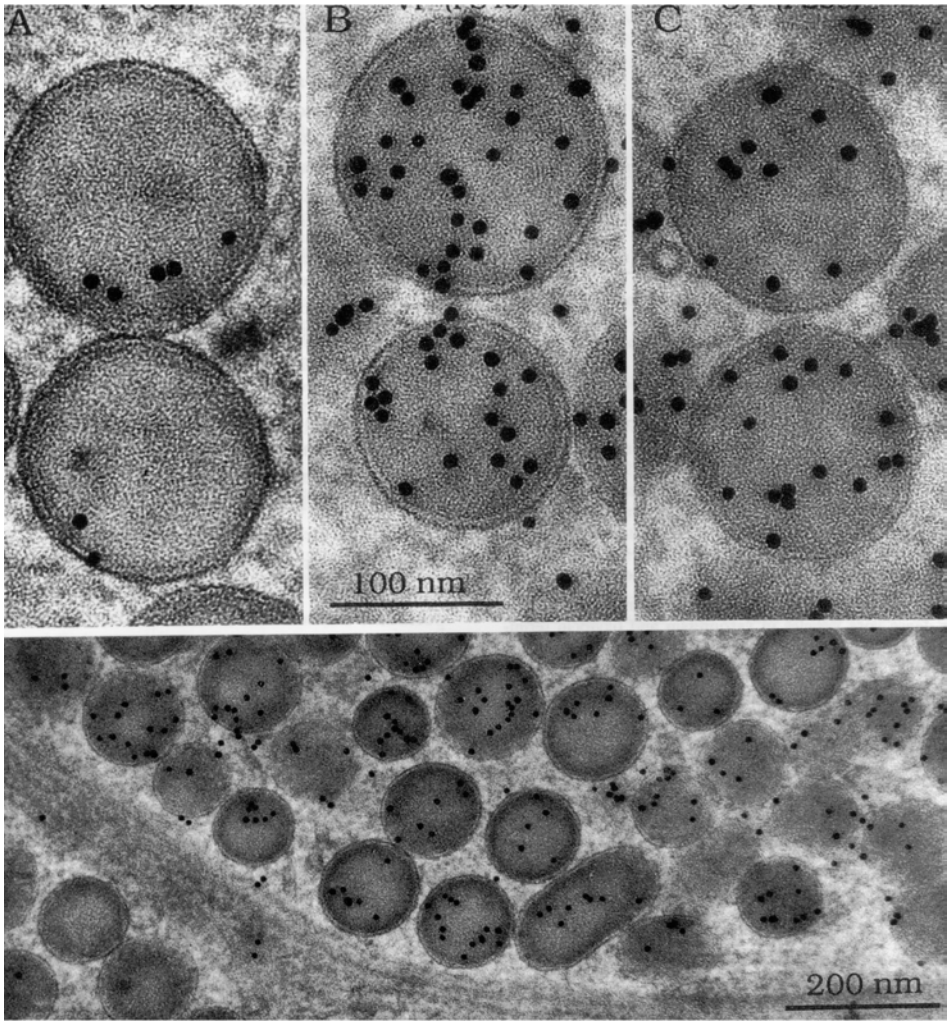
THE
NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

Neuroscience Center of Excellence



Annual Report to the

Tennessee Higher Education Commission

Fiscal year 2015 (7/1/2014-6/30/2015)

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I. ADMINISTRATIVE STRUCTURE

Director:	Professor William E. Armstrong, PhD
	Department of Anatomy and Neurobiology
Co-Director:	Professor Tony Reiner, PhD
	Department of Anatomy and Neurobiology
Administrative Specialist:	Summer Hillman
Program Coordinator/	
IT Specialist:	Brandy Fleming, MS

Neuroscience Executive Committee:

Matthew Ennis, PhD, Professor and Chair, Department of Anatomy and Neurobiology

Mark LeDoux, M., PhD, Professor, Department of Neurology

Charles Leffler, PhD, Professor, Department of Physiology

Tony Reiner, PhD, Professor and NI Co-Director, Department of Anatomy and Neurobiology

Susan E. Senogles, PhD, Associate Professor, Department of Molecular Sciences

Jeff Steketee, PhD, Professor, Department of Pharmacology

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

Center Address:

University of Tennessee Health Science Center
875 Monroe Ave., Suite 426, Wittenborg Building
Memphis TN 38163
(901) 448-5960
http://www.uthsc.edu/neuroscience

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 Summer Hillman. Ms. Hillman organizes the seminar series including all travel arrangements, assists in ordering and billing, and handles NI official correspondence. The Neuroscience Imaging Center is managed by TJ Hollingsworth, PhD. Dr. Hollingsworth reports to Dr. Armstrong.

II. BUDGET (see Schedule 7, page 6)

A. FY 2015. The FY 2015 appropriated budget for the UTNI was $606,779. We carried forward $249,881 from the previous year for a total budget of $856,660. This carryover reflects 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, and monies encumbered to support two new faculty hires for whom we provide seed packages (Kaczorowski and Chizhikov).

This past FY, we expended $538,200 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 (since departed), a full-time Program Coordinator/ IT specialist, a full time Administrative Specialist/histologist (since departed), full time Technical Manager of Imaging Center, 1 other part time histologist in the Imaging Center (now departed), 1 graduate student partially 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 ($73,644). The mentors were located in the departments of Anatomy and Neurobiology, Ophthalmology, Pharmaceutical Sciences, and Pharmacology.

Postdoctoral Support: We provided matching funds for 6 postdoctoral fellows, at ~$15,000 each and 2 at ~$37,000 each ($161,542). The NI Mentors are located in the departments of Anatomy and Neurobiology, Ophthalmology, and Pharmacology.

Neuroscience Imaging Center: For part of the past year, we employed Ms. Li Li, MS, at 50% time to assist the Technical Manager of the Imaging Center, Dr. Amanda Preston. Li Li departed in December of 2014, and Dr. Preston was replaced by Dr. TJ Hollingsworth in May of 2015. Our administrative assistant for most of the year, Shannon Guyot (replaced by Summer Hillman in May of 2015), also worked part-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 $32,997, which is used against the fees needed to pay the service contracts on the Zeiss 710 ($22,455), the JEOL

2000 ($16,800) and the Neurolucida workstation ($4,490). We also spent $655 resharpening a diamond knife for our plastic sectioning.

Neuroscience Behavioral Core: The procedures for use and available equipment can be viewed at: http://www.uthsc.edu/neuroscience/behavioral-core/index.php. Due to the generally 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: The equipment available for use can be viewed at: http://www.uthsc.edu/neuroscience/imaging-center/microtomy.php. This past year we spent $1,542.82 reparing two cyrostats in this core.

Seminars and Symposia: Additional funds went to support travel/lodging/meals ($24,200) and honoraria ($4,800) for the Neuroscience Seminar series, for a joint symposium with the Urban Child Institute entitled: "Early Reading and Language Skills", and for a symposium NI sponsored entitled "The Neurobiology of Appetite: Shedding Light on Obesity" (**see 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. Their unspent funds are reflected in our carryover.

Undergraduate Fellowships: NI supported three undergraduate Neuroscience Merit Fellows (total, $12,000) for summer research.

Travel Awards: $3,500 in travel awards for graduate students and postdoctoral fellows were awarded.

B. FY 2016. We will carryover $259,205 to the coming fiscal year, and have been appropriated $594,404 for a total of $853,609. In addition to providing support for all the NI staff (Program Coordinator, Administrative Assistant, and Imaging Center Manager), here is a breakdown of the major anticipated projects for FY2016:

Students: For the coming year, we have awarded matching funds for 10 graduate stipends to PIs with Neuroscience track graduate students. Mentors are located in the departments of Anatomy and Neurobiology, Neurology, Ophthalmology, and Pharmacology. The NI match is ~$13,500 each for 6 of these (~$81,000), and variable amounts for the remaining 4 student (~$5,600, $9,300, $11,500, $17,000), making an expected total of ~$124,704.

Postdoctoral Support: Due to budget cuts and our commitment to seed packages for faculty, this year we will provide limited funds for 4 postdoctoral fellows (~$20,000) for the coming year. Depending on expenditures, we may increase this amount. Currently these funds were given to postdoctoral awardees from last year since we typically fund 2 years.

Neuroscience Imaging Center: We will pay the service contracts on the JEOL 2000 ($16,800), for the Zeiss 710 Confocal ($22,455), and $4000-5000 on our Microbrightfield contract (paid every 2 years, this is up for renewal this year).

Neuroscience Behavioral Core: We will continue to support the Behavioral Core in FY2016, 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: Currently we have no contracts for any of the Microtomy Core equipment, and will pay for repairs as needed. In the past, service has been on the order of $1500 for the cryostats.

NI Faculty: We will provide administrative supplements to Drs. Armstrong and Reiner. Dr. Elberger retired July 1, 2015. 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 FY2015, these faculty spent ~$10,500 combined, and they will have ~$179,200 to spend in FY2016.

Research Projects and Bridge Funding: We can provide small amounts of bridge assistance, but this will be limited by our commitments to faculty seed packages. We will submit a request to the Dean of the College of Medicine to hire a new Neuroscience faculty member, and may be asked to contribute some that seed package as well.

Seminar Series and Community Outreach: We will offer our weekly Neuroscience Seminar series and will also sponsor a Neuroscience Symposium in the spring of 2016 (topic to be determined). 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 2016. 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).

Schedule 7

CENTERS OF EXCELLENCE ACTUAL, PROPOSED, AND REQUESTED BUDGET

Institution: UT Health Science Center **Center:** Neuroscience

	FY 2014-15 Actual			FY 2015-16 Proposed			FY 2016-17 Requested		
	Matching	Appropr.	Total	Matching	Appropr.	Total	Matching	Appropr.	Total
Expenditures	**$846,727**	**$597,455**	**$1,444,182**	**$846,727**	**$853,609**	**$1,700,336**	**$872,129**	**$624,124**	**$1,496,253**
Salaries									
Faculty	$343,698	$11,947	**$355,645**	$343,392	$36,500	**$379,892**	$353,299	$37,395	**$390,694**
Other Professional	$43,000	$193,999	**$236,999**	$42,700	$174,014	**$216,714**	$43,790	$179,234	**$223,024**
Clerical/ Supporting	$0	$52,045	**$52,045**	$0	$35,265	**$35,265**	$0	$36,323	**$36,323**
Assistantships	$251,568	$155,735	**$407,303**	$251,568	$193,396	**$444,964**	$259,115	$189,128	**$448,243**
Total Salaries	**$638,266**	**$413,726**	**$1,051,992**	**$637,660**	**$439,175**	**$1,076,835**	**$656,204**	**$442,080**	**$1,098,284**
Longevity (Exclude from Salaries and include in Benefits)	**$3,194**	**$3,194**	**$6,388**	**$3,800**	**$3,800**	**$7,600**	**$4,500**	**$4,500**	**$9,000**
Fringe Benefits	$205,267	$121,280	**$326,547**	$205,267	$109,200	**$314,467**	$211,425	$111,890	**$323,315**
Total Personnel	**$846,727**	**$538,200**	**$1,384,927**	**$846,727**	**$552,175**	**$1,398,902**	**$872,129**	**$558,470**	**$1,430,599**
Non-Personnel									
Travel		$23,540	**$23,540**		$40,000	**$40,000**		$30,000	**$30,000**
Software		$586	**$586**		$5,000	**$5,000**		$0	**$0**
Books & Journals		$0	**$0**		$0	**$0**		$0	**$0**
Other Supplies		$5,590	**$5,590**		$112,978	**$112,978**		$40,454	**$40,454**
Equipment		$0	**$0**		$82,456	**$82,456**		$0	**$0**
Maintenance		$18,453	**$18,453**		$48,000	**$48,000**		$18,200	**$18,200**
Scholarships		$0	**$0**		$0	**$0**		$0	**$0**
Consultants		$0	**$0**		$8,000	**$8,000**		$8,000	**$8,000**
Renovation		$0	**$0**		$0	**$0**		$0	**$0**
Other (Specify):		-$32,997	**-$32,997**		-$30,000	**-$30,000**		-$31,000	**-$31,000**
Professional Svcs & memberships		$22,770	**$22,770**		$20,000	**$20,000**		$0	**$0**
Contractual & Special Services		$12,853	**$12,853**		$15,000	**$15,000**		$0	**$0**
Media		$347	**$347**		$0	**$0**		$0	**$0**
Communication		$190	**$190**		$0	**$0**		$0	**$0**
Rentals		$2,475	**$2,475**		$0	**$0**		$0	**$0**
Insurance		$4,448	**$4,448**		$0	**$0**		$0	**$0**
Other Expenditures		$1,000	**$1,000**		$0	**$0**		$0	**$0**
Total Non-Personnel	**$0**	**$59,255**	**$59,255**	**$0**	**$301,434**	**$301,434**	**$0**	**$65,654**	**$65,654**
GRAND TOTAL	**$846,727**	**$597,455**	**$1,444,182**	**$846,727**	**$853,609**	**$1,700,336**	**$872,129**	**$624,124**	**$1,496,253**
Revenue									
New State Appropriation		$606,779	**$606,779**		$594,404	**$594,404**		$624,124	**$624,124**
Carryover State Appropriation		$249,881	**$249,881**		$259,205	**$259,205**		$0	**$0**
New Matching Funds	$846,727		**$846,727**	$846,727		**$846,727**	$872,129		**$872,129**
Carryover from Previous Matching Funds			**$0**			**$0**			**$0**
Total Revenue	**$846,727**	**$856,660**	**$1,703,387**	**$846,727**	**$853,609**	**$1,700,336**	**$872,129**	**$624,124**	**$1,496,253**

III. EXTRAMURAL FUNDING OF NEUROSCIENCE FACULTY

The UT Neuroscience Institute is a concentrated, interdepartmental Neuroscience program. For FY2014-2015, Anatomy and Neurobiology (10 funded Neuroscientists), remained ranked at ***16th in the category of Neuroscience departments among public university medical schools in NIH funding, and 32nd overall (from a total of 44).*** Other participating NI departments that are well ranked include **Physiology** (4 funded NI members), which was ranked ***10th among public medical schools and 16th overall*** (of 85), and **Pharmacology** (7 funded members), ***ranked 34th and 56th*** (of 94) (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 **$14,068,890.** This value is ~$2,000,000 more than last year. 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. Appendix 4 includes some examples of recently awarded faculty.

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, Genetics, Genomics and Bioionformatics, 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.

The Director and Co-Director frequently interact with Executive Committee members and consult with these

members regarding NI membership, 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. We have added 7 new members this past FY.

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 Professr
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)
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
Catherine Kaczorowski, Ph.D., Assistant Professor
Hitoshi Kita, Ph.D., Professor
Peter J. McKinnon, Ph.D., Affiliated Associate Professor (St. Jude)
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 Professor (St. Jude)

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

Robert S. Waters, Ph.D., Professor

Stanislav Zahkarenko, Ph.D. Affiliated Associte 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 Genetics, Genomics and Informatics

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

*Byron Jones, Ph.D., Professor

Lu Lu, Ph.D., Associate Professor

Department of Molecular Sciences

Susan E. Senogles, Ph.D., Professor

Department of Neurology

*Annie Chan, Ph.D., Assistant Professor

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

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

*Jack Tsao, MD, PhD, Professor

Department of Neurosurgery

Frederick Boop, M.D., Professor and Chair

Department of Ophthalmology

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

*Rajashekhar Gangaraju, Ph.D., Assistant Professor

Monica M. Jablonski, Ph.D., Professor

*Vanessa Marie Morales-Tirado, Ph.D., Assistant Professor

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

*Abbas Babajani-Feremi, Ph.D., Assistant Professor, Pediatrics, Le Bonheur

*Joan Han, M.D., Associate Professor, Pediatrics, LeBonheur

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., Associate Professor, Pediatric Neurology, Le Bonheur

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

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., Professor

Kafait U. Malik, Ph.D., Professor

Kazuko Sakata, Ph.D., Associate 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., Associate Professor

Helena Parfevona, Ph.D., Professor

Valeria Vásquez, Ph.D. Affiilated 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 Professor, Neurology

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., Professor

J. Paul Taylor, M.D., Ph.D., 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	*Physiology*	R. Pfeiffer	*Neurology*
E. Geisert	*Ophthalmology*	W. Pulsinelli	*Neurology*
R. Homayouni	*U of Memphis*	A. Reiner	*Anat. & Neurobiology*
M. Jacewicz	*Neurology*	L. Reiter	*Neurology*
C. Kaczorowski	*Anat. & Neurobiology*	R. Smeyne	*Anat. & Neurobiology/St. Jude*
H. Kita	*Anat. & Neurobiology*	J. Wheless	*Ped. Neurology/Le Bonheur*
F-F. Liao	*Pharmacology*	*A. Babajani-Feremi	*Ped. Neurology/Le Bonheur*
S. Naryana	*Ped. Neurology/Le Bonheur*	*B. Jones	*Gen, Genomics, Inform*

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

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

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	*Ophthalmology*	D. Johnson	*Ophthalmology*
M. Dyer	*Ophthalmology*	A. Reiner	*Anat. & Neurobiology*
M. Fitzgerald	*Anat. & Neurobiology/St. Jude*	*R. Gangaraju	*Ophthalmology*
A. Iannaccone	*Anat. & Neurobiology/CBU*	R. Williams	*Gen., Genomics & Inform.*
M. Jablonski	*Ophthalmology*	J. Zuo	*Anat. & Neurobiology/St. Jude*
*V. Morales-Tirado	*Ophthalmology*		

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	*Gen, Genomics, & Inform*	L. Lu	*Anat. & Neurobiology*
J. Boughter	*Anat. & Neurobiology*	P. McKinnon	*Anat. & Neurobiology/St. Jude*
V. Chizhikov	*Anat. & Neurobiology*	J. Morgan	*Anat. & Neurobiology/St. Jude*
A. d'Azzo	*Anat. & Neurobiology/St. Jude*	A. Reiner	*Anat. & Neurobiology*
I. Dragatsis	*Physiology*	L. Reiter	*Neurology*
K. Hamre	*Anat. & Neurobiology*	R. Smeyne	*Anat. & Neurobiology/St. Jude*
R. Homayouni	*Neurology/U Memphis*	M. Honig	*Anat. & Neurobiology*
R. Waters	*Anat. & Neurobiology*	*J. Han	*Pediatrics/Le Bonheur*

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	*Pharmacology*	K. Sakata	*Pharmacology*

H. Chen	*Pharmacology*	J. Steketee	*Pharmacology*
A. Dopico	*Pharmacology*	S. Tavalin	*Pharmacology*
K. Hamre	*Anat. & Neurobiology*	F. Zhou	*Pharmacology*
S. Heldt	*Anat. & Neurobiology*		

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	*Molecular Sciences*	M. LeDoux	*Neurology*
S. Bahouth	*Pharmacology*	K. Malik	*Pharmacology*
E. Chaum	*Ophthalmology*	S. Tavalin	*Pharmacology*
R. Foehring	*Anat. & Neurobiology*	R. Waters	*Anat. & Neurobiology*
M. Jablonski	*Ophthalmology*		
J. Jaggers	*Physiology*		

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 2014 meeting of the Society for Neuroscience in Washington DC, 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 his Ph.D. this past year, Kyle Summers. The Neuroscience graduate track has seen a marked increase in the number of good applications (judged by lab experience, GREs, and GPAs) among entering students the past three years (see Goals below and **Appendix 4**).

IX. NEUROSCIENCE SEMINARS AND SYMPOSIA

During the 2014-2015 academic year, the NI sponsored the weekly Neuroscience Seminar Series, hosting 24 seminars. Of these, 17 neuroscientists from outside UTHSC and 7 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 2014-2015 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 **"Early Reading and Language Skills".** This symposium had ~150 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 Daniela O'Neill, Ph.D. from Waterloo University and Helen Perkins, Ph.D. from University of Memphis, talked about the development of reading abilities in children and how parents and caregiveers can provide important social interaction assisting this development. The NI also partnered with the Urban Child Institute, the CANDLE study group, and the Department of Preventive Medicine on a morning conference preceding our evening session entitled ***"Early Childhood Language and Literacy Implications for Social and Academic Success"***. This event featured 4 speakers, including Drs. O'Neill and Perkins. 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 several 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. These investigators are entering their 3rd year of support this Fall (2015).

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 Manager (Dr. TJ Hollingsworth) 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. This past year we upgraded two cryostats in the Microtomy core for $1,542.82.

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.

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 24 seminars: 17 by visiting neuroscientists and 7 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 tenth 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 (Mentors: 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 2014-2015, 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 9 Neuroscience Track students for FY 2015-2016. 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 2014-2015, NI supported matching funds for 8 postdoctoral students, and have committed to 6 postdocs for FY 2015-2016.

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 (**Appendix 4**), which are detailed above.

3b. Research Projects funded by NI. During 2014-2015, the NI did not solicit research proposals but instead continued to support two new faculty hires. 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 2014-2015. These awards are $10,000-$15,000 each. We will fund 6 postdocs in FY 2014-2015 at a reduced level due to continuing budget cuts to the Center and our

commitments to faculty recruits.

-**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 "**The Neurobiology of Appetite: Shedding Light on Obesity"** symposium in April of 2015, 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 2016, topic to be determined.

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 "**Early Reading and Language Skills",** 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 Daniela O'Neill , Ph.D. of Waterloo University and the other by Helen Perkins, Ph.D. from the University of Memphis. Also as indicated above, the NI partnered with the Urban Child Institute, the CANDLE study group, and the Department of Preventive Medicine on a conference that preceded these talks entitled "***Early Childhood Language and Literacy Implications"*.(Appendix 4).**

APPENDIX 1

External Funding of Neuroscience Institute Faculty

FY 2014-2015

PI	AWARD TITLE	DEPARTMENT	SPONSOR	SPONSOR AWARD NO.	AWARD BEGIN DATE	AWARD END DATE	FY TOTAL COSTS
Armstrong, William	Reproductive Plasticity in Oxytocin Neurons	UTHSC-Anatomy and Neurobiology	NIH-NICHHD	5R01HD072056-03	1/1/2015	12/31/2015	$280,125.00
Boughter, John	Sensory Coding in Taste	UTHSC-Anatomy and Neurobiology	NIH-NIDCD	5 R01 DC000353-30	9/1/2014	8/31/2015	$273,992.00
Bukiya, Anna	Fetal cerebrovascular eCB system as a target of maternal alcohol	UTHSC-Pharmacology	NIH-NIAAA	5R21AA022433-02	6/1/2015	5/31/2016	$209,155.00
Bukiya, Anna	Cholesterol control of alcohol-induced cerebral artery constriction	UTHSC-Pharmacology	NIH-NIAAA	1R01AA023764-01	5/1/2015	4/30/2016	$327,600.00
Chaum, Edward	Phenotype Modeling - an in vivo Platform for Experimental and Therapeutic Intervention for Prom	UTHSC-Ophthalmology	The Shulsky Foundation		11/1/2014	10/31/2015	$150,000.00
Chaum, Edward	MR130114 Nutlin Analogues for the Prevention and Treatment of Proliferative Vitreoretinopathy in	UTHSC-Ophthalmology	DOD	W81XWH-15-1-0023	2/1/2015	1/31/2018	$999,488.00
Chaum, Edward	Nanoplatform and Modeling of the Subretinal and RPE Microenvironment in AMD	UTHSC-Ophthalmology	NIH - NEI	1R01EY024063-01A1	5/1/2015	4/30/2016	$645,184.00
Chaum, Edward	Nanoplatform and Modeling of the Subretinal and RPE Microenvironment in AMD	UTHSC-Ophthalmology	NIH - NEI	1R01EY024063-01A1 REVISED	5/1/2015	4/30/2016	$4,042.00
Chen, Hao	Integrated GWAS of complex behavioral and gene expression traits in outbred rats	UTHSC-Pharmacology	University of Chicago	FP056206-C P50DA037844	5/1/2015	4/30/2016	$383,250.00
Chizhikov, Viktor	Effect of nutrition on brain development after preterm birth	UTHSC-Anatomy And Neurobiology	University of Memphis	University Index Number 5-60028	10/1/2014	4/30/2015	$13,000.00
Dopico, Alejandro	Ethanol Actions on SLO Channels from Arteries vs. Brain	UTHSC-Pharmacology	NIH-NIAAA	4 R37 AA011560-17	7/1/2014	6/30/2015	$371,171.00
Dopico, Alejandro	Vasodilation via selective pharmacological targeting of BK channel beta1subunits	UTHSC-Pharmacology	NIH -NIHBL	5 R01 HL104631-05	12/1/2014	11/30/2015	$349,094.00
Dragatsis, Ioannis	Characterization of an FD Mouse Model and Testing of Compounds that increase IKAP Expression	UTHSC-Physiology	Dysautonomia Foundation, Inc.		2/1/2015	2/1/2016	$75,000.00
Dragatsis, Ioannis	Restoration of IKAP expression in an FD mouse model: Implications for therapeutics	UTHSC-Physiology	Dysautonomia Foundation, Inc.		2/1/2015	1/31/2017	$75,000.00
Fletcher, Max	Cholinergic Modulation of Early Olfactory Sensory Olfactory	UTHSC-Anatomy and Neurobiology	Pew Charitable Trusts		7/1/2014	6/30/2015	$60,000.00
Fletcher, Max	Cholinergic modulation of olfactory bulb glomerular	UTHSC-Anatomy and Neurobiology	NIH-NIDCD	1R01DC013779-01A1	3/1/2015	2/28/2016	$364,787.00
Fletcher, Max	Cholinergic modulation of olfactory bulb glomerular sensitivity	UTHSC-Anatomy and Neurobiology	NIH-NIDCD	1R01DC013779-01A1 REVISED	3/1/2015	2/28/2016	$3,409.00
Foehring, Robert	Slowly Inactivating K+ Channels in Neoxortical Pyramidal Cells	UTHSC-Anatomy and Neurobiology	NIH - NINDS	5R01NS044163-11	7/1/2014	6/30/2015	$335,030.00
Heck, Detlef	CRCNS: Cerebellar Cortico-Nuclear Interactions	UTHSC-Anatomy and Neurobiology	Emory University	5R01NS067201 S310099	9/1/2014	8/31/2015	($49,260.00)
Jablonski, Monica	Biodistribution, Pharmacokinetic Assessment and Long-Term Safety of a Novel Treatment for Age-	UTHSC-Ophthalmology	University of Tennessee Research Foundation (UTRF)		1/2/2015	10/2/2015	$15,000.00
Jablonski, Monica	Insights into AMD derived from the genetic mechanisms in Late Onset Retinal Macular	UTHSC-Ophthalmology	University of California at San Diego	20150688-AYYAGARI 58090191	########	12/30/2015	$13,000.00
Jaggar, Jonathan	Calcium signaling in cerebral arteries	UTHSC-Physiology	NIH -NIHBL	5R01HL067061-13	5/1/2015	4/30/2016	$369,375.00

Jaggar, Jonathan	Arterial Smooth Muscle Chloride Channels	UTHSC-Physiology	NIH -NIHBL	5 R01 HL110347-04	7/1/2014	6/30/2015	$461,429.00
Jaggar, Jonathan	Grant from Arbor Pharmaceuticals, LLC for the E. Eric Muirhead Hypertension Research Day	UTHSC-Physiology	Arbor Pharmaceuticals, LLC		11/4/2014	11/5/2014	$3,500.00
Jones, Byron	Genetics of Chronic Mild Stress and Alcohol Consumption	UTHSC-Genetics, Genomics, And Informatics	NIH-NIAAA	1R01AA021951-01A1	9/26/2014	8/31/2015	$387,657.00
Jones, Byron	Neural Toxicity of Paraquat is Related to Iron Regulation in Midbrain	UTHSC-Genetics, Genomics, And Informatics	NIH-NIAAA	5R01ES022614-03	5/1/2015	4/30/2016	$594,567.00
Kaczorowski, Catherine	Proteomics of memory failure: unraveling the relationship between 'normal' brain aging and Alzheimer's Disease	UTHSC-Anatomy and Neurobiology	NIH-NIA	5R00AG039511-05	6/1/2015	5/31/2016	$235,508.00
Kaczorowski, Catherine	Systems Genetics of Cognitive Aging: The Use of the BXD Murine Reference Panel to Identify	UTHSC-Anatomy and Neurobiology	American Federation for Aging Res		7/1/2014	6/30/2016	$98,500.00
Kita, Hitoshi	Synaptic Transmissions in the Basal Ganglia	UTHSC-Anatomy and Neurobiology	NIH - NINDS	5 R01 NS057236-07	5/1/2015	4/30/2016	$328,125.00
Ledoux, Mark	Research Agreement: Creatine Safety, Tolerability, and Efficacy in Huntington's Disease: CREST-E	UTHSC-Neurology	Massachusetts General Hospital	2U01AT000613+12 CREST-E	7/1/2014	6/30/2015	$241,281.00
Ledoux, Mark	Genetics and Biology of CIZ1 in Cervical Dystonia	UTHSC-Neurology	NIH - NINDS	5R01NS082296-02	7/1/2014	6/30/2015	$324,845.00
Ledoux, Mark	A Phase 3, Multicenter, Double-Blind, Placebo-Controlled, Single-Treatment Efficacy and Safety Study of MYOBLOC® (Part A)	UTHSC-Neurology	US WorldMeds, LLC	MYOBLOC SN SIAL-301	9/5/2014	6/1/2015	$220,834.00
Ledoux, Mark	SD-809-C-18 A Randomized, Double-Blind, Placebo-Controlled Study of SD-809 (Dutetrabenazine) for the	UTHSC-Neurology	Auspex Pharmaceuticals	SD-809-C-18 & SD-809-C-20	9/22/2014	11/15/2015	$296,498.00
Ledoux, Mark	Genetics of Blepharospasm	UTHSC-Neurology	Benign Essential Blepharospasm Research Foundation (BEBRF)		1/1/2015	12/31/2015	$80,000.00
Ledoux, Mark	A Randomized, Double-Blind, Placebo-Controlled, Fixed Dose Study of SD-809 (Deutetrabenazine) for the	UTHSC-Neurology	Auspex Pharmaceuticals	Protocol SD-809-C-23	3/3/2015	5/2/2016	$127,000.00
Leffler, Charles	Studies of the Control of Neonatal Circulation	UTHSC-Physiology	NIH -NIHBL	5R01HL034059-30	6/1/2015	5/31/2016	$403,215.00
Leffler, Charles	Newborn Cerebral Hemorrhage and Arachidonate Metabolites	UTHSC-Physiology	NIH -NIHBL	5 R01 HL042851-24	8/1/2014	7/31/2015	$369,742.00
Li, Wei	Stability and in vivo pharmacokinetic evaluation of selective survivin inhibitors in rats	UTHSC-Pharmaceutical Sciences	University of Tennessee Research Foundation (UTRF)		1/2/2015	10/2/2015	$15,000.00
Liao, Francesca-Fang	Nuclear receptor signaling in BACE1 gene repression under neuroinflammation	UTHSC-Pharmacology	NIH - NINDS	5R21NS083908-02	7/1/2014	6/30/2015	$185,625.00
Liao, Francesca-Fang	Is HSF1 the key in mediating Hsp90 inhibitor effect in AD?	UTHSC-Pharmacology	NIH-NIA	1R01AG049772-01	5/1/2015	4/30/2016	$280,133.00
Malik, Kafait	Angiotensins, Prostaglandins, Adrenergic Interactions	UTHSC-Pharmacology	NIH -NIHBL	5 R01 HL19134-40	4/1/2015	3/31/2016	$555,926.00
Malik, Kafait	Ecosanoids-Induced Vascular Growth During Injury	UTHSC-Pharmacology	NIH -NIHBL	5 R01 HL079109-09	12/1/2014	11/30/2015	$347,625.00
Narayana, Shalini	Augmenting treatment effects of voice therapy in Parkinson's Disease	UTHSC-Pediatrics	Michael J. Fox Foundation for Parkinson's Disease	Grant ID: 9275	7/30/2014	12/31/2017	$677,385.87

O'Connell, Kristen	Modulation of AgRP neuronal excitability: role of diet and body weight	UTHSC-Physiology	NIH - NIDDK	1R01DK102918-01	7/8/2014	5/31/2015	$315,375.00
Reiner, Anton	A Mouse Model for Emotional Disorder Caused by Mild Traumatic Brain Injury	UTHSC-Anatomy and Neurobiology	NIH - NINDS	5R21NS081370-02	9/1/2014	8/31/2015	$222,750.00
Reiner, Anton	Progression of Basal Ganglia Pathology in Q175 Huntington's Disease Mice and Human HD	UTHSC-Anatomy And Neurobiology	CHDI, Inc.	RecID A-8299 RevNo002 (070108)	6/1/2015	1/31/2018	$264,142.00
Reiter, Lawrence	PENDING TECHNOLOGY (14-0818 FAH Patent Disclosure) Maturation Grant	UTHSC-Neurology	University of Tennessee Research Foundation (UTRF)		1/2/2015	10/2/2015	$15,000.00
Reiter, Lawrence	Drosophila genetic screen for a1-antitripsin/nec modifiers.	UTHSC-Neurology	Isis Pharmaceuticals, Inc.		6/1/2015	8/31/2015	$5,000.00
Sakata, Kazuko	Antidepressive Effects and Gene Mechanisms of Early-Life Enriched Environment	UTHSC-Pharmacology	NIH - NIMH	1R03MH102445-01A1	7/1/2014	6/30/2015	$72,500.00
Sakata, Kazuko	Neural Mechanisms of Inflexible Learning Caused by BDNF Deficiency	UTHSC-Pharmacology	NIH - NIMH	1R21MH105567-01	9/26/2014	7/31/2015	$225,000.00
Tavalin, Steven	Mechanisms of CaM Kinase II Signal Transduction	UTHSC-Pharmacology	Vanderbilt University	VUMC 38103 5R01MH063232-15	1/1/2015	12/31/2015	$19,611.00
Tavalin, Steven	Mechanisms controlling AMPA receptor subunit composition	UTHSC-Pharmacology	NIH - NINDS	5R01NS076637-04	6/1/2015	5/31/2016	$262,500.00
Wheless, James	IMPACT OF INITIAL THERAPY AND RESPONSE ON LONG TERM OUTCOME IN CHILDREN WITH CAE	UTHSC-Pediatrics	Cincinnati Children's Hospital Medical Center	Am 4 1107759 5U01NS045911	########	8/31/2015	$9,597.00
Williams, Robert	Robust Systems Genetric of Alcohol and Stress Effects on CNS	UTHSC-Genetics, Genomics, And Informatics	NIH - NIAAA	5U01 AA13499-14	2/1/2015	1/31/2016	$225,325.00
Williams, Robert	INIA: Bioinformatics Core	UTHSC-Genetics, Genomics, And Informatics	NIH - NIAAA	2U01AA016662-09	2/1/2015	1/31/2016	$190,366.00
Williams, Robert	Translational Systems Genetics of Mitochondria, Metabolism and Aging	UTHSC-Anatomy and Neurobiology	NIH - NIA	5R01AG043930-03	6/1/2015	5/31/2016	$490,637.00
Williams, Robert	Mapping The Human Connectome: Structure, Function and Heritability	UTHSC-Genetics, Genomics, And Informatics	Washington University	WU-15-134 5U54MH091657	9/1/2014	8/31/2015	$25,000.00
Williams, Robert	Research to Prevent Blindness Stein Innovation Award	UTHSC-Genetics, Genomics, And Informatics	Research to Prevent Blindness		2/28/2015	12/31/2016	$150,000.00
Zhou, Fuming	Supersensitive dopamine D2 receptor inhibition of the striatopallidal projection	UTHSC-Pharmacology	NIH - NINDS	5R03NS085380-02	9/1/2014	8/31/2015	$74,250.00
TOTAL							**$14,068,890.87**

APPENDIX 2

Faculty Publications and Society for Neuroscience Presentations

FY 2014-2015

Peer-reviewed publications for 2014-2015 (cited in PubMed):

Acevedo-Rodriguez, A, Zhang, L, **Zhou, F**, Gong, S, Gu, H, De Biasi, M, **Zhou, FM**, & Dani, JA. (2014). Cocaine inhibition of nicotinic acetylcholine receptors influences dopamine release. *Front Synaptic Neurosci, 6*, 19. doi: 10.3389/fnsyn.2014.00019

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, 64*(3), 237-246. doi: 10.1097/FJC.0000000000000111

Babajani-Feremi, A, Rezaie, R, **Narayana, S**, Choudhri, AF, Fulton, SP, **Boop, FA**, **Wheless, JW**, & **Papanicolaou, AC**. (2014). Variation in the topography of the speech production cortex verified by cortical stimulation and high gamma activity. *Neuroreport, 25*(18), 1411-1417. doi: 10.1097/WNR.0000000000000276

Befeler, AR, Daniels, DJ, Helms, SA, Klimo, P, Jr., & **Boop, F**. (2014). Head injuries following television-related accidents in the pediatric population. *J Neurosurg Pediatr, 14*(4), 414-417. doi: 10.3171/2014.7.PEDS1433

Benavente, CA, Finkelstein, D, **Johnson, DA**, Marine, JC, Ashery-Padan, R, & **Dyer, MA**. (2014). Chromatin remodelers HELLS and UHRF1 mediate the epigenetic deregulation of genes that drive retinoblastoma tumor progression. *Oncotarget, 5*(20), 9594-9608.

Bhattacharya, SK, Savarino, J, Michalski, G, & Liang, MC. (2014). A new feature in the internal heavy isotope distribution in ozone. *J Chem Phys, 141*(13), 134301. doi: 10.1063/1.4895614

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Chen, GY, Brown, NK, Wu, W, Khedri, Z, Yu, H, Chen, X, van de Vlekkert, D, **D'Azzo, A**, Zheng, P, & Liu, Y. (2014). Broad and direct interaction between TLR and Siglec families of pattern recognition receptors and its regulation by Neu1. *Elife, 3*, e04066. doi: 10.7554/eLife.04066

Chen, J, Wang, J, Schwab, LP, Park, KT, Seagroves, TN, Jennings, LK, **Miller, DD**, & Li, W. (2014). Benzimidazole analogs as potent hypoxia inducible factor inhibitors: synthesis, biological evaluation, and profiling drug-like properties. *Anticancer Res, 34*(8), 3891-3904.

Choudhri, AF, Chin, EM, Klimo, P, & **Boop, FA**. (2014). Spatial distortion due to field inhomogeneity in 3.0 tesla intraoperative MRI. *Neuroradiol J, 27*(4), 387-392. doi: 10.15274/NRJ-2014-10081

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, 35*(12), 2382-2387. doi: 10.3174/ajnr.A4040

Choudhri, AF, Sable, HJ, **Chizhikov, VV**, Buddington, KK, & Buddington, RK. (2014). Parenteral nutrition compromises neurodevelopment of preterm pigs. *J Nutr, 144*(12), 1920-1927. doi: 10.3945/jn.114.197145

Cox, BC, Dearman, JA, Brancheck, J, Zindy, F, Roussel, MF, & **Zuo, J.** (2014). Generation of Atoh1-rtTA transgenic mice: a tool for inducible gene expression in hair cells of the inner ear. *Sci Rep, 4*, 6885. doi: 10.1038/srep06885

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Efeovbokhan, N, **Bhattacharya, SK**, Ahokas, RA, Sun, Y, Guntaka, RV, Gerling, IC, & Weber, KT. (2014). Zinc and the prooxidant heart failure phenotype. *J Cardiovasc Pharmacol, 64*(4), 393-400. doi: 10.1097/FJC.0000000000000125

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, 31*(10), 851-854. doi: 10.1055/s-0033-1361938

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Malbouisson, H, Matos Figueiredo, D, Mundim, L, Nogima, H, Prado Da Silva, WL, Santaolalla, J, Santoro, A, Sznajder, A, Tonelli Manganote, EJ, Vilela Pereira, A, Bernardes, CA, Dogra, S, Tomei, TR, Gregores, EM, Mercadante, PG, Novaes, SF, Padula, SS, Aleksandrov, A, Genchev, V, Iaydjiev, P, Marinov, A, Piperov, S, Rodozov, M, Stoykova, S, Sultanov, G, Tcholakov, V, Vutova, M, Dimitrov, A, Glushkov, I, Hadjiiska, R, Kozhuharov, V, Litov, L, Pavlov, B, Petkov, P, Bian, JG, Chen, GM, Chen, HS, Chen, M, Du, R, Jiang, CH, Liang, S, Plestina, R, Tao, J, Wang, X, Wang, Z, Asawatangtrakuldee, C, Ban, Y, Guo, Y, Li, Q, Li, W, Liu, S, Mao, Y, Qian, SJ, Wang, D, Zhang, L, Zou, W, Avila, C, Chaparro Sierra, LF, Florez, C, Gomez, JP, Gomez Moreno, B, Sanabria, JC, Godinovic, N, Lelas, D, Polic, D, Puljak, I, Antunovic, Z, Kovac, M, Brigljevic, V, Kadija, K, Luetic, J, Mekterovic, D, Sudic, L, Attikis, A, Mavromanolakis, G, Mousa, J, Nicolaou, C, Ptochos, F, Razis, PA, Bodlak, M, Finger, M, Finger, M, Jr., Assran, Y, Ellithi Kamel, A, Mahmoud, MA, Radi, A, Kadastik, M, Murumaa, M, Raidal, M, Tiko, A, Eerola, P, Fedi, G, Voutilainen, M, Harkonen, J, Karimaki, V, Kinnunen, R, Kortelainen, MJ, Lampen, T, Lassila-Perini, K, Lehti, S, Linden, T, Luukka, P, Maenpaa, T, Peltola, T, Tuominen, E, Tuominiemi, J, Tuovinen, E, Wendland, L, Tuuva, T, Besancon, M, Couderc, F, Dejardin, M, Denegri, D, Fabbro, B, Faure, JL, Favaro, C, Ferri, F, Ganjour, S, Givernaud, A, Gras, P, Hamel de Monchenault, G, Jarry, P, Locci, E, Malcles, J, Rander, J, Rosowsky, A, Titov, M, Baffioni, S, Beaudette, F, Busson, P, Charlot, C, Dahms, T, Dalchenko, M, Dobrzynski, L, Filipovic, N, Florent, A, Granier de Cassagnac, R, Mastrolorenzo, L, Mine, P, Mironov, C, Naranjo, IN, Nguyen, M, Ochando, C, Paganini, P, Regnard, S, Salerno, R, Sauvan, JB, Sirois, Y, Veelken, C, Yilmaz, Y, Zabi, A, Agram, JL, Andrea, J, Aubin, A, Bloch, D, Brom, JM, Chabert, EC, Collard, C, Conte, E, Fontaine, JC, Gele, D, Goerlach, U, Goetzmann, C, Le Bihan, AC, Van Hove, P, Gadrat, S, Beauceron, S, Beaupere, N, Boudoul, G, Bouvier, E, Brochet, S, Carrillo Montoya, CA, Chasserat, J, Chierici, R, Contardo, D, Depasse, P, El Mamouni, H, Fan, J, Fay, J, Gascon, S, Gouzevitch, M, Ille, B, Kurca, T, Lethuillier, M, Mirabito, L, Perries, S, Ruiz Alvarez, JD, Sabes, D, Sgandurra, L, Sordini, V, Vander Donckt, M, Verdier, P, Viret, S, Xiao, H, Tsamalaidze, Z, Autermann, C, Beranek, S, Bontenackels, M, Edelhoff, M, Feld, L, Hindrichs, O, Klein, K, Ostapchuk, A, Perieanu, A, Raupach, F, Sammet, J, Schael, S, Weber, H, Wittmer, B, Zhukov, V, Ata, M, Dietz-Laursonn, E, Duchardt, D, Erdmann, M, Fischer, R, Guth, A, Hebbeker, T, Heidemann, C, Hoepfner, K, Klingebiel, D, Knutzen, S, Kreuzer, P, Merschmeyer, M, Meyer, A, Millet, P, Olschewski, M, Padeken, K, Papacz, P, Reithler, H, Schmitz, SA, Sonnenschein, L, Teyssier, D, Thuer, S, Weber, M, Cherepanov, V, Erdogan, Y, Flugge, G, Geenen, H, Geisler, M, Haj Ahmad, W, Heister, A, Hoehle, F, Kargoll, B, Kress, T, Kuessel, Y, Lingemann, J, Nowack, A, Nugent, IM, Perchalla, L, Pooth, O, Stahl, A, Asin, I, Bartosik, N, Behr, J, Behrenhoff, W, Behrens, U, Bell, AJ, Bergholz, M, Bethani, A, Borras, K, Burgmeier, A, Cakir, A, Calligaris, L, Campbell, A, Choudhury, S, Costanza, F, Diez Pardos, C, Dooling, S, Dorland, T, Eckerlin, G, Eckstein, D, Eichhorn, T, Flucke, G, Garay Garcia, J, Geiser, A, Gunnellini, P, Hauk, J, Hempel, M, Horton, D, Jung, H, Kalogeropoulos, A, Kasemann, M, Katsas, P, Kieseler, J, Kleinwort, C, Krucker, D, Lange, W, Leonard, J, Lipka, K, Lobanov, A, Lohmann, W, Lutz, B, Mankel, R, Marfin, I, Melzer-Pellmann, IA, Meyer, AB, Mittag, G, Mnich, J, Mussgiller, A, Naumann-Emme, S, Nayak, A, Novgorodova, O, Nowak, F, Ntomari, E, Perrey, H, Pitzl, D, Placakyte, R, Raspereza, A, Ribeiro Cipriano, PM, Ron, E, Sahin, MO, Salfeld-Nebgen, J, Saxena, P, Schmidt, R, Schoerner-Sadenius, T, Schroder, M, Seitz, C, Spannagel, S, Vargas Trevino, AD, Walsh, R, 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APPENDIX 3

Neuroscience Seminar Speakers

FY 2014-2015

THE NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

NEUROSCIENCE SEMINAR SERIES SCHEDULE

FALL 2014

Paul J. Kenny, Ph.D. — September 9, 2014
Host: Hao Chen, Ph.D.
Ward-Coleman Professor and Chair
Department of Pharmacology & Systems Therapeutics
Director, Experimental Therapeutics Institute
Icahn School of Medicine at Mount Sinai

Title: "Molecular Mechanisms of Nicotine Addiction"

No Seminar — September 16, 2014

Ryan Thummel, Ph.D. — September 23, 2014
Host: Jena Steinle, Ph.D.
Assistant Professor
Department of Anatomy & Cell Biology
Wayne State University School of Medicine

Title: "Reactive Gliosis in the Adult Zebrafish Retina"

Scott Heldt, Ph.D. — September 30, 2014
Assistant Professor
Department of Anatomy & Neurobiology
UTHSC

Title: "Dissociating the Role of GABAA Receptor Subtypes in the Control of Fear and Anxiety"

Helen J. K. Sable, Ph.D. October 7, 2014
Assistant Professor
Department of Psychology
University of Memphis

Title: "Behavioral Pharmacology of Cocaine and Amphetamine in Rats Perinatally Exposed to Polychlorinated Biphenyls (PCBs)"

Charles J. Wilson, Ph.D. October 14, 2014
Host: William Armstrong, Ph.D.
Ewing Halsell Chair of Biology and Director
Neurosciences Institute
The University of Texas at San Antonio

Title: "When Will a Neuron Spike? Predicting Responses to Complex Inputs"

Susan Carlson, Ph.D. October 21, 2014
Host: Michael McDonald, Ph.D.
AJ Rice Professor of Nutrition
Department of Dietetics and Nutrition
University of Kansas Medical Center

Title: "DHA: A Nutrient Important for the Developing Brain and Autonomic Nervous System"

Francesca-Fang Liao, Ph.D. October 28, 2014
Associate Professor
Department of Pharmacology
UTHSC

Title: "Can the Heat Shock Transcription Factor HSF1 Be a Key Player in Neurons?"

Javier Medina, Ph.D. November 4, 2014
Host: Detlef Heck, Ph.D.
Assistant Professor
Department of Psychology
University of Pennsylvania

Title: "Coding in Silence: Precise Control of Movement Kinematics by Optogenetic Inhibition of Purkinje Cells"

Valeria Vásquez, Ph.D. November 11, 2014
Assistant Professor
Department of Physiology
UTHSC

Title: "Phospholipids that Contain Polyunsaturated Fatty Acids Enhance Neuronal Cell Mechanics and Touch Sensation"

Warren Tourtellotte, M.D., Ph.D. December 2, 2014
Host: Ioannis Dragatsis, Ph.D.
Professor of Pathology (Neuropathology), Neurology, & Neuroscience
Feinberg School of Medicine
Northwestern University

Title: "The Function of Elp1/IKBKAP in Familial Dysautonomia"

Jack Tsao, M.D., D.Phil December 9, 2014
Host: Anton Reiner, Ph.D.
Professor of Neurology
Uniformed Services University of the Health Sciences
Bethesda, MD
Professor of Neurology
UTHSC

Title: "Phantom Limb Pain: Theories and Therapies"

THE NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

NEUROSCIENCE SEMINAR SERIES SCHEDULE

SPRING 2015

Martin J. Gallagher, M.D., Ph.D. — January 13, 2015
Host: Scott Heldt, Ph.D.
Associate Professor
Department of Neurology
Vanderbilt University Medical Center

Title: "Pathophysiology of Genetic Epilepsies"

Eric Delpire, Ph.D. — January 27, 2015
Host: Kristen O'Connell, Ph.D.
Professor of Anesthesiology and Molecular Physiology & Biophysics
Director of Anesthesiology Research Division
Vanderbilt University Medical Center

Title: "Role of Cation-chloride Cotransporters in Neuronal Communication"

Gareth Howell, Ph.D. — February 3, 2015
Host: Monica Jablonski, Ph.D., FARVO
Assistant Professor
The Jackson Laboratory

Title: "The Complement Cascade – the Key Driver of Aging, Glaucoma, and Alzheimer's Disease!"

Canceled – Rescheduled for the Fall

Adrian Raine, Ph.D. — February 10, 2015
Host: Kassondra Collins (Graduate Student)
Richard Perry University Professor
Departments of Criminology, Psychiatry and Psychology
University of Pennsylvania

Title: "The Anatomy of Violence: The Biological Roots of Crime"

No Seminar — February 17, 2015

Larry Young, Ph.D. — February 24, 2015
Host: Jordan Ross (Graduate Student)
Professor
Department of Psychiatry
Director
Center for Translational Social Neuroscience
Emory University

Title: "Neurobiology of Social Bonding and Attachment: Implications for Novel Therapies for Autism"

C. Shawn Dotson, Ph.D. — March 3, 2015
Host: John D. Boughter, Ph.D.
Assistant Professor
Departments of Neuroscience & Psychiatry
Division of Addiction Medicine
University of Florida College of Medicine and Center for Smell and Taste

Title: "Modulation of Gustatory Functioning by Molecular Mediators of Appetite and Satiety"

Canceled – Rescheduled for the Fall

Julio Cordero-Morales, Ph.D. March 10, 2015
Assistant Professor
Department of Physiology
UTHSC

Title: "Investigating the Molecular Mechanism of TRP Channels Activation"

Spring Break March 17, 2015

Stefano Vicini, Ph.D. March 24, 2015
Host: Fu-Ming Zhou, Ph.D.
Professor
Department of Pharmacology and Physiology
Georgetown University School of Medicine

Title: "GABAergic Control of Striatal Projection Neurons"

Catherine Kaczorowski, Ph.D. March 31, 2015
Assistant Professor
Department of Anatomy & Neurobiology
UTHSC

Title: "Genomic and Proteomic Strategies Identify Novel Targets
for Cognitive Enhancement"

Guang Yang, Ph.D. April 7, 2015
Host: Francesca-Fang Liao, Ph.D.
Assistant Professor
Department of Anesthesiology and Molecular Neurobiology
NYU Langone Medical Center

Title: "In Vivo Studies of Cortical Plasticity in Chronic Pain and Inflammation"

Zuoxin Wang, Ph.D. April 14, 2015
Host: Hao Chen, Ph.D.
University Distinguished Research Professor
Professor in Psychology & Neuroscience
Florida State University

Title: "The Monogamous Brain"

William Slikker, Ph.D. April 28, 2015
Host: Kanwaljeet J.S. Anand, Ph.D.
Director
National Center for Toxiological Research/FDA

Title: "Pediatric Anesthetic Safety Assessment Using Model Systems from Stem Cells to Whole Animals"

Eric S. Levine, Ph.D. May 5, 2015
Host: Larry Reiter, Ph.D.
Professor
Department of Neuroscience
University of Connecticut Health Center

Title: "Pathophysiology of Autism Spectrum Disorders Using Human Stem Cell Models"

APPENDIX 4

Neuroscience News, Events and Graduate Training Flyer

FY 2014-2015


The 5th Annual
CANDLE Brain Awareness Week Conference
Early Childhood Language and Literacy Implications
for Social and Academic Success
Thursday, March 12, 2015
The Urban Child Institute: 600 Jefferson Avenue, Memphis TN 38105
BRAIN AWARENESS WEEK
Get Connected
THE DANA ALLIANCE FOR BRAIN INITIATIVES
Objective:
Examine how the development of language and literacy in early childhood influences childhood social interactions and school success
8:00 Coffee and Tea Provided
8:15 CANDLE 2005-2015: Reflections and Visions
Frances Tylavsky, DrPH, Professor, Preventive Medicine, UTHSC, PI CANDLE Study
8:30 Maternal Literacy and School-readiness
Laura Murphy, EdD, Professor, Psychiatry, Chief of Psychology, Boling Center for Developmental Disabilities, UTHSC
10:15 Literacy and Poverty Initiatives in Shelby County Community
J. Helen Perkins, EdD, Associate Professor, Instruction and Curriculum Leadership, University of Memphis
11:00 Pragmatics and Theory of Mind in Early Childhood and Relations with More Complex Thinking in Academic and Social Domains
Daniela O'Neil, PhD, Professor, Psychology, University of Waterloo
11:45 Discussion/ Summary
12:00 Lunch (provided)
Registration is FREE
RSVP by March 6
mcaufiel@uthsc.edu or
901-448-1669
(please include any dietary restrictions, as lunch will be provided)
the CANDLE study
http://www.candlestudy.org
THE NEUROSCIENCE INSTITUTE
UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER
http://www.uthsc.edu/
THE URBAN CHILD INSTITUTE
http://www.theurbanchildinstitute.org

Brain Awareness Night

Early Reading & Language Skills

Language and reading skills are important for success in school, and throughout life. Join us to learn how parents and caregivers can grow these skills in our children.

03/12/2015
6:00PM-8:00PM
FREE Registration
The Urban Child Institute
600 Jefferson Ave

Dr. J. Helen Perkins, *Ed. D., Associate Professor, University of Memphis*

Research indicates that children who enter Kindergarten with a plethora of oral language skills often have strong reading and writing skills. Oral Language development should consistently be encouraged even in the earliest stages of a child's development. This presentation will provide research-based best practices to promote language development in children.

Dr. Daniela O'Neill *PhD, Professor, University of Waterloo, Canada*

During the first 5 years of life, children's language and communication develops dramatically. This presentation will highlight how parents and caregivers can powerfully impact children's social interactions, learning to read, and their readiness for today's new learning environments, by engaging in conversations from birth onwards with children.

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

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER
The Neuroscience Institute

THE URBAN CHILD INSTITUTE®

BRAIN AWARENESS WEEK
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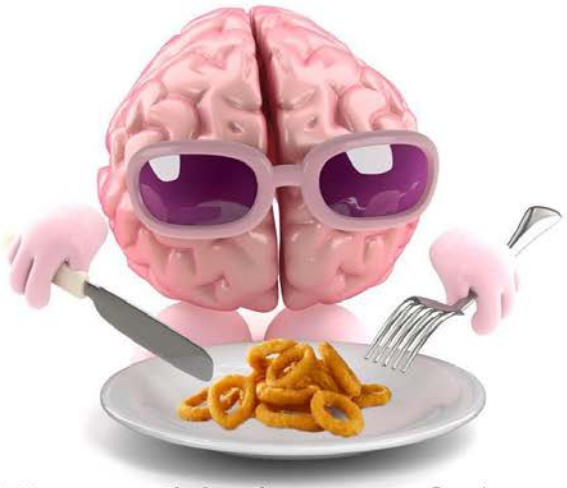
The Neuroscience Institute presents



The Neurobiology of Appetite:
Shedding Light on Obesity

April 21, 2015
General Education Building, room A203

9:00 - 9:10am	Introductory remarks by Kristen M.S. O'Connell, Ph.D.
9:10 - 10:00am	Joan C. Han, M.D., UTHSC "Brain-Derived Neurotrophic Factor and Obesity"
10:00 - 10:40am	John D. Boughter, Ph.D., UTHSC "The Sense of Taste Engages Brain Areas Involved in Feeding and Reward"
11:00 - 11:50am	Satchidananda Panda, Ph.D., Salk Institute "Time Restricted Feeding is a Novel Preventative and Therapeutic Intervention Against Metabolic Diseases"
1:00 - 1:40pm	Kristen M.S. O'Connell, Ph.D., UTHSC "High Fat Diet Prevents the Hypothalamus from Saying 'No' to Obesity"
1:40- 2:30pm	Richard D. Palmiter, Ph.D., University of Washington "Deciphering a Neuronal Circuit That Inhibits Feeding"

THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER

Free required registration available at:
http://www.uthsc.edu/neuroscience/symposia.php
Lunch provided from 12:00 - 1:00 P.M.

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER

UTHSC NEWS

News from The University of Tennessee Health Science Center

APRIL 8, 2015 *by* COMMUNICATIONS & MARKETING

2015 Neuroscience Institute Symposium at UTHSC To Focus on the Neurobiology of Appetite

Understanding appetite is key to unlocking the grip of obesity. The Neuroscience Institute at the University of Tennessee Health Science Center (UTHSC) will host a symposium on Tuesday, April 21, focusing on how the brain controls the appetite, and thus influences obesity.

The 2015 Neuroscience Institute Symposium, titled "The Neurobiology of Appetite: Shedding the Light on Obesity," will be held from 9 a.m. to 2:30 p.m. in Room A203 of the UTHSC General Education Building, 8 South Dunlap. The free symposium is open to health care professionals and the public.

"Obesity is a national problem that is disproportionately prevalent in Memphis, and increasingly more common among children," said William Armstrong, PhD, director of the Neuroscience Institute and a professor in the Department of Anatomy and Neurobiology at UTHSC. "Treating some of the risk factors associated with obesity, such as diabetes or hypertension, does little to control its main cause – overeating, and more particularly, eating highly sugary and fatty foods. Increasingly, scientists point to the brain as the key to understanding the relationship between appetite, diet and obesity."

Among topics to be examined are the brain regions and chemicals that control eating; how time-restricted feeding can prevent and control metabolic disease; and how diet relates to brain activity and may influence hunger and satiety signals.

NEWS CATEGORIES

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Speakers include Joan C. Han, MD, associate professor in the UTHSC Department of Pediatrics, Division of Endocrinology, and founding director of the UT Le Bonheur Pediatric Obesity Program; John D. Boughter, PhD, associate professor in the Department of Anatomy and Neurobiology at UTHSC; Satchidananda Panda, PhD, associate professor at the Salk Institute for Biological Studies in La Jolla, California; Kristen O'Connell, PhD, assistant professor in the Department of Physiology at UTHSC; and Richard D. Palmiter, PhD, professor in the Department of Biochemistry at the University of Washington in Seattle.

Register at http://www.uthsc.edu/neuroscience/symposia.php. Lunch will be provided.

FILED UNDER: COMMUNITY SERVICE, FACULTY NEWS, FEATURED, MEDICINE, NEWS RELEASES, UNCATEGORIZED

› Videos (14)

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ABOUT UTHSC

As Tennessee's only public, statewide, academic health system, the mission of the University of Tennessee Health Science Center (UTHSC) is to bring the benefits of the health sciences to the achievement and maintenance of human health, with a focus on the citizens of Tennessee and the region, by pursuing an integrated program of education, research, clinical care, and public service. Offering a broad range of postgraduate and selected baccalaureate training opportunities, the main UTHSC campus is located in Memphis and includes six colleges: Dentistry, Graduate Health Sciences, Health Professions, Medicine, Nursing and Pharmacy. UTHSC also educates and trains cohorts of medicine, pharmacy and/or health professions students -- in addition to medical residents and fellows -- at its major sites in Knoxville, Chattanooga and Nashville. Founded in 1911, during its more than 100 years, UT Health Science Center has educated and trained more than 57,000 health care professionals in academic settings and health care facilities across the state. For more information, visit www.uthsc.edu. Follow us on Facebook, Twitter and Instagram.

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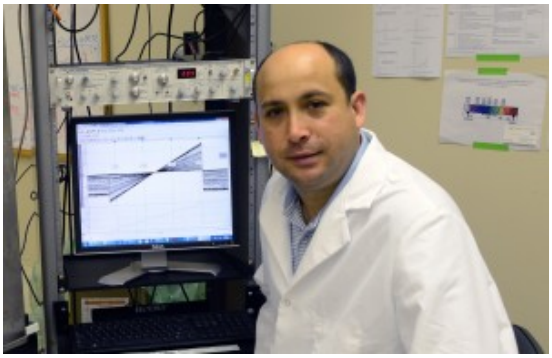
MENU

Assistant Professor Julio Cordero-Morales Receives $231,000 Grant for Protein Function Research

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)** July 2nd, 2015



A new $231,000 grant from the American Heart Association will allow Dr. Julio Cordero-Morales and his research team to study the function of proteins involved in pain perception and blood pressure regulation.

Research being performed by Julio Cordero-Morales, PhD, focuses on understanding the function of proteins involved in pain perception and blood pressure regulation. With new grant funding, Dr. Cordero-Morales and his research team can further explore the importance of the specific roles of these proteins and their regulatory mechanisms in normal and diseased conditions.

Dr. Cordero-Morales, an assistant professor in the Department of Physiology in the College of Medicine at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $231,000 from the American Heart Association. The award will be used to support a project titled, “Elucidating the Mechanism of TRPV4 Activation and its Role in Vascular Function.” The funds will be distributed over three years.

The proteins, called transient receptor potential ion channels, respond to a broad range of stimuli including physical — heat and pressure — and chemical — acid, irritants, and inflammatory agents. These stimuli excite cells to elicit body perception and to regulate blood pressure. Dysfunction of these proteins can lead to conditions such as heart arrhythmia, high blood pressure, arthritis and chronic pain.

"We combine multidisciplinary approaches, such as biochemistry, genetics and behavioral analysis," said Dr. Cordero-Morales. "Our studies on vascular proteins will provide fundamental insights into their function and guide the development of new therapeutic strategies that target these proteins."

The American Heart Association is the nation's oldest and largest voluntary organization devoted to fighting cardiovascular diseases and stroke. Founded by six cardiologists in 1924, the organization now includes more than 22.5 million volunteers and supporters working to eliminate these diseases. The organization funds innovative research, fights for stronger public health policies and provides tools and information to save and improve lives. For more information, visit www.heart.org (http://www.heart.org/).

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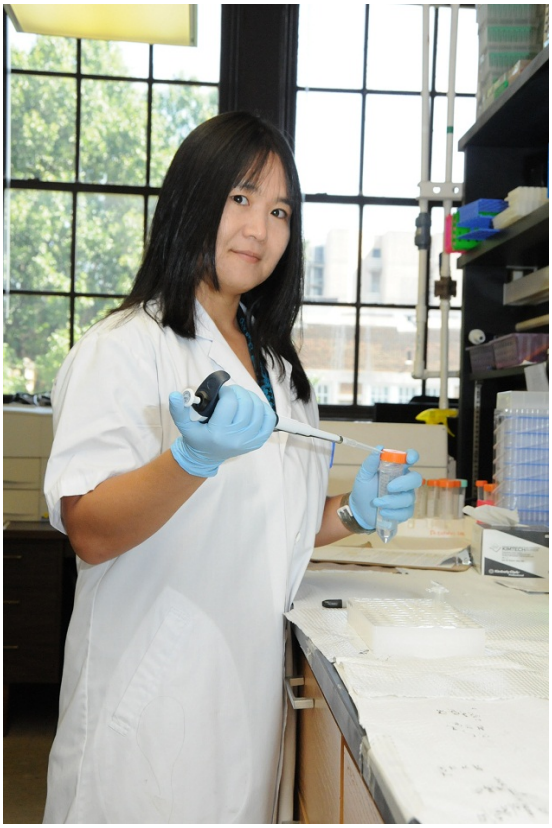
UTHSC Assistant Professor Kazuko Sakata, PhD, Receives $147,500 Grant to Study Anti-Depressive Effects of Enriched Environments Early in Life

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**July 21st, 2014



Dr. Kazuko Sakata

An enriched environment that includes exercise, social interaction and mental stimulation has been proven to help prevent or reverse depression. But it's not clear exactly when in life an enriched environment has the most anti-depressive effect.

Kazuko Sakata, PhD, an assistant professor in the Department of Pharmacology at the University of Tennessee Health Science Center (UTHSC), has received a two-year grant totaling $147,500 from the National Institute of Mental Health (NIMH), a division of the National Institutes of Health (NIH), to research whether an enriched environment early in life is more effective than later in improving or preventing depression. She is also studying gene mechanisms in the brain that respond to the enriched environment. The goal is to develop effective interventions that can not only treat depression, but provide resilience in the brain to keep depression from developing.

"We know that an enriched environment is effective in preventing depression, but when is it most effective?" Dr. Sakata said. "We think that maybe when we give enriched environments early in life, the effect can last longer." Plasticity in the young brain may allow for changes that may have a protective effect throughout life.

Her research with mice involves giving enriched environments at three stages in life — infancy, young adult and middle age — and monitoring the effects. "We hope this could be the fundamental study to apply to humans, too," said Dr. Sakata, who joined the faculty of UTHSC in 2008 following postdoctoral work at the NIH. "Many laboratories study the effect of stress and how stress can cause depression or depression-like behavior in adults. But the unique point of this study is that we are focusing on the positive environment, not the negative environment, and its effects."

Major depressive disorder is the leading cause of disability in the United States for people age 15-44, according to the NIMH. It affects roughly 14.8 million American adults annually at a cost of approximately $83 billion. Better treatment options are necessary, according to Dr. Sakata.

"The ultimate goal is to find out the mechanisms that can provide resilience in the brain against depression," she said. "If we can find the mechanism, if we can support the mechanism, then we can prevent depression or treat depression."

NEWS CATEGORIES

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Assistant Professor Kazuko Sakata of UTHSC Receives $375,000 Grant for Research on Inflexible Learning

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**October 30th, 2014

A $375,000 grant from the NIH will allow Dr. Kazuko Sakata and her research team to explore the neural mechanisms of inflexible learning caused by BDNF deficiency.

Kazuko Sakata, PhD, assistant professor in the Department of Pharmacology at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $375,000 from the National Institute of Mental Health, a subsidiary of the National Institutes of Health. The funds will be used to study inflexible learning, the inability to change from one course of action to another by learning from a behavioral consequence.

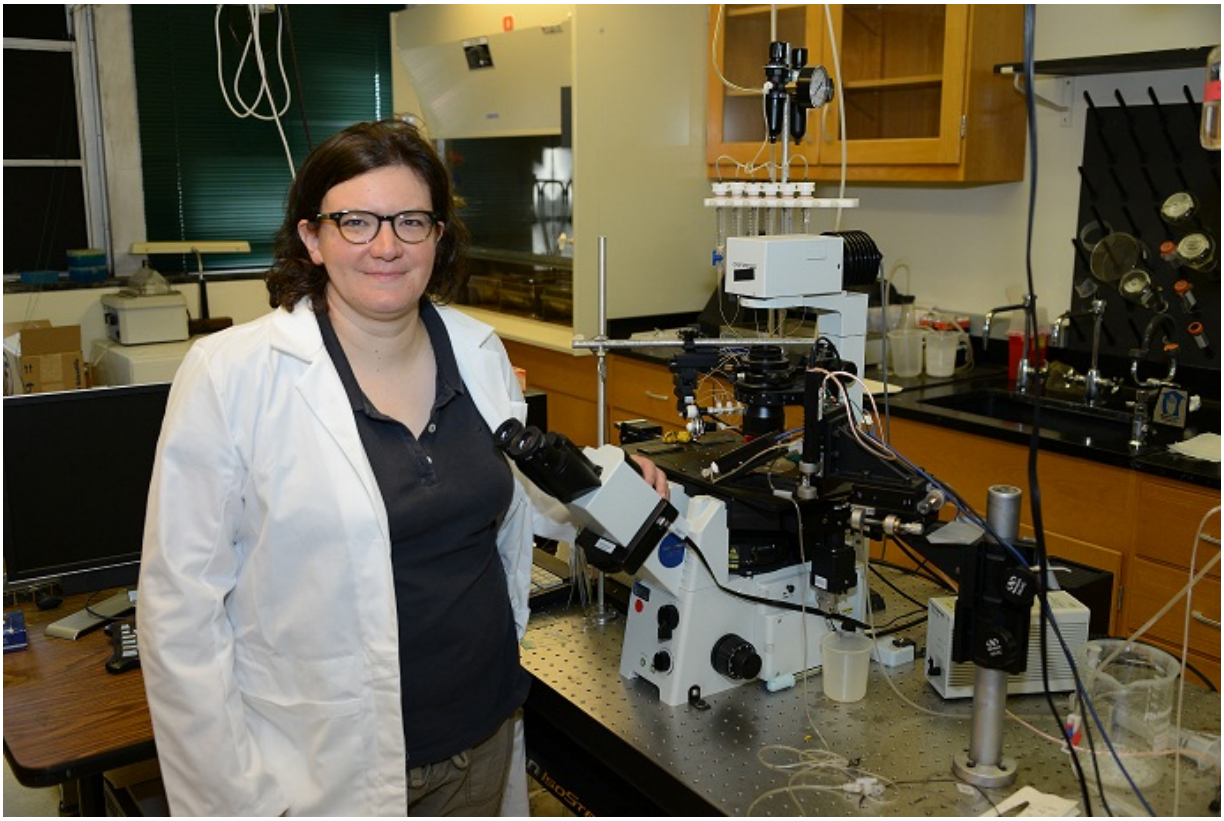
The award will be used to support a project titled, “Neural Mechanisms of Inflexible Learning Caused by BDNF Deficiency,” and will be distributed over a two-year period.

Inflexible learning is a common symptom of many psychiatric disorders, including depression and schizophrenia. Inflexible learning limits the effectiveness of cognitive behavioral therapies and patient recovery. The biological mechanisms of inflexible behavior are largely unknown, but one important cause is deficiency in brain-derived neurotrophic factor (BDNF), a major neuronal growth factor in the brain.

This project will aim to explain how BDNF deficiency affects neural processing between the hippocampus (the part of the brain that forms memory) and the medial prefrontal cortex (the part of the brain that controls executive function) during flexible learning. Based on preliminary results, it is hypothesized that timing-dependent neuronal communication between the hippocampus and the prefrontal cortex occurs during flexible learning, and that the BDNF deficiency disturbs this timing-dependent neuronal communication causing inflexible learning.

Dr. Sakata and her research team will test this hypothesis by finding the timing relations of communication and synchronous firing between these brain regions during flexible learning, and by determining the effects of BDNF deficiency. The hope is that this discovery will aid in the development of a neural biomarker of BDNF deficiency and inflexible behavior, and a new therapeutic strategy for improving flexible learning, which will promote recovery from psychiatric disorders.

“I am very excited about the award and project,” said Dr. Sakata. “BDNF is a very important neuronal growth factor and its deficiency causes inflexible behavior, but we still do not know how BDNF deficiency affects neural processing among different brain regions. I hope understanding the neural mechanisms will help in developing the diagnosis tool for inflexible behavior and its effective treatment such as brain stimulation, which will help psychiatric patients to improve flexible learning and recover from their symptoms like depression.”



A $1.6 million grant from the NIH will enable Dr. Kristen O'Connell and her research team to identify the changes that high-calorie diets have on the neural circuits that control appetite and food intake.

Kristen O'Connell, PhD, assistant professor in the Department of Physiology at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $1,607,325 from the National Institute of Diabetes and Digestive and Kidney Diseases, a subsidiary of the National Institutes of Health. The award will be used to support a project titled, "Modulation of AgRP Neuronal Excitability: Role of Diet and Body Weight." The award will be distributed over a five-year period. Obesity is a major public health problem in the United States, particularly in Memphis and the Mid-South. At present, nearly 70 percent of adults are overweight or obese. Despite increased public health awareness, the obesity epidemic has not improved. The increased prevalence of childhood obesity suggests the problem is likely to worsen in the future. Research has shown that obesity is associated with dramatic changes in the parts of the brain that control appetite. These changes may compound the difficulty that so many people have in losing weight and keeping it off, since the brain is effectively telling them they are hungry, even if there is no reason to be. The goal of Dr. O'Connell and her team is to identify the changes that high-calorie diets have on the neural circuits that control appetite and food intake. "We hope to better understand the molecular basis of these changes, as well as how quickly they occur and whether they are reversible," said Dr. O'Connell. "Our results will hopefully lead to better, safer therapies for obesity and appetite control.

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Alex Dopico, MD, PhD, Chair of Pharmacology at UTHSC, Awarded More Than $1.85 Million Extension Grant to Study Effects of Alcohol on Arteries in the Brain

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**August 26th, 2014

Dr. Alex Dopico

Alex Dopico, MD, PhD, Distinguished Professor and Chair of the Department of Pharmacology at the University of Tennessee Health Science Center (UTHSC), has been awarded more than $1.85 million to extend funding for his ongoing research into the effects of alcohol on the brain. His goal is to develop drugs that target the proteins within cells that control the physiological and behavioral changes associated with alcohol intoxication in order to prevent or reverse those effects.

Dr. Dopico has spent more than 20 years researching alcohol's effects on ion channel proteins in the central nervous system and brain circulation. In early June, he reported a major breakthrough toward developing new drugs to counteract alcohol's toxicity by targeting the BK channel proteins, or Big-conductance potassium channel proteins, which are present in all excitable tissues and control a variety of physiological processes. Modification of their activity by exposure to alcohol is thought to be a cause of changes in normal physiology by alcohol intoxication.

Dr. Dopico and his team identified for the first time a specific site in the BK channel protein where alcohol is recognized and alters the channel's function.

"Having found and characterized at the molecular level a site that is rather specific for alcohol recognition, we can now develop small pharmacological agents that interact with that site and antagonize alcohol action on the channel, eventually leading to prevention or reversal of alcohol toxicity," he said.

A paper by Dr. Dopico and his research team detailing this finding was published recently in the Proceedings of the National Academy of Sciences, one of the world's most-cited multidisciplinary scientific journals.

In 2009, Dr. Dopico was awarded a 10-year MERIT Award worth a total of $3.6 million from the National Institute on Alcohol Abuse and Alcoholism, a division of the National Institutes of Health, for his alcohol studies, which have particular emphasis on the effects of alcohol on BK channels in excitable cells, such as central neurons and brain arterial smooth muscle. When the first half of that award expired in June, Dr. Dopico received the $1.85 million extension to fund an additional five years of research.

The MERIT Award (Method to Extend Research in Time) program has become a symbol of scientific achievement in the research community. The awards are offered to investigators who have demonstrated superior competence and productivity in their research, and who are likely to continue the outstanding performance. Investigators receiving a MERIT Award have the opportunity to obtain up to 10 years of support in two five-year periods without having to submit frequent renewal applications.

Dr. Dopico's previous research includes determining that action in the BK channels makes cerebral arteries contract in the presence of alcohol; that cholesterol levels in cell membranes alter alcohol's action on these channel proteins in cerebral arteries; and that the receptor for caffeine is key in alcohol action on brain arteries.

Dr. Dopico said he is honored to receive the MERIT Award extension that allows him to continue his research. He said identifying the alcohol-recognition site in BK ion channel proteins is "a major finding" that will hopefully impact the development of pharmacotherapeutic agents to treat consequences of alcohol intoxication that affect brain function.

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UTHSC Assistant Professor Shalini Narayana Receives $677,385 Grant for Parkinson's Disease Research

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**October 3rd, 2014

The Michael J. Fox Foundation for Parkinson's Research has awarded Dr. Shalini Narayana a $677,385 grant that will allow her and her research team to determine if non-invasive brain stimulation can improve the effectiveness of voice therapy of individuals with Parkinson's disease.

Shalini Narayana, PhD, assistant professor in the Departments of Pediatrics, and Anatomy and Neurobiology at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $677,385 from The Michael J. Fox Foundation for Parkinson's Research. Dr. Narayana and her research team are testing to determine if non-invasive brain stimulation can improve the effectiveness of voice therapy.

The award will support a project titled, "Augmenting Treatment Effects of Voice Therapy in Parkinson's Disease," and will be distributed over a three-year period.

Patients with Parkinson's disease frequently suffer from speech and voice disorders that adversely affect their communication and quality of life. Medications that help other symptoms of Parkinson's disease are not very effective in treating speech and voice symptoms, but intensive voice therapy has been shown to be helpful. Recently, non-invasive brain stimulation has gained recognition as a useful treatment tool and is approved by the U.S. Food and Drug Administration for treating depression and migraine.

The study will examine speech and voice quality, voice box function and brain activity before and after patients receive voice therapy and brain stimulation or voice therapy alone. The researchers hope to demonstrate that non-invasive brain stimulation improves speech and voice quality at a quicker pace, and that the improvements in communication will be long lasting. It is expected that non-invasive brain stimulation will improve voice box function as well as strengthen the connections between brain areas that are engaged during speaking.

This study will provide free voice therapy and access to neurology, otolaryngology, and speech and voice clinics to people with Parkinson's disease in Memphis and the surrounding greater Mid-South area. The findings from this study will lay the foundation for future large-scale studies to examine the usefulness of brain stimulation as an additional treatment to improve speech and limb motor symptoms in Parkinson's disease. The results from this study will also form the basis for future studies aimed at understanding how various treatments in Parkinson's disease mediate changes in brain function.

"I am very excited about this research project," said Dr. Narayana. "This research demonstrates a great collaboration between neurologists, speech pathologists, and neuroscientists as well as between two major institutions in Memphis, UTHSC and University of Memphis."

As the world's largest nonprofit funder of Parkinson's research, The Michael J. Fox Foundation is dedicated to accelerating a cure for Parkinson's disease and improved therapies for those living with the condition today. The Foundation pursues its goals through an aggressively funded, highly targeted research program coupled with active global engagement of scientists, Parkinson's patients, business leaders, clinical trial participants, donors and volunteers. In addition to funding more than $450 million in research to date, the Foundation has fundamentally altered the trajectory of progress toward a cure. Operating at the hub of worldwide Parkinson's research, the Foundation forges groundbreaking collaborations with industry leaders, academic scientists and government research funders; increases the flow of participants into Parkinson's disease clinical trials with its

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Dr. Duane Miller Named to the National Academy of Inventors

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**January 20th, 2015

Dr. Duane Miller, professor and chair of the Department of Pharmaceutical Sciences in the UTHSC College of Pharmacy, has been named to the National Academy of Inventors.

Duane Miller, PhD, professor and chair of the Department of Pharmaceutical Sciences in the College of Pharmacy at the University of Tennessee Health Science Center (UTHSC), has been named a Fellow of the National Academy of

Inventors (NAI). He will be inducted on March 20 during the organization's fourth annual conference at the California Institute of Technology in Pasadena.

The honor is given to academic inventors who have demonstrated a prolific spirit of innovation in creating or facilitating inventions that have made a tangible impact on the quality of life, economic development or the welfare of society. Those elected to the rank of NAI Fellow are named inventors on U.S. patents and are nominated by their peers.

"It's a very humbling experience," Dr. Miller said. "I never thought I'd be in the Academy."

Dr. Miller, who was nominated by the UT Research Foundation, has collaborated on a number of successful research efforts since he joined the UTHSC faculty in 1992. They have resulted in patents for SARMS (Selective Androgen Receptor Modulators) for treating some cancers; radiation mitigators now under development; and tubulin inhibitors or targeted therapies for resistant cancers. Dr. Miller estimates that he and his collaborators have roughly 400 patents or patents pending for synthetic medicinal structures to attack diseases.

"We're trying to design drugs for the future," Dr. Miller said. "That's what's exciting to me."

Dr. Miller said he originally wanted to be a sports coach, but was inspired to become a pharmacist after a hometown pharmacist helped when his father was diagnosed with emphysema. A semester of work in a lab during pharmacy school at the University of Kansas cemented his career choice. "Once I got into the lab, it got me thinking in a totally different way," Dr. Miller said. "I started thinking about how to design drugs."

The 414 NAI Fellows represent more than 150 prestigious research universities and governmental and nonprofit research institutions. Included among NAI Fellows are 61 presidents and senior leaders of research universities and nonprofit research institutes, 208 members of other national academies, 21 inductees of the National Inventors Hall of Fame, 16 recipients of the U.S. National Medal of Technology and Innovation, 10 recipients of the U.S. National Medal of Science and 21 Nobel Laureates.

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Prof. Edward Chaum Awarded $999,488 Grant for Ocular Trauma Research

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**February 5th, 2015

Edward Chaum, MD, PhD

Significant eye injuries are common in the military personnel who served in Iraq and Afghanistan. Edward Chaum, MD, PhD, Plough Professor of Retinal Diseases at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $999,488 from the U.S. Army Medical Research Acquisition Activity to study the effects of ocular trauma.

The award will be used to support a project titled, "Nutlin Analogues for the Prevention and Treatment of Proliferative Vitreoretinopathy in Ocular Trauma," and will be distributed over three years.

This grant will explore the use of a new class of drugs for the treatment of ocular injuries, in particular those that prevent the scarring caused by traumatic injury, which often leads to blindness. The candidate drug molecules being tested are variants of a known drug currently in clinical trials for the treatment of cancer.

In partnership with Focal Point Pharmaceuticals, a Memphis startup company, the goal of Dr. Chaum and his research team is to prove the effectiveness of these drugs in ocular trauma and other eye diseases, and to develop them commercially for military and civilian clinical use.

"I have had the privilege of working in partnership with the Department of Defense and the Telemedicine and Advanced Technology Research Center at Fort Detrick, Maryland, for the past ten years to translate engineering concepts into novel medical devices and research programs to benefit our veterans," said Dr. Chaum. "This exciting project, in partnership with the DOD, is anticipated to lead to the development of a new class of drugs to treat traumatic eye injuries in military and civilian medicine, and improve the ability of retina surgeons like myself to prevent blindness in the most difficult cases we face."

The U.S. Army Medical Research Acquisition Activity, the contracting element of the U.S. Army Medical Research and Materiel Command, provides support to the Command headquarters and affiliated organizations. For more information, please visit http://www.usamraa.army.mil/index.cfm (http://www.usamraa.army.mil/index.cfm).

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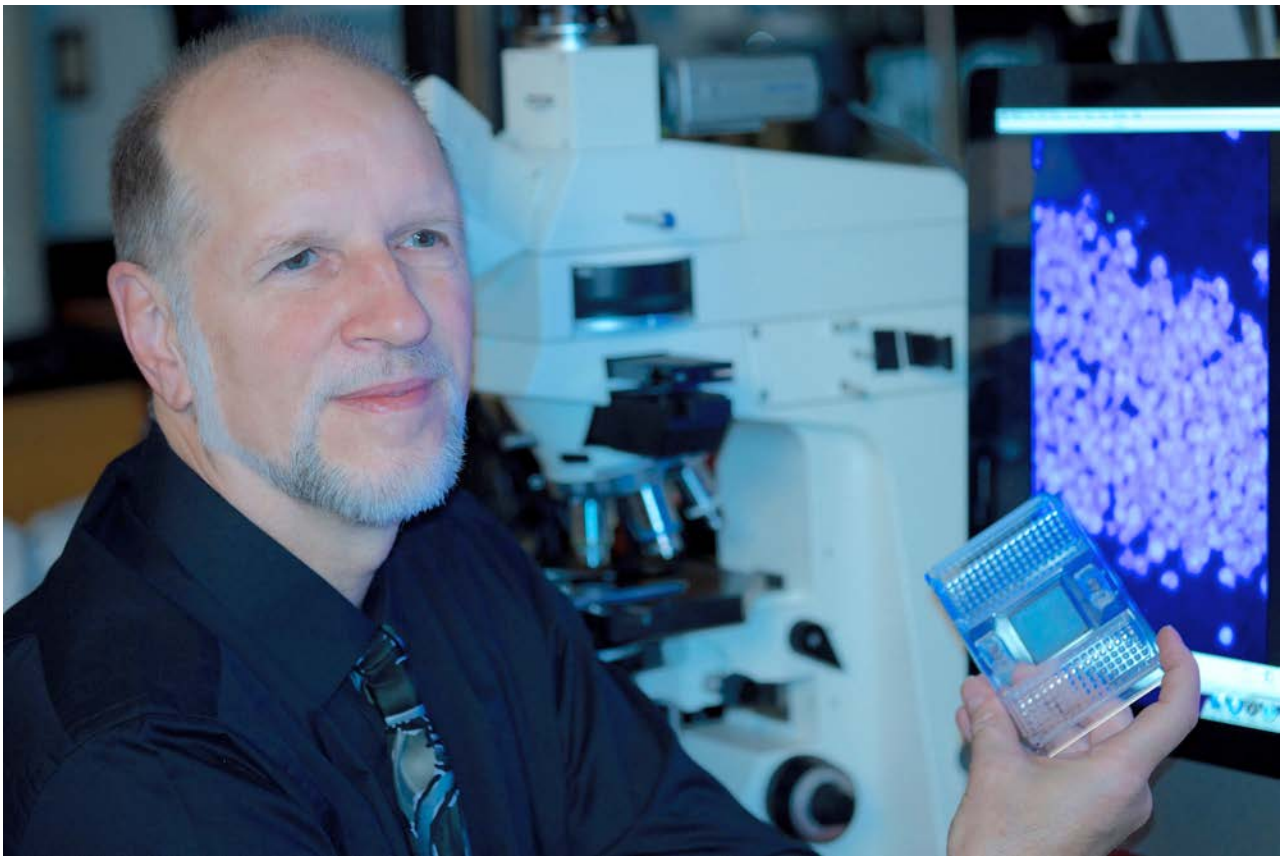
UTHSC News (http://news.uthsc.edu/)

UTHSC's Professor Robert Williams Part of Global ENIGMA Consortium Effort to Crack Brain's Genetic Code

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**March 2nd, 2015



UTHSC's Dr. Robert Williams Among Collaborators on Groundbreaking Brain Research Published in Nature

Work of global research alliance – ENIGMA — appears in Nature

In the largest collaborative study of the brain to date, researchers from the University of Tennessee Health Science Center (UTHSC) are part of a global consortium of 190 institutions working to identify eight common genetic mutations that appear to age the brain an average of three years. The discovery could lead to targeted therapies and interventions for Alzheimer's disease, autism and other neurological conditions.

An international team of roughly 300 scientists known as the Enhancing Neuro Imaging Genetics through Meta Analysis (ENIGMA) Network pooled brain scans and genetic data worldwide to pinpoint genes that enhance or break down key brain regions in people from 33 countries. This is the first high-profile study since the National Institutes of Health (NIH) launched its Big Data to Knowledge (BD2K) centers of excellence in 2014. The research was published recently in the peer-reviewed journal Nature.

"This is a great example of how international collaboration can jumpstart high impact science and genetics. We needed a pool of 30,000 willing subjects and their DNA to drill down to these five new genes," said Robert W. Williams, PhD, a co-investigator of ENIGMA. Dr. Williams is chair of the UTHSC Department of Genetics, Genomics and Informatics, as well as the UT-Oak Ridge National Laboratory Governor's Chair in Computational Genomics.

The study could help identify people who would most benefit from new drugs designed to save brain cells, but more research is necessary to determine if the genetic mutations are implicated in disease.

The UTHSC team is renowned for their work on brain structure in mice. This is their first entry into the world of human genetics. They were able to help strengthen results by showing that one of the genes also works in the same way in their large family of mice. This opens up the possibility of using mouse models to test treatments.

The ENIGMA researchers screened millions of "spelling differences" in the genetic code to see which ones affected the size of key parts of the brain in magnetic resonance images (MRIs) from 30,717 individuals. The MRI analysis focused on genetic data from seven regions of the brain that coordinate movement, learning, memory and motivation. The group identified eight genetic variants associated with decreased brain volume, several found in over one-fifth of the world's population. People who carry one of those eight mutations had, on average, smaller brain regions than brains without a mutation but of comparable age; some of the genes are implicated in cancer and mental illness.

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Professor Robert W. Williams Receives $300,000 Award from Research to Prevent Blindness To Fund Innovative Glaucoma Research

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**April 8th, 2015

Glaucoma is a leading cause of irreversible blindness in the United States and globally. Currently, there is no cure for the disease, and once vision is lost, it cannot be regained.

However, Robert. W. Williams, PhD, chair of the Department of Genetics, Genomics and Informatics at the University of Tennessee Health Science Center (UTHSC), has received a Research to Prevent Blindness (RPB) Stein Innovation Award totaling $300,000 for research into molecular activity in the retina that initiates glaucoma. His goal is to understand the first targets of the disease — the cells most susceptible to the disease — and help devise new prevention and therapy.

At the present time, treatment focuses on reducing pressure in the eye that can trigger glaucoma, rather than addressing the disease at a cellular level. Most often, by the time patients seek treatment, vision is already altered.

Working with mouse models, Dr. Williams aims to identify the cells connecting the eye to the brain (retinal ganglion cells) that are most susceptible to high pressure in the eye that results in their death, and over time, in blindness. Once these cells are identified through cutting-edge, single-cell analysis, the next step would be to develop targeted treatments to make them more resistant to damage from pressure.

"The hope is that this will give us a way to rationally target interventions to help out those cells that are most likely to be damaged by intraocular pressure," Dr. Williams said. "So that if a patient comes in and we learn enough about the patient to say you're glaucoma prone because your mother and father had glaucoma, and your brother had it, and we looked at your DNA and you have high-risk genes, now we would know enough from our experimental work that we would be in a position to intervene." Intervention before actual damage to the eye could be as simple as an environmental, dietary or drug treatment, he said.

"What we'd like to do is strengthen the ganglion cells to make them so strong that even if there is increased pressure in the eye, they don't go into a tailspin," Dr. Williams said.

The UT-Oak Ridge National Laboratory Governor's Chair in Computational Genomics, Dr. Williams was nominated by the UTHSC Department of Ophthalmology for the prestigious award that will be delivered in two installments over a three-year period. The award provides funding to basic scientists actively engaged in research in collaboration with a department of ophthalmology with the goal of understanding the visual system and the diseases that affect its function. New technologies and cutting-edge research that apply to blindness, but are developed outside a department of ophthalmology, are supported through this award.

"Dr. Rob Williams is a brilliant scientist and a leader in genomics and bioinformatics," said Barrett Haik, MD, FACS, Hamilton Professor of Ophthalmology and director of the Hamilton Eye Institute at UTHSC. "His research into the cellular and genomic processes involved in glaucomatous tissue damage has the potential to answer crucial questions that could revolutionize the way millions of glaucoma patients are treated. He is one of only four remarkable individuals to receive the Stein Innovation Award, the largest source of flexible funding available to bring new ideas into vision science."

Dr. Williams said he is grateful to receive the award. "I have a long history in vision research," he said. "I tend to do more genetics now in a broad context. But this grant brings me back to my core area of expertise."

RPB is the world's leading voluntary organization supporting eye research. Since it was founded in 1960, RPB has channeled hundreds of millions of dollars to medical institutions for research into the causes, treatment and prevention of blinding eye diseases. For information on RPB, and RPB-funded research, eye disorders, and its grants program, go to http://www.rpbusa.org (http://www.rpbusa.org/).

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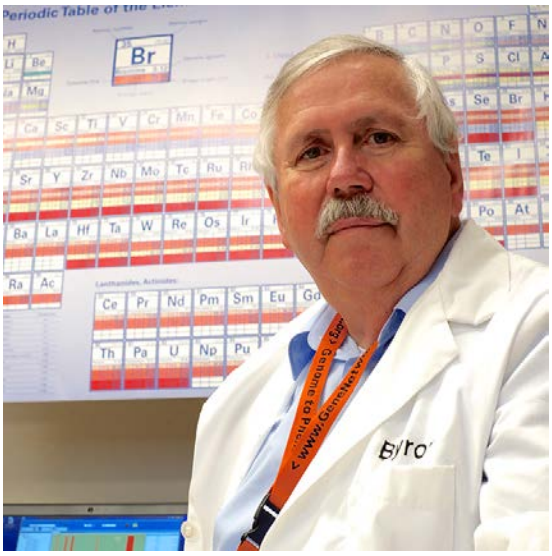
Professor Byron Jones Awarded $2.6 Million to Study Toxicity of the Herbicide Paraquat on the Brain

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**April 20th, 2015

Paraquat is a weed killer used extensively in agriculture in the United States and other parts of the world. It is suspected to increase risk for developing Parkinson's disease.
Byron Jones, PhD, and his research team are using newly awarded funds to investigate individual toxicity to the chemical on certain areas of the brain.



A $2.6 million grant from the National Institute of Environmental Health Sciences will allow Dr. Byron Jones and his collaborators to further investigate if Paraquat, a weed killer, poses risks for brain disorders such as Parkinson's disease.

Dr. Jones, *a professor* in the Department of Genetics, Genomics and Informatics in the College of Medicine at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $2.6 million from the National Institute of Environmental Health Sciences, a subsidiary of the National Institutes of Health.

The award will be used to support a project titled, "Neural Toxicity of Paraquat Is Related to Iron Regulation in the Midbrain," and will be distributed over five years.

"The evidence for this risk from Paraquat is not clear and most likely stems from the fact that not all individuals are equally at risk," said Dr. Jones. "Part of this difference in susceptibility is likely in the genetic makeup of the individual. My colleagues and I are using a mouse model to track down

the genes that confer this differential susceptibility. We hope to use our findings to help identify those humans who would be at increased risk for disease if exposed to Paraquat."

The National Institute of Environmental Health Sciences is committed to discovering how the environment affects individuals in order to promote healthier living. For more information, visit www.niehs.nih.gov (http://www.niehs.nih.gov/).

The National Institutes of Health (NIH), the nation's medical research agency, includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov. (http://www.nih.gov/)

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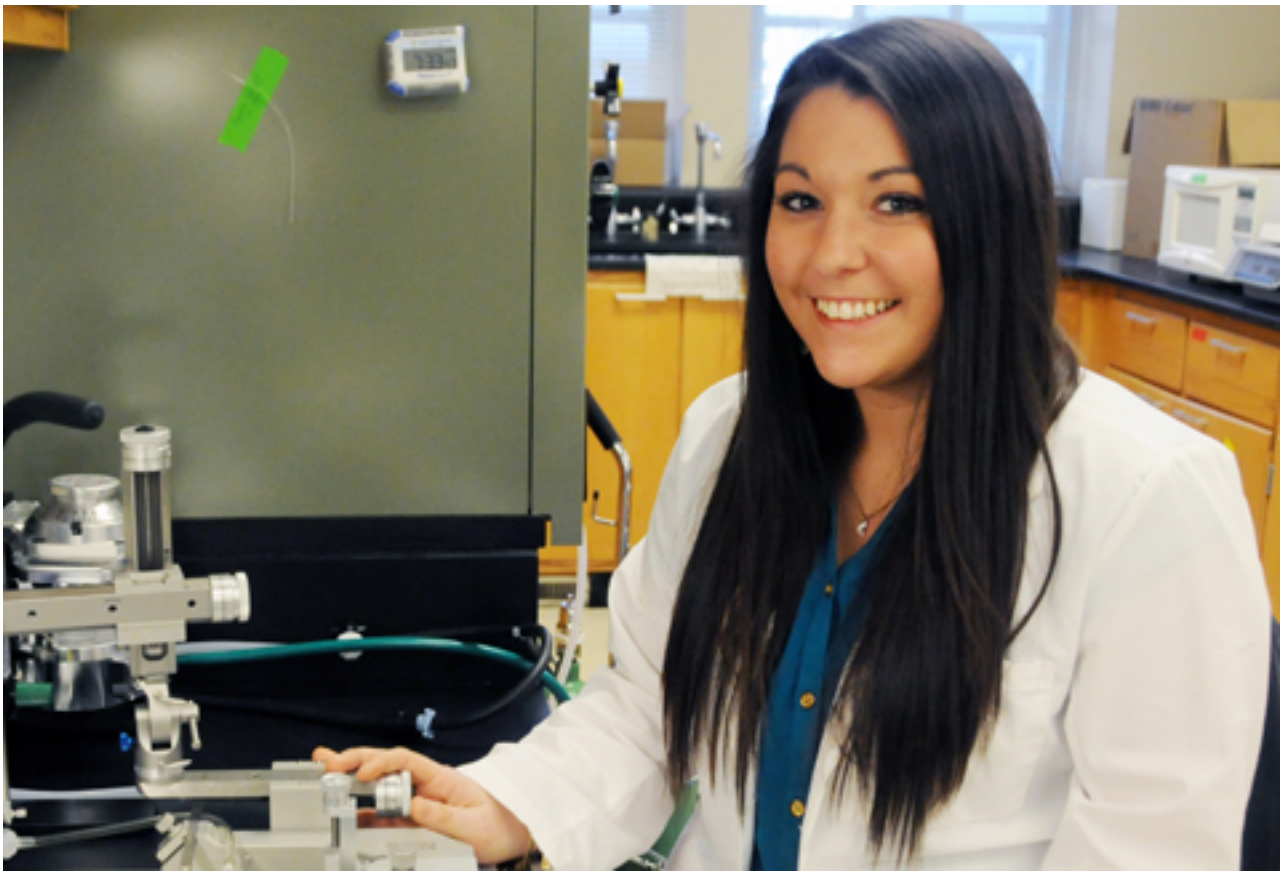
UTHSC Graduate Research Assistant Sarah Neuner Receives $172,480 Grant for Late-Onset Alzheimer's Disease Research

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**May 1st, 2015



A $172,480 grant from the National Institute on Aging, an NIH subsidiary, will allow graduate research assistant Sarah Neuner to identify genes that may influence a person's likelihood for developing late-onset Alzheimer's disease.

Although gene mutations that cause early onset Alzheimer's disease have been identified, the vast majority of cases result from what is known as "sporadic," or late-onset Alzheimer's disease (LOAD), which has no known cause. Sarah Neuner's research focuses on identifying currently unknown genes that influence a person's likelihood of developing LOAD.

Neuner, a graduate research assistant in the lab of Catherine Kaczorowski, PhD, in the Department of Anatomy and Neurobiology, College of Medicine at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $172,480 from the National Institute on Aging, a subsidiary of the National Institutes of Health. The award will be used to support a project titled, "Identification of Genetic Modifiers of Neuronal Deficits and Memory Failure in Alzheimer's Disease." The award will be distributed over four years.

Identifying those genes that modify susceptibility to LOAD in human studies has proven challenging, in part due to large genomic variability in individuals. In contrast, animal studies suffer from the opposite problem – too little genetic diversity, as most traditional studies utilize one inbred Alzheimer's disease (AD) mouse model. Therefore, Neuner and her collaborators have developed a new panel of AD mice that model some of the genetic complexity of human populations, which is thought to contribute to the "sporadic" nature of the disease. In this project, the research team will measure memory function as well as clinically relevant markers of AD in this panel throughout their lifespan in order to determine which strains are more or less prone to developing AD. Results from these tests will be used to pinpoint the region or regions in the genome that contain genes influencing the susceptibility and/or resistance of an individual strain to AD. Once these genes have been identified, gene therapy tools will be used to prevent or reverse AD-related memory deficits. Research outcomes, combined with insight from analysis of available human datasets, will allow researchers to prioritize candidates with the best potential to translate into treatments for use in human populations.

If successful, this research may uncover new therapeutic targets that can be used to delay, prevent, or cure Alzheimer's disease in humans. They may also be useful as "biomarkers" to identify individuals who are at high risk, enabling earlier detection and treatment, which would ultimately result in better outcomes for both patients and their families.

"I am extremely fortunate and thankful to have received a Ruth L. Kirschstein National Research Service Award from the National Institute on Aging, which will provide support for my doctoral training over the next four years," said Neuner. "My mentor, Dr. Catherine Kaczorowski, and the co-sponsor of this award, Dr. Rob Williams, will provide training on research design, ethics, grantsmanship, and additional career development opportunities that are essential for progressing towards a career as an independent scientist. Working closely with Drs. Kaczorowski and Williams

in the development of this project has allowed me to learn from experts in the three fields I am very interested in – aging, Alzheimer's disease and genetics – and combine the two in new ways. This award is especially important to me because it will help me achieve my goal of making significant contributions to the field of Alzheimer's disease genetics and to the understanding of the mechanisms causing this disease."

The National Institute on Aging remains committed to understanding the aging process and prolonging life. It is the primary agency that supports and conducts Alzheimer's research. For more information, visit www.nia.nih.gov (http://www.nia.nih.gov/).

The National Institutes of Health (NIH), the nation's medical research agency, includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov. (http://www.nih.gov/)

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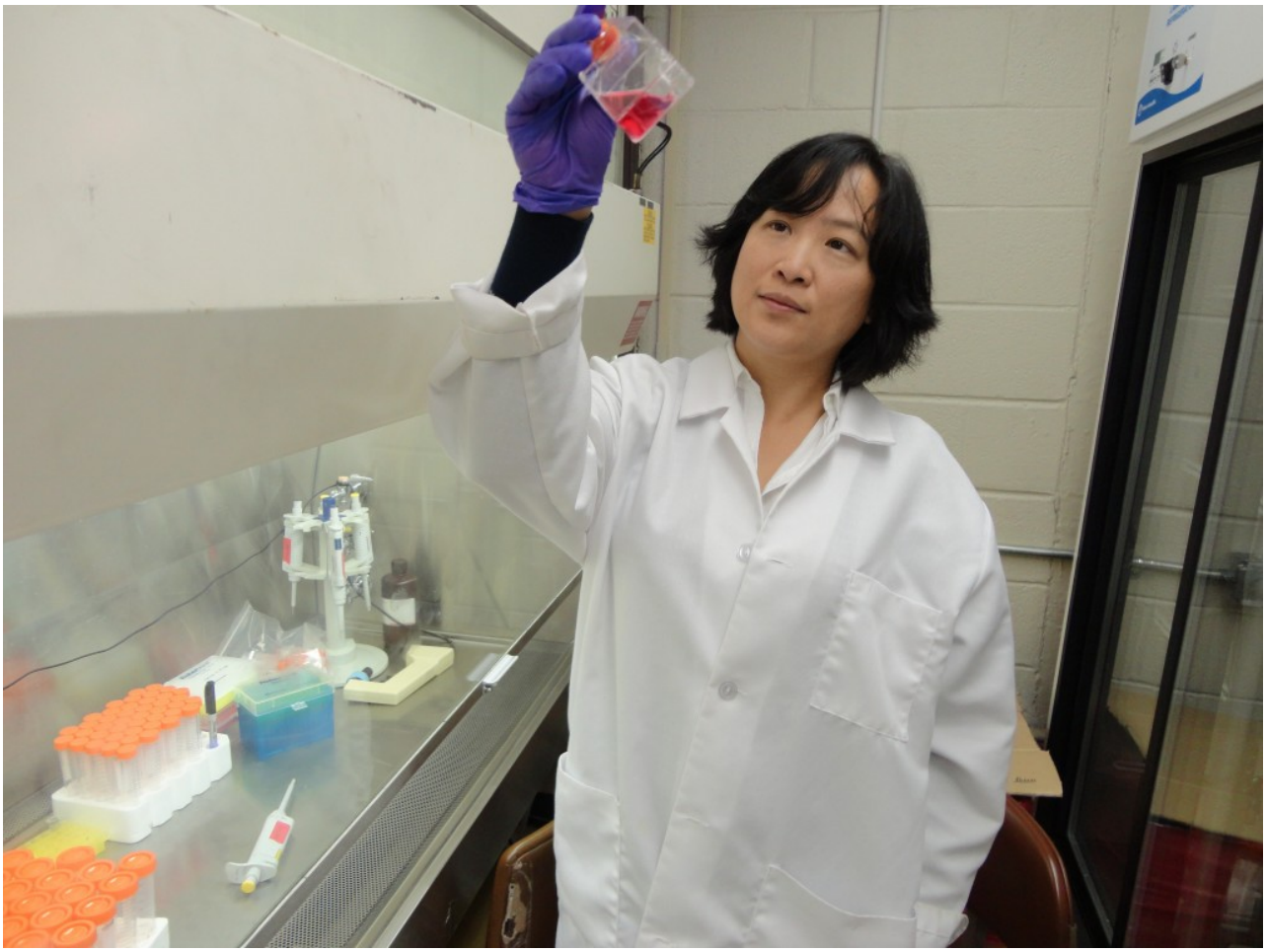
Associate Professor Francesca-Fang Liao of UTHSC Receives $1.4 Million Grant for Alzheimer's Disease Research

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**May 26th, 2015



With the help of a $1.4 million grant from the National Institute on Aging, Dr. Francesca-Fang Liao and her research team will be able to investigate HSF1, a universal master switch in the brain for stress response, which could be significant to brain function and Alzheimer's disease.

Alzheimer's disease (AD) is one of the most devastating neurodegenerative conditions, afflicting more than 4 million Americans each year. The available FDA-approved drugs only stabilize the conditions. More robust medications are needed to improve the syndrome. Synaptic damage is the earliest sign of AD, which leads to memory loss. Therefore, uncovering novel synaptic mechanisms and identifiable targets for the disease is key for developing effective treatments. With new funding, Francesca-Fang Liao, PhD, and her research team plan to do just that.

Dr. Liao, who is an associate professor in the Department of Pharmacology, College of Medicine at the University of Tennessee Health Science Center (UTHSC), has received a grant totaling $1.4 million from the National Institute on Aging, a subsidiary of the National Institutes of Health. The award will be used to support a project titled, "Is HSF1 The Key in Mediating HSP90 Inhibitor Effect in AD?" The award will be distributed over five years.

Dr. Liao and her research team recently discovered that a pharmacological inhibitor of HSP90 can powerfully stimulate multiple genes important for synaptic functions and prevent memory loss in symptomatic Alzheimer's mouse models. So far, the interest for developing a feasible HSP90 inhibitor for AD therapy is high, however, brain penetration and systemic toxicity present major challenges for development.

Previous efforts have shown feasibility in rodent models. Researchers have also discovered an activated transcription factor named HSF1, a universal master switch in stress response, likely being a major player in brain functions. Full evaluation on the efficiency and safety of this brain penetrating inhibitor is extremely important. If successful, it could lead to further development of this strategy toward clinical trials in AD patients.

"We are excited to study HSF1 for its potential important roles in synaptic performance and perhaps in other brain functions in the near future," said Dr. Liao. "We were hugely surprised to learn that very little research has been conducted in regards to this important molecule."

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Dr. William Armstrong, Director of the Neuroscience Institute, Co-Editor of New Book on Neuronal Function in the Brain

Written by **Communications and Marketing, (mailto:communications@uthsc.edu)**March 18th, 2015

The significance of neuronal function in the brain is explored in a new book co-edited by William Armstrong, PhD, and Jeffrey Tasker, PhD, titled “The Neurophysiology of Neuroendocrine

Neurons." Dr. Armstrong, a professor in the Department of Anatomy and Neurobiology at the University of Tennessee Health Science Center (UTHSC), also serves as director of the UTHSC Neuroscience Institute. Dr. Tasker is a professor of cell and molecular biology at Tulane University.

Brain cells (called neurons) communicate with one another by way of chemical and electrical signals. A small but special group, called neuroendocrine cells, also secretes hormones directly into the bloodstream to help regulate a wide variety of bodily functions, including blood pressure, fluid regulation, reproduction, birth and lactation. The electrical activity of neuroendocrine cells relates directly to the pattern and quantity of hormones they release. This book describes the rich history and current knowledge of the electrical properties of neuroendocrine cells, and how this activity is controlled.

This is the first volume in a new series titled "Masterclass in Neuroendocrinology," a co-publication between Wiley Press and the International Neuroendocrine Federation. The series aims to illustrate highest standards and encourage the use of the latest technologies in basic and clinical research, and to inspire further exploration into the field of neuroendocrinology. The series editors are Dr. Armstrong and John A. Russell, PhD, of Edinburgh University in Scotland.