tech	Undergraduate research mentor	Undergraduate, Clinical Neuroscience, VT
January 2023-present	Pooja Kalathar	Neuroscience, Virginia Tech	Undergraduate research mentor	Undergraduate, Clinical Neuroscience, VT
January 2023-present	Hunter Dyche	Neuroscience, Virginia Tech	Undergraduate research mentor	Undergraduate, Computational Neuroscience, VT

POSTDOCTORAL FELLOWS AND RESIDENTS DIRECTLY SUPERVISED OR MENTORED

DATES	NAME	PROGRAM SCHOOL	ROLE	CURRENT POSITION
April 2017-present	Willie Tobin	Neurological Sciences	Postdoc Mentor	Postdoctoral Researcher