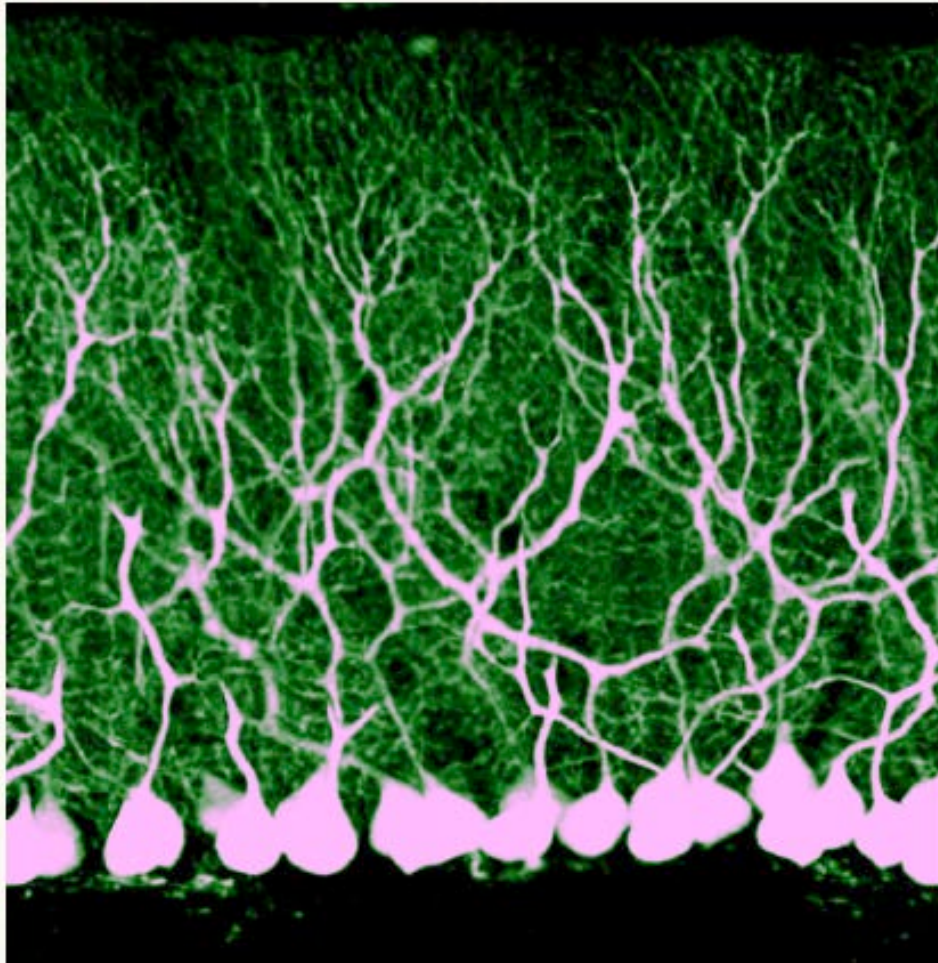




THE
NEUROSCIENCE INSTITUTE

UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

Neuroscience Center of Excellence



Annual Report to the
Tennessee Higher Education Commission
Fiscal year 2014 (7/1/2013-6/30/2014)

TABLE OF CONTENTS

I.	ADMINISTRATIVE STRUCTURE	2-3
II.	BUDGET	3-6
III.	EXTRAMURAL FUNDING OF NEUROSCIENCE FACULTY.....	7
IV.	HISTORY OF THE NEUROSCIENCE INSTITUTE.....	7-8
V.	FACULTY OF THE NEUROSCIENCE INSTITUTE	8 - 12
VI.	AREAS OF NEUROSCIENCE RESEARCH.....	12 - 17
VII.	FACULTY PUBLICATIONS.....	17
VIII.	GRADUATE AND POSTDOCTORAL TRAINING.....	17-18
IX.	NEUROSCIENCE SEMINAR SERIES.....	18
X.	GOALS OF THE INSTITUTE AND RECENT ACCOMPLISHMENTS.....	18-23
	APPENDIX 1: External Funding of Neuroscience Institute Faculty FY 2013-14.....	24-28
	APPENDIX 2: Faculty Publications and Society for Neuroscience Presentations FY 2013-14.....	29-44
	APPENDIX 3: Neuroscience Seminar Speakers FY 2013-14.....	45-52
	APPENDIX 4: Neuroscience News and Activity FY 2013-14.....	53-66

I. ADMINISTRATIVE STRUCTURE

Director: Professor William E. Armstrong, Ph.D.
Department of Anatomy and Neurobiology

Co-Director: Professor Tony Reiner, Ph.D.
Department of Anatomy and Neurobiology

Administrative Specialist: Shannon Guyot

Program Coordinator/

IT Specialist: Brandy Fleming

Neuroscience Executive Committee:

Matthew Ennis, Ph.D., Professor and Chair, Department of Anatomy and Neurobiology

Eldon Geisert, Ph.D., Professor and Director, Center for Vision Research, Department of Ophthalmology

Mark LeDoux, M.D., Ph.D., Professor, Department of Neurology

Charles Leffler, Ph.D., Professor, Department of Physiology

Tony Reiner, Ph.D., Professor and NI Co-Director, Department of Anatomy and Neurobiology

Susan E. Senogles, Ph.D., Associate Professor, Department of Molecular Sciences

Jeff Steketee, Ph.D., Professor, Department of Pharmacology

Jim Wheless, M.D., Professor, Chief of Pediatric Neurology and LeBonheur Chair, Le Bonheur Hospital/UTHSC

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University of Tennessee Health Science Center

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Organizational Structure:

The Neuroscience Center of Excellence comprises the administrative core and financial engine of the University of Tennessee Health Science Center's (UTHSC) Neuroscience Institute (NI), which is located within UTHSC's College of Medicine in Memphis, TN. Prof. William E. Armstrong is the Director, and Prof. Tony Reiner is the Co-Director. The Director reports to the Executive Dean of the College of Medicine at UTHSC, currently David Stern, M.D. Physically the NI is housed within twelve different departments in the College of Medicine and some other UT departments, with an administrative suite in Rm 426 Wittenborg Building at

UTHSC. Affiliated members reside at UT Knoxville, Oak Ridge National Laboratory, St. Jude Children's Hospital, LeBonheur Children's Hospital, Christian Brothers University, and at the University of Memphis.

Dr. Armstrong supervises Ms. Brandy Fleming, MS, who is our Program Coordinator and also functions as our IT specialist. Ms. Fleming and Dr. Armstrong supervise our administrative assistant Shannon Guyot. Ms. Guyot organizes the seminar series including all travel arrangements, does NI official correspondence, and also works ¼ time in the Imaging Center. The Neuroscience Imaging Center is managed by Amanda Preston, Ph.D. Dr. Preston reports to Dr. Armstrong and supervises 2 part-time histologists, Li Li and Shannon Guyot. Dr. Andrea Elberger manages the Bio-Rad Confocal Microscope and reports to Dr. Armstrong. Dr. Armstrong serves as overall director of the Imaging Center.

II. BUDGET (see Schedule 7, page 6)

A. FY 2014. The FY 2014 appropriated budget for the UTNI was \$621,729. We carried forward \$299,482 from the previous year for a total budget of \$921,211. This carryover continues to partly reflect amounts encumbered but unspent for Graduate Stipends that were picked up previously by NI and are now picked up by UTHSC for the student's first 18 months. However, the main reason for this year's carryover was the anticipation of assisting with a new Neuroscience hire at UTHSC. While this did not happen, some of this carryover was spent as part of NI support detailed below.

This past FY, we expended \$547,753 total personnel costs (including salaries and fringe). Personnel costs include administrative supplements for the NI Director (who also directs the NI Imaging Center), the NI Co-Director, the Director of the BioRad Confocal Microscope, a full-time Program Coordinator/ IT specialist, a full time Administrative Specialist/histologist, full time Technical Director of Imaging Center, 1 other part time histologist in the Imaging Center, 1 postdoctoral fellow supported by startup funds, matching support for 6 graduate student stipends and 8 matching postdoctoral fellowships (see below).

Students: We awarded matching funds for 6 graduate stipends to PIs with Neuroscience track graduate students (\$81,235). The mentors were located in the departments of Anatomy and Neurobiology, Neurology, Ophthalmology, Pharmaceutical Sciences, and Pharmacology.

Postdoctoral Support: We provided matching funds for 8 postdoctoral fellows, at ~\$15,000 each (\$147,664). The NI Mentors are located in the departments of Anatomy and Neurobiology, Neurology, and Pharmacology.

Neuroscience Imaging Center: This past year we hired Ms. Li Li, MS, at 50% time to assist the Technical Director of the Imaging Center, Dr. Amanda Preston. Li Li replaced Zerriyan Jackson. Our administrative assistant, Shannon Guyot, also works ¼ time in the Imaging Center. We supplement our cost-recovery program to keep user fees low, helping to pay the service contracts on our JEOL 2000 Electron Microscope, the Zeiss 710 confocal microscope, and the Neurolucida workstation. Our BioRad Confocal Microscope is no longer

under service contract. This year our cost-recovery program took in \$44,736, which accounted for the fees needed to pay the service contracts on the Zeiss 710 (\$19,295), the JEOL 2000 (\$16,800) and the NeuroLucida workstation (\$4,490). We also upgraded our NeuroLucida system with the purchase of a new workstation in order that we keep pace with the demands of the new software, at a cost of \$3,275. In addition, we had to order replacement parts for the NeuroLucida system at a total of \$1,663. We continued our contract service with the UTHSC Pathology Group for EM use.

Neuroscience Behavioral Core: We purchased a site license for the AnyMaze software for behavioral monitoring in the Behavioral Core at a cost of \$4,796. The procedures for use and available equipment can be viewed at: <http://www.uthsc.edu/neuroscience/behavioral-core/index.php>. We also purchased a GoPro underwater camera and a rotarod extender at a total cost of \$955. However, due to the generally the low cost of maintenance (PIs provide their own technicians to use the equipment), NI has not yet instituted fee for service in this facility. However, this may change as we look towards upgrading and adding equipment in the future.

Neuroscience Microtomy Core: This past year we started a Microtomy Core, and we had to spend \$532. servicing two cryostats donated to the core, a Leica CM3050 and Reichert-Jung 2800E.

Seminars and Symposia: Additional funds went to support travel/lodging/meals (\$22,484) and honoraria (\$4,936) for the Neuroscience Seminar series, for a joint symposium with the Urban Child Institute entitled: “Brain Development and Success in School and Life”, and for a symposium NI sponsored entitled “Post-Traumatic Stress Disorder: Clinical and Neurobiological Features” (see **Appendix 4**). In addition, NI provided \$5000 to partner with the Urban Child and the University of Memphis to help pay for the development of a mobile kiosk with an interactive graphics screen which informs users about the functions of different parts of the brain and the importance of certain activities to their development, as well as those activities which impair brain development. This kiosk is aimed at parents and child-care workers and has been placed at 2 different venues over the past year: the Pink Palace Museum and currently, at Le Bonheur Children’s Hospital. It will rotate to the University of Tennessee Health Science Center sometime during this fiscal year (**Appendix 4**).

Research Projects: We continued to pay startup funds for our two new faculty, Drs. Chizhikov and Kaczorowski, each of whom is getting ~\$200,000 from NI over a 5 year period, from FY 2013-2018.

Undergraduate Fellowships: NI supported four undergraduate Neuroscience Merit Fellows (total, \$16,000) for summer research.

Travel Awards: \$4,000 in travel awards for graduate students and postdoctoral fellows were awarded.

B. FY 2015. We will carryover \$249,881 to the coming fiscal year, and have been appropriated \$606,779 for a total of \$856,660. In addition to providing support for all the NI staff (Program Coordinator, Administrative Assistant, Imaging Center Director and Technical Assistant), here is a breakdown of the major anticipated projects for FY2015:

Students: For the coming year, we have awarded matching funds for 6 graduate stipends to PIs with

Neuroscience track graduate students. Mentors are located in the departments of Anatomy and Neurobiology, Neurology, Ophthalmology, Pharmacology, and Pharmaceutical Sciences. The NI match is ~\$13,500 each for 5 of these (~\$67,500), and \$10,650 for one student, making an expected total of ~\$78,150.

Postdoctoral Support: We will provide matching funds for 8 postdoctoral fellows (~\$129,860 total) for the coming year. Applications are being solicited only now, since funds were opened up due to the cancelling of an expected recruit this year.

Neuroscience Imaging Center: We will pay the service contracts on the JEOL 2000 (\$16,800), for the Zeiss 710 Confocal (\$19,225) and if needed a laser replacement for the BioRad 2000 (~\$10,000). Our current Neurolucida software contract is good for one more year.

Neuroscience Behavioral Core: We will continue to support the Behavioral Core in FY 2015, but expenditures are expected to be minimal. However, should a need arise for additional equipment, or for a part-time assistant to help run behavioral studies, NI would consider additional funding assuming a fee for service program were approved and initiated.

Neuroscience Microtomy Core: We already have a pending service contract to maintain the two cryostats in this core, with an anticipated cost of ~\$2000. We intend to install a fee for service for these machines this year pending approval by the UT business office. Should the on demand service for the aging cryostats fail to put them in productive use, we will consider the purchase of a new cryostat in the Microtomy Core.

NI Faculty: We will provide administrative supplements to Drs. Armstrong, Reiner, and Elberger. However if the use of the BioRad Confocal continues to wane, Dr. Elberger's administrative support will be terminated once we take this machine out of service. In 2013, NI committed \$189,000 to Dr. Catherine Kaczorowski and \$195,000 to Dr. Victor Chizhikov, to be spent over 4-5 years. During FY 2014 these faculty spent ~\$68,000 combined.

Research Projects and Bridge Funding: While our original priorities for FY2014 and FY2015 were projected to be a new NI hire, the delay of approval for this hire means we will have funds to offer support for research, including some bridge funds for those in need, a full measure of postdoctoral matching funds (see above), and support for the Imaging Center.

Seminar Series and Community Outreach: We will offer our weekly Neuroscience Seminar series and will also sponsor a Neuroscience Symposium on the Neurobiology of Feeding/Obesity in the spring of 2015. We will continue to work with the Urban Child Institute to fund community outreach activities such as Brain Awareness Week and will sponsor a symposium with them in March of 2015 concerning early language development. We will continue to fund summer Undergraduate Neuroscience Merit Fellowships to Rhodes and Christian Brothers University students who are doing research projects in Neuroscience towards fulfilling their degree requirements (from 2-4 awards, depending on qualifications).

2014 Neuroscience Center of Excellence Annual Report

Schedule 7

CENTERS OF EXCELLENCE/CENTERS OF EMPHASIS
ACTUAL, PROPOSED, AND REQUESTED BUDGET

Institution UT Health Science Center Center Neuroscience
Summary

	FY 2013-14 Actual			FY 2014-15 Proposed			FY 2015-16 Requested		
	Matching	Appopr.	Total	Matching	Appopr.	Total	Matching	Appopr.	Total
Expenditures	1,298,710	671,330	1,970,040	1,162,897	856,660	2,019,557	1,169,042	637,118	1,806,160
Salaries									
Faculty	420,435	11,200	431,635	429,453	42,253	471,706	450,926	44,366	495,292
Other Professional	285,364	192,853	478,217	287,156	187,465	474,621	280,514	175,838	456,352
Clerical/ Supporting	15,964	84,744	100,708	15,964	55,330	71,294	16,762	58,097	74,859
Assistantships	72,100	127,699	199,799	72,100	164,007	236,107	54,705	148,770	203,475
Total Salaries	793,863	416,496	1,210,359	804,673	449,055	1,253,728	802,907	427,071	1,229,978
Longevity	5,320	3,106	8,426	6,640	3,666	10,306	6,972	3,849	10,821
Fringe Benefits	149,527	128,151	277,678	151,584	130,822	282,406	159,163	132,185	291,348
Total Personnel	948,710	547,753	1,496,463	962,897	583,543	1,546,440	969,042	563,105	1,532,147
Non-Personnel									
Travel	0	13,806	13,806	0	30,000	30,000	0	25,000	25,000
Software	0	0	0	0	5,000	5,000	0	0	0
Books & Journals	0	0	0	0	0	0	0	0	0
Other Supplies	0	105,392	105,392	0	101,617	101,617	0	42,013	42,013
Equipment	0	26,874	26,874	0	55,000	55,000	0	0	0
Maintenance	0	22,241	22,241	0	48,000	48,000	0	45,000	45,000
Scholarships	0	0	0	0	0	0	0	0	0
Consultants	0	0	0	0	10,000	10,000	0	7,000	7,000
Renovation	0	0	0	0	0	0	0	0	0
Imaging Center Recovery	0	(44,736)	(44,736)	0	(40,000)	(40,000)	0	(45,000)	(45,000)
Startup	350,000	0	350,000	200,000	63,500	263,500	200,000	0	200,000
			0			0			0
		0	0		0	0			0
Total Non-Personnel	350,000	123,576	473,576	200,000	273,117	473,117	200,000	74,013	274,013
GRAND TOTAL	1,298,710	671,330	1,970,040	1,162,897	856,660	2,019,557	1,169,042	637,118	1,806,160
Revenue									
New State Appropriation	0	621,729	621,729	0	606,779	606,779	0	637,118	637,118
Carryover State Appropriation	0	299,482	299,482	0	249,881	249,881	0	0	0
New Matching Funds	1,298,710	0	1,298,710	1,162,897	0	1,162,897	1,169,042	0	1,169,042
Carryover from Previous Matching Funds	0	0	0	0	0	0	0	0	0
Total Revenue	1,298,710	921,211	2,219,921	1,162,897	856,660	2,019,557	1,169,042	637,118	1,806,160

III. EXTRAMURAL FUNDING OF NEUROSCIENCE FACULTY

The UT Neuroscience Institute is a concentrated, interdepartmental Neuroscience program. For FY2013-2014, Anatomy and Neurobiology (10 funded Neuroscientists), remained ranked at *17th in the category of Neuroscience departments among public university medical schools in NIH funding, and 33rd overall (from a total of 46)*. Other participating NI departments that are well ranked include **Physiology** (5 funded NI members), which was ranked *9th among public medical schools and 15th overall* (of 86), **Pharmacology** (7 funded members), *ranked 34th and 52nd* (of 98) and **Neurology** (3 funded members), *ranked 28th and 49th* (Statistics from Blue Ridge Institute for Medical Research). The total annual grant dollars (total costs) currently held by faculty associated with the NI at UTHSC (*i.e.*, excluding affiliate members, such as St. Jude, and excluding grants in no cost extensions) is **\$12,669,418.20**. This value is not significantly different from last year's funding.

The research grants (current year total costs) currently held by individual faculty of the NI are listed by Principal Investigator in **Appendix 1**. These values are reported to us by Research Administration at UTHSC.

IV. HISTORY OF THE NEUROSCIENCE INSTITUTE

The Neuroscience Center of Excellence at UTHSC was established in 1985 and designated an accomplished Center of Excellence by the Tennessee Higher Education Commission in 1988. In 1998, the Neuroscience Center of Excellence was designated as the University of Tennessee Neuroscience Institute, with dedicated space in the Wittenborg, Link and Johnson buildings. The Neuroscience Center of Excellence award was designed to support graduate and postdoctoral education, to recruit and provide initial support to new neuroscience faculty, to renovate laboratory facilities, to purchase research equipment, to host symposia, a weekly seminar series, and to support community outreach programs such those associated with Brain Awareness Week. The Director from 1985-2002 was Dr. Steven T. Kitai. Dr. David Smith was named director from 2002-2006 (deceased, Sept. 2006), and Dr. William Armstrong has been director since 2006.

The program brings together neuroscience faculty members from the Departments of Anatomy and Neurobiology, Medicine, Molecular Sciences, Neurology, Neurosurgery, Ophthalmology, Pathology, Pediatrics, Pharmaceutical Sciences, Pharmacology, Physiology, Psychiatry, and Surgery, and in the Department of Biochemistry and Cellular and Molecular Biology at the University of Tennessee, Knoxville. Strong affiliations exist with Methodist University Hospital, Le Bonheur Children's Hospital, St. Jude's Children Hospital, the University of Memphis, Rhodes College, Christian Brother's University and the Urban Child Institute. The interdepartmental nature of the program and the collaborations it fosters provide the cross-disciplinary environment necessary for high quality neuroscience research, training and patient care.

Page 2 above lists the members of the Executive Committee. The Director and Co-Director frequently

interact with Executive Committee members and consult with these members regarding research, symposia, and postdoctoral awards. For funding awards, applications are solicited and each application is read and ranked by at least 3 members of the committee. Final rankings are compiled by the Director and Co-Director and passed back to the Executive Committee for approval before funding.

V. FACULTY OF THE NEUROSCIENCE INSTITUTE

The Neuroscience Institute is currently comprised of 88 faculty members in several different departments on the UTHSC campus, including those with primary appointments at St. Jude Children's Research Hospital and at the University of Memphis and Christian Brothers University, and one faculty member at UT Knoxville. Faculties are listed with each department; those with primary appointments outside UTHSC or UTK are so indicated. * indicates new member.

Department of Anatomy and Neurobiology

William E. Armstrong, Ph.D., Professor and NI Director

John D. Boughter, Jr., Ph.D. Associate Professor

Joseph C. Callaway, Ph.D., Associate Professor

Angela Cantrell, Ph.D., Assistant Professor

Viktor Chizhikov, Ph.D., Assistant Professor

Alessandra d'Azzo, Ph.D., Affiliated Professor (St. Jude)

Hong Wei Dong, Ph.D., Assistant Professor

Michael A. Dyer, Ph.D., Affiliated Professor (St. Jude)

Andrea J. Elberger, Ph.D., Professor

Matthew Ennis, Ph.D., Professor and Chair

Malinda E. C. Fitzgerald, Ph.D., Adjunct Professor (Christian Brothers Univ.)

Max Fletcher, Ph.D., Assistant Professor

Robert C. Foehring, Ph.D., Professor

Kristin Hamre, Ph.D., Associate Professor

Detlef Heck, Ph.D., Associate Professor

Scott Heldt, Ph.D., Assistant Professor

Paul Herron, Ph.D., Associate Professor

Marcia G. Honig, Ph.D., Professor

Eldridge F. Johnson, Ph.D., Professor

Catherine Kaczorowski, Ph.D., Assistant Professor

Hitoshi Kita, Ph.D., Professor

2014 Neuroscience Center of Excellence Annual Report

Lu Lu, Ph.D., Associate Professor

Peter J. McKinnon, Ph.D., Affiliated Associate Professor (St. Jude)

Guy Mittleman, Ph.D., Adjunct Associate Professor (Univ. Memphis)

James I. Morgan, Ph.D., Affiliated Professor (St. Jude)

Randall J. Nelson, Ph.D., Professor

Guillermo Oliver, Ph.D., Affiliated Associate Professor (St. Jude)

Anton J. Reiner, Ph.D., Professor and NI Co-Director

Reese S. Scroggs, Ph.D., Associate Professor

Richard J. Smeyne, Ph.D., Affiliated Associate Professor (St. Jude)

Michael Taylor, Ph.D., Affiliated Assistant Professor (St. Jude)

J. Paul Taylor, M.D., Ph.D., Affiliated Associate Professor (St. Jude)

Robert S. Waters, Ph.D., Professor

Robert W. Williams, Ph.D., UT-Oak Ridge National Laboratory Governor's Chair in Computational Genomics
Professor

Stanislav Zahkarenko, Ph.D. Affiliated Associate Professor (St. Jude)

Jian Zuo, Ph.D., Affiliated Professor (St. Jude)

Department of Biochemistry and Cellular and Molecular Biology, UT Knoxville

Rebecca A. Prosser, Ph.D., Professor

Department of Medicine

Tai-June Yoo, M.D., Ph.D., Professor

Department of Molecular Sciences

Susan E. Senogles, Ph.D., Professor

Department of Neurology

Dominic M. Desiderio, Ph.D., Professor

Michael Jacewicz, M.D., Professor

Mark S. LeDoux, M.D., Ph.D., Professor

Michael C. Levin, M.D., Professor

Michael McDonald, Ph.D., Associate Professor

Thaddeus S. Nowak, Ph.D., Professor

Ronald F. Pfeiffer, M.D., Professor

William A. Pulsinelli, M.D., Ph.D., Semmes-Murphey Professor and Chair

Lawrence T. Reiter, Ph.D., Associate Professor

Department of Neurosurgery

Frederick Boop, M.D., Professor and Chair

Department of Ophthalmology

Edward Chaum, M.D., Ph.D., Plough Foundation Professor

Eldon E. Geisert, Ph.D., Professor

Alessandro Iannoccone, M.D., Associate Professor

Monica M. Jablonski, Ph.D., Associate Professor

Jena Steinle, Ph.D., Associate Professor

Dianna A. Johnson, Ph.D., Hiatt Professor

Department of Pathology

F. Curtis Dohan, Jr., M.D., Associate Professor

Department of Pediatrics, Pediatric Neurology and LeBonheur Children's Hospital

Andrew Papanicolaou, Ph.D., Professor, Pediatrics, Le Bonheur

Kanwakheet J.S. Anand, M.D., Ph.D., Professor, Pediatrics, Le Bonheur

Masanori Igarashi, M.D., Associate Professor, Pediatric Neurology, Le Bonheur

Kathryn McVicar, M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Amy McGregor, M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Robin L. Morgan, M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

*Shalini Narayana, Ph.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Freedom F. Perkins, Jr., M.D., Assistant Professor, Pediatric Neurology, Le Bonheur

Massroor Pourcyrous, M.D., Professor, Pediatrics

James W. Wheless, M.D., Professor and Chief of Pediatric Neurology, Le Bonheur

Department of Pharmaceutical Sciences

Duane D. Miller, Ph.D., Van Vleet Professor and Chairman

Bob Moore, Ph.D., Professor of Pharmaceutical Sciences

Department of Pharmacology

Suleiman W. Bahouth, Ph.D., Professor

Hao Chen, Ph.D., Assistant Professor

Alex M. Dopico, M.D., Ph.D., Professor

Francesca-Fang Liao, Ph.D., Associate Professor

Kafait U. Malik, Ph.D., Professor

Kazuko Sakata, Ph.D., Assistant Professor

Burt Sharp, M.D., Van Vleet Professor

Jeffery Steketee, Ph.D., Professor

Steven J. Tavalin, Ph.D., Associate Professor

Fu-Ming Zhou, M.D., Ph.D., Associate Professor

Department of Physiology

*Julio Cordero-Morales, Ph.D., Assistant Professor

Ioannis Dragatsis, Ph.D., Associate Professor

Jonathan Jaggar, Ph.D., Professor

Charles W. Leffler, Ph.D., Professor

Kristen M.S. O'Connell, Ph.D., Assistant Professor

Helena Parfevona, Ph.D., Professor

*Valeria Vásquez, Ph.D. Affiliated Assistant Professor

Paula Dietrich, Ph.D., Assistant Professor

Department of Psychiatry

Kenneth Sakauye, M.D., Professor and Vice Chair

Department of Medicine/Cardiology

Syamal Bhattacharya, Ph.D., Professor

University of Memphis

Ramin Homayouni, Ph.D., Adjunct Associate Professor, Neurology

Guy Mittleman, Ph.D., Adjunct Professor, Anatomy and Neurobiology

St. Jude Children's Hospital (see Departments Above for Affiliated Appointments)

Michael Dyer, Ph.D., Professor

Alessandra D'Azzo, Professor

Peter McKinnon, Ph.D., Professor

James Morgan, Ph.D., Professor

Guillermo Oliver, Ph.D., Associate Professor

Richard Smeyne, Ph.D., Associate Professor

Michael Taylor, Ph.D., Assistant Professor

J. Paul Taylor, M.D., Ph.D., Associate Professor

Stanislav Zakharenko, Ph.D., Associate Professor

Jian Zuo, Ph.D., Professor

VI. AREAS OF NEUROSCIENCE RESEARCH

The research programs of the faculty of NI are diverse, representing most areas of modern neuroscience research. Within the program are several strong areas of research focus, where in many instances basic scientists and clinical investigators interact to investigate the mechanisms of diseases of the nervous system. We can be organized into the following groups based on collaborations and research interests:

Neurological and Neurodegenerative Disorders

Neurological diseases include disorders of the nervous system arising from nervous system malfunction or degeneration. Among these are the movement disorders (which include Parkinson's disease, essential tremor, Huntington's disease, dystonia, myoclonus, Tourette's syndrome, paroxysmal dyskinesias, drug-induced dyskinesias, restless legs syndrome, spinocerebellar ataxias, spasticity, multiple system atrophy, and progressive supranuclear palsy), dementing diseases (notably Alzheimer's), primary motor diseases (such as amyotrophic lateral sclerosis and multiple sclerosis), and diseases of neurotransmission abnormality (such as epilepsy). The integration of genetic, cellular, and physiological information will be required to unravel the pathophysiology of each disorder and improve therapeutics. Due to aging of our population, movement disorders and dementing diseases will place an enormous and increasing financial burden on society. Investigations by this group will play an important role in the breakthroughs needed to understand and treat these diseases. Current areas of focus include: cellular and network physiology of basal ganglia in the context of Parkinson's disease, neurobiology of neuronal dysfunction and death in Huntington's disease, and molecular biology of synaptogenesis in dystonia. Researchers also study the potential protective effects of hypothermia on cerebral ischemic insults, Alzheimer's disease, and molecular mimicry in immune-mediated neurological disease. * Designates new member.

Faculty:

M. LeDoux

Neurology

T. Nowak

Neurology

A. Cantrell

Anat. & Neurobiology

A. Papanicolaou

Ped. Neurology/Le Bonheur

I. Dragatsis	<i>Physiology</i>	R. Pfeiffer	<i>Neurology</i>
E. Geisert	<i>Ophthalmology</i>	W. Pulsinelli	<i>Neurology</i>
R. Homayouni	<i>U of Memphis</i>	A. Reiner	<i>Anat. & Neurobiology</i>
M. Jacewicz	<i>Neurology</i>	L. Reiter	<i>Neurology</i>
C. Kaczorowski	<i>Anat. & Neurobiology</i>	R. Smeyne	<i>Anat. & Neurobiology/St. Jude</i>
H. Kita	<i>Anat. & Neurobiology</i>	J. Wheless	<i>Ped. Neurology/Le Bonheur</i>
F-F. Liao	<i>Pharmacology</i>		

Excitable Properties of Neurons

Behavior, mentation and physiological homeostasis are all a function of neuronal activity in the nervous system. This activity can be encoded by membrane polarity or in the rates and patterns of neuronal action potentials. Information is passed among neurons through synaptic transmission. Whether a neuron fires at any given moment is determined by the interaction of intrinsic membrane properties with synaptic inputs. Research in this group focuses on these properties from several viewpoints. At the molecular level, studies determine the genetic capacity for producing proteins related to specific ion channels and neurotransmitter receptors. Expression patterns of the proteins in classes of neurons impart a unique signature of ion channels and receptors. Electrophysiological recordings can reveal the properties of ionic currents underlying particular patterns of firing, the modulation of these currents by neurotransmitters, the precise properties of synaptic input, and the plasticity of neuronal activity. At a more global level, neuronal activity can be studied within an intact neuronal network and correlated with behavior. The common goal of this group is to understand how and why neuronal activity occurs in both normal tissue and in neurological disorders. One of the members of this group, Kristen O'Connell, had a research article recently reviewed by the F1000 Prime Review group (**Appendix 4**).

Faculty:

R. Foehring	<i>Anat. & Neurobiology</i>	D. Heck	<i>Anat. & Neurobiology</i>
W. Armstrong	<i>Anat. & Neurobiology</i>	H. Kita	<i>Anat. & Neurobiology</i>
J. Callaway	<i>Anat. & Neurobiology</i>	R. Nelson	<i>Anat. & Neurobiology</i>
A. Cantrell	<i>Anat. & Neurobiology</i>	K. O'Connell	<i>Physiology</i>
*J. Cordero-Morales	<i>Physiology</i>	R. Scroggs	<i>Anat. & Neurobiology</i>
A. Dopico	<i>Pharmacology</i>	S. Tavalin	<i>Pharmacology</i>
M. Ennis	<i>Anat. & Neurobiology</i>	R. Waters	<i>Anat. & Neurobiology</i>
C. Kaczorowski	<i>Anat. & Neurobiology</i>	*V. Vásquez	<i>Physiology</i>

Sensory Information Processing

Sensory systems extract information from the environment and provide the nervous system an interface with the outside world. Understanding the way in which this information is represented in neuronal activity is the focus of this research group. To understand sensory processing, we need to address the genetic basis of sensory function, the coding of information by individual sensory neurons at several levels of the nervous system, from peripheral receptors to cerebral cortex, and the role of the environment in shaping the responsiveness of these neurons through mechanisms of neuronal plasticity. Interactions between somatosensory and motor cortices, the effects of early alcohol exposure on sensory and motor processing, the control over gustatory information processing by descending influences from limbic forebrain, the genetics of taste processing, the processing of nociceptive (pain) information, and synaptic processing in the olfactory bulb are all areas of research addressed by this group.

Faculty:

M. Ennis	<i>Anat. & Neurobiology</i>	R. Nelson	<i>Anat. & Neurobiology</i>
J. Boughter	<i>Anat. & Neurobiology</i>	R. Scroggs	<i>Anat. & Neurobiology</i>
*J. Cordero-Morales	<i>Physiology</i>	R. Waters	<i>Anat. & Neurobiology</i>
M. Fletcher	<i>Anat. & Neurobiology</i>	*V. Vásquez	<i>Physiology</i>
C.-X. Li	<i>Anat. & Neurobiology</i>		

Vision and Retina

We rely primarily on our sight to guide us through the world. Our eyes provide the major sensory input to the brain, accounting for one-third of the sensory axons entering the human nervous system. Understanding the normal function of the eye and the way this process is affected by disease is the primary interest of this group. Researchers are addressing the normal development of the eye as well as the genetic basis of function and disease. The current program reflects a comprehensive and synergistic approach to important fundamental questions of eye genetics and development and the application of this new strategy to the treatment of disease. These investigators seek to understand normal and abnormal ocular development and how genes control these events. There is an active program in the application of molecular techniques to the modulation of retinal cell growth and cellular responses to injury using gene therapy. Current areas of focus include prevention and treatment of eye diseases and disorders, eye genetics in development and childhood diseases, retinal degenerative diseases, anterior segment disorders, response of the retina and optic nerve to injury, and genetic control of eye development. The primary goal of the vision and retina research group is to provide a framework for effective communications between research laboratories effecting eventually the translation of basic research to clinical applications.

Faculty:

E. Chaum	<i>Ophthalmology</i>	D. Johnson	<i>Ophthalmology</i>
M. Dyer	<i>Ophthalmology</i>	A. Reiner	<i>Anat. & Neurobiology</i>
M. Fitzgerald	<i>Anat. & Neurobiology/St. Jude</i>	J. Steinle	<i>Ophthalmology</i>
A. Iannaccone	<i>Anat. & Neurobiology/CBU</i>	R. Williams	<i>Anat. & Neurobiology</i>
M. Jablonski	<i>Ophthalmology</i>	J. Zuo	<i>Anat. & Neurobiology/St. Jude</i>

Neurogenetics and Development

This group is interested in gaining a deeper understanding of the origins of the impressive structural and functional complexity, diversity, and plasticity of the nervous system. Experimental and technical expertise of this group is broad, ranging from genetic and molecular analysis of the early stages of central and peripheral nervous system development to sophisticated functional assays of neuronal plasticity in response to environmental manipulations. The group is highly collaborative and includes a significant contingent of neuroscientists from St. Jude Children's Research Hospital (primarily the Departments of Developmental Neurobiology and Genetics). Current research tends to rely heavily on genetically defined lines of rodents. Topics of this research interest include: control of cell cycling and cell death in the brain, control of axon outgrowth and neurotrophic interactions during neural development, the formation, elimination and stabilization of synapses, functional maturation and environmental/drug sensitivity of the developing nervous system, genetics of disease vulnerability and outcome, and mechanisms of cell migration in the developing brain.

Faculty:

R. Williams	<i>Anat. & Neurobiology/Pediatrics</i>	L. Lu	<i>Anat. & Neurobiology</i>
J. Boughter	<i>Anat. & Neurobiology</i>	P. McKinnon	<i>Anat. & Neurobiology/St. Jude</i>
V. Chizhikov	<i>Anat. & Neurobiology</i>	J. Morgan	<i>Anat. & Neurobiology/St. Jude</i>
A. d'Azzo	<i>Anat. & Neurobiology/St. Jude</i>	A. Reiner	<i>Anat. & Neurobiology</i>
I. Dragatsis	<i>Physiology</i>	L. Reiter	<i>Neurology</i>
A. Elberger	<i>Anat. & Neurobiology</i>	B. Sharp	<i>Pharmacology</i>
K. Hamre	<i>Anat. & Neurobiology</i>	R. Smeyne	<i>Anat. & Neurobiology/St. Jude</i>
R. Homayouni	<i>Neurology/U Memphis</i>	R. Waters	<i>Anat. & Neurobiology</i>
M. Honig	<i>Anat. & Neurobiology</i>		

Mental and Addictive Disorders

Mental and addictive disorders are due to changes in normal brain function. This research group collaboratively explores changes in brain function that might explain mental disorders, such as depression and addiction, and drug-induced changes in brain function that may be responsible for relieving mental disorders or producing addiction. Research is currently being conducted using both *in vivo* and *in vitro* models. Molecular, cellular, neuroanatomical, neurophysiological, neurochemical, morphological and behavioral approaches are all being used to study the neuroscience of mental and addictive disorders. Research efforts are currently focused on depression and antidepressants and drugs of abuse, including cocaine, amphetamine, nicotine, ethanol and toluene. Several collaborative efforts currently exist within the group, including studies on drug effects on ion channels, drug-receptor adaptations, developmental neuroplasticity and interactions between stress and drugs.

Faculty:

B. Sharp	<i>Pharmacology</i>	K. Sakata	<i>Pharmacology</i>
H. Chen	<i>Pharmacology</i>	J. Steketee	<i>Pharmacology</i>
A. Dopico	<i>Pharmacology</i>	S. Tavalin	<i>Pharmacology</i>
K. Hamre	<i>Anat. & Neurobiology</i>	F. Zhou	<i>Pharmacology</i>
S. Heldt	<i>Anat. & Neurobiology</i>		

Neural Cell Signaling

The function, growth and survival of neural cells are regulated by extracellular and intracellular signals. One example is the release of neurotransmitter from a presynaptic neuron, which is sensed by the postsynaptic neuron via receptors that recognize specific neurotransmitter molecules. This information is relayed to the cell's interior by a series of elaborate and interdependent signaling intermediates and results in a change in the cell in response to its environment. This diverse group of researchers is investigating those processes that are collectively referred to as signal transduction using neural or neural-derived cell systems. Indeed, most drugs that are currently used in the management of neurological disorders, such as ADHD, depression, schizophrenia, Parkinson's disease and others, exert their effects on signaling components. The goal of this group is to understand the involvement of signal transduction in both the normal functioning of neural cells and those pathological changes that are manifested in neurological disorders. Current areas of emphasis include: G-protein-coupled receptor signaling and regulation, growth factor receptor signaling, apoptosis, cellular migration, and mechanisms of neuronal injury and repair.

Faculty:

S. Senogles (Head)	<i>Molecular Sciences</i>	D. Johnson	<i>Ophthalmology</i>
S. Bahouth	<i>Pharmacology</i>	M. LeDoux	<i>Neurology</i>
E. Chaum	<i>Ophthalmology</i>	K. Malik	<i>Pharmacology</i>
R. Foehring	<i>Anat. & Neurobiology</i>	S. Tavalin	<i>Pharmacology</i>
M. Jablonski	<i>Ophthalmology</i>	R. Waters	<i>Anat. & Neurobiology</i>
J. Jagers	<i>Physiology</i>	T. Yoo	<i>Medicine</i>

VII. FACULTY PUBLICATIONS

The Neuroscience faculty at UTHSC is consistently productive, both in terms of peer-reviewed publications and participation in the national neuroscience community. Lists of 1) peer-reviewed journal publications during the last academic year, as cited in PubMed; and 2) presentations at the 2013 meeting of the Society for Neuroscience in San Diego, CA, are presented in **Appendix 2**. These PubMed-cited publications do not include the many chapters, reviews and other articles written by NI faculty. NI faculty members are indicated in **bold** in **Appendix 2**.

VIII. GRADUATE AND POSTDOCTORAL TRAINING

The Graduate education at UTHSC has moved away from department-based graduate programs to a single Integrated Biomedical Sciences Program (IBSP) for students in the health sciences. The students matriculate into this integrated program, but within the IBSP, each student chooses one of a number of tracks, of which Neuroscience is one. Students who enter the graduate program are eligible for predoctoral stipends and a waiver of tuition. NI funds matching level stipends for the third and fourth year for students in the Neuroscience Track. UTHSC has agreed to pay all IBS stipends prior to placement in labs, during which time they take coursework and do research rotations.

Students in the Neuroscience track take a sequence of several graduate core courses. In the first year, students enroll in Neuroscience Seminar, Neuroscience Student Symposium, Functional Neuroanatomy, and one of three courses offered in alternate years - students must take two of these three courses: Cellular Neuroscience, Behavioral Neuroscience or Developmental and Molecular Neurobiology. Students must also take a Statistics class, either at UTHSC or University of Memphis. A wide variety of additional courses are available to Neuroscience graduate students on the UTHSC campus, including courses in biochemistry, physiology, pharmacology, histology, and genetics.

In addition to their coursework, graduate students register for 3-4 laboratory rotations during the first year of graduate study in order to help them choose a research mentor. They typically then enter a laboratory during their second year and begin to acquire the specialized training they will need to complete their doctoral

dissertations. The Ph.D. degree is granted through the College of Graduate Health Sciences. The degree requires a minimum of six semesters of graduate work and normally requires from four-six years to complete.

During the past academic year, NI supported matching stipends for 6 students. In addition, 8 postdoctoral fellows were supported with matching funds. One graduate student previously supported by the NI was awarded their Ph.D. this past year. NI has taken a more active role in the national recruitment efforts for the graduate program (see Goals below and **Appendix 4**).

IX. NEUROSCIENCE SEMINARS AND SYMPOSIA

During the 2013-2014 academic year, the NI sponsored the weekly Neuroscience Seminar Series, hosting 27 seminars. Of these, 17 neuroscientists from outside UTHSC and 10 within the NI presented their recent research findings to UT faculty and students. The NI seminar series serves as the basis for a graduate course, Neuroscience Seminar (ANAT 821), which is attended by all neuroscience track IPBS graduate students and within which they read papers by and meet with the visiting scientists. This seminar program is vital to the Neuroscience Track of the Graduate Program and to the entire UT neuroscience community, serving to keep our faculty and students abreast of recent developments and, perhaps even more important, to showcase our strengths to national and international leaders in neuroscience research visiting our campus. NI also assists in the Student Seminar course (course director William Armstrong), where students give seminars and receive critical feedback from their colleagues. A complete list of FY 2013-2014 seminar speakers and their topics are provided in **Appendix 3**.

NI continued its long-standing collaboration with the Urban Child Institute for a symposium on **“Brain Development in School and Life: Can Intervention Recover Missed Opportunities”**. This symposium had ~100 attendees (primarily those involved with care of infants to preK children) and received news coverage in the Commercial Appeal and the University Record (**Appendix 4**). Speakers Clancy Blair, Ph.D. from New York University and Nathan Fox, Ph.D. from University of Maryland, talked about the development of executive function in children, and the effects of early psychosocial deprivations. The NI also partnered with the Urban Child Institute, the CANDLE study group, and the Department of Preventive Medicine on a daylong conference that preceded these talks entitled **“Early Brain Development and Function: Impact on Social and Health Outcomes”**. This event featured 5 outside speakers, including Drs. Blair and Fox. A flyer for this event is also shown in **Appendix 4**.

X. GOALS OF THE INSTITUTE AND RECENT ACCOMPLISHMENTS

Four long-range goals of the UT Neuroscience Institute were established in 1985 and set to promote excellence in Neuroscience research, education and patient care at UTHSC. In the past 5 years we have made a concerted effort to promote Neuroscience at UTHSC, providing funds for numerous clinical and basic science research projects, funding postdocs in NI labs, and supporting the hiring of new Neuroscience faculty.

Goal 1. Augment our already strong research efforts in Neuroscience by a) recruitment of new faculty, b) renovation of facilities, c) acquisition of equipment, d) developing major programmatic activities, and e) creating a focal point to promote the exchange of information among our research faculty.

1a. Faculty recruitment. NI is providing \$384,000 in seed money toward the seed packages for Dr. Catherine Kaczorowski and Dr. Victor Chizhikov. We are distributing these funds over 4-5 years.

1b. Acquisition of equipment for Cores. In the past, NI has contributed matching funds for multi-user equipment grants, including those obtained from NIH for an electron microscope, for two confocal microscopes, for a computerized light microscope for three-dimensional neuronal reconstructions, and a high resolution digital camera attachment for the electron microscope, all are located in the Neuroscience Imaging Core and are maintained and supervised by a dedicated Technical Director (Dr. Amanda Preston) provided by the NI. The web site for the Imaging Center is constantly refreshed: (http://www.uthsc.edu/neuroscience/imaging-center/index.php?doc=m_content.inc) and features on line scheduling. We upgraded our NeuroLucida reconstruction computer with a new Z-axis motor, joystick, and computer, and we placed online two cyrostats in the Microtomy Core. We also purchased the Anymaze software, a GoPro underwater camera, and rotarod extender for the Behavioral Core, and previously placed the Digigait analysis workstation here (to measure gait abnormalities in mice models of neurodegenerative disease).

1c. Developing major programmatic activities. Several areas of research focus exist within the NI and are consolidated into seven research groups. These areas include: 1) Neurological and Neurodegenerative Disorders, 2) Vision and Retina, 3) Neurogenetics, Development and Evolution, 4) Sensory Information Processing, 5) Excitable Properties of Neurons, 6) Mental and Addictive Disorders, and 7) Neural Cell Signaling. These areas of focus provide for interaction among faculty in different departments and promote collaborative research activities, focused journal clubs, and other programmatic interactions conducive to interdisciplinary neuroscience research and training. The details of this organization are provided above.

NI has made a concerted effort to participate in faculty hires this past and coming year, which takes a substantial amount of funds to contribute to seed packages. In addition, several of our supported faculty the past few years have used NI funds to acquire DOD or NIH funding, e.g., most recently Tony Reiner for work on Traumatic Brain Injury (TBI). Dr. Reiner has established a TBI working group now featured on the NI website:

<http://www.uthsc.edu/neuroscience/tbi.php>. This year, we are creating a similar group concerning the neurobiology of feeding/metabolism and focused on obesity as well as eating disorders such as anorexia nervosa. This group will be led by John Boughter and Kristen O'Connell.

1d. Creating a focal point to promote the exchange of information among our research faculty. There are several avenues for the exchange of information:

1) Over 200 posters describing the interdisciplinary Graduate and Postdoctoral Program in Neuroscience are distributed yearly to undergraduate institutions around the country (see **Appendix 4**).

2) The NI Neuroscience Seminar series is a major mechanism for interaction among neuroscience faculty and students and brings outstanding neuroscientists from around the world to the UTHSC campus. During the past year, there were 27 seminars: 17 by visiting neuroscientists and 10 by NI or local faculty. Announcements are mailed to all participating faculty and students and are posted at various points throughout the UTHSC campus and a list of speakers is shown in **Appendix 3**.

3) There are several web sites maintained by NI or by NI faculty. The main NI website provides information on the NI and is a recruitment tool to attract first-rate neuroscience students and faculty. This site, <http://www.uthsc.edu/neuroscience/>, now includes all of the services offered by the Neuroscience Imaging Core, the Behavioral Core, a list of NI supported research projects, recent external funding of NI members, the Neuroscience Undergraduate Merit Scholars, Neuroscience Track students, new Research Groups, and many other items. Other servers are run by NI member and Governor's Chair, Rob Williams and offer Neuroscience faculty worldwide an avenue to present their research findings and search neurogenetic data, and is used daily by more than 100 scientists throughout the world. The servers may be found at: <http://www.nervenet.org>, <http://www.genenetwork.org/>, <http://www.mbl.org/>, <http://www.complextrait.org/>, and include the GeneNetwork, Mouse Brain Library, Complex Trait Analysis, Virtual Microscopy, Web QTL Project, among others.

4) Ms. Fleming maintains 3 servers for NI members. One server is for file exchange for users of the Imaging Center. All images are now digitally acquired from our confocal and electron microscopes, and these can be uploaded to this site by users, stored for a month, and downloaded at their convenience during that period. We also maintain a server for archiving all of our NI business, and a third server is maintained for the department of Anatomy and Neurobiology, which contains the largest single group of neuroscientists on campus. We also help maintain the website for this department (<http://www.uthsc.edu/anatomy-neurobiology/>).

5) NI maintains online scheduling calendars for the NI Imaging Center, Behavioral Core, and two conference rooms. In the case of the Imaging Center, these calendars also provide automated billing information to the administrative staff (PI, account numbers, hours used).

Goal 2. Promote education and research training in Neuroscience at the predoctoral (including undergraduate

and graduate students, dental, medical and other professional students and minority students) and postdoctoral (including Ph.D.s, interns and residents) levels of students at UT and other Tennessee institutions.

2a. Training for underprivileged students continues to be active and supported by NI neuroscientists and their laboratories through funds from the state of Tennessee, the College of Pharmacy, and Rust College. NI involvement comes primarily under the **Prescience Program** (part of a Summer Research Scholars Program administered by UTHSC graduate college), which provides financial support for summer research internships, and is administered by NI member Prof. Emeritus E. J. Johnson (Dr. Johnson still works part-time for UTHSC), with the help of NI member Kristen O'Connell. The **Prescience Program** provides basic science career exposure (research laboratory apprentice-preceptorship) and basic science skills reinforcement activity for scholarly oriented high school and college minority students. Students are paired with an undergraduate apprentice with a Ph.D. or M.D. biomedical scientist preceptor in a one-to-one relationship. This association and environment are designed to inform the student of the undergraduate prerequisites and essential course work that are required to pursue doctoral studies and to inform them of the demands and relevance of communication skills, mathematics, and science to the conduct of biomedical research.

2b. This year marks our ninth year for awarding **Undergraduate Neuroscience Merit Scholarships** to outstanding undergraduates at Rhodes College, Christian Brothers University (CBU) and students at other undergraduate institutions with Neuroscience programs who return home to Memphis in the summertime. The Rhodes and CBU scholars work on independent projects for their undergraduate thesis. The scholars (and mentors) for summer of 2014 were Anqi Zheng of CBU (Dr. Kanwaljeet Anand in Pediatrics) and Jessica Baker of Rhodes College (Drs. Kristen Hamre and Scott Heldt of Anatomy and Neurobiology). In some years, we also use this program to place Memphians who attend college elsewhere but wish to do summer research.

2c. In 2013-2014, NI supported the stipends of 6 students. ***We continue to support the recruitment of graduate students into the Neuroscience Track of Interdisciplinary Program for Biomedical Sciences by creating and circulating a flyer to 200 different undergraduate biology, psychology, and neuroscience programs nationwide.*** A copy of the flyer can be found in **Appendix 4**. We recently pledged matching funds for another 6 Neuroscience Track students for FY 2014-2015. NI provides a conference room for many activities, including student classes. Students engage our outside speakers each week, both in scientific meetings as part of the Seminar Class, but socially as well. Students are included in faculty lunches with outside speakers, as are postdocs. Students are also encouraged to pick one of the outside speakers each year.

2d. In 2013-2014, NI supported matching funds for 8 postdoctoral students, and have committed to 8 postdocs for FY 2014-2015.

Goal 3: Hasten the application of the latest and most promising scientific information to the clinical treatment of neurological disorders (e.g., Parkinson's disease, Alzheimer's disease, stroke, spinal cord injury, neurotrauma, brain tumors, cognitive disorders, drug addiction, and multiple sclerosis) by integrating educational and research programs.

3a. The Neuroscience Seminar series and Symposia encourage participation by the faculty, and collaborative research activities, especially those between basic scientists and clinical faculty. Several of the research focus areas of the NI are devoted primarily to study of the basic biology of human disease, including the groups for Neurological and Neurodegenerative Disorders, Neuro-oncology, Vision and Retina, and Mental and Addictive Disorders. This aim was addressed by our Neuroscience seminar series (**Appendix 3**) and the Urban Child annual symposia (**Appendices 3, 4**), which are detailed above.

3b. Research Projects funded by NI. During 2013-2014, the NI did not solicit research proposals but instead continued to support two new faculty hires, and will solicit postdoctoral matching applications. Other support is listed below.

-Postdoctoral Research Awards. The NI provided matching funds on a competitive basis for 8 postdoctoral fellows or research associates for FY 2013-2014. These awards are \$10,000-\$15,000 each. We will fund 8 postdocs in FY 2014-2015 at approximately the same level.

-Autism Research. NI supported a visiting graduate student (Juanma Ramirez) in Dr. Larry Reiter's (Neurology) lab to study genetics of autism.

Goal 4: Interact with the faculty of other UT campuses and neighboring undergraduate institutions

Some NI faculty are involved in large multi-institutional grant programs, involving a number of universities (listed above). There is considerable collaboration between NI faculty on the UTHSC campus and investigators at St. Jude Children's Research Hospital and at the University of Memphis.

In addition to research collaborations, we continue to sponsor the Neuroscience Seminar Series on the UTHSC campus, which is often attended by faculty and students from other Memphis institutions, and our faculty are involved in workshops and seminars at other institutions and at national meetings. Our Neuroscience Symposia, such as the "**Post-traumatic Stress Disorder: Clinical and Neurobiology Features**" symposium in April of 2014, bring together clinical and basic research scientists from our various local sites and outside of UTHSC (**See Appendix 4**). Currently we are planning a symposium for Spring of 2015 on the Neuroscience of Feeding.

As mentioned previously, the NI continues its community interaction with Urban Child Institute with a community forum during Brain Awareness Week at the Urban Child Institute. This past year's program, entitled "**Brain Development and Success in School and Life**", was directed toward parents, teachers, and other professionals involved in the care and early instruction of children (**Appendix 4**). The program was organized by NI member Dr. Paul Herron, and was hosted by NI Director William E. Armstrong. Two talks were featured, one by Clancy Blair of New York University and the other by Nathan Fox, Ph.D. ("**Branding and a Child's Brain**"), from the University of Maryland. Also as indicated above, the NI partnered with the Urban Child Institute, the CANDLE study group, and the Department of Preventive Medicine on a daylong conference that preceded these talks entitled "**Early Brain Development and Function: Impact on Social and Health Outcomes**". (**Appendix 4**).

The NI director, William Armstrong, was invited to contribute an editorial to the Commercial Appeal on August 11, 2013 entitled "**Interacting with Child is Greatest Gift**", wherein Dr. Armstrong discussed findings of the Urban Child Institute's 2013 Data Book, documenting trends in the Memphis area on many aspects of child development (**Appendix 4**). Finally, also as indicated earlier, this year we partnered with the Urban Child Institute on the development of a mobile, interactive kiosk aimed at informing the mothers of young children on ways of positive interactions that will facilitate brain development (**Appendix 4**).

APPENDIX 1
External Funding of Neuroscience Institute Faculty
FY 2013-2014

2014 Neuroscience Center of Excellence Annual Report

PI	AWARD TITLE	SPONSOR	Sponsor Award no	AWARD BEGIN DATE	AWARD END DATE	FY 2014 Total Cost
Armstrong, William	Reproductive Plasticity in Oxytocin Neurons	NIH-NICHHD	1R01HD072056-02	1/15/2014	12/31/2014	\$280,125.00
Boughter, John	Sensory Coding in Taste	NIH-NIDCD	5 R01 DC000353-29	9/1/2013	8/31/2014	\$260,294.00
Bukiya, Anna	Fetal cerebrovascular eCB system as a target of maternal alcohol consumption	NIH-NIAAA	1R21AA022433-01	6/5/2014	5/31/2015	\$178,125.00
Chaum, Edward	Delta State Rural Development Network Grant Program: TEAM Sugar-Free	Delta Health Alliance	4D60RH08555-06-03	8/1/2013	9/30/2013	\$44,716.00
Chaum, Edward	Proprietary Study	Private	Project 3192	9/1/2013	8/31/2014	\$8,640.00
Chaum, Edward	Phenotype Modeling - an in vivo Platform for Experimental and Therapeutic Intervention for Prom I Mutations	The Shulsky Foundation		11/1/2013	10/31/2014	\$150,000.00
Chaum, Edward	Proprietary Study	Private Sponsor	X052131	1/27/2014	4/1/2015	\$56,225.00
Chaum, Edward	Proprietary Study	Private Sponsor	X052130/CL3-78989-005	1/27/2014	3/31/2016	\$52,900.00
Chizhikov, Viktor	Analysis of a novel duplication locus causing human cerebellar	NIH-NICHHD	7R21NS077163-03	10/2/2013	6/30/2014	\$184,806.00
Dopico, Alejandro	Vasodilation via selective pharmacological targeting of BK channel beta1 subunits	NIH - NIHBL	1 R01 HL104631-04	12/1/2013	11/30/2014	\$349,967.00
Dopico, Alejandro	Vasodilation via selective pharmacological targeting of BK channel beta1 subunits	NIH - NIHBL	1 R01 HL104631-04 REVISED	12/1/2013	11/30/2014	\$31,109.00
Dopico, Alejandro	Ethanol Actions on SLO Channels From Arteries VS Brain	NIH - NIAAA	5 R37 AA11560-16	7/1/2013	6/30/2014	\$316,379.00
Fletcher, Max	Cholinergic Modulation of Early Olfactory Sensory Olfactory	Pew Charitable Trusts		7/1/2013	6/30/2014	\$60,000.00
Foehring, Robert	Slowly Inactivating K+ Channels in Neocortical Pyramidal Cells	NIH - NINDS	2R01NS044163-10	7/1/2013	6/30/2014	\$326,571.00
Heck, Detlef	CRCNS: Cerebellar Cortico-Nuclear Interactions	Emory University	S310099 5R01NS067201-04	9/1/2013	8/31/2014	\$14,840.00
Iannaccone, Alessandro	Autoimmunity and Age-Related Macular Degeneration	NIH-NEI	1R01EY022706-02	9/1/2013	8/31/2014	\$356,250.00
Jablonski, Monica	Genetic Modulation of Glaucoma	NIH-NEI	5 R01 EY021200-03	6/1/2013	5/31/2014	\$356,250.00
Jablonski, Monica	Pharmacokinetics and Biodistribution of a Novel Treatment for Age-Related Macular Degeneration	University of Tennessee Research Foundation	UTRF	12/9/2013	9/12/2014	\$15,000.00
Jablonski, Monica	A Novel Therapy and Delivery System to Treat Age-Related Macular Degeneration	William and Ella Owens Medical Research Foundation		3/16/2014	3/15/2015	\$50,000.00
Jaggar, Jonathan	Calcium channels in arterial smooth muscle cells	NIH - NIHBL	5 R01 HL094378-04	3/1/2014	2/28/2015	\$357,000.00
Jaggar, Jonathan	Calcium channels in arterial smooth muscle cells	NIH - NIHBL	5 R01 HL094378-04 REVISED	3/1/2013	2/28/2014	\$19,048.00

2014 Neuroscience Center of Excellence Annual Report

Jablonski, Monica	Genetic Modulation of Glaucoma	NIH-NEI	5 R01 EY021200-03	6/1/2013	5/31/2014	\$356,250.00
Jablonski, Monica	Oculotherapy	LaunchYourCity Inc.	LYC	9/15/2012	9/14/2013	\$20,000.00
Jablonski, Monica	Improved formulations for topical delivery of brimonidine for glaucoma	University of Tennessee Research Foundation	UTRF	12/10/2012	12/9/2013	\$15,000.00
Jaggar, Jonathan	Calcium channels in arterial smooth muscle cells	NIH - NIHBL	5 R01 HL094378-04	3/1/2013	2/28/2014	\$329,670.00
Jaggar, Jonathan	Calcium channels in arterial smooth muscle cells	NIH - NIHBL	5 R01 HL094378-04 REVISED	3/1/2013	2/28/2014	\$19,048.00
Jaggar, Jonathan	Arterial Smooth Muscle Chloride Channels	NIH - NIHBL	5 R01 HL110347-02	7/1/2012	6/30/2013	\$420,343.00
Kita, Hitoshi	Rhythmicity and Synchrony in the Basal Ganglia	Northwestern University	0600 370 S554 / 60021273 UT P50NS047085	10/5/2012	10/4/2013	\$210,149.00
Ledoux, Mark	Coenzyme Q10 in Huntington's Disease	Massachusetts General Hospital	2CARE 2U01NS052592-06	9/30/2012	7/31/2013	\$201,400.00
Ledoux, Mark	The Role of THAP1 in Dystonia	NIH - NINDS	5 R01 NS069936-03	8/1/2012	7/31/2013	\$317,275.00
Ledoux, Mark	Proprietary Study	Private	Dystonia Coalition	5/24/2011	8/31/2014	\$75,000.00
Ledoux, Mark	Genetics of Dystonia-Spastic Paraplegia	Cincinnati Children's Hospital Medical Center		5/17/2013	5/16/2014	\$10,000.00
Leffler, Charles	Control of Neonatal Circulation	NIH - NIHBL	2R01HL034059-28A1	6/7/2013	5/31/2014	\$389,706.00
Leffler, Charles	Hydrogen Sulfide in Newborn Cerebral Circulation	NIH - NIHBL	5 R01 HL042851-22	8/1/2012	7/31/2013	\$377,289.00
Li, Wei	Discovery of tissue-selective, nonhypercalcemic VDR modulators for RA treatment	NIH - NIAMS	1R21AR063242-01A1	4/1/2013	3/31/2014	\$159,375.00
Liao, Francesca-Fang	Novel regulation of BACE1 by nitrosative and metabolic stresses	Alzheimer's Association	11RG-11-204030	9/1/2012	8/31/2013	\$66,600.00
Liao, Francesca-Fang	AD pathogenesis in a novel diet model with partial eNOS deficiency	NIH-NIA	1R21AG041934-01A1	9/30/2012	8/31/2013	\$225,000.00
Malik, Kafait	Ecosanoids-Induced Vascular Growth During Injury	DHHS - NIH - National Heart, Lung, and Blood	1 R01 HL079109-07	12/1/2012	11/30/2013	\$347,625.00
Malik, Kafait	Ecosanoids-Induced Vascular Growth During Injury	NIH - NIHBL	1 R01 HL079109-07 REVISED	12/1/2012	11/30/2013	\$20,085.00
Malik, Kafait	Angiotensins, Prostaglandins - Adrenergic Interactions	NIH - NIHBL	5 R01 HL19134-38	4/1/2013	3/31/2014	\$581,462.00
Malik, Kafait	Angiotensins, Prostaglandins - Adrenergic Interactions	NIH - NIHBL	5 R01 HL19134-38 REVISED	4/1/2013	3/31/2014	\$10,821.00
McDonald, Michael	GD3 synthase gene therapy to improve memory and prevent neurodegeneration	NIH-NIA	5 R01AG0402301-02	9/1/2012	8/31/2013	\$307,500.00
McDonald, Michael	GD3S knockdown to improve cognitive and motor deficits in models of parkinsonism	NIH - NINDS	5R01NS065063-05	2/1/2013	1/31/2014	\$285,548.00

2014 Neuroscience Center of Excellence Annual Report

McDonald, Michael	GD3S knockdown to improve cognitive and motor deficits in models of parkinsonism	NIH - NINDS	5R01NS065063-05 REVISED	2/1/2013	1/31/2014	\$20,623.00
McDonald, Michael	Dietary glycomacropeptide (GMP) for neuroprotection and cognitive enhancement	NIH-NIA	5R21AG041935-02	4/15/2013	2/28/2014	\$168,750.00
McDonald, Michael	Dietary glycomacropeptide (GMP) for neuroprotection and cognitive enhancement	DHHS - NIH - National Institute on Aging	5R21AG041935-02 REVISED	4/15/2013	2/28/2014	\$8,438.00
Miller, Duane	Treatment with KZ-41 and OTP Promotes wound healing in a radiation combined injury model	NIH- NIAID	5 R33 AI080534-05	9/1/2012	8/31/2013	\$356,484.00
Miller, Duane	Proprietary Study	Private		1/31/2013	1/30/2014	\$47,359.00
Nowak, Thaddeus	Eliminating anesthesia confounds in experimental stroke	NIH - NINDS	1 R21 NS077039-02	9/1/2012	8/31/2013	\$187,500.00
Nowak, Thaddeus	Genetics of stroke vulnerability in mice	NIH - NINDS	5R21NS066166-02	7/1/2012	6/30/2013	\$187,500.00
Nowak, Thaddeus	Genetics of stroke vulnerability in mice	NIH - NINDS	5R21NS066166-02S1	7/1/2012	6/30/2013	\$22,460.00
O'Connell, Kristen	Leptin signaling in hypothalamic neurons and glutamate receptors	Beth Israel Deaconess Medical Center	01025884 5R01DK09040-02	5/1/2013	4/30/2014	\$25,285.00
O'Connell, Kristen	Leptin signaling in hypothalamic neurons and glutamate receptors	Beth Israel Deaconess Medical Center	1R01DK094040	5/19/2012	4/30/2013	\$25,285.00
Parfenova, Elena	Cerebrovascular Stress and Circulating Endothelial Cells	NIH - NINDS	5 R01 NS063936-04	2/1/2013	1/31/2014	\$285,548.00
Parfenova, Elena	Cerebrovascular Stress and Circulating Endothelial Cells	NIH - NINDS	5 R01 NS063936-04 REVISED	2/1/2013	1/31/2014	\$20,623.00
Parfenova, Elena	Heme Oxygenase and Cerebral Vascular Injury	NIH - NINDS	5 R01HL099655-09	6/1/2013	5/31/2014	\$348,718.00
Pfeiffer, Ronald	Proprietary Study	Private	SP1055 Study	5/16/2013	12/31/2013	(\$24,060.00)
Pfeiffer, Ronald	Vasodilation via selective pharmacological targeting of BK channel beta1 subunits	TEVA Neuroscience	TEVA	5/3/2013	5/4/2013	\$10,000.00
Reiner, Anton	Neural Control of Choroidal Blood Flow	NIH-NEI	5 R01 EY005298-26	4/1/2013	3/31/2014	\$337,500.00
Reiner, Anton	Neural Control of Choroidal Blood Flow	NIH-NEI	5 R01 EY005298-26 REVISED	4/1/2013	3/31/2014	\$18,750.00
Steinle, Jena	Compound 49b prevents diabetic retinopathy through IGFBP3	Juvenile Diabetes Foundation	1-2011-597	8/1/2012	7/31/2013	\$165,000.00
Steinle, Jena	Compound 49b Prevents Retinal Endothelial Cell Death Through IGFBP-3 Levels	NIH-NEI	1R01EY022045-01A1	9/1/2012	8/31/2013	\$375,000.00
Steinle, Jena	Mechanisms of TNFalpha-Induced Insulin Resistance in Retinal Cells	NIH-NEI	1R01EY022330-01A1	6/1/2013	5/31/2014	\$262,500.00
Steinle, Jena	Study of blast injury	DOD	W81XWH-12-1-0318	8/15/2012	2/13/2013	\$250,000.00

2014 Neuroscience Center of Excellence Annual Report

Tavalin, Steven	Proprietary Study	Private	VUMC38103 2R01MH063232-13	1/1/2013	12/31/2014	\$18,637.00
Zhou, Fuming	TRPC3 channel mediates 5-HT2C receptor-induced excitation	NIH - NINDS	5 R03 NS076960-02	9/1/2012	8/31/2013	\$75,000.00
Zhou, Fuming	Regulation of basal ganglia output neurons	NIH - NINDS	5R01NS058850-05	9/1/2012	8/31/2013	\$269,231.00
TOTAL						\$12,477,583.00

APPENDIX 2

Faculty Publications and Society for Neuroscience Presentations

FY 2013-2014

1) Peer-reviewed publications for 2013-2014 (cited in PubMed):

- Aboud, O, Mrak, RE, **Boop, FA**, & Griffin, WS. (2013). Epilepsy: neuroinflammation, neurodegeneration, and APOE genotype. *Acta Neuropathol Commun*, 1(1), 41.
- Adal, KM, Sidibe, D, Ali, S, **Chaum, E**, Karnowski, TP, & Meriaudeau, F. (2014). Automated detection of microaneurysms using scale-adapted blob analysis and semi-supervised learning. *Comput Methods Programs Biomed*, 114(1), 1-10.
- Al Darazi, F, Zhao, W, Zhao, T, Sun, Y, Marion, TN, Ahokas, RA, **Bhattacharya, SK**, Gerling, IC, & Weber, KT. (2014). Small Dedifferentiated Cardiomyocytes Bordering on Microdomains of Fibrosis: Evidence for Reverse Remodeling with Assisted Recovery. *J Cardiovasc Pharmacol*.
- Alami, NH, Smith, RB, Carrasco, MA, Williams, LA, Winborn, CS, Han, SS, Kiskinis, E, Winborn, B, Freibaum, BD, Kanagaraj, A, Clare, AJ, Badders, NM, Bilican, B, **Chaum, E**, Chandran, S, Shaw, CE, Eggan, KC, Maniatis, T, & **Taylor, JP**. (2014). Axonal transport of TDP-43 mRNA granules is impaired by ALS-causing mutations. *Neuron*, 81(3), 536-543.
- Alcalay, RN, Caccappolo, E, Mejia-Santana, H, Tang, MX, Rosado, L, Orbe Reilly, M, Ruiz, D, Louis, ED, Comella, CL, Nance, MA, Bressman, SB, Scott, WK, Tanner, CM, Mickel, SF, Waters, CH, Fahn, S, Cote, LJ, Frucht, SJ, Ford, B, Rezak, M, Novak, KE, Friedman, JH, **Pfeiffer, RF**, Marsh, L, Hiner, B, Payami, H, Molho, E, Factor, SA, Nutt, JG, Serrano, C, Arroyo, M, Ottman, R, Pauciulo, MW, Nichols, WC, Clark, LN, & Marder, KS. (2014). Cognitive and motor function in long-duration PARKIN-associated Parkinson disease. *JAMA Neurol*, 71(1), 62-67.
- Ali, S, Sidibe, D, Adal, KM, Giancardo, L, **Chaum, E**, Karnowski, TP, & Meriaudeau, F. (2013). Statistical atlas based exudate segmentation. *Comput Med Imaging Graph*, 37(5-6), 358-368.
- Anand, KJ**. (2013). Pain panacea for opiophobia in infants? *JAMA*, 309(2), 183-184.
- Anand, KJ**. (2014). Pediatric critical care: grand challenges for a glowing future. *Front Pediatr*, 2, 35.
- Anand, KJ**, Clark, AE, Willson, DF, Berger, J, Meert, KL, Zimmerman, JJ, Harrison, R, Carcillo, JA, Newth, CJ, Bisping, S, Holubkov, R, Dean, JM, Nicholson, CE, Eunice Kennedy Shriver National Institute of Child, H, & Human Development Collaborative Pediatric Critical Care Research, N. (2013). Opioid analgesia in mechanically ventilated children: results from the multicenter Measuring Opioid Tolerance Induced by Fentanyl study. *Pediatr Crit Care Med*, 14(1), 27-36.
- Anand, KJ**, Palmer, FB, & **Papanicolaou, AC**. (2013). Repetitive neonatal pain and neurocognitive abilities in ex-preterm children. *Pain*, 154(10), 1899-1901.
- Annunziata, I, & **d'Azzo, A**. (2013). Interorganellar membrane microdomains: dynamic platforms in the control of calcium signaling and apoptosis. *Cells*, 2(3), 574-590.
- Annunziata, I, Patterson, A, Helton, D, Hu, H, Moshiah, S, Gomero, E, Nixon, R, & **d'Azzo, A**. (2013). Lysosomal NEU1 deficiency affects amyloid precursor protein levels and amyloid-beta secretion via deregulated lysosomal exocytosis. *Nat Commun*, 4, 2734.
- Barzilai, A, & **McKinnon, PJ**. (2013). Genome maintenance in the nervous system; insight into the role of the DNA damage response in brain development and disease. *DNA Repair (Amst)*, 12(8), 541-542.
- Baver, SB, Hope, K, Guyot, S, Bjorbaek, C, **Kaczorowski, C**, & **O'Connell, KM**. (2014). Leptin modulates the intrinsic excitability of AgRP/NPY neurons in the arcuate nucleus of the hypothalamus. *J Neurosci*, 34(16), 5486-5496.
- Bayazitov, IT, Westmoreland, JJ, & **Zakharenko, SS**. (2013). Forward suppression in the auditory cortex is caused by the Ca(v)3.1 calcium channel-mediated switch from bursting to tonic firing at thalamocortical projections. *J Neurosci*, 33(48), 18940-18950.
- Birg, L, **Narayana, S**, Rezaie, R, & **Papanicolaou, A**. (2013). Technical tips: MEG and EEG with sedation. *Neurodiagn J*, 53(3), 229-240.
- Blundon, JA, & **Zakharenko, SS**. (2013). Presynaptic gating of postsynaptic synaptic plasticity: a plasticity filter in the adult auditory cortex. *Neuroscientist*, 19(5), 465-478.
- Bonten, EJ, Annunziata, I, & **d'Azzo, A**. (2014). Lysosomal multienzyme complex: pros and cons of working

- together. *Cell Mol Life Sci*, 71(11), 2017-2032.
- Boop, S, **Wheless, J**, Van Poppel, K, **McGregor, A**, & **Boop, FA**. (2013). Cerebellar seizures. *J Neurosurg Pediatr*, 12(3), 288-292.
- Brocato, B, Zoerner, AA, Janjetovic, Z, Skobowiat, C, Gupta, S, **Moore, BM**, 2nd, Slominski, A, Zhang, J, Schenone, M, Phinehas, R, Ferry, RJ, Jr., Dick, E, Jr., Hubbard, GB, Mari, G, & Schlabritz-Loutsevitch, N. (2013). Endocannabinoid crosstalk between placenta and maternal fat in a baboon model (*Papio spp.*) of obesity. *Placenta*, 34(11), 983-989.
- Bukiya, A, **Dopico, AM**, **Leffler, CW**, & Fedinec, A. (2014). Dietary cholesterol protects against alcohol-induced cerebral artery constriction. *Alcohol Clin Exp Res*, 38(5), 1216-1226.
- Bukiya, AN, Kuntamallappanavar, G, Edwards, J, Singh, AK, Shivakumar, B, & **Dopico, AM**. (2014). An alcohol-sensing site in the calcium- and voltage-gated, large conductance potassium (BK) channel. *Proc Natl Acad Sci U S A*, 111(25), 9313-9318.
- Caciotti, A, Catarzi, S, Tonin, R, Lugli, L, Perez, CR, Michelakakis, H, Mavridou, I, Donati, MA, Guerrini, R, **d'Azzo, A**, & Morrone, A. (2013). Galactosialidosis: review and analysis of CTSA gene mutations. *Orphanet J Rare Dis*, 8, 114.
- Cagle, MC, & **Honig, MG**. (2014). Parcellation of cerebellins 1, 2, and 4 among different subpopulations of dorsal horn neurons in mouse spinal cord. *J Comp Neurol*, 522(2), 479-497.
- Caron, E, Morgan, R, & **Wheless, JW**. (2014). An unusual cause of flaccid paralysis and coma: baclofen overdose. *J Child Neurol*, 29(4), 555-559.
- Cheishvili, D, **Dietrich, P**, Maayan, C, Even, A, Weil, M, **Dragatsis, I**, & Razin, A. (2014). IKAP deficiency in an FD mouse model and in oligodendrocyte precursor cells results in downregulation of genes involved in oligodendrocyte differentiation and myelin formation. *PLoS One*, 9(4), e94612.
- Chen, H**, Luo, R, Gong, S, Matta, SG, & **Sharp, BM**. (2014). Protection genes in nucleus accumbens shell affect vulnerability to nicotine self-administration across isogenic strains of adolescent rat. *PLoS One*, 9(1), e86214.
- Chen, J, Slominski, AT, **Miller, DD**, & Li, W. (2013). Effects of sidechain length and composition on the kinetic conversion and product distribution of vitamin D analogs determined by real-time NMR. *Dermatoendocrinol*, 5(1), 142-149.
- Chen, J, Wang, J, Kim, TK, Tieu, EW, Tang, EK, Lin, Z, Kovacic, D, **Miller, DD**, Postlethwaite, A, Tuckey, RC, Slominski, AT, & Li, W. (2014). Novel vitamin D analogs as potential therapeutics: metabolism, toxicity profiling, and antiproliferative activity. *Anticancer Res*, 34(5), 2153-2163.
- Chen, X, Bahrami, A, Pappo, A, Easton, J, Dalton, J, Hedlund, E, Ellison, D, Shurtleff, S, Wu, G, Wei, L, Parker, M, Rusch, M, Nagahawatte, P, Wu, J, Mao, S, Boggs, K, Mulder, H, Yergeau, D, Lu, C, Ding, L, Edmonson, M, Qu, C, Wang, J, Li, Y, Navid, F, Daw, NC, Mardis, ER, Wilson, RK, Downing, JR, Zhang, J, **Dyer, MA**, & St. Jude Children's Research Hospital-Washington University Pediatric Cancer Genome, P. (2014). Recurrent somatic structural variations contribute to tumorigenesis in pediatric osteosarcoma. *Cell Rep*, 7(1), 104-112.
- Chen, X, Stewart, E, Shelat, AA, Qu, C, Bahrami, A, Hatley, M, Wu, G, Bradley, C, McEvoy, J, Pappo, A, Spunt, S, Valentine, MB, Valentine, V, Krafcik, F, Lang, WH, Wierdl, M, Tsurkan, L, Tolleman, V, Federico, SM, Morton, C, Lu, C, Ding, L, Easton, J, Rusch, M, Nagahawatte, P, Wang, J, Parker, M, Wei, L, Hedlund, E, Finkelstein, D, Edmonson, M, Shurtleff, S, Boggs, K, Mulder, H, Yergeau, D, Skapek, S, Hawkins, DS, Ramirez, N, Potter, PM, Sandoval, JA, Davidoff, AM, Mardis, ER, Wilson, RK, Zhang, J, Downing, JR, **Dyer, MA**, & St. Jude Children's Research Hospital-Washington University Pediatric Cancer Genome, P. (2013). Targeting oxidative stress in embryonal rhabdomyosarcoma. *Cancer Cell*, 24(6), 710-724.
- Chen, Y, Wang, B, Liu, D, Li, JJ, Xue, Y, **Sakata, K**, Zhu, LQ, **Heldt, SA**, Xu, H, & **Liao, FF**. (2014). Hsp90 chaperone inhibitor 17-AAG attenuates Abeta-induced synaptic toxicity and memory impairment. *J Neurosci*, 34(7), 2464-2470.
- Cheshire, WP, & **Pfeiffer, RF**. (2013). Is alpha-synuclein rising to the surface as a diagnostic biomarker for Parkinson disease? *Neurology*, 81(18), 1568-1569.
- Choudhri, AF, Klimo, P, Jr., Auschwitz, TS, Whitehead, MT, & **Boop, FA**. (2014). 3T Intraoperative MRI for Management of Pediatric CNS Neoplasms. *AJNR Am J Neuroradiol*.

- Choudhri, AF, **Narayana, S**, Rezaie, R, Whitehead, MT, McAfee, SS, **Wheless, JW**, **Boop, FA**, & **Papanicolaou, AC**. (2013). Same day tri-modality functional brain mapping prior to resection of a lesion involving eloquent cortex: technical feasibility. *Neuroradiol J*, 26(5), 548-554.
- Choudhri, AF, Whitehead, MT, Klimo, P, Jr., Montgomery, BK, & **Boop, FA**. (2014). Diffusion tensor imaging to guide surgical planning in intramedullary spinal cord tumors in children. *Neuroradiology*, 56(2), 169-174.
- Choudhri, AF, Whitehead, MT, **McGregor, AL**, Einhaus, SL, **Boop, FA**, & **Wheless, JW**. (2013). Diffusion tensor imaging to evaluate commissural disconnection after corpus callosotomy. *Neuroradiology*, 55(11), 1397-1403.
- Chun, S, Westmoreland, JJ, Bayazitov, IT, Eddins, D, Pani, AK, **Smeyne, RJ**, Yu, J, Blundon, JA, & **Zakharenko, SS**. (2014). Specific disruption of thalamic inputs to the auditory cortex in schizophrenia models. *Science*, 344(6188), 1178-1182.
- Conant, KD, Finucane, B, Cleary, N, Martin, A, Muss, C, Delany, M, Murphy, EK, Rabe, O, Luchsinger, K, Spence, SJ, Schanen, C, Devinsky, O, Cook, EH, LaSalle, J, **Reiter, LT**, & Thibert, RL. (2014). A survey of seizures and current treatments in 15q duplication syndrome. *Epilepsia*, 55(3), 396-402.
- Coskun, MA, Loveland, KA, Pearson, DA, **Papanicolaou, AC**, & Sheth, BR. (2013). Interaction of finger representations in the cortex of individuals with autism: a functional window into cortical inhibition. *Autism Res*, 6(6), 542-549.
- Cox, BC, Chai, R, Lenoir, A, Liu, Z, Zhang, L, Nguyen, DH, Chalasani, K, Steigelman, KA, Fang, J, Rubel, EW, Cheng, AG, & **Zuo, J**. (2014). Spontaneous hair cell regeneration in the neonatal mouse cochlea in vivo. *Development*, 141(4), 816-829.
- Curry, CJ, Rosenfeld, JA, Grant, E, Gripp, KW, Anderson, C, Aylsworth, AS, Saad, TB, **Chizhikov, VV**, Dybose, G, Fagerberg, C, Falco, M, Fels, C, Fichera, M, Graakjaer, J, Greco, D, Hair, J, Hopkins, E, Huggins, M, Ladda, R, Li, C, Moeschler, J, Nowaczyk, MJ, Ozmore, JR, Reitano, S, Romano, C, Roos, L, Schnur, RE, Sell, S, Suwannarat, P, Svaneby, D, Szybowska, M, Tarnopolsky, M, Tervo, R, Tsai, AC, Tucker, M, Vallee, S, Wheeler, FC, Zand, DJ, Barkovich, AJ, Aradhya, S, Shaffer, LG, & Dobyns, WB. (2013). The duplication 17p13.3 phenotype: analysis of 21 families delineates developmental, behavioral and brain abnormalities, and rare variant phenotypes. *Am J Med Genet A*, 161A(8), 1833-1852.
- Deng, YP, Wong, T, Bricker-Anthony, C, Deng, B, & **Reiner, A**. (2013). Loss of corticostriatal and thalamostriatal synaptic terminals precedes striatal projection neuron pathology in heterozygous Q140 Huntington's disease mice. *Neurobiol Dis*, 60, 89-107.
- Dickson, PE, Calton, MA, & **Mittleman, G**. (2014). Performance of C57BL/6J and DBA/2J mice on a touchscreen-based attentional set-shifting task. *Behav Brain Res*, 261, 158-170.
- Dickson, PE, Miller, MM, Rogers, TD, Blaha, CD, & **Mittleman, G**. (2014). Effects of adolescent nicotine exposure and withdrawal on intravenous cocaine self-administration during adulthood in male C57BL/6J mice. *Addict Biol*, 19(1), 37-48.
- Dimitriadis, SI, Laskaris, NA, Simos, PG, Micheloyannis, S, Fletcher, JM, Rezaie, R, & **Papanicolaou, AC**. (2013). Altered temporal correlations in resting-state connectivity fluctuations in children with reading difficulties detected via MEG. *Neuroimage*, 83, 307-317.
- Ding, S, & **Zhou, FM**. (2014). Serotonin regulation of subthalamic neurons. *Rev Neurosci*.
- Dong, C, & **Anand, KJ**. (2013). Developmental neurotoxicity of ketamine in pediatric clinical use. *Toxicol Lett*, 220(1), 53-60.
- Dong, HW**, & **Ennis, M**. (2014). Activation of group I metabotropic glutamate receptors enhances persistent sodium current and rhythmic bursting in main olfactory bulb external tufted cells. *J Neurophysiol*, 111(3), 641-647.
- DuBose, CS, Chesler, EJ, Goldowitz, D, & **Hamre, KM**. (2013). Use of the expanded panel of BXD mice narrow QTL regions in ethanol-induced locomotor activation and motor incoordination. *Alcohol Clin Exp Res*, 37(1), 170-183.
- Dyer, MA**, Arvold, ND, Chen, YH, Pinnell, NE, Mitin, T, Lee, EQ, Hodi, FS, Ibrahim, N, Weiss, SE, Kelly, PJ, Floyd, SR, Mahadevan, A, & Alexander, BM. (2014). The role of whole brain radiation therapy in the management of melanoma brain metastases. *Radiat Oncol*, 9(1), 143.

- Earls, LR, Westmoreland, JJ, & **Zakharenko, SS**. (2014). Non-coding RNA regulation of synaptic plasticity and memory: Implications for aging. *Ageing Res Rev*.
- Earls, LR, & **Zakharenko, SS**. (2013). A Synaptic Function Approach to Investigating Complex Psychiatric Diseases. *Neuroscientist*, 20(3), 257-271.
- Edelmann, MN, **Ogg, RJ**, Scoggins, MA, Brinkman, TM, Sabin, ND, Pui, CH, Srivastava, DK, Robison, LL, Hudson, MM, & Krull, KR. (2013). Dexamethasone exposure and memory function in adult survivors of childhood acute lymphoblastic leukemia: A report from the SJLIFE cohort. *Pediatr Blood Cancer*, 60(11), 1778-1784.
- Eden, CJ, Ju, B, Murugesan, M, Phoenix, TN, Nimmervoll, B, Tong, Y, Ellison, DW, Finkelstein, D, Wright, K, Boulos, N, Dapper, J, Thiruvengatam, R, Lessman, CA, **Taylor, MR**, & Gilbertson, RJ. (2014). Orthotopic models of pediatric brain tumors in zebrafish. *Oncogene*, 0.
- Eggly, S, Meert, KL, Berger, J, Zimmerman, J, **Anand, KJ**, Newth, CJ, Harrison, R, Carcillo, J, Dean, JM, Willson, DF, Eunice Kennedy Shriver National Institute of Child, H, Human Development, C, & Pediatric Critical Care Research, N. (2013). Physicians' conceptualization of "closure" as a benefit of physician-parent follow-up meetings after a child's death in the pediatric intensive care unit. *J Palliat Care*, 29(2), 69-75.
- Elabiad, MT, Arheart, KL, Korones, SB, & **Pourcyrous, M**. (2014). Adjusting for Bias in C-Reactive Protein Levels When Using a Vitros Slide Method in Infants. *Am J Perinatol*.
- Evanson, KW, Bannister, JP, Leo, MD, & **Jaggard, JH**. (2014). LRRC26 Is a Functional BK Channel Auxiliary gamma Subunit in Arterial Smooth Muscle Cells. *Circ Res*, 115(4), 423-431.
- Evidente, VG, Fernandez, HH, **LeDoux, MS**, Brashear, A, Grafe, S, Hanschmann, A, & Comella, CL. (2013). A randomized, double-blind study of repeated incobotulinumtoxinA (Xeomin((R))) in cervical dystonia. *J Neural Transm*, 120(12), 1699-1707.
- Fain, JN, Company, JM, Booth, FW, Laughlin, MH, Padilla, J, Jenkins, NT, **Bahouth, SW**, & Sacks, HS. (2013). Exercise training does not increase muscle FNDC5 protein or mRNA expression in pigs. *Metabolism*, 62(10), 1503-1511.
- Fells, JI, Lee, SC, Norman, DD, Tsukahara, R, Kirby, JR, Nelson, S, Seibel, W, Papoian, R, Patil, R, **Miller, DD**, Parrill, AL, Pham, TC, Baker, DL, Bittman, R, & Tigyi, G. (2013). Targeting the hydrophobic pocket of autotaxin with virtual screening of inhibitors identifies a common aromatic sulfonamide structural motif. *FEBS J*.
- Fielding, JR, Rogers, TD, Meyer, AE, Miller, MM, Nelms, JL, **Mittleman, G**, Blaha, CD, & Sable, HJ. (2013). Stimulation-evoked dopamine release in the nucleus accumbens following cocaine administration in rats perinatally exposed to polychlorinated biphenyls. *Toxicol Sci*, 136(1), 144-153.
- Figley, MD, Bieri, G, Kolaitis, RM, **Taylor, JP**, & Gitler, AD. (2014). Profilin 1 associates with stress granules and ALS-linked mutations alter stress granule dynamics. *J Neurosci*, 34(24), 8083-8097.
- Fitzgerald, AC, Wright, BT, & **Heldt, SA**. (2014). The behavioral pharmacology of zolpidem: evidence for the functional significance of alpha1-containing GABA(A) receptors. *Psychopharmacology (Berl)*, 231(9), 1865-1896.
- Flanigan, TJ, Xue, Y, Kishan Rao, S, Dhanushkodi, A, & **McDonald, MP**. (2014). Abnormal vibrissa-related behavior and loss of barrel field inhibitory neurons in 5xFAD transgenics. *Genes Brain Behav*.
- Fletcher, ML**, & Bendahmane, M. (2014). Visualizing olfactory learning functional imaging of experience-induced olfactory bulb changes. *Prog Brain Res*, 208, 89-113.
- Ganta, K, Malik, AM, Wood, JB, & **Levin, MC**. (2014). Radial contrast enhancement on brain magnetic resonance imaging diagnostic of primary angiitis of the central nervous system: a case report and review of the literature. *J Med Case Rep*, 8, 26.
- Ganzewinkel, CJ, **Anand, KJ**, Kramer, BW, & Andriessen, P. (2013). Chronic Pain in the Newborn: Toward a Definition. *Clin J Pain*.
- Gerling, IC, Ahokas, RA, Kamalov, G, Zhao, W, **Bhattacharya, SK**, Sun, Y, & Weber, KT. (2013). Gene expression profiles of peripheral blood mononuclear cells reveal transcriptional signatures as novel biomarkers of cardiac remodeling in rats with aldosteronism and hypertensive heart disease. *JACC Heart Fail*, 1(6), 469-476.
- Graybeal, C, Bachu, M, Mozhui, K, Saksida, LM, Bussey, TJ, Sagalyn, E, **Williams, RW**, & Holmes, A.

- (2014). Strains and stressors: an analysis of touchscreen learning in genetically diverse mouse strains. *PLoS One*, 9(2), e87745.
- Guan, D, **Armstrong, WE**, & **Foehring, RC**. (2013). Kv2 channels regulate firing rate in pyramidal neurons from rat sensorimotor cortex. *J Physiol*, 591(Pt 19), 4807-4825.
- Guedj, R, Danan, C, Daoud, P, Zupan, V, Renolleau, S, Zana, E, Aizenfisz, S, Lapillonne, A, de Saint Blanquat, L, Granier, M, Durand, P, Castela, F, Coursol, A, Hubert, P, Cimerman, P, **Anand, KJ**, Khoshnood, B, & Carbajal, R. (2014). Does neonatal pain management in intensive care units differ between night and day? An observational study. *BMJ Open*, 4(2), e004086.
- He, F, Krans, A, Freibaum, BD, **Taylor, JP**, & Todd, PK. (2014). TDP-43 suppresses CGG repeat-induced neurotoxicity through interactions with HnRNP A2/B1. *Hum Mol Genet*.
- He, H, Williams-Guy, K, Pagadala, J, Presley, CS, **Miller, DD**, **Steinle, JJ**, & Yates, CR. (2014). A sensitive and fast LC-MS/MS method for determination of beta-receptor agonist JP-49b: application to a pharmacokinetic study in rats. *J Chromatogr B Analyt Technol Biomed Life Sci*, 953-954, 86-91.
- Heck, DH**, De Zeeuw, CI, Jaeger, D, Khodakhah, K, & Person, AL. (2013). The neuronal code(s) of the cerebellum. *J Neurosci*, 33(45), 17603-17609.
- Heldt, SA**, **Elberger, AJ**, Deng, Y, Guley, NH, Del Mar, N, Rogers, J, Choi, GW, Ferrell, J, Rex, TS, **Honig, MG**, & **Reiner, A**. (2014). A novel closed-head model of mild traumatic brain injury caused by primary overpressure blast to the cranium produces sustained emotional deficits in mice. *Front Neurol*, 5, 2.
- Heldt, SA**, Zimmermann, K, Parker, K, Gaval, M, Weinshenker, D, & Ressler, KJ. (2014). BDNF deletion or TrkB impairment in amygdala inhibits both appetitive and aversive learning. *J Neurosci*, 34(7), 2444-2450.
- Helton, KJ, Glass, JO, Reddick, WE, Paydar, A, Zandieh, AR, Dave, R, Smeltzer, MP, Wu, S, Hankins, J, Aygun, B, & **Ogg, RJ**. (2014). Comparing segmented ASL perfusion of vascular territories using manual versus semiautomated techniques in children with sickle cell anemia. *J Magn Reson Imaging*.
- Herr, MJ, Longhurst, CM, Baker, B, **Homayouni, R**, Speich, HE, Kotha, J, & Jennings, LK. (2014). Tetraspanin CD9 modulates human lymphoma cellular proliferation via histone deacetylase activity. *Biochem Biophys Res Commun*, 447(4), 616-620.
- Hess, PR, Rawnsley, DR, Jakus, Z, Yang, Y, Sweet, DT, Fu, J, Herzog, B, Lu, M, Nieswandt, B, **Oliver, G**, Makinen, T, Xia, L, & Kahn, ML. (2014). Platelets mediate lymphovenous hemostasis to maintain blood-lymphatic separation throughout life. *J Clin Invest*, 124(1), 273-284.
- Howarth, RA, Adamson, AM, Ashford, JM, Merchant, TE, **Ogg, RJ**, Schulenberg, SE, Ogg, S, Li, J, Wu, S, Xiong, X, & Conklin, HM. (2014). Investigating the relationship between COMT polymorphisms and working memory performance among childhood brain tumor survivors. *Pediatr Blood Cancer*, 61(1), 40-45.
- Huang, Y, Wang, L, Bennett, B, **Williams, RW**, Wang, YJ, Gu, WK, & Jiao, Y. (2013). Potential role of Atp5g3 in epigenetic regulation of alcohol preference or obesity from a mouse genomic perspective. *Genet Mol Res*, 12(3), 3662-3674.
- Ito, J, Roy, S, Liu, Y, Cao, Y, **Fletcher, M**, **Lu, L**, **Boughter, JD**, Grun, S, & **Heck, DH**. (2014). Whisker barrel cortex delta oscillations and gamma power in the awake mouse are linked to respiration. *Nat Commun*, 5, 3572.
- Jacewicz, M**, & Marino, CR. (2014). Neurologic complications of pancreas and small bowel transplantation. *Handb Clin Neurol*, 121, 1277-1293.
- Jackson, GR, Scott, IU, Kim, IK, Quillen, DA, **Iannaccone, A**, & Edwards, JG. (2014). Author response: additional considerations in the utility of dark adaptometry for the diagnosis of age-related macular degeneration. *Invest Ophthalmol Vis Sci*, 55(5), 3149.
- Jackson, GR, Scott, IU, Kim, IK, Quillen, DA, **Iannaccone, A**, & Edwards, JG. (2014). Diagnostic sensitivity and specificity of dark adaptometry for detection of age-related macular degeneration. *Invest Ophthalmol Vis Sci*, 55(3), 1427-1431.
- Jacola, LM, Ashford, JM, Reddick, WE, Glass, JO, **Ogg, RJ**, Merchant, TE, & Conklin, HM. (2014). The relationship between working memory and cerebral white matter volume in survivors of childhood brain tumors treated with conformal radiation therapy. *J Neurooncol*, 119(1), 197-205.

- Jardine, D, Emond, M, Meert, KL, Harrison, R, Carcillo, JA, **Anand, KJ**, Berger, J, Newth, CJ, Willson, DF, Nicholson, C, Dean, JM, Zimmerman, JJ, for the Eunice Kennedy Shriver National Institute of Child, H, & Human Development Collaborative Pediatric Critical Care Research, N. (2014). A Single Nucleotide Polymorphism in the Corticotropin Receptor Gene Is Associated With a Blunted Cortisol Response During Pediatric Critical Illness. *Pediatr Crit Care Med*.
- Jellen, LC, **Lu, L**, Wang, X, Unger, EL, Earley, CJ, Allen, RP, **Williams, RW**, & Jones, BC. (2013). Iron deficiency alters expression of dopamine-related genes in the ventral midbrain in mice. *Neuroscience*, 252, 13-23.
- Jennings, BL, George, LW, Pingili, AK, Khan, NS, Estes, AM, Fang, XR, Gonzalez, FJ, & **Malik, KU**. (2014). Estrogen metabolism by cytochrome P450 1B1 modulates the hypertensive effect of angiotensin II in female mice. *Hypertension*, 64(1), 134-140.
- Jennings, BL, Montanez, DE, May, ME, Jr., Estes, AM, Fang, XR, Yaghini, FA, Kanu, A, & **Malik, KU**. (2014). Cytochrome P450 1B1 contributes to increased blood pressure and cardiovascular and renal dysfunction in spontaneously hypertensive rats. *Cardiovasc Drugs Ther*, 28(2), 145-161.
- Jia, S, Muto, A, Orisme, W, Henson, HE, Parupalli, C, Ju, B, Baier, H, & **Taylor, MR**. (2014). Zebrafish Cacn1fa is required for cone photoreceptor function and synaptic ribbon formation. *Hum Mol Genet*, 23(11), 2981-2994.
- Jiang, Y, Liu, L, Pagadala, J, **Miller, DD**, & **Steinle, JJ**. (2013). Compound 49b protects against blast-induced retinal injury. *J Neuroinflammation*, 10(1), 96.
- Jiang, Y, Zhang, Q, Liu, L, Tang, J, Kern, TS, & **Steinle, JJ**. (2013). beta2-adrenergic receptor knockout mice exhibit a diabetic retinopathy phenotype. *PLoS One*, 8(7), e70555.
- Jiang, Y, Zhang, Q, & **Steinle, JJ**. (2014). Intravitreal injection of IGFBP-3 restores normal insulin signaling in diabetic rat retina. *PLoS One*, 9(4), e93788.
- Jiang, Y, Zhang, Q, Ye, EA, & **Steinle, JJ**. (2014). beta1-adrenergic receptor stimulation by agonist Compound 49b restores insulin receptor signal transduction in vivo. *Mol Vis*, 20, 872-880.
- Johnson, JO, Piro, EP, Boehringer, A, Chia, R, Feit, H, Renton, AE, Pliner, HA, Abramzon, Y, Marangi, G, Winborn, BJ, Gibbs, JR, Nalls, MA, Morgan, S, Shoai, M, Hardy, J, Pittman, A, Orrell, RW, Malaspina, A, Sidle, KC, Fratta, P, Harms, MB, Baloh, RH, Pestronk, A, Weihl, CC, Rogava, E, Zinman, L, Drory, VE, Borghero, G, Mora, G, Calvo, A, Rothstein, JD, Consortium, I, Drepper, C, Sendtner, M, Singleton, AB, **Taylor, JP**, Cookson, MR, Restagno, G, Sabatelli, M, Bowser, R, Chio, A, & Traynor, BJ. (2014). Mutations in the Matrin 3 gene cause familial amyotrophic lateral sclerosis. *Nat Neurosci*, 17(5), 664-666.
- Jones, BC, Huang, X, Mailman, RB, **Lu, L**, & **Williams, RW**. (2014). The perplexing paradox of paraquat: the case for host-based susceptibility and postulated neurodegenerative effects. *J Biochem Mol Toxicol*, 28(5), 191-197.
- Jones, BC, **Lu, L**, **Williams, RW**, Unger, EL, & Yin, L. (2013). Response to Breckenridge et al. (2013). *Neurotoxicology*, 38, 23-24.
- Ju, B, Chen, W, Spitsbergen, JM, Lu, J, Vogel, P, Peters, JL, Wang, YD, Orr, BA, Wu, J, Henson, HE, Jia, S, Parupalli, C, & **Taylor, MR**. (2014). Activation of Sonic hedgehog signaling in neural progenitor cells promotes glioma development in the zebrafish optic pathway. *Oncogenesis*, 3, e96.
- Kaczorowski, CC**, Stodola, TJ, Hoffmann, BR, Prisco, AR, Liu, PY, Didier, DN, Karcher, JR, Liang, M, Jacob, HJ, & Greene, AS. (2013). Targeting the endothelial progenitor cell surface proteome to identify novel mechanisms that mediate angiogenic efficacy in a rodent model of vascular disease. *Physiol Genomics*, 45(21), 999-1011.
- Kamalov, G, Zhao, W, Zhao, T, Sun, Y, Ahokas, RA, Marion, TN, Al Darazi, F, Gerling, IC, **Bhattacharya, SK**, & Weber, KT. (2013). Atrophic cardiomyocyte signaling in hypertensive heart disease. *J Cardiovasc Pharmacol*, 62(6), 497-506.
- Karnowski, TP, Giancardo, L, Li, Y, Tobin, KW, & **Chaum, E**. (2013). Retina image analysis and ocular telehealth: The oak ridge national laboratory-hamilton eye institute case study. *Conf Proc IEEE Eng Med Biol Soc*, 2013, 7140-7143.
- Katyal, S, Lee, Y, Nitiss, KC, Downing, SM, Li, Y, Shimada, M, Zhao, J, Russell, HR, Petrini, JH, Nitiss, JL, & **McKinnon, PJ**. (2014). Aberrant topoisomerase-1 DNA lesions are pathogenic in neurodegenerative

- genome instability syndromes. *Nat Neurosci*, 17(6), 813-821.
- Keeley, PW, Zhou, C, **Lu, L**, **Williams, RW**, Melmed, S, & Reese, BE. (2014). Pituitary tumor-transforming gene 1 regulates the patterning of retinal mosaics. *Proc Natl Acad Sci U S A*, 111(25), 9295-9300.
- Khan, MU, Zhao, W, Zhao, T, Al Darazi, F, Ahokas, RA, Sun, Y, **Bhattacharya, SK**, Gerling, IC, & Weber, KT. (2013). Nebivolol: a multifaceted antioxidant and cardioprotectant in hypertensive heart disease. *J Cardiovasc Pharmacol*, 62(5), 445-451.
- Khan, N, Thompson, CJ, Choudhri, AF, **Boop, FA**, & Klimo, P, Jr. (2013). Part I: The application of the h-index to groups of individuals and departments in academic neurosurgery. *World Neurosurg*, 80(6), 759-765 e753.
- Khan, NR, Auschwitz, T, McAbee, JH, **Boop, FA**, & Klimo, P, Jr. (2013). Highly cited publications in pediatric neurosurgery: part 2. *Childs Nerv Syst*, 29(12), 2215-2228.
- Khan, RB, Merchant, TE, **Boop, FA**, Sanford, RA, Ledet, D, Onar-Thomas, A, & Kun, LE. (2013). Headaches in children with craniopharyngioma. *J Child Neurol*, 28(12), 1622-1625.
- Kim, DK, Kang, B, Kim, OY, Choi, DS, Lee, J, Kim, SR, Go, G, Yoon, YJ, Kim, JH, Jang, SC, Park, KS, Choi, EJ, Kim, KP, **Desiderio, DM**, Kim, YK, Lotvall, J, Hwang, D, & Gho, YS. (2013). EVpedia: an integrated database of high-throughput data for systemic analyses of extracellular vesicles. *J Extracell Vesicles*, 2.
- Klimo, P, Jr., DeCuypere, M, Ragel, BT, McCartney, S, Couldwell, WT, & **Boop, FA**. (2013). Career satisfaction and burnout among U.S. neurosurgeons: a feasibility and pilot study. *World Neurosurg*, 80(5), e59-68.
- Klimo, P, Jr., Thompson, CJ, Ragel, BT, & **Boop, FA**. (2014). Methodology and reporting of meta-analyses in the neurosurgical literature. Response. *J Neurosurg*, 120(4), 794-795.
- Klimo, P, Jr., Thompson, CJ, Ragel, BT, & **Boop, FA**. (2014). Methodology and reporting of meta-analyses in the neurosurgical literature. *J Neurosurg*, 120(4), 796-810.
- Krieg, TD, Salinas, FS, **Narayana, S**, Fox, PT, & Mogul, DJ. (2013). PET-based confirmation of orientation sensitivity of TMS-induced cortical activation in humans. *Brain Stimul*, 6(6), 898-904.
- Lavado, A, & **Oliver, G**. (2014). Jagged1 is necessary for postnatal and adult neurogenesis in the dentate gyrus. *Dev Biol*, 388(1), 11-21.
- Layman, WS, Saucedo, MA, & **Zuo, J**. (2013). Epigenetic alterations by NuRD and PRC2 in the neonatal mouse cochlea. *Hear Res*, 304, 167-178.
- Lee, Y, Brown, EJ, Chang, S, & **McKinnon, PJ**. (2014). Pot1a prevents telomere dysfunction and ATM-dependent neuronal loss. *J Neurosci*, 34(23), 7836-7844.
- Leo, MD, Bannister, JP, Narayanan, D, Nair, A, Grubbs, JE, Gabrick, KS, **Boop, FA**, & **Jaggari, JH**. (2014). Dynamic regulation of beta1 subunit trafficking controls vascular contractility. *Proc Natl Acad Sci U S A*, 111(6), 2361-2366.
- Levin, MC**, Lee, S, Gardner, LA, Shin, Y, Douglas, JN, & Cooper, C. (2013). Autoantibodies to Non-myelin Antigens as Contributors to the Pathogenesis of Multiple Sclerosis. *J Clin Cell Immunol*, 4.
- Li, CX**, Chappell, TD, Ramshur, JT, & **Waters, RS**. (2014). Forelimb amputation-induced reorganization in the ventral posterior lateral nucleus (VPL) provides a substrate for large-scale cortical reorganization in rat forepaw barrel subfield (FBS). *Brain Res*.
- Li, CX**, Yang, Q, Vemulapalli, S, & **Waters, RS**. (2013). Forelimb amputation-induced reorganization in the cuneate nucleus (CN) is not reflected in large-scale reorganization in rat forepaw barrel subfield cortex (FBS). *Brain Res*, 1526, 26-43.
- Li, JJ, Dolios, G, Wang, R, & **Liao, FF**. (2014). Soluble beta-amyloid peptides, but not insoluble fibrils, have specific effect on neuronal microRNA expression. *PLoS One*, 9(3), e90770.
- Li, X, Nooh, MM, & **Bahouth, SW**. (2013). Role of AKAP79/150 protein in beta1-adrenergic receptor trafficking and signaling in mammalian cells. *J Biol Chem*, 288(47), 33797-33812.
- Liao, FF**, Wang, R, & Park, EA. (2013). Repression of Alzheimer's beta-secretase. *Aging (Albany NY)*, 5(11), 789-790.
- Liebe, R, Hall, RA, **Williams, RW**, Dooley, S, & Lammert, F. (2013). Systems genetics of hepatocellular damage in vivo and in vitro: identification of a critical network on chromosome 11 in mouse. *Physiol Genomics*, 45(20), 931-939.

- Lindsay, JH, Glass, JD, Amicarelli, M, & **Prosser, RA**. (2014). The mammalian circadian clock in the suprachiasmatic nucleus exhibits rapid tolerance to ethanol in vivo and in vitro. *Alcohol Clin Exp Res*, 38(3), 760-769.
- Liu, Z, Fang, J, Dearman, J, Zhang, L, & **Zuo, J**. (2014). In vivo generation of immature inner hair cells in neonatal mouse cochleae by ectopic Atoh1 expression. *PLoS One*, 9(2), e89377.
- Lucariello, A, Perna, A, Sellitto, C, Baldi, A, **Iannaccone, A**, Cobellis, L, De Luca, A, & De Falco, M. (2014). Modulation of wolframin expression in human placenta during pregnancy: comparison among physiological and pathological states. *Biomed Res Int*, 2014, 985478.
- Mary-Sinclair, MN, Wang, X, Swanson, DJ, Sung, CY, Mendonca, EA, Wroblewski, K, Baumer, SH, Goldowitz, D, **Jablonski, MM**, & Skapek, SX. (2014). Varied manifestations of persistent hyperplastic primary vitreous with graded somatic mosaic deletion of a single gene. *Mol Vis*, 20, 215-230.
- McEvoy, J, Nagahawatte, P, Finkelstein, D, Richards-Yutz, J, Valentine, M, Ma, J, Mullighan, C, Song, G, Chen, X, Wilson, M, Brennan, R, Pounds, S, Becksfort, J, Huether, R, Lu, C, Fulton, RS, Fulton, LL, Hong, X, Dooling, DJ, Ochoa, K, Mardis, ER, Wilson, RK, Easton, J, Zhang, J, Downing, JR, Ganguly, A, & **Dyer, MA**. (2014). RB1 gene inactivation by chromothripsis in human retinoblastoma. *Oncotarget*, 5(2), 438-450.
- McKimm, E, Corkill, B, Goldowitz, D, Albritton, LM, **Homayouni, R**, Blaha, CD, & **Mittleman, G**. (2014). Glutamate dysfunction associated with developmental cerebellar damage: relevance to autism spectrum disorders. *Cerebellum*, 13(3), 346-353.
- McKinnon, PJ**. (2013). Maintaining genome stability in the nervous system. *Nat Neurosci*, 16(11), 1523-1529.
- McKinnon, PJ**. (2014). TDP2 keeps the brain healthy. *Nat Genet*, 46(5), 419-421.
- Millen, KJ, Steshina, EY, Iskusnykh, IY, & **Chizhikov, VV**. (2014). Transformation of the cerebellum into more ventral brainstem fates causes cerebellar agenesis in the absence of Ptf1a function. *Proc Natl Acad Sci U S A*, 111(17), E1777-1786.
- Moscovich, M, **LeDoux, MS**, Xiao, J, Rampon, GL, Vemula, SR, Rodriguez, RL, Foote, KD, & Okun, MS. (2013). Dystonia, facial dysmorphism, intellectual disability and breast cancer associated with a chromosome 13q34 duplication and overexpression of TFDP1: case report. *BMC Med Genet*, 14(1), 70.
- Mulligan, MK, Dubose, C, Yue, J, Miles, MF, **Lu, L**, & **Hamre, KM**. (2013). Expression, covariation, and genetic regulation of miRNA Biogenesis genes in brain supports their role in addiction, psychiatric disorders, and disease. *Front Genet*, 4, 126.
- Nakanishi, N, Ryan, SD, Zhang, X, Khan, A, Holland, T, Cho, EG, Huang, X, **Liao, FF**, Xu, H, Lipton, SA, & Tu, S. (2013). Synaptic protein alpha1-takusan mitigates amyloid-beta-induced synaptic loss via interaction with tau and postsynaptic density-95 at postsynaptic sites. *J Neurosci*, 33(35), 14170-14183.
- Narayana, S**, Zhang, W, Rogers, W, Strickland, C, Franklin, C, Lancaster, JL, & Fox, PT. (2014). Concurrent TMS to the primary motor cortex augments slow motor learning. *Neuroimage*, 85 Pt 3, 971-984.
- Narayanan, D, Bulley, S, Leo, MD, Burris, SK, Gabrick, KS, **Boop, FA**, & **Jaggard, JH**. (2013). Smooth muscle cell transient receptor potential polycystin-2 (TRPP2) channels contribute to the myogenic response in cerebral arteries. *J Physiol*, 591(Pt 20), 5031-5046.
- Narayanan, R, Yepuru, M, Coss, CC, Wu, Z, Bauler, MN, Barrett, CM, Mohler, ML, Wang, Y, Kim, J, Snyder, LM, He, Y, Levy, N, **Miller, DD**, & Dalton, JT. (2013). Discovery and preclinical characterization of novel small molecule TRK and ROS1 tyrosine kinase inhibitors for the treatment of cancer and inflammation. *PLoS One*, 8(12), e83380.
- Nooh, MM, Chumpia, MM, Hamilton, TB, & **Bahouth, SW**. (2014). Sorting of beta1-adrenergic receptors is mediated by pathways that are either dependent on or independent of type I PDZ, protein kinase A (PKA), and SAP97. *J Biol Chem*, 289(4), 2277-2294.
- Nourian, Z, Li, M, Leo, MD, **Jaggard, JH**, Braun, AP, & Hill, MA. (2014). Large conductance Ca²⁺-activated K⁺ channel (BKCa) alpha-subunit splice variants in resistance arteries from rat cerebral and skeletal muscle vasculature. *PLoS One*, 9(6), e98863.
- O'Neill, B, Tilley, MR, Han, DD, Thirtamara-Rajamani, K, Hill, ER, Bishop, GA, **Zhou, FM**, During, MJ, & Gu, HH. (2014). Behavior of knock-in mice with a cocaine-insensitive dopamine transporter after virogenetic restoration of cocaine sensitivity in the striatum. *Neuropharmacology*, 79, 626-633.
- Ogden, KK, Khatri, A, Traynelis, SF, & **Heldt, SA**. (2014). Potentiation of GluN2C/D NMDA receptor

- subtypes in the amygdala facilitates the retention of fear and extinction learning in mice. *Neuropsychopharmacology*, 39(3), 625-637.
- Palamoor, M, & **Jablonski, MM**. (2013). Synthesis, characterization and in vitro studies of celecoxib-loaded poly(ortho ester) nanoparticles targeted for intraocular drug delivery. *Colloids Surf B Biointerfaces*, 112, 474-482.
- Palmer, FB, **Anand, KJ**, Graff, JC, Murphy, LE, Qu, Y, Volgyi, E, Rovnaghi, CR, Moore, A, Tran, QT, & Tylavsky, FA. (2013). Early adversity, socioemotional development, and stress in urban 1-year-old children. *J Pediatr*, 163(6), 1733-1739 e1731.
- Pandey, AK, **Lu, L**, Wang, X, **Homayouni, R**, & **Williams, RW**. (2014). Functionally enigmatic genes: a case study of the brain ignorome. *PLoS One*, 9(2), e88889.
- Pani, AK, Jiao, Y, Sample, KJ, & **Smeyne, RJ**. (2014). Neurochemical measurement of adenosine in discrete brain regions of five strains of inbred mice. *PLoS One*, 9(3), e92422.
- Papanicolaou, AC**, Rezaie, R, **Narayana, S**, Choudhri, AF, **Wheless, JW**, Castillo, EM, Baumgartner, JE, & **Boop, FA**. (2014). Is it time to replace the Wada test and put awake craniotomy to sleep? *Epilepsia*, 55(5), 629-632.
- Parkinson Study Group, QEI, Beal, MF, Oakes, D, Shoulson, I, Henchcliffe, C, Galpern, WR, Haas, R, Juncos, JL, Nutt, JG, Voss, TS, Ravina, B, Shults, CM, Helles, K, Snively, V, Lew, MF, Griebner, B, Watts, A, Gao, S, Pourcher, E, Bond, L, Kompoliti, K, Agarwal, P, Sia, C, Jog, M, Cole, L, Sultana, M, Kurlan, R, Richard, I, Deeley, C, Waters, CH, Figueroa, A, Arkun, A, Brodsky, M, Ondo, WG, Hunter, CB, Jimenez-Shahed, J, Palao, A, Miyasaki, JM, So, J, Tetrud, J, Reys, L, Smith, K, Singer, C, Blenke, A, Russell, DS, Cotto, C, Friedman, JH, Lannon, M, Zhang, L, Drasby, E, Kumar, R, Subramanian, T, Ford, DS, Grimes, DA, Cote, D, Conway, J, Siderowf, AD, Evatt, ML, Sommerfeld, B, Lieberman, AN, Okun, MS, Rodriguez, RL, Merritt, S, Swartz, CL, Martin, WR, King, P, Stover, N, Guthrie, S, Watts, RL, Ahmed, A, Fernandez, HH, Winters, A, Mari, Z, Dawson, TM, Dunlop, B, Feigin, AS, Shannon, B, Nirenberg, MJ, Ogg, M, Elias, SA, Thomas, CA, Frei, K, Bodis-Wollner, I, Glazman, S, Mayer, T, Hauser, RA, Pahwa, R, Langhammer, A, Ranawaya, R, Derwent, L, Sethi, KD, Farrow, B, Prakash, R, Litvan, I, Robinson, A, Sahay, A, Gartner, M, Hinson, VK, Markind, S, Pelikan, M, Perlmutter, JS, Hartlein, J, Molho, E, Evans, S, Adler, CH, Duffy, A, Lind, M, Elmer, L, Davis, K, Spears, J, Wilson, S, Leehey, MA, Hermanowicz, N, Niswonger, S, Shill, HA, Obradov, S, Rajput, A, Cowper, M, Lessig, S, Song, D, Fontaine, D, Zadikoff, C, Williams, K, Blindauer, KA, Bergholte, J, Propsom, CS, Stacy, MA, Field, J, Mihaila, D, Chilton, M, Uc, EY, Sieren, J, Simon, DK, Kraics, L, Silver, A, Boyd, JT, Hamill, RW, Ingvaldstad, C, Young, J, Thomas, K, Kostyk, SK, Wojcieszek, J, **Pfeiffer, RF**, Panisset, M, Beland, M, Reich, SG, Cines, M, Zappala, N, Rivest, J, Zweig, R, Lumina, LP, Hilliard, CL, Grill, S, Kellermann, M, Tuite, P, Rolandelli, S, Kang, UJ, Young, J, Rao, J, Cook, MM, Severt, L, & Boyar, K. (2014). A randomized clinical trial of high-dosage coenzyme Q10 in early Parkinson disease: no evidence of benefit. *JAMA Neurol*, 71(5), 543-552.
- Passaro, AD, Elmore, LC, Ellmore, TM, Leising, KJ, **Papanicolaou, AC**, & Wright, AA. (2013). Explorations of object and location memory using fMRI. *Front Behav Neurosci*, 7, 105.
- Patay, Z, Parra, C, Hawk, H, George, A, Li, Y, Scoggins, M, Broniscer, A, & **Ogg, RJ**. (2014). Quantitative Longitudinal Evaluation of Diaschisis-Related Cerebellar Perfusion and Diffusion Parameters in Patients with Supratentorial Hemispheric High-Grade Gliomas After Surgery. *Cerebellum*.
- Patil, R, Hosni-Ahmed, A, Jones, TS, Patil, SA, Asres, LB, Wang, X, Yates, RC, Geisert, EE, & **Miller, DD**. (2014). Synthesis and in vitro evaluation of novel 1,2,3,4-tetrahydroisoquinoline derivatives as potent antiangioma agents. *Anticancer Agents Med Chem*, 14(3), 473-482.
- Patil, SA, Patil, R, Pfeiffer, LM, & **Miller, DD**. (2013). Chromenes: potential new chemotherapeutic agents for cancer. *Future Med Chem*, 5(14), 1647-1660.
- Pavesi, E, **Heldt, SA**, & **Fletcher, ML**. (2013). Neuronal nitric-oxide synthase deficiency impairs the long-term memory of olfactory fear learning and increases odor generalization. *Learn Mem*, 20(9), 482-490.
- Peixoto-Neves, D, Leal-Cardoso, JH, & **Jaggar, JH**. (2014). Eugenol dilates rat cerebral arteries by inhibiting smooth muscle cell voltage-dependent calcium channels. *J Cardiovasc Pharmacol*.
- Pfeiffer, RF**. (2014). Gastrointestinal involvement in Parkinson's disease: the horse or the cart. *Acta Physiol (Oxf)*, 211(2), 271-272.

- Pfeiffer, RF.** (2014). Neurologic manifestations of malabsorption syndromes. *Handb Clin Neurol*, 120, 621-632.
- Pritchard, EM, Stewart, E, Zhu, F, Bradley, C, Griffiths, L, Yang, L, Suryadevara, PK, Zhang, J, Freeman, BB, 3rd, Guy, RK, & **Dyer, MA.** (2014). Pharmacokinetics and Efficacy of the Spleen Tyrosine Kinase Inhibitor R406 after Ocular Delivery for Retinoblastoma. *Pharm Res.*
- Prosser, RA,** Stowie, A, Amicarelli, M, Nackenoff, AG, Blakely, RD, & Glass, JD. (2014). Cocaine modulates mammalian circadian clock timing by decreasing serotonin transport in the SCN. *Neuroscience*, 275, 184-193.
- Qaddoumi, I, Kocak, M, Pai Panandiker, AS, Armstrong, GT, Wetmore, C, Crawford, JR, Lin, T, Boyett, JM, Kun, LE, **Boop, FA,** Merchant, TE, Ellison, DW, Gajjar, A, & Broniscer, A. (2014). Phase II Trial of Erlotinib during and after Radiotherapy in Children with Newly Diagnosed High-Grade Gliomas. *Front Oncol*, 4, 67.
- Quintana, AM, Picchione, F, Klein Geltink, RI, **Taylor, MR,** & Grosveld, GC. (2014). Zebrafish ETV7 regulates red blood cell development through the cholesterol synthesis pathway. *Dis Model Mech*, 7(2), 265-270.
- Ramaswami, M, **Taylor, JP,** & Parker, R. (2013). Altered ribostasis: RNA-protein granules in degenerative disorders. *Cell*, 154(4), 727-736.
- Reiner, A,** Shelby, E, Wang, H, Demarch, Z, Deng, Y, Guley, NH, Hogg, V, Roxburgh, R, Tippett, LJ, Waldvogel, HJ, & Faull, RL. (2013). Striatal parvalbuminergic neurons are lost in Huntington's disease: implications for dystonia. *Mov Disord*, 28(12), 1691-1699.
- Rodrigues, PM, Grigaravicius, P, Remus, M, Cavalheiro, GR, Gomes, AL, Martins, MR, Frappart, L, Reuss, D, **McKinnon, PJ,** von Deimling, A, Martins, RA, & Frappart, PO. (2013). Nbn and atm cooperate in a tissue and developmental stage-specific manner to prevent double strand breaks and apoptosis in developing brain and eye. *PLoS One*, 8(7), e69209.
- Roguski, EE, **Chen, H, Sharp, BM,** & Matta, SG. (2013). Fostering itself increases nicotine self-administration in young adult male rats. *Psychopharmacology (Berl)*, 229(2), 227-234.
- Roguski, EE, **Sharp, BM, Chen, H,** & Matta, SG. (2014). Full-gestational exposure to nicotine and ethanol augments nicotine self-administration by altering ventral tegmental dopaminergic function due to NMDA receptors in adolescent rats. *J Neurochem*, 128(5), 701-712.
- Roofthoof, DW, Simons, SH, **Anand, KJ,** Tibboel, D, & van Dijk, M. (2014). Eight years later, are we still hurting newborn infants? *Neonatology*, 105(3), 218-226.
- Rovnaghi, CR, Kala, AF, Allen, SL, & **Anand, KJ.** (2014). Interpretation of cortisol concentrations and reference intervals from the CALIPER database. *Clin Chem*, 60(2), 418-419.
- Ruisanchez, E, Dancs, P, Kerek, M, Nemeth, T, Farago, B, Balogh, A, Patil, R, Jennings, BL, Liliom, K, **Malik, KU,** Smrcka, AV, Tigyi, G, & Benyo, Z. (2014). Lysophosphatidic acid induces vasodilation mediated by LPA1 receptors, phospholipase C, and endothelial nitric oxide synthase. *FASEB J*, 28(2), 880-890.
- Sacks, HS, Fain, JN, **Bahouth, SW,** Ojha, S, Frontini, A, Budge, H, Cinti, S, & Symonds, ME. (2013). Adult epicardial fat exhibits beige features. *J Clin Endocrinol Metab*, 98(9), E1448-1455.
- Sakata, K,** & Duke, SM. (2014). Lack of BDNF expression through promoter IV disturbs expression of monoamine genes in the frontal cortex and hippocampus. *Neuroscience*, 260, 265-275.
- Sakata, K,** Martinowich, K, Woo, NH, Schloesser, RJ, Jimenez, DV, Ji, Y, Shen, L, & Lu, B. (2013). Role of activity-dependent BDNF expression in hippocampal-prefrontal cortical regulation of behavioral perseverance. *Proc Natl Acad Sci U S A*, 110(37), 15103-15108.
- Salinas, FS, **Narayana, S,** Zhang, W, Fox, PT, & Szabo, CA. (2013). Repetitive transcranial magnetic stimulation elicits rate-dependent brain network responses in non-human primates. *Brain Stimul*, 6(5), 777-787.
- Sari, AN, Korkmaz, B, Serin, MS, Kacan, M, Unsal, D, Buharalioglu, CK, Sahar Firat, S, Manthathi, VL, Falck, JR, **Malik, KU,** & Tunctan, B. (2014). Effects of 5,14-HEDGE, a 20-HETE mimetic, on lipopolysaccharide-induced changes in MyD88/TAK1/IKKbeta/IkappaB-alpha/NF-kappaB pathway and circulating miR-150, miR-223, and miR-297 levels in a rat model of septic shock. *Inflamm Res*, 63(9), 741-756.

- Shokolenko, IN, Fayzulin, RZ, Katyal, S, **McKinnon, PJ**, Wilson, GL, & Alexeyev, MF. (2013). Mitochondrial DNA ligase is dispensable for the viability of cultured cells but essential for mtDNA maintenance. *J Biol Chem*, 288(37), 26594-26605.
- Simon Bulley, SB, & **Jaggar, JH**. (2014). Cl(-) channels in smooth muscle cells. *Pflugers Arch*, 466(5), 861-872.
- Simos, PG, Rezaie, R, **Papanicolaou, AC**, & Fletcher, JM. (2014). Does IQ affect the functional brain network involved in pseudoword reading in students with reading disability? A magnetoencephalography study. *Front Hum Neurosci*, 7, 932.
- Skalicky, AM, Rentz, AM, Liu, Z, **Wheless, JW**, Pelletier, CL, Dunn, DW, Frost, MD, Nakagawa, J, Magestro, M, Prestifilippo, J, & Pashos, C. (2014). The Burden of Subependymal Giant Cell Astrocytomas Associated With Tuberous Sclerosis Complex: Results of a Patient and Caregiver Survey. *J Child Neurol*.
- Skobowiat, C, Nejati, R, **Lu, L**, **Williams, RW**, & Slominski, AT. (2013). Genetic variation of the cutaneous HPA axis: an analysis of UVB-induced differential responses. *Gene*, 530(1), 1-7.
- Slominski, A, Kim, TK, Zmijewski, MA, Janjetovic, Z, Li, W, Chen, J, Kusniatsova, EI, Semak, I, Postlethwaite, A, **Miller, DD**, Zjawiony, JK, & Tuckey, RC. (2013). Novel vitamin D photoproducts and their precursors in the skin. *Dermatoendocrinol*, 5(1), 7-19.
- Smeyne, M, & **Smeyne, RJ**. (2013). Glutathione metabolism and Parkinson's disease. *Free Radic Biol Med*, 62, 13-25.
- Swaminathan, S, Li, H, Palamoor, M, de Obarrio, WT, Madhura, D, Meibohm, B, & **Jablonski, MM**. (2014). Novel endogenous glycan therapy for retinal diseases: safety, in vitro stability, ocular pharmacokinetic modeling, and biodistribution. *AAPS J*, 16(2), 311-323.
- Taylor, DR, Wait, SD, **Wheless, JW**, & **Boop, FA**. (2013). Amygdalar neuromelanosis intractable epilepsy without leptomeningeal involvement. *J Neurosurg Pediatr*, 12(1), 21-24.
- Taylor, JP**. (2014). Neurodegenerative diseases: G-quadruplex poses quadruple threat. *Nature*, 507(7491), 175-177.
- Thompson, KE, Zeng, K, Wilson, CM, Gaber, MW, **Miller, DD**, & Yates, CR. (2014). Quinic acid derivative KZ-41 exhibits radiomitigating activity in preclinical models of radiation injury. *Drug Dev Res*, 75(1), 29-36.
- Thompson, RL, **Williams, RW**, Kotb, M, & Sawtell, NM. (2014). A forward phenotypically driven unbiased genetic analysis of host genes that moderate herpes simplex virus virulence and stromal keratitis in mice. *PLoS One*, 9(3), e92342.
- Timmer, KM, & **Steketee, JD**. (2013). Group I metabotropic glutamate receptors in the medial prefrontal cortex: role in mesocorticolimbic glutamate release in cocaine sensitization. *Synapse*, 67(12), 887-896.
- Toutounchian, JJ, **Steinle, JJ**, Makena, PS, Waters, CM, Wilson, MW, Haik, BG, **Miller, DD**, & Yates, CR. (2014). Modulation of radiation injury response in retinal endothelial cells by quinic acid derivative KZ-41 involves p38 MAPK. *PLoS One*, 9(6), e100210.
- Tse, BC, **Steinle, JJ**, **Johnson, D**, Haik, BG, & Wilson, MW. (2013). Superselective intraophthalmic artery chemotherapy in a nonhuman primate model: histopathologic findings. *JAMA Ophthalmol*, 131(7), 903-911.
- Tunctan, B, Korkmaz, B, Sari, AN, Kacan, M, Unsal, D, Serin, MS, Buharalioglu, CK, Sahan-Firat, S, Cuez, T, Schunck, WH, Manthati, VL, Falck, JR, & **Malik, KU**. (2013). Contribution of iNOS/sGC/PKG pathway, COX-2, CYP4A1, and gp91(phox) to the protective effect of 5,14-HEDGE, a 20-HETE mimetic, against vasodilation, hypotension, tachycardia, and inflammation in a rat model of septic shock. *Nitric Oxide*, 33, 18-41.
- Uhlmann, RA, Ogwo, C, **Williams, RW**, Osborne, SE, Williams, LJ, & Detti, L. (2013). Somatic and reproductive development in pre-pubertal mice treated with cyclophosphamide and subsequent estrogen replacement. *Syst Biol Reprod Med*, 59(6), 337-341.
- Urraca, N, Cleary, J, Brewer, V, Pivnick, EK, **McVicar, K**, Thibert, RL, Schanen, NC, Esmer, C, Lamport, D, & **Reiter, LT**. (2013). The interstitial duplication 15q11.2-q13 syndrome includes autism, mild facial anomalies and a characteristic EEG signature. *Autism Res*, 6(4), 268-279.
- Valle-Garcia, D, Griffiths, LM, **Dyer, MA**, Bernstein, E, & Recillas-Targa, F. (2014). The ATRX cDNA is

- prone to bacterial IS10 element insertions that alter its structure. *Springerplus*, 3, 222.
- van Ganzewinkel, C, Derijks, L, **Anand, KJ**, van Lingen, RA, Neef, C, Kramer, BW, & Andriessen, P. (2014). Multiple intravenous doses of paracetamol result in a predictable pharmacokinetic profile in very preterm infants. *Acta Paediatr*, 103(6), 612-617.
- Vasquez, V**, Baez, ME, Bravo, M, & Fuentes, E. (2013). Determination of heavy polycyclic aromatic hydrocarbons of concern in edible oils via excitation-emission fluorescence spectroscopy on nylon membranes coupled to unfolded partial least-squares/residual bilinearization. *Anal Bioanal Chem*, 405(23), 7497-7507.
- Vasquez, V**, Krieg, M, Lockhead, D, & Goodman, MB. (2014). Phospholipids that contain polyunsaturated fatty acids enhance neuronal cell mechanics and touch sensation. *Cell Rep*, 6(1), 70-80.
- Vasquez, V**, Scherrer, G, & Goodman, MB. (2014). Sensory biology: it takes Piezo2 to tango. *Curr Biol*, 24(12), R566-569.
- Vemula, SR, Xiao, J, Bastian, RW, Momcilovic, D, Blitzer, A, & **LeDoux, MS**. (2014). Pathogenic variants in TUBB4A are not found in primary dystonia. *Neurology*, 82(14), 1227-1230.
- Vemula, SR, Xiao, J, Zhao, Y, Bastian, RW, Perlmutter, JS, Racette, BA, Paniello, RC, Wszolek, ZK, Uitti, RJ, Van Gerpen, JA, Hedera, P, Truong, DD, Blitzer, A, Rudzinska, M, Momcilovic, D, Jinnah, HA, Frei, K, **Pfeiffer, RF**, & **LeDoux, MS**. (2014). A rare sequence variant in intron 1 of THAP1 is associated with primary dystonia. *Mol Genet Genomic Med*, 2(3), 261-272.
- Vishwanathan, R, **Iannaccone, A**, Scott, TM, Kritchevsky, SB, Jennings, BJ, Carboni, G, Forma, G, Satterfield, S, Harris, T, Johnson, KC, Schalch, W, Renzi, LM, Rosano, C, & Johnson, EJ. (2014). Macular pigment optical density is related to cognitive function in older people. *Age Ageing*, 43(2), 271-275.
- Walters, BJ, Lin, W, Diao, S, Brimble, M, Iconaru, LI, Dearman, J, Goktug, A, Chen, T, & **Zuo, J**. (2014). High-throughput screening reveals alsterpaullone, 2-cyanoethyl as a potent p27Kip1 transcriptional inhibitor. *PLoS One*, 9(3), e91173.
- Wang, J, Chen, J, **Miller, DD**, & Li, W. (2014). Synergistic combination of novel tubulin inhibitor ABI-274 and vemurafenib overcome vemurafenib acquired resistance in BRAFV600E melanoma. *Mol Cancer Ther*, 13(1), 16-26.
- Wang, L, Lu, W, Zhang, L, Huang, Y, Scheib, R, Liu, X, Myers, L, **Lu, L**, Farber, CR, Liu, G, Wang, CY, Deng, H, **Williams, RW**, Wang, Y, Gu, W, & Jiao, Y. (2014). Trps1 differentially modulates the bone mineral density between male and female mice and its polymorphism associates with BMD differently between women and men. *PLoS One*, 9(1), e84485.
- Wang, LS, Jiao, Y, Huang, Y, Liu, XY, Gibson, G, Bennett, B, **Hamre, KM**, Li, DW, Zhao, HY, Gelernter, J, Kranzler, HR, Farrer, LA, **Lu, L**, Wang, YJ, & Gu, WK. (2013). Critical evaluation of transcription factor Atf2 as a candidate modulator of alcohol preference in mouse and human populations. *Genet Mol Res*, 12(4), 5992-6005.
- Wang, T, Han, W, Wang, B, Jiang, Q, Solberg-Woods, LC, Palmer, AA, & **Chen, H**. (2014). Propensity for social interaction predicts nicotine-reinforced behaviors in outbred rats. *Genes Brain Behav*, 13(2), 202-212.
- Wang, X, Wang, H, Sun, V, Tuan, HF, Keser, V, Wang, K, Ren, H, Lopez, I, Zaneveld, JE, Siddiqui, S, Bowles, S, Khan, A, Salvo, J, Jacobson, SG, **Iannaccone, A**, Wang, F, Birch, D, Heckenlively, JR, Fishman, GA, Traboulsi, EI, Li, Y, Wheaton, D, Koenekoop, RK, & Chen, R. (2013). Comprehensive molecular diagnosis of 179 Leber congenital amaurosis and juvenile retinitis pigmentosa patients by targeted next generation sequencing. *J Med Genet*, 50(10), 674-688.
- Wei, W, Li, L, Yu, G, Ding, S, Li, C, & **Zhou, FM**. (2013). Supersensitive presynaptic dopamine D2 receptor inhibition of the striatopallidal projection in nigrostriatal dopamine-deficient mice. *J Neurophysiol*, 110(9), 2203-2216.
- Wen, D, Chitkara, D, Wu, H, Danquah, M, Patil, R, **Miller, DD**, & Mahato, RI. (2014). LHRH-Conjugated Micelles for Targeted Delivery of Antiandrogen to Treat Advanced Prostate Cancer. *Pharm Res*.
- Wheless, JW**, & Almoazen, H. (2013). A novel topical rapamycin cream for the treatment of facial angiofibromas in tuberous sclerosis complex. *J Child Neurol*, 28(7), 933-936.
- Wheless, JW**, & Klimo, P, Jr. (2013). Subependymal Giant Cell Astrocytomas in Patients With Tuberous

- Sclerosis Complex:: Considerations for Surgical or Pharmacotherapeutic Intervention. *J Child Neurol*. White, JJ, Arancillo, M, Stay, TL, George-Jones, NA, Levy, SL, **Heck, DH**, & Sillitoe, RV. (2014). Cerebellar zonal patterning relies on Purkinje cell neurotransmission. *J Neurosci*, 34(24), 8231-8245.
- Wilcox, MA, Khan, NR, McAbee, JH, **Boop, FA**, & Klimo, P, Jr. (2013). Highly cited publications in pediatric neurosurgery. *Childs Nerv Syst*, 29(12), 2201-2213.
- Willard, VW, Conklin, HM, **Boop, FA**, Wu, S, & Merchant, TE. (2014). Emotional and behavioral functioning after conformal radiation therapy for pediatric ependymoma. *Int J Radiat Oncol Biol Phys*, 88(4), 814-821.
- Winchell, AM, Taylor, BA, Song, R, Loeffler, RB, Grundlehner, P, Hankins, JS, Wang, WC, **Ogg, RJ**, Hillenbrand, CM, & Helton, KJ. (2014). Evaluation of SWI in children with sickle cell disease. *AJNR Am J Neuroradiol*, 35(5), 1016-1021.
- Workman, JJ, **Chen, H**, & Larabee, RN. (2014). Environmental signaling through the mechanistic target of rapamycin complex 1: mTORC1 goes nuclear. *Cell Cycle*, 13(5), 714-725.
- Wu, G, Diaz, AK, Paugh, BS, Rankin, SL, Ju, B, Li, Y, Zhu, X, Qu, C, Chen, X, Zhang, J, Easton, J, Edmonson, M, Ma, X, Lu, C, Nagahawatte, P, Hedlund, E, Rusch, M, Pounds, S, Lin, T, Onar-Thomas, A, Huether, R, Kriwacki, R, Parker, M, Gupta, P, Becksfort, J, Wei, L, Mulder, HL, Boggs, K, Vadodaria, B, Yergeau, D, Russell, JC, Ochoa, K, Fulton, RS, Fulton, LL, Jones, C, **Boop, FA**, Broniscer, A, Wetmore, C, Gajjar, A, Ding, L, Mardis, ER, Wilson, RK, **Taylor, MR**, Downing, JR, Ellison, DW, Zhang, J, Baker, SJ, & St. Jude Children's Research Hospital-Washington University Pediatric Cancer Genome, P. (2014). The genomic landscape of diffuse intrinsic pontine glioma and pediatric non-brainstem high-grade glioma. *Nat Genet*, 46(5), 444-450.
- Xie, Y, Pivnick, EK, Cohen, HL, Adams-Graves, PE, **Pourcyrous, M**, Aygun, B, & Hankins, JS. (2013). Phenocopy of warfarin syndrome in an infant born to a mother with sickle cell anemia and severe transfusional iron overload. *J Pediatr Hematol Oncol*, 35(6), e265-268.
- Yamada, Y, & **Prosser, RA**. (2014). Copper chelation and exogenous copper affect circadian clock phase resetting in the suprachiasmatic nucleus in vitro. *Neuroscience*, 256, 252-261.
- Yang, JJ, Lim, JY, Huang, J, Bass, J, Wu, J, Wang, C, Fang, J, Stewart, E, Harstead, EH, E, S, Robinson, GW, Evans, WE, Pappo, A, **Zuo, J**, Relling, MV, Onar-Thomas, A, Gajjar, A, & Stewart, CF. (2013). The role of inherited TPMT and COMT genetic variation in cisplatin-induced ototoxicity in children with cancer. *Clin Pharmacol Ther*, 94(2), 252-259.
- Yang, Y, & **Oliver, G**. (2014). Development of the mammalian lymphatic vasculature. *J Clin Invest*, 124(3), 888-897.
- Yang, Y, & **Oliver, G**. (2014). Transcriptional control of lymphatic endothelial cell type specification. *Adv Anat Embryol Cell Biol*, 214, 5-22.
- Ye, R, Carneiro, AM, Airey, D, Sanders-Bush, E, **Williams, RW**, **Lu, L**, Wang, J, Zhang, B, & Blakely, RD. (2014). Evaluation of heritable determinants of blood and brain serotonin homeostasis using recombinant inbred mice. *Genes Brain Behav*, 13(3), 247-260.
- Ye, Y, Jian, K, **Jaggar, JH**, Bukiya, AN, & **Dopico, AM**. (2014). Type 2 ryanodine receptors are highly sensitive to alcohol. *FEBS Lett*, 588(9), 1659-1665.
- Yeo, AJ, Becherel, OJ, Luff, JE, Cullen, JK, Wongsurawat, T, Jenjaroenpoon, P, Kuznetsov, VA, **McKinnon, PJ**, & Lavin, MF. (2014). R-loops in proliferating cells but not in the brain: implications for AOA2 and other autosomal recessive ataxias. *PLoS One*, 9(3), e90219.
- Yepuru, M, Wu, Z, Kulkarni, A, Yin, F, Barrett, CM, Kim, J, Steiner, MS, **Miller, DD**, Dalton, JT, & Narayanan, R. (2013). Steroidogenic enzyme AKR1C3 is a novel androgen receptor-selective coactivator that promotes prostate cancer growth. *Clin Cancer Res*, 19(20), 5613-5625.
- Zhan, X, **Desiderio, DM**, Wang, X, Zhan, X, Guo, T, Li, M, Peng, F, Chen, X, Yang, H, Zhang, P, Li, X, & Chen, Z. (2014). Identification of the proteomic variations of invasive relative to non-invasive non-functional pituitary adenomas. *Electrophoresis*, 35(15), 2184-2194.
- Zhan, X, Wang, X, & **Desiderio, DM**. (2013). Mass spectrometry analysis of nitrotyrosine-containing proteins. *Mass Spectrom Rev*.
- Zhan, X, Wang, X, & **Desiderio, DM**. (2013). Pituitary adenoma nitroproteomics: current status and perspectives. *Oxid Med Cell Longev*, 2013, 580710.

- Zhang, Q, Jiang, Y, Miller, MJ, Peng, B, Liu, L, Soderland, C, Tang, J, Kern, TS, Pinter, J, & **Steinle, JJ**. (2013). IGFBP-3 and TNF-alpha regulate retinal endothelial cell apoptosis. *Invest Ophthalmol Vis Sci*, 54(8), 5376-5384.
- Zhang, Q, Jiang, Y, Toutouchian, J, Wilson, MW, Morales-Tirado, V, **Miller, DD**, Yates, CR, & **Steinle, JJ**. (2013). Novel quinic acid derivative KZ-41 prevents retinal endothelial cell apoptosis without inhibiting retinoblastoma cell death through p38 signaling. *Invest Ophthalmol Vis Sci*, 54(9), 5937-5943.
- Zhang, YW, Chen, Y, Liu, Y, Zhao, Y, **Liao, FF**, & Xu, H. (2013). APP regulates NGF receptor trafficking and NGF-mediated neuronal differentiation and survival. *PLoS One*, 8(11), e80571.
- Zigmond, MJ, & **Smeyne, RJ**. (2014). Exercise: is it a neuroprotective and if so, how does it work? *Parkinsonism Relat Disord*, 20 Suppl 1, S123-127.
- Zindy, F, Kawachi, D, Lee, Y, Ayrault, O, Ben Merzoug, L, **McKinnon, PJ**, Ventura, A, & Roussel, MF. (2014). Role of the miR-17 approximately 92 cluster family in cerebellar and medulloblastoma development. *Biol Open*, 3(7), 597-605.

2) Abstracts presented at 2013 Annual Society for Neuroscience Meeting, San Diego, CA

- Flanigan, TJ, Rao, SK, Xue, Y, and **McDonald, MP** (2013) Intracerebroventricular infusion of sialidase from *V. cholera* in 5xFAD transgenic mice. *Neuroscience Abstract*.
- Goldowitz, D, Boyle, J, Wong, K, Lattimer, S, Kobor, M, Lussier, A, and **Hamre, K** (2013) Strain differences in ethanol-induced cell death examined in BXD embryos and neonates. *Neuroscience Abstract*.
- Saputra, J, **Fitzgerald, MEC**, and **Boughter Jr, JD** (2013) This presenter will not attend. PBN neuroanatomical maps and taste reactivity behavior in response to bitter, sweet and umami taste stimuli in the mouse. *Neuroscience Abstract*.
- Crusio, WE, Algeo, MP, Bonheur, B, **Lu, L**, **Williams, W**, and Delprato, A (2013) Genetic dissection of variation in hippocampal structure and learning in the expanded family of BXD mouse strains. *Neuroscience Abstract*.
- Ding, S and **Zhou, FM** (2013) Presynaptic dopamine D1 receptor regulation of the striatonigral GABA transmission. *Neuroscience Abstract*.
- Dragatsis, I**, Pietrich, P, Deng, Y, Del Mar, N, Rogers, J, Irudayam, MJ, Jones, KR, and **Reiner, A** (2013) Cerebral cortex develops normally in mice with early embryonic deletion of huntington from cortical pyramidal neurons. *Neuroscience Abstract*.
- Deng, Y, Wong, T, and **Reiner, A** (2013) Pattern of premanifest loss of thalamostriatal and corticostriatal input to striatal projection neuron types in Q140 Huntington's disease knock-in mice. *Neuroscience Abstract*.
- Chandaka, G, Wang, L, **Senogles, SE**, and **Armstrong, WE** (2013) Changes in SK3 channel and associated proteins during pregnancy and lactation in the rat supraoptic nucleus (SON). *Neuroscience Abstract*.
- Cooper, J and **Prosser, RA** (2013) Involvement of tPA and LRP-1 in regulating mammalian circadian clock phase. *Neuroscience Abstract*.
- Abrahamsson, K and **Prosser, RA** (2013) Matrix metalloproteinases 2/9 as potential regulators of the suprachiasmatic nucleus circadian clock. *Neuroscience Abstract*.
- Yamada, Y and **Prosser, RA** (2013) Investigating MAPK pathway involvement in TTM- and Cu-induced phase shifts of the SCN circadian clock. *Neuroscience Abstract*.
- Lindsay, JH, Glass, JD, and **Prosser, RA** (2013) Alcohol tolerance and withdrawal using the suprachiasmatic nucleus (SCN) circadian clock as a model system. *Neuroscience Abstract*.
- Ye, Y, Bukiya, A, and **Dopico, A** (2013) Ethanol concentrations reached in blood during alcohol intoxication decrease ryanodine receptor type 2 activity. *Neuroscience Abstract*.
- Gardner, LA, Croover, CJ, Bradley, CS, and **Levin, M** (2013) A potential role for apolipoprotein A1 in multiple sclerosis. *Neuroscience Abstract*.
- Calton, MA, Dickson, PE, Harper, RM, Goldowitz, D, and **Mittleman, G** (2013) Cerebellar Purkinje cell loss in developing Lurcher mice influences respiratory compensatory responses to acute hypercapnia and hypoxia. *Neuroscience Abstract*.

- Douglas, J, Garnder, LA, Lee, S, and **Levin, MC** (2013) Autoimmunity and neurodegeneration: Antibodies effect on neuronal viability and endogenous proteins. *Neuroscience Abstract*.
- LeDoux, MS**, Zhao, Y, and Reide, T (2013) Vocal changes in dystonic rats are associated with abnormal breathing rhythm but not lowered lung pressure. *Neuroscience Abstract*.
- Roy, S, Scattoni, ML, **Heck, DH, Lu, L**, and **Williams, RW** (2013) Genetic and parametric analysis of infant vocalization between C57BL/6J, DBA/2J, and reciprocal F1 hybrids. *Neuroscience Abstract*.
- Hamre, KM**, Pandey, A, Mulligan, M, Ingles, J, Yue, J, and **Lu, L** (2013) Strain differences in expression of microRNAs in the hippocampus assessed using next generation sequencing technology: Comparison of DBA/2J and C57BL/6J mouse strains. *Neuroscience Abstract*.
- Maiti, P, **McDonald, MP**, and Rex, TS (2013) Effects of rAAV-mediated knockdown of GD3 synthase (GD3S) on MPTP-induced neurodegeneration and executive dysfunction. *Neuroscience Abstract*.
- Ramshur, JT, Decosta-Fortune, T, Li, CX, Curry, A, and **Waters, RS** (2013) Functional modulation of deafferented forelimb barrel cortex in rat. *Neuroscience Abstract*.
- Yu, G, Huang, Z, **Chen, H**, and **Sharp, BM** (2013) Inactivation of the central nucleus of the amygdala reduces the stress-induced amplification of relapse to nicotine-taking. *Neuroscience Abstract*.
- Chen, H**, Wang, T, and Wang, B (2013) Cooling sensation of menthol is a conditioned reinforcer for nicotine. *Neuroscience Abstract*.
- McKimm, E, Corkill, B, **Heck, D**, Goldowitz, D, **Mittleman, G**, and **Blaha, CD** (2013) Cerebellar pathology results in compensatory neural adaptations within cerebellar-prefrontal cortex pathways involved in modulating cortical dopamine release: Relevance to Autism-related behavioral disorders. *Neuroscience Abstract*.
- Yu, G, Huang, Z, **Chen, H**, and **Sharp, BM** (2013) Histone deacetylase inhibition amplifies reacquisition of nicotine SA and contributes to the stress-induced amplification of relapse to nicotine-taking. *Neuroscience Abstract*.
- Gong, S, Wang, T, and **Chen, H** (2013) Carbon Disulfide mediates socially-acquired nicotine self-administration. *Neuroscience Abstract*.
- Aboud, O, Mrak, RE, **Boop, FA**, and Griffin ST (2013) Neuronal stress responses are more related to APOE genotype than to stress modality or age. *Neuroscience Abstract*.
- Lee, S, Shin, Y, and **Levin, MC** (2013) Hnrnp a1 point mutation-induced neuronal cell death: Neurotoxic properties of aggregated hnrnp a1 protein. *Neuroscience Abstract*.
- Foehring, RC** and Guan, D (2013) Electrophysiological properties and potassium channels in subtypes of layer 5 neocortical pyramidal neurons. *Neuroscience Abstract*.
- Reiner, AJ, Heldt, SA, Elberger, AJ**, Deng, Y, Guley, NH, D'Surney, L, Rogers, JT, Del Mar, N, **Honig, MG**, Presley, CS, and **Moore, BM** (2013) Emotional, sensory and motor deficits in mice after mild traumatic brain injury produced using a novel closed-head model of primary overpressure blast are alleviated by the novel CB2 drug SMM189. *Neuroscience Abstract*.
- Sakata, K** and Jha, S (2013) Effects of an enriched environment and antidepressant treatments on expression of depression-related genes in normal wild type and depressed BDNF mutant mice. *Neuroscience Abstract*.
- Mulligan, MK, Roy, S, and **Williams, RW** (2013) Direct and indirect systems in mouse striatum: Spatial and genetic variation of medium spiny neuron subpopulations. *Neuroscience Abstract*.
- Wang, L, **Foehring, RC**, Chandaka, G, and **Armstrong, WE** (2013) Changes in SK3 channel gating may underlie afterhyperpolarization (AHP) enhancement during pregnancy in rat supraoptic nucleus (SON). *Neuroscience Abstract*.
- Wright, BT and **Heldt, SA** (2013) Differences in zolpidem effects between C57BL/6J and DBA/2J mice. *Neuroscience Abstract*.
- Gao, Y and **Heldt, SA** (2013) The role of neuronal nitric oxide in controlling spontaneous motor activity rhythm in mice. *Neuroscience Abstract*.
- Pavesi, E, Gao, Y, Stewart, JK, **Fletcher, ML**, and **Heldt, SA** (2013) Elucidating the neurocircuitry mediating conditioned olfactory fear. *Neuroscience Abstract*.
- Liu, Y, **Blaha, C, Mittleman, G**, Goldowitz, D, and **Heck, DH** (2013) Cerebellar stimulation differentially modulates neuronal spiking activity in mouse prefrontal cortex. *Neuroscience Abstract*.

APPENDIX 3
Neuroscience Seminar Speakers
FY 2013-2014



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

NEUROSCIENCE SEMINAR SERIES SCHEDULE

Fall 2013

Peter F. Hitchcock, Ph.D. September 10, 2013
Host: Eldon Geisert, Ph.D.
Professor
Department of Ophthalmology and Visual Sciences
University of Michigan

Title: "Developmental and Injury-Induced Neurogenesis in the Vertebrate Retina"

Pablo E. Castillo, M.D., Ph.D. September 17, 2013
Host: Steve Tavalin, Ph.D.
Professor
Dominick P. Purpura Department of Neuroscience
Albert Einstein College of Medicine

Title: "Bi-Directional Plasticity Expressed by NMDA Receptors"

Tim Saltuklaroglu, Ph.D. September 24, 2013
Host: John D. Boughter, Ph.D.
Associate Professor
Department of Audiology and Speech Pathology
University of Tennessee - Knoxville

Title: "Electroencephalographic Time / Frequency Measures of Sensorimotor Control in Speech"

Xinwei Cao, Ph.D.

October 1, 2013

Assistant Member
Department of Developmental Neurobiology
St. Jude Children's Research Hospital

Title: "The Hippo Pathway During Vertebrate Neural Development"

Detlef Heck, Ph.D.

October 8, 2013

Associate Professor
Department of Anatomy & Neurobiology
UTHSC

Title: "Brain Rhythms Controlled by Breathing: New Insights from Mice and Man"

Janet L. Fisher, Ph.D.

October 15, 2013

Host: Fu-Ming Zhou, Ph.D.
Associate Professor
Department of Pharmacology, Physiology & Neuroscience
University of South Carolina School of Medicine

Title: "Subunit-dependent Properties of Ionotropic Glutamate Receptors"

Alfredo Fontanini, M.D., Ph.D.

October 22, 2013

Host: John D. Boughter, Ph.D.
Assistant Professor
Department of Neurobiology and Behavior
Stony Brook University

Title: "Integration of Sensory and Anticipatory Signals in the Gustatory Cortex of Alert Rodents"

Robert Foehring, Ph.D.

October 29, 2013

Professor and Vice Chair
Department of Anatomy & Neurobiology
UTHSC

Title: "Not too Shabby: Functional Roles of Kv2 Channels in Neocortical Pyramidal Neurons"

Steven Warach, M.D., Ph.D.

November 5, 2013

Host: William Armstrong, Ph. D.
Professor and Executive Director
Seton/UT Southwestern Clinical Research Institute of Austin
Vice-Chair for Austin Programs
Department of Neurology and Neurotherapeutics
UT Southwestern Medical Center
Network Director of Cerebrovascular Medicine, Interim Chair of Neurology
Seton Brain and Spine Institute

Title: "Bedside to Bench and Back: Imaging Biomarkers in Acute Stroke Research"

Paula Dietrich, Ph.D.

November 19, 2013

Assistant Professor
Department of Physiology
UTHSC

Title: "Essential Roles of Huntingtin in the Adult Mouse: Implications for Therapeutic Strategies for Huntington's Disease"

Ann McKee, M.D.

December 3, 2013

Host: Anton Reiner, Ph.D.
Professor of Neurology & Pathology
Boston University School of Medicine
Co-Director
Center for the Study of Traumatic Encephalopathy

Title: "Emerging Concepts in Chronic Traumatic Encephalopathy"

Donald A. Wilson, Ph.D.

December 10, 2013

Host: Max Fletcher, Ph.D.
Research Professor
Departments of Physiology & Neuroscience and Child & Adolescent Psychiatry
New York University Langone Medical Center

Title: "Smell in Context: State-dependent and Top-down Modulation in Olfaction"



THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

**NEUROSCIENCE SEMINAR SERIES
SCHEDULE
SPRING 2014**

S. Patricia Becerra, Ph.D.

January 14, 2014

Host: Monica Jablonski, Ph.D.

Senior Investigator

Protein Structure & Function Section

Laboratory of Retinal Cell and Molecular Biology

NIH – National Eye Institute

Title: “Identification of a Receptor for PEDF, an Ocular Guardian”

Kristen O’Connell, Ph.D.

January 28, 2014

Assistant Professor

Department of Physiology

UTHSC

Title: “Diet Composition, not Body Weight, Electrically Remodels
Orexigenic AgRP Neurons in the Hypothalamus”

David Kabelik, Ph.D.

February 4, 2014

Assistant Professor

Neuroscience Program

Department of Biology

Rhodes College

Title: “Sex and Aggression: The Social Behavior Neural Network in a Simple
Vertebrate Brain”

Stuart Tobet, Ph.D.

February 11, 2014

Host: Kristen O'Connell

Professor

Department of Biomedical Sciences

Director

School of Biomedical Engineering

Colorado State University

Title: "The Developing Hypothalamus as a Sex-dependent Substrate for Shared Risk in Mood Disorders, Cardiovascular Disease and Obesity "

Matthew Ennis, Ph.D.

February 18, 2014

Professor & Chair

Department of Anatomy & Neurobiology

UTHSC

Title: "Glomeruli: Dynamic Portals into the Olfactory Brain"

Michael Petrides, Ph.D.

February 25, 2014

Host: Andrew Papanicolaou, Ph.D.

Professor

Departments of Neurology & Neurosurgery

Montreal Neurological Institute

Department of Psychology

McGill University

Title: **Canceled (Rescheduled to the Fall)**

Zuoxin Wang, Ph.D.

March 4, 2014

Host: Hao Chen, Ph.D.

University Distinguished Research Professor

Professor in Psychology and Neuroscience

Florida State University

Title: "The Monogamous Brain"

Anton Reiner, Ph.D.

March 18, 2014

Professor
Department of Anatomy & Neurobiology
Co-Director
Neuroscience Institute
UTHSC

Title: "Mild Traumatic Brain Injury in Mice:
Consequences and Treatment Directions"

Jon H. Kaas, Ph.D.

March 25, 2014

Host: Anton Reiner, Ph.D.
Distinguished Professor
Department of Psychology
Vanderbilt University

Title: "The Evolution of the Human Brain"

Edwin S. Levitan, Ph.D.

April 1, 2014

Host: Fu-Ming Zhou, Ph.D.
Professor & Vice Chair, Research
Department of Pharmacology & Chemical Biology
University of Pittsburgh

Title: "Surprising Synaptic Sights"

Seth S. Margolis, Ph.D.

April 8, 2014

Host: Lawrence Reiter, Ph.D.
Assistant Professor
Department of Biological Chemistry
Department of Neuroscience
John Hopkins University School of Medicine

Title: "Mechanisms of Angelman Syndrome: From Synapse
Restriction to UBE3A Substrates"

Scott A. Small, M.D. April 15, 2014

Host: Catherine Kaczorowski, Ph.D.
Boris and Rose Katz Professor of Neurology
Division of Aging and Dementia
Director, Alzheimer's Disease Research Center
Taub Institute for Research on Alzheimer's Disease and the Aging Brain

Title: **Canceled (To Be Rescheduled)**

Bruce Bean, Ph.D. April 29, 2014

Host: Robert Foehring, Ph.D.
Professor
Department of Neurobiology
Harvard Medical School

Title: "Ion Channel Regulation of Neuronal Firing Patterns"

Michael P. McDonald, Ph.D. May 6, 2014

Associate Professor
Department of Neurology
UTHSC

Title: "Modifying Brain Gangliosides to Improve Behavior and Prevent Neurodegeneration"

Michael C. Levin, M.D. May 13, 2014

Associate Professor
Department of Neurology
Department of Anatomy & Neurobiology
UTHSC

Title: "Novel Genomic DNA Mutations in the RNA Binding Protein hnRNP A1 as a Cause of Multiple Sclerosis, Implications for Neurodegeneration"

APPENDIX 4
Neuroscience News, Events and Graduate Training Flyer
FY 2013-2014

Learn About Early Childhood Brain Development

Frank M. Norfleet Forum for the Advancement of Health Early Brain Development and Function: Impact on Social and Health Outcomes

This year's speakers:

- Clancy Blair, *PhD, New York University*
- Nathan Fox, *PhD, University of Maryland*
- Ariel Kalil, *PhD, University of Chicago*
- Alison Miller, *PhD, University of Michigan*
- Kimberly Noble, *MD, PhD, Columbia University*

03/20/2014

7:15AM-3:45PM

\$25 Registration

(includes breakfast and lunch)

FedEx Institute of Technology

University of Memphis

Brain Awareness Night

Brain Development and Success in School and Life Can Intervention Recover Missed Opportunities?

Early experiences over the first years of life shape the way the brain manages complex thinking skills that are important for learning in school and for controlling behavior and emotions.

03/20/2014
5:00PM-8:00PM
FREE Registration
The Urban Child Institute
600 Jefferson Ave



Dr. Clancy Blair, PhD, Professor, Department of Applied Psychology, New York University

Dr. Blair will talk about how the brain's capacity for managing complex skills, known as executive function, is developed. His talk will focus on how executive functions are shaped in early development and the roles that positive and negative experiences play.



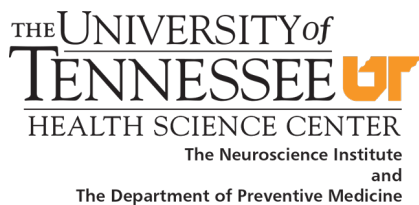
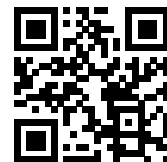
Dr. Nathan Fox PhD, Distinguished University Professor, Department of Human Development and Quantitative Methodology, University of Maryland.

Dr. Fox will talk about the lasting effects of early psychosocial deprivations such as institutionalization on children development. His talk will focus on whether interventions can ameliorate these deficits and whether there is an optimal period of time for intervention.

Professional training hours (CEUs) will be provided by the UT Neuroscience Institute. For more information, contact Dr. Paul Herron, Neuroscience Institute, 901-448-5824, pherron@uthsc.edu.

DETAILS AND REGISTRATION AT:

<http://www.urbanchildinstitute.org/brain-awareness>



GUEST COLUMN

Interacting with child is greatest gift

By William E. Armstrong
Special to Viewpoint



William E. Armstrong

The brain undergoes dramatic changes from conception through early childhood, changes that underlie the rapid acquisition of sensory, motor and cognitive skills observed in young children, changes that will never fail to astound parents. A child's brain is an incredible engine, diligently working, constantly adapting to interpret the world. We should consider its care of utmost importance.

but also provides the associated warmth of human contact. Studies repeatedly show that children need positive human contact to fully develop social skills and language. As the jubilant cry emanating from a parent's first appreciation of an intelligible sound or a returned smile provides a powerful reinforcement for more such interaction, the more complex motor, social and cognitive skills that come later need personal interaction to fully develop. For example, imaging studies reveal deficits in brain size and function in children reared in relative isolation. Our sensory systems are not hard-wired at birth, and synapses among neurons develop throughout childhood as a function of the activity that produces them. Such brain plasticity allows children to learn any language at a young age, whereas it is much more difficult for an adult to learn a new one, having already established more perma-

nent connections. Much can be done for children costing little more than time. Expensive toys are not critical for good brain development when compared with simple positive human interaction — especially from a parent or caregiver. In this regard, The Urban Child Institute has been front and center in providing critical assistance and information to foster early childhood development. Focusing on the first three years of life, the Institute supports frequent seminars and training sessions, and currently funds a longitudinal developmental study of Memphis children, entitled the "Conditions Affecting Neurocognitive Development and Learning in Early Childhood" (CANDLE) study. This support is especially critical in a city with large health disparities, family incomes below the national average and a high percentage of single-parent homes. Memphis is also above national levels for risk factors for child development such as teen pregnancy and crime, as well as health factors such as obesity. These and other factors add stress to growing children, and stress can have cumulative, nega-

tive effects on brain function. These and other data relevant to early childhood development and well-being, are presented in The Urban Child Institute's Data Book 2013, available on their website. Here we can learn that there are positive trends for Memphis as well: declining rates of infant mortality and teen births; increasing rates of mothers with prenatal care and mothers who breast-feed. But perhaps the best news is that nothing is immutable, and our fates are not predetermined by demographics. The brain, just as any muscle, is an instrument of change when properly exercised. Children who are raised in an economically impoverished environment can still overcome this disadvantage with effective parenting, care giving, stimulating education and proper nutrition. But such changes require effort and awareness on the part of adults. We cannot expect children to initiate the contact necessary to fully engage their brains. Time spent personally interacting with children (e.g. touching, talking, reading, playing) is the greatest gift an adult can provide.

The Neuroscience Institute at the University of Tennessee Center for Health Sciences has been a proud partner with The Urban Child Institute for over a decade, co-sponsoring a symposium each spring during Brain Awareness Week and contributing many scientists to the institute's functions. In a new collaboration with the institute and the University of Memphis, a mobile interactive exhibit aimed at parents of young children is in development, which will use touch-screen access to reveal basic brain functions and how to develop them. We hope this small token of our great interest in children will reach those who haven't the time or resources for more formal educational activities.

William E. Armstrong, Ph.D., is director of the Neuroscience Institute and a professor of anatomy and neurobiology at the University of Tennessee Center for Health Sciences (utsc.edu/neuroscience).

This is one in a series of monthly guest columns on the importance of public/private investment in early childhood. For more information, call The Urban Child Institute at 901-385-4233 or visit tuci.org.

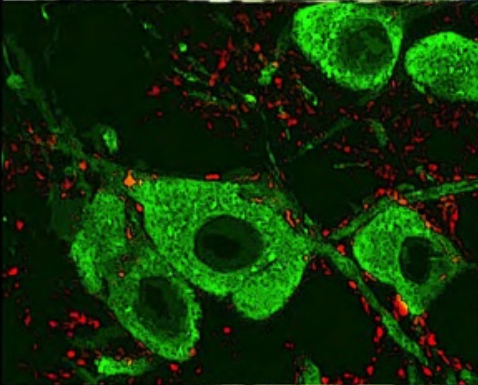
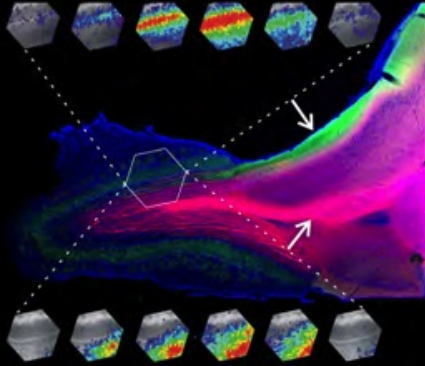


THE
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**St. Jude Children's
Research Hospital**
ALSAC • Danny Thomas, Founder

Graduate Studies in Neuroscience



THE UNIVERSITY of
TENNESSEE **UT**
HEALTH SCIENCE CENTER

The Neuroscience Graduate Program is a multidisciplinary, interdepartmental Ph.D. program at the University of Tennessee Health Science Center (UTHSC) and supported by the Neuroscience Institute. Established in 1985, the Neuroscience Institute comprises over 90 faculty from multiple departments and colleges, including Anatomy and Neurobiology, Medicine, Molecular Sciences, Neurology, Neurosurgery, Ophthalmology, Pathology, Pediatrics, Pharmaceutical Sciences, Pharmacology, Physiology, and Surgery. Some faculty hold primary appointments at the world-renowned St. Jude Children's Research Hospital (SJCRC) a short distance away. Our program provides broad training in neurophysiology, neuropharmacology, neuroanatomy, molecular and cellular neuroscience, developmental neurobiology, and behavioral neuroscience.

Basic and clinical Neuroscience research at UTHSC focus on intracellular signaling pathways, neuronal excitability, synaptic transmission, sensory processing and retinal biology, neurological and neurodegenerative disorders, brain tumors, neurogenetics and neural development, and mental and addictive disorders. UTHSC is one of the world's leading centers exploiting novel genetic approaches to explore brain development, function and behavior, and psychiatric and neurodegenerative diseases. Neuroscientists at SJCRC are studying diverse pediatric tumors and diseases in the CNS using cutting-edge molecular, genomic and genetic methods.

Memphis is a culturally diverse metropolitan area of over 2.5 million residents, with the rich traditions of a city on the banks of the Mississippi River. Memphis has more sunny days than Miami, and combines southern heritage and hospitality with contemporary charm. You'll enjoy great dining (world famous barbecue), art galleries and an exciting nightlife. Memphis is a must for those wanting to visit the birthplace of blues, soul, and rock and roll. Sun Studio, The Rock 'N' Soul Museum, Gibson Guitar Factory and Beale Street entertainment district are just a few blocks from campus, as is the Mississippi River, and downtown. The city is runner and bike-friendly, with a new "greenline" extending to the city center from a 3200 acre urban park (Shelby Farms) that also provides fishing and horseback riding. Memphis is home to FedEx, to the NBA's Memphis Grizzlies, and to the Memphis Zoo, ranked one of the top zoos in the US and home to over 3500 animals on 76 beautifully landscaped acres.

To apply to the Neuroscience Track of our Graduate Program, please go to the Integrated Biomedical Science Program website:
<http://www.uthsc.edu/grad/IBS>

To find out more about Neuroscience and our program, please visit our website:
<http://www.uthsc.edu/neuroscience>



Early Advantage

Urban Child Institute message spreads in Pink Palace exhibit

ERIN WILLIAMS | Special to The Daily News

Talk, touch, read and play.

These four words focused on early childhood development have helped to shape the mission of the Urban Child Institute for the past four years, and now they are traveling beyond the building and into the Memphis Pink Palace Museum. The important message bears repeating and repetition in creating bright young minds, and the institute is focused on spreading the word as far and wide as possible – starting with their kiosk-like exhibition, “The Early Advantage.”

“We are wired to love on babies ... but to understand the science behind why that special love and attention is so important ... we want everybody to understand how important it is to really focus resources and attention on children in these first three years,” said Katy Spurlock, the Urban Child Institute’s director of education and dissemination.

The touch-screen program takes the unofficial motto and turns it into an interactive quiz on early childhood development.

“We call it the ‘Interactive Brain Map,’” Spurlock said. “It’s really meant to show adults or caregivers how to interact with a child.”

The institute contracted with the Center for Multimedia Arts at the University of Memphis to develop the first of six modules that will eventually roll out as more funding becomes available, and is making its debut as part of the exhibit space at the Pink Palace.

The program itself, placed on the first floor in the exhibition space, is short but effective. Patrons approach a touch screen that presents different scenarios tied to the “Touch Talk Read Play” focus. Over the course of a simulated day, patrons have three opportunities to choose in what way than can stimulate their child’s energy, ranging from playing with your cell phone while your child begs for your attention to reading a book together before bed.

At the end, the computer goes through each choice you made and then decides if you had a good or OK day with your child, and focuses on how the impact of the day shaped the child’s brain development.

“We want everybody to understand that young children – particularly in these first three years – are in a very vulnerable time, but also a huge time of opportunity because whatever happens to them in those first three years helps to establish a foundation for their brain development,” said Spurlock of the exhibit’s debut.



Katy Spurlock, the Urban Child Institute’s director of education and dissemination, with “The Early Advantage” exhibit at the Pink Palace Museum.

(Daily News/Andrew J. Breig)

The Kiwanis Clubs of Germantown and the Louisiana-Mississippi-West Tennessee District have helped to participate in the exhibition's funding and placement, along with the University of Tennessee Neuroscience Institute, who has been working with the Urban Child Institute for several years on public programming.

"We're putting it in venues where we know children go," said [William Armstrong](#), professor in the department of anatomy and neurobiology and director of the Neuroscience Institute.

He assisted in the development of the curriculum for The Early Advantage. Armstrong noted that as time has gone on, it's become more and more recognized by both the medical and childcare fields how important this early development is in a child's life, and that maybe it will be seen by parents whose schedules don't always allow for such regular behavior.

"You can throw a lot of money at different problems, but nothing works better than contact and development in those early years," he said. "The ultimate goal is to have it reflect how these activities would actually [infringe] on different areas of the brain and what they would actually do."

[Steve Pike](#), director of museums for the Pink Palace Family of Museums, saw it as a no-brainer to allow the institute to debut its project at the museum, and understands that its tenets fall in line with the overall education aspect that the museum supports.

"To the extent that children come to us ready and willing to be educated, it makes our job easier. It makes it possible for us to do a better job," he said. "Things like spending time with your child, playing with your child, talking to your child, reading to your child, paying attention to your child – gives a child both the social skills and the cognitive ability to learn before they ever get to a museum or before they ever get to a school, for that matter."

He hopes that those who do stop by will take the time to implement what he calls "self-motivated learning."

"There's a full day of stuff to do here, but I would certainly urge anybody who comes here with a kid to just take a little minute and look at that exhibit, because it's where they're gonna find something that they can really give the kid," Pike said.

The Memphis Public Library and Le Bonheur Children's Hospital have also expressed interest in receiving the exhibit after its run ends in February, Spurlock said, who added that the additional modules will roll out on an as-funded basis. Combined with the institute's ads on TV, radio, written materials, trainings and even T-shirts, the message could continue to grow with time. "For our education system to get better, for our criminal justice system to reduce its numbers, for our economic development to increase, we need to pay attention to all children in our community in these first three years and realize the vulnerability that's there as well as the opportunity to do things right," Spurlock said.

1 Leptin modulates the intrinsic excitability of AgRP/NPY neurons in the arcuate nucleus of the hypothalamus.

Baver SB¹, Hope K, Guyot S, Bjørbaek C, Kaczorowski C, O'Connell KM

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J Neurosci. 2014 Apr 16; 34(16):5486-96

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8+1

RECOMMENDATIONS 1 | ABSTRACT | COMMENTS

expand all

Recommendations:

Good

21 Jul 2014



William Colmers

F1000 Neuroscience

University of Alberta, Edmonton, AB, Canada.

INTERESTING HYPOTHESIS | NEW FINDING

DOI: 10.3410/f.718354171.793497475

Energy homeostasis is a key physiological response, not merely for the survival advantage that it confers on animals in the face of low food availability (conditions under which the system evolved a very long time ago) but also for the problems that arise with the system in the face of unlimited availability of calorically dense and palatable food (resulting in obesity). The homeostatic system, seated largely (but not entirely) in the hypothalamus, comprises a number of elements, including neurons in the arcuate nucleus (ARC) that make the neurotransmitters/neuromodulators neuropeptide Y (NPY) and agouti-related peptide (AgRP) {1-3}. These neurons also make and release GABA, which is also key to their actions. NPY is a potent orexigenic, acting in several brain regions {3}. Optogenetic or chemogenetic activation of these cells results in short-latency, voracious eating {4-6}. Other neurons in the ARC that produce pro-opiomelanocortin (POMC) result in the suppression of food intake {4,6} when activated. Both of these neuron types are sensitive to the adipose-derived hormone leptin, which in some aspects can be considered a satiety signal (it also does plenty more, in the brain and the periphery, but that's another tale). NPY/AgRP/GABA neurons are inhibited by leptin action {7}, while the POMC neurons are excited by leptin {8}. This has been known for some time, but the mechanisms by which leptin, acting via the signaling form of the receptor (LepRb), mediates these effects on neuronal excitability are, as they say, largely unknown.

This paper reports interesting findings on the mechanisms by which leptin can regulate the firing of NPY/AgRP neurons and the effect that prolonged exposure (9-12 weeks) to a high-fat diet (HFD) has on this response. The authors first examined the effect of leptin on identified, GFP-expressing NPY neurons from the ARC of mice fed either standard diet (SD) or HFD for a prolonged period. Additionally, some of these animals were either food deprived for 14-16 hours (fasted) or not (fed). Neurons from SD-fed animals were strongly inhibited by leptin application, while those from SD-fasted animals were far less sensitive. Interestingly, NPY cells from HFD-fed or -fasted animals were essentially insensitive to leptin, similar to the SD-fasted animals, consistent with observations by others. A study of the action potential waveform in NPY cells from SD-fed, SD-fasted or HFD-fed animals indicated significant differences in their properties, with cells from the SD-fed animals being more hyperpolarized and wider, with a more delayed hyperpolarization than neurons from either the SD-fasted or the HFD-fed animals.

The authors next looked at the hyperpolarization caused by leptin. Treating the neuron with 4-aminopyridine (4-AP), generally considered a blocker of transient, voltage-dependent K⁺ currents (Kv), prevented the hyperpolarization caused by leptin. Using voltage-clamp recordings, they determined that the neurons have a large Kv, which did not inactivate, classically the description of a delayed rectifier current (IDR). Somewhat surprisingly, the 4-AP-sensitive component was about half of the steady-state IDR in these cells. Using HEK cells expressing LepRb and either Kv2.1 or Kv2.2 channels (IDR channels that match the kinetics of the IDR seen in the NPY cells) they showed that activating LepRb in cells expressing the Kv2.1, but not those expressing Kv2.2, reduced the current, suggesting that Kv2.1 is the effector. Furthermore, inhibition of the Src signaling pathway with Src1 and PP1 prevented LepRb's effects on Kv2.1. Kv2.1 is also highly expressed in NPY cells, while the detection of Kv2.2 was negligible. Use of Stomatoxin-1 (a tarantula venom component that blocks Kv2.1, Kv2.2 and Kv4.2) depolarized and increased firing rates of NPY cells from SD-fed mice.

The authors conclude that prolonged HFD feeding causes leptin insensitivity in mouse ARC NPY neurons and that leptin is likely to act via the modulation of a Kv2.1 channel via Src kinase. This seems a reasonable conclusion, consistent with all the evidence. There is much to admire in this paper, including the methodical and careful approach to the neuronal properties and the effects that diet has on it. Important questions still remain, however. Based on their results, it appears that there is no net reduction in the IDR in the NPY cells in the SD-fasted or HFD-fed animals, so it remains to be determined if the phosphorylation state of the IDR channels (presumably Kv2.1) differs in the SD-fed and the SD-fasted or HFD-fed animals. This might be amenable to testing with Src inhibitors. The changes in action potential waveform seen in the SD-fasted and HFD-fed NPY cells relative to the SD-fed suggest that NPY cells in the latter will admit far more Ca²⁺ into the cell during an action potential – as this has significant physiological consequences, it would be of interest to look. Neither of these points should be seen as detracting from this study, however.

Finally, there is one caveat that relates to all work with mice and obesogenic diets. While these animals get fat on a HFD, unlike rats, they do not usually defend excess weight when returned to SD {9,10}. Because of this, the relationship between results in the HFD-fed mice and obesity in humans remains unclear, as the principal effect could result from elevated signaling from excess adipose tissue, elevated circulating triglycerides or other consequences of the HFD treatment, and it would be of considerable interest to repeat these studies on animals that had returned to the ideal weight of their SD-fed littermates.

References

1. **Central nervous system control of food intake.**
Schwartz MW, Woods SC, Porte D, Seeley RJ, Baskin DG. Nature 2000 Apr 6; 404(6778):661-71
PMID: 10766253 DOI: 10.1038/35007534
2. **The electrophysiology of feeding circuits.**
Jobst EE, Enrietti PJ, Cowley MA. Trends Endocrinol Metab 2004 Dec; 15(10):488-99

7/29/2014

Leptin modulates the intrinsic excitability of AgRP/NPY neurons in the arcuate nucleus of the hypothalamus. - F1000Prime

- PMID: 15541648 DOI: 10.1016/j.tem.2004.10.007
3. **The role of NPY in hypothalamic mediated food intake.**
Mercer RE, Chee MJ, Colmers WF. Front Neuroendocrinol 2011 Oct; 32(4):398-415
PMID: 21726573 DOI: 10.1016/j.yfrne.2011.06.001
 4. **AGRP neurons are sufficient to orchestrate feeding behavior rapidly and without training.**
Aponte Y, Atasoy D, Sternson SM. Nat Neurosci 2011 Mar; 14(3):351-5
PMID: 21209617 DOI: 10.1038/nn.2739
 5. **Rapid, reversible activation of AgRP neurons drives feeding behavior in mice.**
Krashes MJ, Koda S, Ye C, Rogan SC, Adams AC, Cusher DS, Maratos-Flier E, Roth BL, Lowell BB. J Clin Invest 2011 Apr 1; 121(4):1424-8
PMID: 21364278 DOI: 10.1172/JCI46229
 6. **Deconstruction of a neural circuit for hunger.**
Atasoy D, Betley JN, Su HH, Sternson SM. Nature 2012 Aug 9; 488(7410):172-7
PMID: 22801496 DOI: 10.1038/nature11270
 7. **Fasting induces a large, leptin-dependent increase in the intrinsic action potential frequency of orexigenic arcuate nucleus neuropeptide Y/Agouti-related protein neurons.**
Takahashi KA, Cone RD. Endocrinology 2005 Mar; 146(3):1043-7
PMID: 15591135 DOI: 10.1210/en.2004-1397
 8. **Leptin activates anorexigenic POMC neurons through a neural network in the arcuate nucleus.**
Cowley MA, Smart JL, Rubinstein M, Cerdán MG, Diano S, Horvath TL, Cone RD, Low MJ. Nature 2001 May 24; 411(6836):480-4
PMID: 11373681 DOI: 10.1038/35078085
 9. **Initiation and perpetuation of obesity and obesity resistance in rats.**
Levin BE, Hogan S, Sullivan AC. Am J Physiol 1989 Mar; 256(3 Pt 2):R766-71
PMID: 2646957
 10. **Persistent diet-induced obesity in male C57BL/6 mice resulting from temporary obesigenic diets.**
Guo J, Jou W, Gavrilova O, Hall KD. PLoS One 2009; 4(4):e5370
PMID: 19401758 DOI: 10.1371/journal.pone.0005370

Disclosures

None declared

[Add a comment](#)

Abstract:

ABSTRACT

The hypothalamic arcuate nucleus (ARH) is a brain region critical for regulation of food intake and a primary area for the action of leptin in the CNS. In lean mice, the adipokine leptin inhibits neuropeptide Y (NPY) and agouti-related peptide (AgRP) neuronal activity, resulting in decreased food intake. Here we show that diet-induced obesity in mice is associated with persistent activation of NPY neurons and a failure of leptin to reduce the firing rate or hyperpolarize the resting membrane potential. However, the molecular mechanism whereby... [more »](#)

diet uncouples leptin's effect on neuronal excitability remains to be fully elucidated. In NPY neurons from lean mice, the Kv channel blocker 4-aminopyridine inhibited leptin-induced changes in input resistance and spike rate. Consistent with this, we found that ARH NPY neurons have a large, leptin-sensitive delayed rectifier K(+) current and that leptin sensitivity of this current is blunted in neurons from diet-induced obese mice. This current is primarily carried by Kv2-containing channels, as the Kv2 channel inhibitor stromatocin-1 significantly increased the spontaneous firing rate in NPY neurons from lean mice. In HEK cells, leptin induced a significant hyperpolarizing shift in the voltage dependence of Kv2.1 but had no effect on the function of the closely related channel Kv2.2 when these channels were coexpressed with the long isoform of the leptin receptor LepRb. Our results suggest that dynamic modulation of somatic Kv2.1 channels regulates the intrinsic excitability of NPY neurons to modulate the spontaneous activity and the integration of synaptic input onto these neurons in the ARH.

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Health and fitness calendar

Staff Reports

Monday, April 21, 2014

Fitness events

Zero Prostate Cancer Run/Walk: 7:30 a.m. Saturday at Memphis Botanic Garden. zeroprostatecancerrun.org/memphis or call 901-274-2202.

Memphis Rotary Club Rotary Ride for Families: 8 a.m. Saturday at East Parkway Pavilion in Overton Park. Benefiting the Dorothy Day House. 901-526-1318. Registration site: rotaryfamilyride.com

March of Dimes March for Babies presented by FedEx: 9 a.m. Saturday at Shelby Farms. A 4.5 leisurely walk. Registration 8 a.m. 901-590-1722. marchofdimes.com/tennessee and marchforbabies.org

John P. Freeman PTSA 5K Walk/Run: Saturday at John P. Freeman Optional School, 5250 Tulane Road. Registration 7:30 a.m. The event kicks off at 8 a.m. with John P. Freeman Performing Band and Panther Cheerleaders cheering on each participant. 5K Run/Walk at 8:30 a.m. Package Pickup 7:45—8:45 a.m. and 5—7 p.m. Thursday at John P. Freeman School Optional School. Race day 7:30 a.m. 901-552-6557. racesonline.com

Tunica (Miss.) Main Street's Bike Ride: 10 a.m. Saturday. 13 mile ride and a 40 mile ride. \$10 registration fee. 662-363-6611.

Walking as One: 2 p.m. Saturday at Church Health Center Wellness, 1115 Union Ave. Family-friendly fun in a noncompetitive atmosphere with live music, food, post-walk activities, team prizes, kids' zone and more. 901-701-2097.

Earth Day 5K Fun Run: 2 p.m. Sunday (\$25) at Shelby Farms. Packet Pickup 3-7 p.m. Saturday at Shelby Farms Visitor Center. Race day registration 11 a.m.-1:30 p.m. Fee: \$30. 901-767-PARK (7275). earthday5K.racesonline.com

The 15th annual Hope House Classic Golf Tournament: April 28 at Chickasaw Country Club, 3395 Galloway Ave. Registration fee \$300/individual; \$1,000/per team of four players. 901-272-2702 ext. 206. hopehousememphis.org

Health Events

Lifblood Blood Drives: Open to the public.

Art of Living Foundation "Stress Free, Violence Free Memphis" Campaign: 12:30 p.m. Monday at Midday Moves, University of Memphis and 6 p.m. Monday at Whole Foods. Health and wellness seminars in support of National Stress Awareness Month. Call

901-881-7145. artofliving.org

Tuesday: 9:30 a.m.-noon. Shelby County Jury Commission, 157 Poplar Ave., Suite 400.

Thursday: 12:30-4:30 p.m. Baptist Memorial Hospital-Tipton, 1995 U.S. 51 S., Covington.

Friday: 8 a.m.-5 p.m. Tipton Center Mobiles, 1995 U.S. 51 S., Covington.

Saturday: 10 a.m.-6 p.m. Tipton Center Mobiles, 1995 U.S. 51 S., Covington; noon-4 p.m. St. William Catholic Church, 4932 Easley, Millington.

Sunday: 8:30 a.m.-12:30 p.m. Germantown Presbyterian Church, 2363 Germantown Road, Germantown; 9 a.m.-1 p.m. Bartlett Baptist Church, 3465 Kirby Whitten Road, Bartlett; 1-5 p.m. Great Oaks Church of Christ, 3355 Brunswick Road, Bartlett.

“Do You Have Ringing In Your Ears”: Noon-1 p.m. Wednesday seminar topic of discussion at Methodist Fayette Hospital (lobby), 214 Lakeview Drive, Somerville. Dr. Case Keaton, audiologist, discusses tinnitus (ringing of the ears), hearing loss and the newest technology in hearing aids. 901-516-4055.

Post-Traumatic Stress Disorder Symposium: 9 a.m.-2:30 p.m. Thursday in the UTHSC General Education Building, 8 S. Dunlap (Room A204). University of Tennessee Health Science Center's Neuroscience Institute hosts a symposium titled “Post-Traumatic Stress Disorder: Clinical and Neurobiological Features.” Clinical and research experts in the fields of post-traumatic stress disorder and traumatic brain injury will be speakers, with keynote addresses from Kerry J. Ressler, MD, Ph.D., from Emory University School of Medicine, and Jeffrey J. Bazarian, MD, MPH, from the University of Rochester Medical Center. Free and open to the general public, health care workers and researchers. Registration required. Lunch provided. Register at: uthsc.edu/neuroscience/symposia.php

Healthy Kids Day: 9 a.m.-noon Saturday at the YMCA at Schilling Farms, 1185 Schilling Blvd. E., Collierville. Free. Active games, crafts, moon bounce, face painting, etc. Jump rope performances by Riverdale Ropers, 9:15 and 10:30 a.m.; basketball free throw contest, 11 a.m. (for ages 5-12); family Zumba 11:30 a.m. Call 901-850-9622.

“I Love My Health” Community Health Festival: 10 a.m.-2 p.m. Saturday at Methodist North Hospital, 3960 New Covington Pike. Free. Affordable Care Act information, health screenings, health insurance coverage, CPR classes, exercise demonstrations and healthy cooking demonstration, etc. 901-516-5038. methodisthealth.org.

Safe Disposal of Medications: 10 a.m.-2 p.m. Saturday at Emmanuel United Methodist Church, 2404 Kirby Road (at Messick). Turn in your unused or expired medications for safe disposal. Details about event and for other location drop-off sites, call 800-882-9539 or 901-754-6591. dea.gov

Healthy Living Support Group: Noon-1 p.m. April 28 meeting at Baptist Rehabilitation-Germantown (Community Classroom 125), 2100 Exeter Road, Germantown. A Spring Fling Healthy Cooking Demonstration will be performed. Light lunch served.



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- Thursday, Sep. 25, 2014
Wednesday, Sep. 24, 2014
Tuesday, Sep. 23, 2014
Monday, Sep. 22, 2014
Saturday, Sep. 20, 2014

Back

Go to date:

Input field with Go button

Search News:

Input field with Go button

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- Wednesday, Sep. 24, 2014
Tuesday, Sep. 23, 2014
Monday, Sep. 22, 2014
Friday, Sep. 19, 2014
Thursday, Sep. 18, 2014

Back | Forward >

Go to date:

Input field with Go button

Search Records:

Input field with Go button

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Search results for 'ptsd' | Advanced Search

Editorial Results

- 1. UTHSC to Host PTSD Symposium - Saturday, April 12, 2014

The Neuroscience Institute at the University of Tennessee Health Science Center will host a symposium on post-traumatic stress disorder April 24.

The symposium will run from 9 a.m. to 2:30 p.m. and will be held in Room A204 in the General Education Building, 8 S. Dunlap St., on the UTHSC campus.

- 2. UTHSC to Hold Post-Traumatic Stress Disorder Symposium - Thursday, April 10, 2014

The Neuroscience Institute at the University of Tennessee Health Science Center will host a symposium on post-traumatic stress disorder April 24.

The symposium will run from 9 a.m. to 2:30 p.m. and will be held in Room A204 in the General Education Building, 8 S. Dunlap St., on the UTHSC campus.

- 3. Marijuana Study in Veterans Wins Federal Backing - Tuesday, March 18, 2014

WASHINGTON (AP) - The federal government has signed off on a long-delayed study looking at marijuana as a treatment for veterans with post-traumatic stress disorder, a development that drug researchers are hailing as a major shift in U.S. policy.

- 4. 'People Like Me' - Monday, March 26, 2012

Robert Littlepage still thinks about it.

At times, he thinks about nothing else.

"It's not like people think it is. It's not like sand and in the Sahara," he said as he sat crouched at a table, his forearms resting on his legs, one leg moving up and down. "It's like cracked mud, like you are down in the Delta, in Clarksdale or something."

- 5. New Generation - Wednesday, December 07, 2011

It was 70 years ago that a new generation of veterans was created when the U.S. entered World War II.

And the 70th anniversary of the attack on Pearl Harbor - Wednesday, Dec. 7 - comes as another new generation of service men and women return home from the war in Iraq, where U.S. troops will exit by the end of the month.

- 6. Memphian Pens Sleep Self-Help Book - Thursday, August 26, 2010

Dr. Karin Thompson would prefer her new book on post-traumatic insomnia end up on somebody's nightstand than a medical library.

- 7. Vet Groups: Definition of Combat is Outdated - Thursday, March 26, 2009

WASHINGTON (AP) - A World War II-era law established that veterans who "engaged in combat with the enemy" receive special treatment when they seek disability compensation, making it less burdensome for them to prove the injury was from their time in the service.