Matthew C. Weston, Ph.D.

**CURRICULUM VITAE**

**Position:** Assistant Professor

**Address:** Stafford Building, Room 118E

* + Department of Neurological Sciences
	+ Robert Larner, M.D. College of Medicine
	+ University of Vermont
	+ Voice: (802) 656-2828
	+ Email: mcweston@uvm.edu

**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**

2015-Present University of Vermont Assistant Professor Neurological Sciences

Burlington, VT

**OTHER POSITIONS HELD**

**Years Institution Role**

2010-2015 Baylor College of Medicine Postdoctoral Fellow

Neurological Research Institute

Houston, TX

2009-2010 Baylor College of Medicine Postdoctoral Associate

Department of Neuroscience

Houston, TX

2004-2009 Baylor College of Medicine Graduate Student

Department of Neuroscience

Houston, TX

2001-2004 University of Virginia Laboratory Specialist

Department of Pharmacology

Charlottesville, VA

**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 ACTIVITES**

RESEARCH AWARDS AND GRANTS

**Ongoing Research Support**

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”

PI: Dr. Wayne Frankel

Weston lab Role: To perform cellular electrophysiology experiments on 3 new mouse models with human variants that cause DEE.

**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

Mentor: John Swann

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

**Pending**

“The impact of PTEN signaling on neuronal form and function”

PI: Dr. Bryan Luikart. Scored 7th percentile.

Weston lab Role: To perform in vivo and in vitro electrophysiology experiments to investigate the effects of modulating Akt signaling on PTEN-induced seizures and synaptic alterations.

“The role of the hippocampal vasculature in vascular cognitive impairment and dementia”

PI: Dr. Abbie Chapman Johnson. Scored 9th percentile.

Weston lab role: To assist the PI in setting up in vivo optical measurements of neural activity in head-fixed mice.

SCHOLARSHIP

**Publications**

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 mTORC1 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**. Reduced GABAergic neuron excitability, altered synaptic connectivity, and seizures in a KCNT1 gain-of-function mouse model of childhood epilepsy. (2020) Cell Reports. 33: 108303.
23. McCabe MP, Shore AN, Frankel WN, **Weston MC**. (2021) Altered fast synaptic transmission in a mouse model of DNM1-associated developmental epileptic encephalopathy. eNeuro. Mar 10;8(2):ENEURO.0269-20.2020.
24. Tobin WF and Weston MC (2022) Excess interictal activity marks seizure prone cortical areas and mice in a genetic epilepsy model. BioRxiv. 2021.12.23.473545; doi: https://doi.org/10.1101/2021.12.23.473545

**Non-Peer Reviewed Publications**

Review Articles

1. McCabe MPand **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 *STXBP1*-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

12. Cullen ER and **Weston MC**. Glutamate’s Secret Interictal Life. (2021) Epilepsy Currents. 2021 Sep 17;21(6):460-462. doi: 10.1177/15357597211043728.

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) In press.

SELECTED PRESENTATIONS

**Regional**

|  |  |  |
| --- | --- | --- |
| 2016 | UVM Pharmacology Department Seminar “Pre- and postsynaptic contributions of hyperactive mTOR signaling to microcircuit dysfunction.” | Burlington, VT |
| 2016 | UVM Neurological Sciences Grand Rounds “Pre- and postsynaptic contributions of hyperactive mTOR signaling to microcircuit dysfunction.” | Burlington, VT |

**National**

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| 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 |
| November 2016 | Society for Neuroscience Annual Meeting **“**Poster Presentation: Regulation of Synaptic Transmission by mTORC1 and mTORC2.**”** | San Diego, CA |
| June 2017 | Dartmouth Medical School“"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 |
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| 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 |
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| 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 DNM1-related DEE.” | Chicago, IL |
| December 2021 | American Epilepsy Society Annual Meeting“Synaptic reorganization in a new mouse model of an mTORopathy, biallelic *Szt2* loss.” | Chicago, IL |

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| January 2022 | Fralin Biomedical Research Institute, Virginia Tech“K+ channel gain of function in epilepsy-from currents to networks.” | Roanoke, VA |

**International**

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| 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

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| **Years** | **Department** |  |  |
| 2016-2017 | Neurological Sciences |   | Grand Rounds Selection Committee  |

COLLEGE SERVICES

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

MEDICAL CENTER SERVICE

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| 2019-present | Larner College of Medicine | Internal Grant Review Study Section |

PUBLIC SERVICE

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| 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-presentAmerican Epilepsy Society

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| 2020-present Society for Neuroscience, Vermont Chapter Treasurer  |

SERVICE TO PROFESSIONAL ORGANIZATIONS

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| --- | --- | --- |
| 2017 | NJ Governor’s Council for Medical Research and Treatment of Autism | Grant Review |

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| 2019 | Einstein Foundation, Berlin Germany  | Grant Review |

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| 2020-2021 | American Epilepsy Society  | Vice Chair, Basic Science SIG |
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| 2020-present | American Epilepsy Society  | Early Career Grant review Committee. |
| 2022 | Autism Speaks | Postdoctoral Fellowship Review Committee |
| 2022 | United Kingdom Medical Research Council  | Ad hoc grant review |

SERVICE TO PROFESSIONAL PUBLICATIONS

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| --- | --- | --- |
| 2015-Present | *Epilepsy Currents* | Associate Editor |
| 2015-present |  *Scientific Reports, PLoS Genetics, Journal of Neuroscience, Progress in Neurobiology, Neuron, British Journal of Pharmacolgy and more.* | Peer Reviews |
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**TEACHING**

 FORMAL SCHEDULED CLASSES

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| **YEAR** | **COURSE TITLE** | **COURSE****R E** | **HOURS** | **NUMBER OF LEARNERS** | **LEARNER****LEVEL** |
| 2016/17 | 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 |
| 2019-21 | 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

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| **DATES** | **NAME** | **PROGRAM SCHOOL** | **ROLE** | **CURRENT POSITION** |
| Jan-Feb 2016 | Megan Perkins | Neuroscience Graduate Program | Research Rotation Mentor | PhD Candidate |
| Jan 2016-present | Patrick Mullins | Neuroscience Graduate Program | Research Rotation Mentor,Committee  | Teaching Faculty,UVM |
| June-August 2016 | Brianna Marsh | Neurological Sciences | SNURF Research Advisor | Undergraduate |
| July-Sept2016 | Katherine Tooke | Neuroscience Graduate Program | Research Rotation Mentor | Bioscience Writer,Palladian Partners |
| July-Sept2016 | Mahafuza Aktar | Neuroscience Graduate Program | Research Rotation Mentor | PhD Candidate, Pshychology |
| May 2016 - Present | Willie Curry | Neuroscience Graduate Program  | Thesis Committee Member | PhD. |
| Dec 2016 – July 2020 | Matthew McCabe | Neuroscience Graduate Program | **Thesis Advisor** | Research Scientist, Q-State Biosciences |
| Jan 2017- May 2018 | Anthony Spinella | Neuroscience | Undergraduate Honors Thesis Advisor | MD/PhD Candidate, Ohio State |
| Jan 2017-2018 | Rose Warren | Bioengineering | Research Rotation Mentor | Undergraduate |
| June-August 2017 | Gabriella Nisly | Neurological Sciences | SNURF Research Advisor | Undergraduate |
| May 2017 - Present | John McGinnis | Neuroscience Graduate Program | Thesis Committee Chair | Postdoc, Sanofi |
| Nov. 2017-May 2018 | Lia Aftandilian | Biology | Research Rotation Mentor | Undergraduate |
| May 2017 – May 2019 | Elise Prehoda | Neuroscience | Undergraduate Honors Thesis Advisor | MD Candidate UVM |
| Dec 2018 - Present | Adrian Dutkiewicz | Neuroscience Graduate Program | Thesis Committee Chair | Postdoc,Eurofins Scientific |
| May 2017 - Present | Erin Cullen | Neuroscience Graduate Program | **Thesis Advisor** | PhD Candidate |
| January 2019-present | Robert O’Connor | Neuroscience | Undergraduate research mentor | M.P.T. candidate |
| January 2019- July 2021 | Joshua Powers | Computer Science | Thesis Committee Chair | Faculty, Milwaukee School of Engineering |
| January 2021-present | Pranav Mathkar | Neuroscience Graduate Program | **Thesis Advisor** | PhD Candidate |

POSTDOCTORAL FELLOWS AND RESIDENTS DIRECTLY SUPERVISED OR MENTORED

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