CURRICULUM VITAE

Colleen Marie (Burns) Niswender

Associate Professor of Pharmacology
Warren Director of Molecular Pharmacology
Warren Center for Neuroscience Drug Discovery

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Education

1986-1987	Undergraduate, University of Akron, Akron, Ohio
1987-1991	Undergraduate, University of Toledo, Toledo, Ohio
1991	B.S., Pharmacy with Honors in Pharmacology, University of Toledo, Toledo, Ohio
1991-1996	Graduate Student, Pharmacology, Vanderbilt University
1996	Ph.D., Pharmacology, Vanderbilt University

Professional Training and Experience

1996-1998	Postdoctoral Fellow, Pharmacology, Vanderbilt University
1998-2003	Senior Fellow, Pharmacology, University of Washington
2003-2004	Acting Instructor, Pharmacology, University of Washington
2004-2009	Research Assistant Professor, Pharmacology, Vanderbilt University Co-Director, Molecular Pharmacology, Vanderbilt Program in Drug Discovery
2009-present	Research Associate Professor, Pharmacology, Vanderbilt University Director, Molecular Pharmacology, Vanderbilt Center for Neuroscience Drug Discovery
2017-2020	Research Professor, Pharmacology, Vanderbilt University Director, Molecular Pharmacology, Vanderbilt Center for Neuroscience Drug Discovery
2020-2021	Research Professor, Pharmacology, Vanderbilt University Warren Director (endowed), Molecular Pharmacology, Warren Center for Neuroscience Drug Discovery
2021-present	Associate Professor, tenure-track, Pharmacology, Vanderbilt University Warren Director (endowed), Molecular Pharmacology, Warren Center for Neuroscience Drug Discovery

Professional Organizations

1991-1996	Phi Kappa Phi
1991-1998, 2006-present	Society for Neuroscience
2007-present	American Society for Pharmacology and Experimental Therapeutics
2012-present	rettsyndrome.org
2013-2018	Member, Academic Drug Discovery Consortium
2018-2020	Board member, Academic Drug Discovery Consortium

2016-present Executive Board member, Secretary, Academic Drug Discovery Consortium (moving to President in 2022)

Professional Activities-Intramural

Current Committee Membership

- Vanderbilt Kennedy Center Science Day Planning Committee, 2021
- Dean's Committee on Financial Tools
- Vanderbilt Institute for Clinical and Translational Research, Accelerating Drug Discovery Repurposing Incubator
- Faculty Senate, Basic Sciences Representative
- Medical Scientist Training Program Admission Subcommittee Member
- Diversity, Equity, and Inclusion Committee Member

Other intramural activities

- Interviewer for Interdisciplinary Graduate Program, Medical Scientist Training Program, Quantitative Cellular Biology Program, 2011-present
- Grant reviewer: Pilot and Feasibility Awards program, Vanderbilt University for Obesity and Metabolism, 2013
- NRSA reviewer for students in Pharmacology Communications class PHAR 8328
  -Krystian Kozek, 2015
  -Oakleigh Folkes, 2016
  -Mabel Seto, 2017
  -Bretton Nabit, 2020
- MSTP Second Look Day Speaker, "Introduction to the Vanderbilt Center for Neuroscience Drug Discovery: Case Study in Rett Syndrome", Vanderbilt University, April 7, 2017.
- Blog post, "Stealing Magnolias", for Pharmacology Diversity, Equity, and Inclusion blog, 2020 regarding life as a scientist with Type I diabetes
-Reviewer of applications for Vanderbilt Summer Science Academy, 2021
-Representative for Research Faculty at the Vanderbilt Liaison Committee for Medical Education site visit, February, 2021
- Interviewer, Psychiatry Department Residency Recruitment, 2021
- Participation in Faculty Workshop to Support Student Mental Health and Awareness, January 19, 2021
- Colleen Niswender lab presentation, Interdisciplinary Graduate Program introduction to pharmacology labs (selected for presentation among faculty)

Mentoring Professional Activities

-Participation in Research Track Faculty lunch seminar to provide feedback to VU (hosted by Alyssa Hasty, October 10, 2018)
-Participation in Workshop to craft an IMSD personal mentoring and diversity statement, October 15, 2019
-Participation in Faculty Workshop to Support Student Mental Health and Awareness, January 19, 2021
- Participant in Culturally Aware Mentoring workshop, December, 2021

Professional Activities-Extramural

Editorial position

- Special Guest Editor, Neuropharmacology, "The Synaptic Basis of Neurodegeneration", 2013

Meeting planning and session chairs

- Co-organizer, Academic Drug Discovery Conference, Nashville TN, October 9-11, 2013.
- Co-chair of Autism Spectrum Disorders Speaking Session, 9th International Meeting on Metabotropic Glutamate Receptors, 2017
- Co-chair of mGlu7-Focused Speaking Session, 10th International Meeting on Metabotropic Glutamate Receptors, 2021

Grant reviews

- Melanoma Research Foundation, 2006
- Michael J. Fox Foundation, 2009, 2013
- Parkinson's Disease Society of the United Kingdom, 2010
- Ontario Mental Health Foundation, 2011
- Multiple Sclerosis Fast Forward Foundation, 2012
- NIH EUREKA program, 2013
- Trailblazer Award, Autism Speaks, 2014
- IWT, Belgian Grant Foundation, 2014
- Meixner Postdoctoral Fellowship Program, Autism Speaks, 2014, 2015, 2016
- German Research Foundation, 2019
- Sapenzia, University of Rome Funding Call, 2020

Manuscript reviews

- Journal of Neurochemistry, 2006
- Molecular Pharmacology, 2007, 2009, 2010, 2012, 2014, 2018
- Neuropharmacology, 2008, 2010, 2012, 2014, 2018, 2020
- ACS Chemical Neuroscience, 2009, 2012, 2017, 2020
- Journal of Neuroscience, 2009
- Journal of Pharmacology and Experimental Therapeutics, 2009, 2014
- British Journal of Pharmacology, 2009, 2010
- Neuroscience, 2010, 2020
- Nature Protocols, 2011
- Journal of Biological Chemistry, 2011
- Proceedings of the National Academy of Sciences, 2011
- The International Journal of Neuropsychopharmacology, 2011
- Expert Opinion on Drug Discovery, 2012
- Pharmacology, Biochemistry, and Behavior, 2012
- Neuropharmacology, 2012, 2015, 2016, 2017
- Frontiers in Neural Circuits, 2016
- Journal of Medicinal Chemistry, 2017, 2018

- Journal of Affective Disorders, 2017
- International Journal of Biological Sciences, 2017
- Neuropsychopharmacology, 2017, 2018
- Journal of Physiology, 2019
- ACS Pharmacology and Translational Science, 2020
- Cell Reports, 2020
-Nature Communications 2021
-Orphanet Journal of Rare Diseases, 2021

Outside PhD thesis review

- Ee Von Moo, "Novel modes of targeting muscarinic acetylcholine receptors", Monash University

Teaching Activities

- Discussion leader for Interdisciplinary Graduate Program Core Course. Kim et al., 2001, J. Biol. Chem. "*The role of phosphorylation in D1 dopamine receptor desensitization",* 2006 and 2008.
- Lecturer in Neuroscience 345 Course. *"Neuromodulation and metabotropic glutamate receptors",* 2007 and 2008.
- Discussion leader in Neuroscience 345 Course. Sansig et al., 2001, J. Neuroscience. *"Increased seizure susceptibility in mice lacking metabotropic glutamate receptor 7",* 2007.
- Discussion leader for Interdisciplinary Graduate Program Core Course. Ross et al., 1978 J. Biol. Chem. "*Reconstitution of hormone-sensitive adenylate cyclase activity with resolved components of the enzyme",* 2007.
- Discussion leader in Neuroscience 345 Course. Volk et al., 2007, J. Neuroscience. *"Multiple Gq coupled receptors converge on a common protein synthesis-dependent long term-depression that is affected in fragile X mental retardation",* 2008.
- Lecturer, Modern Drug Discovery Course. "*$mGlu_4$ positive allosteric modulators for the treatment of CNS disorders*". Vanderbilt University, 2012, 2013, 2014, 2015, 2019.
- Lecturer, Neuroscience 235 Course. "*Drug Discovery in Academia: mGlu4 positive allosteric modulators for the treatment of CNS disorders*". Vanderbilt University, 2013, 2014, 2015, 2016.
-Lecturer, Pharmacology and Drug Discovery Course, *"Receptors in Action",* Vanderbilt University, August 2021
-Lecturer, Scientific Communications, "*Crafting Specific Aims*", Vanderbilt University, September 2021

Consultancies

- Appello Pharmaceuticals, 2018-present

Honors, Leadership, and Distinctions

- Valedictorian, College of Pharmacy, University of Toledo, 1991
- Phi Kappa Phi Graduate Fellowship, 1991
- AAPS-AFPE Gateway Scholarship, 1991
- The Merck-Sharp and Dohme Award in Medicinal Chemistry, 1991
- The Upjohn Award in Pharmacology, 1991
- The SmithKline Beecham Award in Clinical Pharmacy, 1991
- First Place, Vanderbilt University Graduate Student Research Day, 1993
- First Place, Vanderbilt University Graduate Student Research Day, 1993
- Grass Foundation Fellowship to attend "Neurobiology of Human, 1995

Neurological Disease: Mechanisms of Neurodegeneration", Cold Spring Harbor Laboratory
- Travel award to "Obesity and the Regulation of Energy Homeostasis", Keystone Symposium, Taos, NM, 2000
- WCNDD Team Member contributing to writing and successful Investigational New Drug Application petition to the FDA for VU0467319, currently in Phase 1 clinical trials, licensed to Acadia Pharmaceuticals, May 2020.
- WCNDD Team Member contributing to writing and successful Investigational New Drug Application petition to the FDA for VU6011472, slated to begin clinical trials January 2021
-Boehringer-Ingelheim mGlu3 positive allosteric modulator program for improvement of cognition impairments in schizophrenia has achieved "Start of Lead Op" designation with a funding extension to WCNDD team-fastest declaration of a program for this status in company's history
- ASPET Scientific Achievement in Drug Discovery and Development, January 2022

Research Supervision

I began independently training students, postdoctoral fellows, and research faculty in 2009. Vanderbilt policy is that Research-level faculty must have a tenure-track faculty member serve as a co-mentor; for the individuals listed below, however, I served/serve as either the primary mentor or on thesis committees. Prior to this point, I functioned primarily within the drug discovery group but also served as a "nonofficial" mentor and advisor to many of Dr. Jeff Conn's trainees.

Faculty

Rocco Gogliotti	Vanderbilt University Pharmacology Postdoctoral Fellow (2012-2016), moved to Research Instructor in 2016, to Research Assistant Professor in 2017. Current position, Assistant Professor, tenure track, Loyola University.
Sarika Peters	Vanderbilt University, Department of Pediatrics, Vanderbilt Kennedy Center Associate Professor with tenure. Mentoring committee member.

Postdoctoral Fellows

Thomas Utley	Vanderbilt University pharmacology postdoctoral fellow (2010-2012). Current position, Licensing Agent, Vanderbilt Center for Technology Transfer office.
Julie Roper-Field	Vanderbilt University pharmacology postdoctoral fellow (2010-2012). Current position, Project Manager, VICTR and CTSA Consortium Coordinating Center, Vanderbilt University Medical Center.
Nidhi Jalan-Sakrikar	Vanderbilt University pharmacology postdoctoral fellow (2012-2014). Current position, Assistant Professor, Mayo Clinic.
Branden Stansley	Vanderbilt University pharmacology postdoctoral fellow (2015-2019), awarded T32 postdoctoral training award and an F32 NRSA, June 2016. Current position, Medical Liaison, Biogen.
Xia Lei	Vanderbilt University pharmacology postdoctoral fellow (2020-present).
Geanne Freitas	Vanderbilt University pharmacology postdoctoral fellow, (2021-present).

Graduate Students

Shen Yin	Vanderbilt University Interdisciplinary Graduate Student, Pharmacology. Primary mentor with Jeff Conn as co-mentor, Graduation, 10/2013. Current position, Senior Clinical Scientist, Genentech.
Rebecca Klar Senter	Vanderbilt University Interdisciplinary Graduate Student, Pharmacology. Primary mentor with Jeff Conn as co-mentor. Graduation, 7/2015. Current position, Associate Director, Non-clinical and Translational Research, Flexion Therapeutics.
Annah Moore	Vanderbilt University Department of Pharmacology. Co-mentor with Dr. David Sweatt from 4/2017-11/2018. Graduation, 10/2020. Current position: Health Data Science Fellow, Insight Data Science.
Nicole Fisher	Vanderbilt University Interdisciplinary Graduate Student, Pharmacology. Primary mentor with Jeff Conn as co-mentor. Graduation 10/2020. Current position: 1/1/2021: Postdoctoral Fellow with Dr. Mark von Zostrow, UCSF.
Christopher Hofmann	Vanderbilt University Interdisciplinary Graduate Student, Pharmacology. Primary mentor with C. David Weaver as co-mentor. Graduation 08/2021. Currently Medical Writer at Scientific Pathways.
Sheryl Vermudez	Vanderbilt University Interdisciplinary Graduate Student. Primary mentor with Jeff Conn as co-mentor. Member of Initiative to Maximize Student Diversity. Defense 12/9/2021.

Graduate Student/MSTP Student Thesis Committees

Olivia Veatch	Vanderbilt University genetics graduate student, Johnathan Haines Lab. Thesis committee member, Graduation 8/2013. "Identifying biological pathways implicated in defined subgroups of phenotypic expression for autism spectrum disorders." Current position, Research Instructor in Neurology, Vanderbilt Kennedy Center.
Rachel Crouch	Vanderbilt University pharmacology graduate student, Scott Daniels' Lab. Co-chair of thesis committee. Graduation, 11/2016. Current position, Assistant Professor, Lipscomb University.
Nick Harris	Vanderbilt University Molecular Physiology and Biophysics MD/PhD Student, Danny Winder Lab. Thesis committee member. Graduation, 08/2018. Current position, MSTP student, Vanderbilt University Medical Center.
Christian Marks	Vanderbilt University Molecular Physiology and Biophysics Graduate Student, Roger Colbran Lab. Thesis committee member. Graduation, 05/2019. Current position, Health Policy Analyst, GCS Administrators.

Mark Fulton — Vanderbilt University Department of Chemistry, Craig Lindsley Lab. Thesis committee member, Graduation 06/2019. Current position, postdoctoral fellow, Harvard University.

Carson Reed — Vanderbilt University Department of Chemistry, Craig Lindsley Lab. Thesis committee member. Graduation, 06/2019. Current position, Drug Discovery Scientist, Warren Center for Neuroscience Drug Discovery, Vanderbilt University.

Sean Moran — Vanderbilt Neuroscience Graduate Student, P. Jeffrey Conn laboratory, thesis committee member. Graduation 5/2020. Current position: postdoctoral fellow at Broad Institute.

Bridget Collins — Vanderbilt University School of Medicine, MTSP student, Jeffrey Neul laboratory, thesis committee (current).

Jacob Kalbfleisch — Vanderbilt University Department of Chemistry, Craig Lindsley Lab. Thesis committee member (current).

Medical Students

Caroline Kim — VUMC Emphasis Program for Medical Students, 2007-2008. 'Investigation of type III metabotropic glutamate receptor potentiators using a novel HTS assay using thallium flux through GIRK channels". Current position, General Surgeon Baytown, Texas.

Undergraduate Students

Alexander Kane — Vanderbilt University undergraduate. Honors thesis committee member, graduation 5/2008. Current position, Assistant Professor of Clinical Psychology, Weill Cornell Medicine.

Frank Byers — Vanderbilt University Masters in Laboratory Investigation student, Thesis committee member, graduation, 5/2014.

Sanders Pair — Vanderbilt University Undergraduate research mentor (NSC 3861, 2015-2016).

Annalise McDonald — Vanderbilt University Undergraduate Honor's thesis mentor (2017-2018). Current position, Patient Enrollment Coordinator, Iora Health.

Susmita Chennareddy — Vanderbilt University Undergraduate Honor's thesis mentor (2018-2020). Current position: Medical school student at Columbia University.

Hana Badivuku — Vanderbilt University Undergraduate Honor's thesis mentor (2018-2020). Current position: Applicant Coordinator, Undiagnosed Disease Network.

Hemangi Rajpal — Vanderbilt University Undergraduate Honor's thesis mentor (2019-2021).

Jessica Wu — Vanderbilt University Undergraduate researcher (2021-present).

Rotation students (past and present)

Yerai Oliveres (2004), Alexander Nakenoff (2009), Michael Nedelcovych (2009), Shen Yin (2009), Sahana Naganhushan Kalburgi (2014), Aparna Shekar (2014), Nicole Fisher (2015), Francis Prael (2015), Nathan Winters (2017), Annah Moore (2017), Sheryl Vermudez (2017), Sarah Naguib (2017), Bretton Nabit (2018), Lindsey Guerin (2019), Katherine Clowes (2019), MinSoo Kim (2019), Jared Phillips (2020), Abigael Weit (2021), Alex Contreras, VERTICES Program (2021), Hannah Waterman (2021), Cody Marshall, (2021), Jaybree Lopez (2021), Kiera McRae (2022), Kristine Yoon (2022), Emma Webb (2022).

Mentoring of Molecular Pharmacology Group at WCNDD

Present

Research Assistants: Li Peng, Marc Quitalig, Matthew Loch, Allie Fu

Research Faculty: Alice Rodriguez, Aidong Qi

Past (beginning in 2004)

Research Assistants: Kari Johnson, Qingwei Luo, Atin Lamsal, Kiran Gogi, Emma Squire, Eileen Engleberg, Jeffrey Adams, Sonia Ajmera, Matthew Jenkins, Katrina Brewer, Shan Liang, Sheridan Carrington, Krishma Hajari, Ashton Hunter, Vincent Luscombe, Natasha Billard, Caroline Baggeroer, Mallory Maurer

Drug Discovery Scientists/Research Specialists: Rocio Zamorano, Daryl Venable

Research Faculty: Douglas Sheffler, Meredith Noetzel, Bartholomew Roland, Mohsin Sarwar, Nathalie Schnetz-Boutaud, Paige Vinson

Trainee grants

Rebecca Klar Senter	Weatherstone Predoctoral Fellowship, Autism Speaks "*Metabotropic glutamate receptor 7: a novel therapeutic target for Rett syndrome"*	07/2014-07/2016
Nicole Fisher	T32GM007628 Predoctoral Training grant	07/2015-06/2017
	F31 MH113259 NRSA Predoctoral fellowship *"Metabotropic glutamate receptor 7 as a novel therapeutic target for MECP2 Duplication syndrome"* Nominated by me and received Vanderbilt Dean's Award	10/2017-09/2020
Sheryl Vermudez	T32GM007628 Predoctoral Training grant	07/2017-06/2019
	F31 MH119699 NRSA Predoctoral fellowship *"Stratifying Rett syndrome patient populations to evaluate the efficacy of genetic and pharmacological treatment interventions"* Nominated by me and received Vanderbilt Dean's Award	08/2019-07/2022
Branden Stansley	T32NS007491 Postdoctoral Training grant	07/2015-06/2016
	F32 MH11124 NRSA Postdoctoral fellowship *"The therapeutic potential of mGlu3 modulation in MeCP2-related disorders"*	07/2016-06/2018
Rocco Gogliotti	T32MH065215 Postdoctoral Training grant	07/2012-07/2013

"mGlu$_7$, a novel target for Rett Syndrome therapeutics"

T32GM07628 Postdoctoral Training grant 07/2013-07/2014
"mGlu$_7$, a novel target for Rett Syndrome therapeutics"

NIH NRSA Postdoctoral Fellowship (awarded, not accepted) 07/2014
"Temporal Divergence Between Hyperexcitation and Hypoconnectivity in Rett Syndrome"

Rettsyndrome.org Mentored Training Fellowship 07/2014-06/2016
"Temporal Divergence Between Hyperexcitation and Hypoconnectivity in Rett Syndrome"

BBRF Young Investigator Award 01/2017-02/2019
"mGlu$_5$ and beyond: transcriptional profiling MECP2- and MECP2-autonomous Rett syndrome autopsy samples"

MH112983 NIMH K Award 09/2017-06/2021
"Normalizing E:I imbalance in Rett syndrome by modulation of late response genes"

NS112171 NIMH R01 Award 05/2020-04/2025
"A precision medicine approach to Rett syndrome"

Research Program

Current Funding

MHR01MH124671 09/01/2020-06/30/2025
Niswender CM/Lindsley CW, co-PIs $476,862 direct/year
Development of mGlu$_7$ allosteric modulators for neurological and psychiatric disorders

PR160102/W81XWH-17-1-0266, Department of Defense 08/01/2017-07/31/2022
Niswender CM, PI $395,156 direct/year
The role of metabotropic glutamate receptor 7 in the etiology and treatment of Rett syndrome

Vanderbilt Kennedy Center Directors Award 11/01/2021-10/31/2022
Niswender CM/Dong H, Co-PIs $50,000 direct/year
Evaluation of a novel biomarker approach for Rett syndrome therapeutics

IRSF (**Niswender CM,** Gogliotti RG, co-PIs) 12/01/2021-11/30/2023
The interplay of the heat shock cascade and Rett syndrome $137012 direct/year

IRSF (Neul, JL PI; **Niswender CM**, Co-I) 12/01/2021-11/30/2023
Development of a treatment-responsive biomarker for Rett syndrome $134,661 direct/year

R01NS112171-01A1 (Gogliotti RG; **Niswender CM**, Co-I) 05/01/2020-04/30/2025
NINDS $17,294 (subcontract)
A precision medicine approach to Rett Syndrome

R37NS031373-24 (Conn PJ; **Niswender CM**, Co-I) 05/01/2014-04/30/2021

NIH/NINDS $320,361 direct/year
Functions of Metabotropic Glutamate Receptor Subtypes

R01MH062646-21 (Conn PJ PI; **Niswender CM**, Co-I) 07/01/2016-04/30/2021
NIH/NIMH $311,274 direct/year
Regulation of Signaling by mGluR5

W81XWH1910355 (Conn, PJ; **Niswender CM**, Co-I) 07/01/2019-06/30/2022
DOD $2,997,528 direct/year
Optimization of selective M4 muscarinic receptor antagonists for treatment of dystonia

R01MH119673-01 (Conn PJ, PI; **Niswender CM**, Mol Pharm lead) 02/15/2019-11/30/2023
NIMH $479,119 dicret/year
Discovery of mGlu receptor PAMs for treatment of schizophrenia

UNIV60543 (Conn PJ, PI; **Niswender CM**, Mol Pharm lead) 01/15/2018-11/14/2021
Boehringer Ingelheim International GmbH $1,031,250 direct/year
Discovery of Novel mGluR3 Positive Allosteric Modulators (PAMs)

UG3NS116218-01(Rook JM/Conn PJ/Lindsley CW/Gereau R;
Niswender CM, Mol Pharm lead) 09/30/2019-07/31/2021
NINDS $613,869 direct/year
Novel mGlu5 negative allosteric modulators as first-in-class non-addictive analgesic therapeutics

UNIV61500 (Conn, PI, **Niswender CM**, Mol Pharm lead) 03/10/2020-03/09/2022
Acadia Pharmaceuticals $1,718,750 direct/year
Discovery and Development of Novel M1 Positive Allosteric Modulators (PAMs)

VUMC63366 (Raghavan/Bernard PIs, **Niswender CM,** Co-I) 03/01/2018-02/28/2022
NIH/VUMC $67,142
The Vanderbilt Institute for Clinical and Translational Research (VICTR)

Pending

R01MH062646 (Conn, PJ and **Niswender CM**, co-PIs) 07/01/2021-06/30/2026
NIMH $1,989,250 total directs
Regulation of signaling by mGluR5

Completed

Trainee grants

-Pharmaceutical Research and Manufacturers of America Foundation Predoctoral Award in Pharmacology (1994-1996)
-Pharmaceutical Research and Manufacturers of America Foundation Postdoctoral Award in Pharmacology (1997-1998)
-Fellow, Neurobiology and Behavior Training Grant, University of Washington (1999-2000)
-Fellow, National Service Research Award, NIDDK (2000-2003)

-University of Washington Diabetes and Endocrinology Research Center Pilot and Feasibility Award (3/1/2003-02/28/2004)

Faculty grants

R03MH076398-01 (**Niswender CM, PI**) 08/1/2005-07/31/2006
NIH/NIMH $3,000 plus access to screening
Measurement of GPCR-mediated thallium flux through GIRK. Access grant to Molecular Libraries Screening Center Network.

R21NS053536-01/1R21NS053536-01S1 (**Niswender CM, PI**) 09/30/2005-02/28/2008
NIH/NIMH $125,000 plus $25,000 supplement
A Direct Assay for HTS of Gi/o-linked GPCRs: mGluR7 as the Prototype

X01MH077607-01 (**Niswender CM, PI**) 02/01/2006-01/31/2007
NIH/NIMH HTS resources
Discovery of novel allosteric agonists of the M4 muscarinic receptor.
Access grant to Molecular Libraries Screening Center Network.

R01NS048334 (**Niswender CM, PI**) 2/01/2004-11/30/2009
NIH/NINDS $1,165,000
Metabotropic Glutamate Receptors in Basal Ganglia. PI during last year of grant.

Basic Research Award (**Niswender CM, PI**) 01/01/2012-12/31/2013
International Rett Syndrome Foundation $100,000
Metabotropic glutamate receptor 7: a novel therapeutic candidate for Rett Syndrome

R21NS078262 (**Niswender CM, PI**) 04/01/2012-03/13/2014
NIH/NINDS $420,809
Metabotropic glutamate receptors in the basal ganglia.

UNIV59555/7SFRN33520017 (Hasty A, PI) 04/01/2017-03/31/2021
AHA $30,357
Toward Obesity Precision Medicine: Promise of the Glucagon-Like Peptide 1 Receptor
UH2 NS099066-01 (**Niswender CM, PI**) 09/01/2016-09/29/2021

NINDS $124,768
Development of VU0652957 for the treatment of Parkinson's disease (PD)
R21MH102548-01 (**Niswender CM, PI**) 08/01/2014-07/31/2017
NIMH $431,476
Metabotropic Glutamate Receptor Regulation in MeCP2-Related Disorders

8766 Autism Speaks (**Niswender CM, PI**) 03/01/2014-08/28/2017
Autism Speaks $449,996
Temporal divergence of hypoconnectivity and excitotoxicity in Rett Syndrome

3503 rettsyndrome.org (**Niswender CM, PI**) 04/01/2017-03/31/2019
Rettsyndrome.org $68,182

Exploration of metabotropic glutamate receptor 3 as a target for MeCP2-related disorders

3511 rettsyndrome.org (**Niswender CM, PI**) 04/01/2018-
03/31/2020Rettsyndrome.org $68,182
Tailoring gene replacement therapy for MECP2-related disorders

R01MH104158-06 (**Niswender CM, PI**) 11/01/2018-03/31/2020
NIMH $250,000
Molecular and Behavioral Neurobiology of Transcription Factor TCF4

R01MH108498-01 (**Niswender CM**/Lindsley CW, **Co-PIs**) 12/10/2015-11/30/2018
NIMH $295,878
Development of an $mGlu_{2/4}$ heterodimer-selective allosteric modulator

#23 (**Niswender CM**, PI) 06/01/2020-02/28/2021
Pitt Hopkins Research Foundation $34,702
Exploring MECP2 overexpression as a potential therapeutic strategy for Pitt-Hopkins syndrome

UNIV60533 (Conn PJ, PI; **Niswender CM**, Mol Pharm lead) 11/15/2018-05/14/2021
Boehringer Ingelheim International GmbH $687,500
Discovery of Novel mGluR1 Positive Allosteric Modulators (PAMs)

R01MH110389-01 (**Niswender CM**/Lindsley CW, Co-PIs) 07/01/2017-06/30/2021
NIMH $254,504
Development of a metabotropic glutamate receptor 7 positive allosteric modulator

Industry/Foundation/NIH Sponsored Drug Discovery Partnerships

LEAPS Award (Conn PJ, PI; **Niswender CM**, **Biology lead**) 12/01/2007 – 10/30/2011
Michael J. Fox Foundation $3,209,590
Discovery of novel allosteric modulators of mGluR4 for treatment of Parkinson's disease.

Seaside Therapeutics (Conn PJ, PI; **Niswender CM**, **Mol Pharm lead**) 11/1/2007-4/31/2011
Novel strategies for treatment of Fragile X syndrome $3,094,464

VUMC34998 (Conn PJ, PI; **Niswender CM**, **Mol Pharm lead**) 12/9/2008 – 12/9/2012
Johnson and Johnson $4,549,320
Discovery of mGlu5 PAMs for treatment of Schizophrenia

U01 MH087965 (Conn PJ, Lindsley CW, co-PIs,
Niswender CM, **Mol Pharm lead**) 2/19/2010 – 12/31/2014
NIMH $5,931,948
Vanderbilt NCDDDG *Discovery of Novel Treatments of Schizophrenia*

VUMC39328 (Conn PJ, PI; **Niswender CM,**
Mol Pharm and Biology lead) 9/19/2012 – 1/31/2015
Bristol Myers Squibb $7,051,718
Discovery and Development of mGlu4 PAMs for treatment of Parkinson's Disease

U54MH084659 (Lindsley CW, PI, **Niswender CM, Mol Pharm effort**) 9/1/2008-5/31/2015
NIH/NIMH $14,592,390

Vanderbilt Specialized Chemistry Center for Accelerated Probe Development

U19 MH097056 (Conn PJ, PI; **Niswender CM, Mol Pharm lead**) 1/8/2013 – 11/30/2015
NIMH $2,405,322
Development of mGluR5 NAMs for Treatment of Major Depression

UNIV40457 (Conn PJ, PI; **Niswender CM, Mol Pharm lead**) 12/21/2012-12/31/2016
AstraZeneca $3,046,875
Discovery of Novel M4 Positive Allosteric Modulators (PAMs)

U19MH106839 (Conn PJ, PI; **Niswender CM, Mol Pharm lead**) 09/10/2015-06/30/2019
NIMH $3,377,068
Development of an M1 PAM Experimental Therapeutic for Schizophrenia

UNIV60006 (Conn PJ, PI; **Niswender CM, Mol Pharm lead**) 12/20/2017-03/20/2020
H. Lundbeck A/S $3,512,208
Discovery and Development of Novel M4 Positive Allosteric Modulators (PAMs)

UNIV60627 (Jones CK/Lindsley CW, Co-PIs; **Niswender CM**,
Mol Pharm lead) 01/04/2019-01/08/2021
Ancora Innovation, LLC $2,062,500
Development of Selective M5 NAMs for Prevention and Treatment of Opioid Use Disorders

UNIV60623 (Lindsley CW/Conn PJ, Co-PIs; **Niswender CM**,
Mol Pharm lead) 01/04/2019-01/04/2019
Ancora Innovation, LLC $3,953,125
Development of selective M_4 antagonist for dystonia

Investigational New Drug Applications

1. Member of development team; co-wrote IND for the development of VU0467319, an M_1 receptor PAM for cognitive deficits in Alzheimer's disease and schizophrenia. Open IND status achieved, July 2017, Phase I trial run successfully at Vanderbilt, licensed to Acadia Pharmaceuticals, May 2020.

https://clinicaltrials.gov/ct2/show/NCT03220295?term=VU319&rank=1

2. Member of development team, co-wrote IND for the development of VU6011472, an $mGlu_4$ PAM for treatment of Parkinson's disease. Program was licensed to Appello Pharmaceuticals, Open IND status achieved, November 2020, clinical trial to begin 01/2021.

Publications (255)

Last or Co-last* Author Manuscripts

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2. Herrick-Davis, K., E. Grinde, and **C.M. Niswender**, *Serotonin 5-HT2C receptor RNA editing alters receptor basal activity: implications for serotonergic signal transduction.* J Neurochem, 1999. **73**(4): p. 1711-7.

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Patents

1. Substituted 1,1,3,1-Tetraoxidobenzo{D} {1,3,2}Dithiazoles as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. 8,658,650. Issued 2/25/2014, USA. US 2011-0319429-A1

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3. Aryl and Heteroaryl Sulfones as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. 8,912,336. Issued 12/16/2014, USA. 20120245185 A1

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5. Alkyl-3-((2-Amidoethyl)Amino)-8-Azabicyclo[3.2.1]Octane-8-Carboxylate Analogs as M1 Allosteric Agonists and Methods of Making and Using Same. Patent 8,697,691. Issued 4/15/2014, USA. US-2011-0172227-A1

6. Benzisoxazoles and Azabenzisoxazaoles as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. Patent 8,916,584. Issued 12/23/2014, USA. 20130079366 A1

7. Pyrazolopyridine, Pyrazolopyrazine, Pyrazolopyrimidine, Pyrazolothiophene and Pyrazolothiazole Compounds as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. Patent 9,163,015. Issued 10/20/2015, USA. 20130096110 A1

8. Heterocyclic Sulfone mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. Patent 9,192,603. Issued 11/24/2015, USA. 20130158078 A1

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11. Benzothiazole and Benzisothiazole-Substituted Compounds as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. Patent 10,221,172. Issued 3/5/2019, USA. US-2018-0022744-A1

12. Isoquiniline and Napthalene-Substituted Compounds as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. Patent 10,227,343. Issued 3/12/2019, USA. US-2018-0022745-A1

13. Positive Allosteric Modulators of the GLP-1 Receptor. Patent 10,487,087. Issued 11/26/2019, USA. US-2019-0010162-A1

14. Indazole Compounds as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. 10,508,105, Issued 12/17/2019, USA. US-2019-0055225-A1

15. Indazole and Azaindazole Substituted Compounds as mGluR4 Allosteric Potentiators, Compositions, and Methods of Treating Neurological Dysfunction. Patent 10,526,323, Issued 1/7/2020, USA. US-2018-0022746-A1

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Presentations

1. Identification and Functional Characterization of Edited Human Serotonin 2c Receptor Isoforms. 4th IUPHAR Satellite Meeting on Serotonin. October 1998.

2. High Throughput Screening and Medicinal Chemistry at Vanderbilt in Support of Drug Discovery for Muscarinic Receptor Ligands. Vanderbilt Institute for Chemical Biology Retreat.

3. Allosteric modulation of metabotropic glutamate receptor 5, M1, and M4 muscarinic receptors: potential therapeutic directions for schizophrenia. 27th Annual Meeting of the Southeastern Pharmacology Society. November 2006.

4. High Throughput Screening and Medicinal Chemistry at Vanderbilt: The search for Allosteric Ligands of the M1 and M4 Muscarinic Receptors. HTS Users Group Meeting, Vanderbilt University. March, 2007

5. Allosteric modulation of mGluR4 as a novel therapeutic direction for the treatment of Parkinson's disease. American Society for Biochemistry and Molecular Biology, Experimental Biology, San Diego, CA. April, 2008.

6. Allosteric modulation of GCPRs as a novel therapeutic direction for the treatment of CNS disorders. American Society of Pharmacology and Experimental Therapeutics, Experimental Biology, San Diego, CA, April. 2008.

7. Allosteric modulation of mGluR4 as a novel therapeutic direction for the treatment of Parkinson's disease. Keystone Symposia; G Protein Coupled Receptors: New Insights in Functional Regulation and Clinical Application, Killarney, Ireland. May, 2008.

8. Allosteric modulation of mGluR4: a novel therapeutic direction for the treatment of Parkinson's disease. 6th International Meeting on Metabotropic Glutamate Receptors, Taormina, Sicily, Italy. September, 2008.

9. The development of positive allosteric modulators of mGluR4 for the treatment of Parkinson's disease. WFN World Congress on Parkinson's Disease and Related Disorders. Miami, FL. December, 2009.

10. The development of positive allosteric modulators of mGluR4 for the treatment of Parkinson's disease—Parkinson's Disease Case Study. 4th Annual Drug Discovery for Neurodegeneration Conference. Houston, TX. February, 2010.

11. HTS results from academia: discovery of allosteric modulators of mGluR4 and 5. Metabotropic Glutamate Receptors: Translation from Discovery to Clinical Trials. The New York Academy of Sciences. New York, NY. February, 2010.

12. Functionally selective and context dependent pharmacology of GPCR allosteric modulators. Pharmacology drive assays for GPCRs and ion channels. Ninth Annual World Pharmaceutical Congress. Philadelphia, PA, June, 2010.

13. Novel ion channel-based assays: detecting and characterizing 7TM receptor modulators. Pharmacology drive assays for GPCRs and ion channels. Ninth Annual World Pharmaceutical Congress. Philadelphia, PA, June, 2010.

14. The Development of Positive Allosteric Modulators of Metabotropic Glutamate Receptor 4. Allosteric Modulator Drug Discovery Congress, San Diego, CA, November, 2010.

15. mGlu4 receptor positive allosteric modulator development for the treatment of CNS disorders. 7th International Meeting on Metabotropic Glutamate Receptors, Taormina, Italy. October, 2011.

16. mGlu4 positive allosteric modulators for the treatment of CNS disorders. 45th Annual Winter Conference on Brain Research. Snowbird, Utah, January.

17. mGlu4 positive allosteric modulators for the treatment of CNS disorders. Guest presentation to Vanderbilt Parkinson's Disease Advisory Board, Vanderbilt University, April 19, 2013.

18. Metabotropic glutamate receptor 7: a novel therapeutic target for MeCP2-related disorders. Vanderbilt University Rett Syndrome Symposium, October 16, 2013.

19. Metabotropic glutamate receptor potentiation as a therapeutic direction in Rett syndrome. Invited talk, International Rett Syndrome Foundation meeting, June 25, 2014.

20. Metabotropic glutamate receptor 7 ($mGlu_7$): a novel target for the treatment of Rett syndrome. Invited talk, 8th International Meeting on Metabotropic Glutamate Receptors, October 2, 2014.

21. Metabotropic glutamate receptor 7 ($mGlu_7$): a novel target for the treatment of Rett syndrome. Invited talk, Multimodal Interventions in IDD from Drug Discovery to Clinical Trials, Vanderbilt Kennedy Center, October 22, 2014.

22. Metabotropic glutamate receptor 7: a new therapeutic target for both Rett and *MECP2* Duplication syndromes. Invited talk, MECP2 Duplication Conference, Houston TX, Sept 2015.

23. Metabotropic Glutamate Receptor 4 Positive Allosteric Modulators for Parkinson's Disease: Impact of Receptor Heterodimerization. CNS Diseases World Summit. Boston, MA, Sept 12, 2016.

24. Drug Discovery for Autism Spectrum Disorder. Joint lecture given with Rocco Gogliotti, Belmont University Brain Awareness Week, Nashville, TN, March 2017.

25. Metabotropic Glutamate Receptor 7: A New Therapeutic Target for Neurodevelopmental Disorders. Vanderbilt University Department of Pharmacology Seminar Series. Nashville, TN. September, 2017.

26. Therapeutic Potential of mGlu7 in Neurodevelopmental Disorders. Invited Speaker, 9th International Meeting on Metabotropic Glutamate receptors. Taormina, Italy, October 2017.

27. Therapeutic potential of $mGlu_7$ modulation in *MECP2*-related disorders. Vanderbilt Department of Pharmacology Works in Progress Seminar, Nashville, TN. January, 2018.

28. Drug Discovery for Autism Spectrum Disorder. Joint lecture given with Rocco Gogliotti, Belmont University Brain Awareness Week, Nashville, TN, March 2018.

29. A Potential Novel therapeutic target for Neurofibromatosis Type 1. Vanderbilt NF Symposium. Nashville, TN. April 2018.

30. Therapeutic potential of $mGlu_7$ modulation in Rett syndrome and related neurodevelopmental disorders. Gatlinburg Conference on Research and Theory in Intellectual and Developmental Disabilities, San Diego, CA. April 2018.

31. Development of new therapeutics for neurodevelopmental disorders at VCNDD: focus on Pitt Hopkins syndrome. PTHS Family Conference, Minneapolis, MN, June 2018.

32. Introduction to the Vanderbilt Center for Neuroscience Drug Discovery: focus on New Therapeutics for Rett syndrome. Rett Education Day, Vanderbilt Kennedy Center, October 2018.

33. Allosteric modulation of metabotropic glutamate receptors for the treatment of neurodevelopmental disorders. LabRoots presentation, February 2019.

34. Metabotropic glutamate receptor 7 and neurodevelopmental disorders. Invited speaker, Georgetown University. September, 2019.

35. Case Study: Commercialization and Perseverance. Invited speaker, Cleveland Clinic 17th Annual Medical Innovation Summit. October, 2019.

36. Assessing safety and efficacy of genetically targeting MeCP2 in Rett syndrome. Sheryl Vermudez and Colleen Niswender Works in Progress talk. January 2020.

37. Research Ethics Grand Rounds Lecture: Managing expectations, encouraging hope: sharing the truth in research advertising. Panelist, February, 2020.

38. Development of Novel Pharmacological and Genetic Treatments for Pitt Hopkins Syndrome, Pitt Hopkins Virtual Conference. June, 2020.

39. Target-based approached to the development of new therapeutics for neurodevelopmental disorders. Vanderbilt Special Seminar. February, 2021.

40. Target-based approaches to the development of new therapeutics for neurodevelopmental disorders. Uniformed Services University seminar, April 2021.

41. Leveraging human genetics to identify novel treatments for Pitt Hopkins syndrome. Pitt Hopkins Virtual Conference. June, 2021.

42. Invited presentation, "$mGlu_7$ in Neurodevelopmental Disorders", 10th International Meeting on Metabotropic Glutamate Receptors, 2021

43. Invited presentation and student lecture scheduled at Scripps Florida, March 1-2, 2022

44. Invited presentation and lecture on the Drug Discovery process for Jefferson University, February 24, 2022

Abstracts
(*=Best poster winner)**

1. **Burns, CM**, Obermiller PS, Emeson RB. RNA editing of AMPA receptor subunit (GluR-B) mRNA. , Society for Neuroscience Abstracts, 1993.

2. **Burns CM**, Rueter SM, Emeson RB. Molecular mechanisms mediating the editing of glutamate receptor (GluR-B) RNA transcripts. Albany Conference, RNA Editing, 1994.

3. Rueter, SM, **Burns CM** and Emeson RB. *In vitro* editing of glutamate receptor (GluR-B) RNA transcripts. RNA Processing: Cold Spring Harbor Laboratory, 1995.

4. **Burns CM**, Chu H, Rueter SM, Sanders-Bush E, Emeson RB. Identification and characterization of RNA editing within the serotonin 2C receptor. Society for Neuroscience Abstracts, 1996.

5. Chu H, **Burns C**, Canton H, Emeson RB, Sanders-Bush E. Functional characterization of rat serotonin 5-HT_{2C} receptor editing isoforms. Society for Neuroscience Abstracts, 1996.

6. Rueter SM, **Burns** CM, Emeson RB. Characterization of AMPA receptor subunit (GluR-B) RNA editing in rat brain nuclear extracts. Society for Neuroscience Abstracts, 1996.

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97. Fisher NM, Gogliotti RG, Stansley BJ, Adams JJ, Moore AM, Weiner RL, Lindsley CW, Xiang Z, Jones CK, Conn PJ, **Niswender CM**. Phenotypic overlap between mice lacking $mGlu_7$ and models of neurodevelopmental disorders. Vanderbilt Program in Molecular Medicine Retreat, Nashville, TN. July, 2017.

98. Seto M, Abe M, Gogliotti RG, Loch MT, Bollinger KA, Chang S, Engelberg E, Harp JR, Bubser M, Engers DW, Jones CK, Rodriguez AL, Blobaum AL, Conn PJ, **Niswender CM**, Lindsley CW. Developing Positive Allosteric Modulators for the Metabotropic Glutamate Receptor 7. Vanderbilt Institution of Chemical Biology Symposium, Nashville, TN. August 2017.

99. Seto M, Abe M, Gogliotti RG, Reed CW, McGowan KM, Loch MT, Remke DH, Bollinger KA, Chang S, Engelberg E, Harp JR, Bubser M, Engers DW, Rook JM, Jones CK, Rodriguez AL, Blobaum AL, Conn PJ, **Niswender CM**, Lindsley CW. Progress toward the Development of Novel Positive and Negative Allosteric Modulators for the Metabotropic Glutamate Receptor Subtype 7 ($mGlu_7$). 9th International Meeting on Metabotropic Glutamate Receptors, Taormina, Sicily, Italy. October 2017.

100. ***Best poster winner for entire conference** Gogliotti RG, Fisher NM, Stansley BJ, Lavieri RR, Shirey-Rice PK, Lindsley CW, Conn PJ, Pulley JM, **Niswender CM**. Metabotropic Glutamate Receptor 7 as a Potential Therapeutic Target for Neurofibromatosis Type 1. 9th International Meeting on Metabotropic Glutamate Receptors, Taormina, Sicily, Italy. October 2017.

101. Fisher NM, Gogliotti RG, Stansley BJ, Adams JJ, Moore AM, Weiner RL, Lindsley CW, Xiang Z, Jones CK, Conn PJ, **Niswender CM**. Phenotypic overlap between mice lacking $mGlu_7$ and models of neurodevelopmental disorders. 9th International Meeting on Metabotropic Glutamate Receptors, Taormina, Sicily, Italy. October 2017.

102. Moran SP, Doyle CA, Xiang Z, Plumley HC, Dickerson HW, Remke DH, **Niswender CM**, Engers DW, Lindsley CW, Rook JM, Conn PJ. M1 Allosteric modulators without agonist activity in the medial prefrontal cortex may provide the optimal profile for cognitive enhancement. Society for Neuroscience, 2017.

103. Gogliotti RG, Fisher NM, Stansley BJ, Jones CK, Lindsley CW, Conn PJ, **Niswender CM**. Total RNA-sequencing of Rett syndrome autopsy samples to facilitate preclinical target identification. Society for Neuroscience, 2017.

104. Moehle MS, Pancani T, Yohn S, Byun N, Dickerson J, Remke D, Jones C, Xiang Z, **Niswender C**, Wess J, Wilson G, Lindsley C, Rook J, Conn J. Hindbrain cholinergic projections to the substantia nigra pars reticulate regulate direct pathway dopamine signaling. Society for Neuroscience, 2017.

105. Fisher NM, Luscombe VB, Gogliotti RG, Moore AM, McDonald AJ, Conn PJ, **Niswender CM**. $mGlu_7$ dysfunction in neurodevelopmental disorders. Vanderbilt Kennedy Center Science Day. Nashville, TN. January, 2018.

106. Fisher NM, Luscombe VB, Gogliotti RG, Moore AM, McDonald AJ, Conn PJ, **Niswender CM**. $mGlu_7$ dysfunction in neurodevelopmental disorders. 36th National Medicinal Chemistry Symposium, April/May 2018, Nashville, TN.

107. Seto M, Abe M, Gogliotti RG, Reed CW, Luscombe VB, Jenkins MT, Loch MT, Bollinger KA, Chang S, Engelberg EM, Harp JM, Bubser M, Engers DW, Jones CK, Rodriguez AL, Blobaum AL, Conn PJ, **Niswender CM**, Lindsley CW. Development and Characterization of Novel Allosteric Modulators for the Metabotropic Glutamate Receptor Subtype 7 ($mGlu_7$). 36th National Medicinal Chemistry Symposium, April/May 2018, Nashville, TN.

108. Kalbfleisch JJ, Spearing PK, Loch MT, Rodriguez AL, Luscombe VB, Jenkins MT, Blobaum AL, Engers DW, Conn PJ, **Niswender CM**, Lindsley CW. SAR elucidation of VU0226390, an $mGlu_7$ Receptor Negative Allosteric Modulator. 36th National Medicinal Chemistry Symposium, April/May 2018, Nashville, TN.

109. Reed CW, McGowan KM, Spearing PK, Stansley BJ, Roenfanz HF, Engers DW, Rodriguez AL, Engelberg EM, Luscombe VB, Loch MT, Remke DH, Rook JM, Blobaum AL, Conn PJ, **Niswender CM**, Lindsley CW. Development of Novel, Selective CNS Penetrant Metabotropic Glutamate Receptor 7 ($mGlu_7$) Negative Allosteric Modulators. 36th National Medicinal Chemistry Symposium, April/May 2018, Nashville, TN.

110. Fisher NM, Luscombe VB, Gogliotti RG, Moore AM, McDonald AJ, Conn PJ, **Niswender CM**. $mGlu_7$ dysfunction in neurodevelopmental disorders. Vanderbilt Program in Molecular Medicine Retreat, Nashville, TN, June 2018.

111. Reed CW, McGowan KM, Spearing PK, Stansley BJ, Roenfanz, HF, Engers DW, Rodriguez AL, Engleberg EM, Luscombe VB, Loch MT, Remke DH, Rook JM, Blobaum AL, Conn PJ, **Niswender CM**, Lindsley CW. Progress Towards the Development of Novel, Selective CNS Penetrant Metabotropic Glutamate Receptor 7 ($mGlu_7$) Negative Allosteric Modulators. Vanderbilt Institute of Chemical Biology Research Symposium. Nashville, TN. August 2018.

112. Fisher NM, Luscombe VB, Gogliotti RG, Moore AM, McDonald AJ, Conn PJ, **Niswender CM**. $mGlu_7$ dysfunction in neurodevelopmental disorders. Vanderbilt Pharmacology Retreat, Nashville, TN, October 2018.

113. Vermudez SD, Gogliotti RG, Stansley BJ, Fisher NM, Engers JJ, Lindsley CW, Conn PJ, **Niswender CM**. Modulating the metabotropic glutamate receptor 3 as a potential therapeutic intervention for MECP2-associated disorders. Society for Neuroscience, 2018.

114. Moran SP, Doyle CA, Cho HP, Xiang X, Maksymetz JT, Faltin S, **Niswender CM**, Rook JM, Lindsley CW, Conn P. Biased M1 PAMs reveal critical role for phospholipase D in M1 PAM enhancement of cortical function. Society for Neuroscience, 2018.

115. Moehle MS, Rook JM, Foster DJ, Yohn SE, **Niswender CM**, Lindsley CW, Jones CK, Conn P. Selective antagonists of the M4 muscarinic acetylcholine receptor relieve parkinsonian motor deficits. Society for Neuroscience, 2018.

116. Gogliotti RG, **Niswender CM**. Cross-species expression profiling for improved target selection in Rett syndrome. Drug Discovery and Development Conference, San Francisco, CA. December 2018.

117. Fisher NM, Gogliotti RG, Gould RG, Luscombe VB, Badivuku H, McDonald AJ, Jones CK, Lindsley CW, Conn PJ, **Niswender CM**. $mGlu_7$ dysfunction as a novel cause of neurodevelopmental disease. Molecular Pharmacology Gordon Conference, Ventura, CA, February 2019.

118. Fisher NM, Gogliotti RG, Gould RG, Luscombe VB, Badivuku H, McDonald AJ, Jones CK, Lindsley CW, Conn PJ, **Niswender CM**. $mGlu_7$ dysfunction as a novel cause of neurodevelopmental disease. Vanderbilt Pharmacology Forum, Nashville, TN, April 2019.

119. Gogliotti RG, Fisher NM, Vermudez SA, Arthur B, Conn PJ, **Niswender CM**. RNA-sequencing of Rett syndrome autopsy samples identifies mutation-specific patterns of gene expression. Epigenetics in Human Disease Conference, Banff, AB. March, 2019.

120. Fisher NM, Buch A, Luscombe V, Gogliotti R, Conn PJ, **Niswender CM**. A point mutation associated with developmental delay and epilepsy leads to loss-of-function of the $mGlu_7$ receptor that can be reversed by positive allosteric modulation. Vanderbilt Kennedy Center Science Day, 2019.

121. Badivuku, H, Chennareddy S, Gould RW, Fisher NM, Gogliotti RG, Jones CK, **Niswender CM**. Characterization of Rett Syndrome Model Mice by Electroencephalography. Vanderbilt Kennedy Center Science Day, 2019.

122. Vermudez SAD, Gogliotti RG, Arthur B, Morales CD, Moxley Y, Buch A, Conn PJ, **Niswender CM**. Evaluating the beneficial and adverse effects of genetically targeting MECP2 in Rett syndrome. Vanderbilt Pharmacology Retreat, October 2019.

123. Vermudez SAD, Gogliotti RG, Buch A, Arthur B, Morales CD, Moxley Y, Rajpal H, Conn PJ, **Niswender, CM**. Investigating the effects of genetically increasing MECP2 dosage in mouse models of typical and atypical Rett syndrome. Society for Neuroscience Connectome, January 2021.

124. Vermudez, S.A.D., A. Buch, K. Weiss, Y. Moxley, H. Rajpal, R.G. Gogliotti, and **C.M. Niswender**. Evaluating the effects of genetically increasing MECP2 dosage in Pitt-Hopkins syndrome model mice. Genetic Modifiers Workshop, 2021.

125. Dong, H.W., K. Weiss, K. Baugh, **C. M. Niswender**, and J. L. Neul. Potentiation of mGluR(7) rescues neurophysiological features in a mouse model of Rett syndrome. Society for Neuroscience, 2021.

126. Dogra, S., B.J. Stansley, Z. Xiang, R. G. Gogliotti, F. Nicoletti, C.W. Lindsley, **C. M. Niswender, M. E.** Joffe, and P. J. Conn. Activating mGlu3 metabotropic glutamate receptors rescues schizophrenia-like cognitive deficits through metaplastic adaptations within the hippocampus. Society for Neuroscience, 2021.

127. Buch, A., N.M. Fisher, S.A.D. Vermudez, K. Weiss, Y. Moxley, R. G. Gogliotti, and **C. M. Niswender**. Understanding the effects of genetically increasing mGlu7 expression in Rett syndrome model mice. Vanderbilt Kennedy Center Science Day, 2021.

128. Lei, X., A. L. Rodriguez, **C. M. Niswender.** Mechanisms of orthosteric agonist and allosteric modulator activation of $mGlu_7$. Vanderbilt Kennedy Center Science Day, 2021.

129. Barbaro, L. A.L. Rodriguez, A.N. Blevins, J.W. Dickerson, N. Billard, O. Boutaud, J.L. Rook, **C. M. Niswender**, P.J. Conn, D.W Engers, C.W. Lindsley. Discovery of "molecular switches" within a series of mGlu5 allosteric ligands driven by a "magic methyl" effect affording both PAMs and NAMs with in vivo

activity, derived from an M1 PAM chemotype. 10th Meeting on Metabotropic Glutamate Receptors, Sicily, Italy, 2021.

130. Yamada, Y., K. Gilliland, Z. Xiang, D. Haymer, K.E. Crocker, M.T. Loch, M.L. Schulte, A.L. Rodriguez, **C.M. Niswender**, P.J. Conn, C.W. Lindsley, B.J. Melancon. Positive allosteric modulators (PAMs) of the group II metabotropic glutamate receptors: Design, synthesis, and evaluation as ex-vivo tool compounds. 10th Meeting on Metabotropic Glutamate Receptors, Sicily, Italy, 2021.