

**2<sup>nd</sup> Annual  
Enhancing Neuroscience Diversity  
through Undergraduate Research  
Education Experiences (ENDURE)  
2012 Program Meeting**

**New Orleans, LA  
October 13, 2012**



**National Institute on Aging**



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## ENDURE PROGRAM GOALS

The Blueprint initiative "Enhancing Neuroscience Diversity through Undergraduate Research Education Experiences (ENDURE)" aims to raise interest and opportunities in neuroscience research for individuals who are typically underrepresented in the neuroscience. The goal is to provide such individuals with training at the undergraduate level, so that they are prepared to enter and successfully complete neuroscience Ph.D. programs. ENDURE provides undergraduate training through partnerships between research-intensive institutions and institutions with a substantial enrollment of neuroscience majors from diverse groups. This includes individuals from underrepresented racial and ethnic groups; individuals with disabilities; and individuals from economically disadvantaged backgrounds. ENDURE undergraduate training programs support a range of activities to increase student interest and involvement in the neurosciences, including research experiences, core and advanced neuroscience courses, seminars, and journal clubs. In FY 10, five ENDURE awards were granted.

## MEETING GOALS

As issued, the RFA (<http://grants.nih.gov/grants/guide/rfa-files/RFA-MH-10-070.html>) cites "it is a goal of this initiative that the NIH Blueprint Institutes will convene an annual meeting that will bring together BP-ENDURE program directors and participating students". The purpose of the meeting will be to discuss best practices and provide a forum for student scientific and academic enhancing activities. An additional goal and outcome for this annual meeting is to provide linkage and opportunity for collaboration for existing diversity (example Neuroscience Scholars Program) and undergraduate (example Faculty for Undergraduate Neuroscience) programs already at Society for Neuroscience. The students will enhance their networks with other ENDURE participants, peer mentoring from diverse graduate students, and T32 program directors.

## THE ORGANIZING COMMITTEE

Dr. Mark Chavez

Dr. Michelle Jones-London

Dr. Alberto Rivera-Rentas

Ms. Christiane Robbins

Ms. Nakia Wilson (*The Dixon Group, Inc.*) Ms. TaRaena Yates (*Synergy Enterprises, Inc.*)

For further information about the program and its training sites:

[http://neuroscienceblueprint.nih.gov/bp\\_nih-supported\\_training/endure\\_programs.htm](http://neuroscienceblueprint.nih.gov/bp_nih-supported_training/endure_programs.htm)

2<sup>nd</sup> ANNUAL ENHANCING NEUROSCIENCE DIVERSITY THROUGH UNDERGRADUATE  
RESEARCH EDUCATION EXPERIENCES (ENDURE) 2012 PROGRAM MEETING

October 13, 2012  
WESTIN NEW ORLEANS CANAL PLACE \* BALLROOM II

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## AGENDA

7:00 – 7:30 am REGISTRATION

7:30 – 7:40 am ENDURE MEETING GOALS AND INTRODUCTION

Dr. Mark Chavez, Division of Adult Translational Research and Treatment  
Development, National Institute of Mental Health (NIMH)

7:40 – 8:10 am NIH BLUEPRINT WELCOME AND SCIENTIFIC PRESENTATION

Dr. Nora Volkow, National Institute of Drug Abuse (NIDA) Director

Q&A

8:10 – 9:00 am PATHWAYS AND PERSPECTIVES ON BEING A RESEARCHER

*CHAIR AND PANEL INTRODUCTIONS:* Dr. Michelle Jones-London, Office of Training,  
Career Development and Workforce Diversity, National Institute for Neurological  
Disorders and Stroke (NINDS)

A discussion framed by several specific questions: What a graduate student should  
expect both of the school and themselves? How to identify a good mentor? Why a  
career in neuroscience research is fulfilling? How do I prepare for and navigate some of  
the challenges of graduate school?

- ❖ Roberta Diaz-Brinton, Ph.D. – University of Southern California, Director, USC  
STAR Science Education Program, Center for Scientific Translation, USC  
Clinical and Translational Science
- ❖ Daniel Colon-Ramos, Ph.D. – Yale School of Medicine, Assistant Professor of  
Cell Biology
- ❖ Hakeem Lawal, Ph.D. – UCLA School of Medicine, Postdoctoral Fellow
- ❖ Stephanie Perez - UT San Antonio Health Science Center, Graduate Student

9:00 – 9:30 am PANEL Q & A

9:30 – 10:30 am T32 RECRUITMENT FAIR AND NETWORKING

**T32 RECRUITMENT FAIR PARTICIPANTS**

University/School	Representative
<i>Brandeis University</i>	<b>Angela Gutchess, PhD</b> Assistant Professor of Psychology
<i>Brown University</i>	<b>Diane Lipscombe PhD</b> , Professor of Neuroscience
<i>Case Western Reserve University</i>	<b>Evan S. Deneris, PhD</b> Professor of Neurosciences <b>Lynn Landmesser, PhD</b> Professor of Neurosciences
<i>Emory University</i>	<b>Michael J. Kuhar, PhD</b> Candler Professor of Neuropharmacology
<i>Georgetown University</i>	<b>Karen N. Gale, PhD</b> Professor of Pharmacology & Physiology
<i>Harvard Medical School</i>	<b>Richard T. Born, MD</b> Professor of Neurobiology
<i>Johns Hopkins University</i>	<b>Marshall Shuler, PhD</b> Director of Minority Affairs, Neuroscience Graduate Program
<i>New York University</i>	<b>Lynne Kiorpes, PhD</b> Director of WINS
<i>Stanford University</i>	<b>John R. Huguenard, PhD</b> Associate Professor of Neurology
<i>University of Alabama at Birmingham</i>	<b>Anne B. Theibert, PhD</b> Director, Undergraduate Neuroscience Program
<i>University of Cincinnati</i>	<b>James P. Herman, PhD</b> Professor of Psychiatry
<i>University of Colorado Denver</i>	<b>Diego Restrepo, PhD</b> Director, Center for Neuroscience (CNS)
<i>University of Michigan</i>	<b>Edward L. Stuenkel, PhD</b> Professor of Molecular and Integrative Physiology Director of the Neuroscience Graduate Program
<i>University of North Carolina at Chapel Hill</i>	<b>Paul Manis, PhD</b> Professor, Dept. of Otolaryngology/Head and Neck Surgery
<i>University of Pennsylvania</i>	<b>Irwin Lucki, PhD</b> Professor of Pharmacology and Psychiatry
<i>University of Utah</i>	<b>Mario Alburges, PhD</b> Research Associate Professor of Pharmacology and Toxicology
<i>Vanderbilt University</i>	<b>Mark T. Wallace, PhD</b> Director, Vanderbilt Brain Institute Director, Neuroscience Graduate Program
<i>Yale University School of Medicine</i>	<b>Michael Crair, PhD</b> William Ziegler III Associate Professor, Director of Graduate Studies

## BIOGRAPHICAL SKETCHES - PANEL SPEAKERS

*Each accomplished researcher will share their research background and answer the general questions from their respective lens including early lessons from graduate school, being a diverse scientist, and the big picture view of a research career.*



**Roberta Diaz Brinton, Ph.D.**  
*University of Southern California  
R. Pete Vanderveen Chair in Therapeutic Discovery and Development  
Professor of Pharmacology and Pharmaceutical Sciences, Biomedical Engineering and Neurology  
Norris Foundation Laboratory for Neuroscience Research  
Director, USC STAR Science Education Program  
Director Center for Scientific Translation, USC Clinical and Translational Science Institute*

**Dr. Brinton** is Professor of Molecular Pharmacology and Toxicology at the University of Southern California Pharmaceutical Sciences Center with a joint appointment in the Department of Biology, Neurobiology Division. She received her Ph.D. in Psychobiology and Neuropharmacology from the University of Arizona and completed her postdoctoral training in Neuroendocrinology at Rockefeller University. Her research is focused on the elucidation of fundamental cellular mechanisms of cognitive function and the application of those principles to discovery and design of therapeutics for the prevention and treatment of neurodegenerative diseases.

Dr. Brinton is also Director of Science, Technology And Research (STAR) Program. The program is a cooperative venture in science education between the University of Southern California Health Sciences Campus and Francisco Bravo Medical Magnet High School in East Los Angeles and USC / LAUSD Math, Science and Technology Magnet High School in South Central Los Angeles. The **STAR** Program provides junior and senior high school students interested in learning about scientific exploration the opportunity to join a basic science research team.



**Daniel Colón-Ramos, Ph.D.**  
*Yale School of Medicine  
Assistant Professor of Cell Biology;  
Program in Cellular Neuroscience and Neurodegeneration & Repair*

**Dr. Colón-Ramos** was born and raised in Puerto Rico. He completed his B.A. at Harvard University, where he did research, in collaboration with the Smithsonian Tropical Research Institute, on the use of medicinal plants by indigenous groups in Central America. He then completed his PhD in the lab of Dr. Sally Kornbluth at Duke University, where he combined bioinformatics, molecular biology, biochemistry and cell biological approaches to answer questions critical for understanding the molecular mechanisms of apoptosis, a physiological process tightly linked to cancer. He then trained in molecular genetics, physiology and neurobiology as a postdoctoral fellow in the lab of Dr. Kang Shen at Stanford University. He was a prestigious K99/R00 awardee and has successfully transitioned to a NINDS R01.

Currently, the Colón-Ramos lab is interested in understanding the developmental events that direct precise neural connectivity. He is also part of a non-profit scientific think tank (Council for the Advancement of Puerto Rico Research and Innovation) and [CienciaPR](#) is one of the initiatives.



**Hakeem O. Lawal, Ph.D**

*David Geffen School of Medicine at UCLA  
Senior Post Doctoral Research Scholar  
Department of Psychiatry*

Dr. Lawal's primary research interest is in understanding the cellular and molecular basis for neurodegenerative diseases and developing suitable disease-modifying therapies. He obtained his M.S and Ph.D degrees at The University of Alabama in the laboratory of Dr. Janis O'Donnell where he used genetic, biochemical and cell biological tools to investigate the role of dopamine in cellular migration in a model for angiogenesis. During his graduate work, he discovered a passion for using simple genetic systems to understand the progression of human diseases. In the latter part of his Ph.D work, he switched to Neurobiology and helped establish the *Drosophila* environmental toxicity model for Parkinson's disease (PD). He is currently doing his postdoctoral work in developing treatments for PD in the laboratory of Dr. David Krantz where he has shown that the overexpression of the vesicular monoamine transporter, the protein responsible for packaging and transporting dopamine into synaptic vesicles for exocytosis, is protective against environmental risk factors of PD. In a recently completed pharmacological screen, he led a team to discover several new therapeutic agents potentially capable of ameliorating PD symptoms. Currently, Dr. Lawal has started investigating the biological role of another vesicle transporter, the vesicular acetylcholine transporter (VACHT). The long term goal of the VACHT project is to determine the relationship of the structure of the transporter to its function, understand how the function changes in a disease (AD) state, and on this basis to develop pharmacological modifiers of transporter function which may serve as potential therapeutics for cognitive decline associated with pathological aging.



**Stephanie Perez**

*University of Texas Health Science Center at San Antonio  
Ph.D. Candidate, Pharmacology Department  
Integrated Multidisciplinary Graduate Program*

Stephanie Perez received her B.S. in Biology from the University of Texas at San Antonio (UTSA) in 2004. She then completed her M.S. in Biology with a concentration in Neuroscience at UTSA in 2007. Stephanie is currently a fourth year graduate student in the Department of Pharmacology at the University of Texas Health Science Center at San Antonio in the laboratory of Dr. Daniel Lodge. The current focus of Stephanie's research is aimed at understanding the etiology and pathophysiology of schizophrenia in order to identify novel targets for the development of pharmacological and non-pharmacological therapeutic interventions. Specifically, she is using electrophysiological, neurochemical, and behavioral approaches to better understand how aberrant ventral hippocampal activity affects mesolimbic dopamine transmission and associated behaviors, in a rodent model of the schizophrenia.

Stephanie is examining unique and novel approaches, such as deep brain stimulation and neuronal transplantation, in an attempt to normalize aberrant hippocampal transmission and subsequently, dopamine neuron activity and associated behaviors in a rodent model of schizophrenia. Stephanie believes that her studies provide valuable information regarding how alterations in ventral hippocampal function is able to alter complex circuits and their control of both normal and aberrant behaviors. These data will help develop a better understanding of the pathophysiology schizophrenia with an ultimate goal being the development of novel therapeutic approaches.

# MENTORING RESOURCES AND PROFESSIONAL CONFERENCES

"MENTOR: SOMEONE WHOSE HINDSIGHT CAN BECOME YOUR FORESIGHT"

Society for Neuroscience Mentoring Program

<http://neuroonline.sfn.org/home/>

How to Get the Mentoring You Want: A Guide for Graduate Students at a Diverse University

<http://www.apa.org/research/responsible/mentoring/mentoring-guide.pdf>

How to Mentor Graduate Students: A Guide for Faculty

<http://www.sfn.org/siteobjects/published/0000BDF20016F63800FD712C30FA42DD/861CA2EFD35FE6C55BACF0EC0F5ADF6E/file/HowtoMentorGradStudents.pdf>

JustGarciaHill: A Virtual Community for Minorities in Sciences

<http://justgarciahill.org/>

The Leadership Alliance

<http://www.theleadershipalliance.org/>

NIDA Mentoring Guide

<http://www.drugabuse.gov/mentoringguide/MentoringGuide.pdf>

## PROFESSIONAL CONFERENCES

Venues for professional development activities, scientific presentations and networking opportunities with diverse peers, faculty and academic biomedical research Institutions

- ❖ Association of American Indian Physicians (AAIP)
- ❖ Annual Biomedical Research Conference for Minority Students (ABRCMS)
- ❖ Association of Minority Health Professions Schools, Inc. (AMHPS)
- ❖ Hispanic Association of Colleges and Universities (HACU)
- ❖ Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)
- ❖ Neuroscience Scholars Program (NSP) at Society for Neuroscience

# ENDURE TRAINEE INFORMATION AND RESEARCH ABSTRACTS

## **BP-ENDURE-ATLANTA: ENGAGING UNDERGRADUATES IN NEUROSCIENCE RESEARCH**

GEORGIA STATE UNIVERSITY

Principal Investigator: *Dr. Kyle J. Frantz*

Partner Institutions: Emory University, Agnes Scott College and Spelman College

**PROGRAM DESCRIPTION:** Undergraduate students can be attracted to science by engaging in research. A summer experience as an apprentice in a scientist's laboratory or clinic may be effective in this regard, but short-term research may fail to provide the preparation necessary to progress into PhD programs in fields such as neuroscience.

The BP- ENDURE-Atlanta project led by Georgia State University (GSU) in partnership with Agnes Scott College (ASC), Emory University, and Spelman College, will provide a two-year neuroscience research immersion and integration program for students from underrepresented groups. Program evaluation will test the hypothesis that in-depth research training, coupled with an intensive professional development workshop series, will positively affect participants' communication skills and confidence with research abilities, and will increase rates of matriculation into neuroscience PhD programs. Identification of a reliable approach to developing the skills and confidence necessary to progress into PhD programs will enable more students from various backgrounds to pursue their interests in science, and will ultimately increase diversity in the US scientific workforce.

*Specific Aim 1* is to engage undergraduates from underrepresented groups in research and training, using a two-year program for junior and senior undergraduates that includes five major components: 1) a research immersion in Atlanta's well-established BRAIN summer program; 2) a Research Assistantship in the first academic year; 3) a Travel Assistantship to conduct research at a partner T32 training program in the second summer; 4) a Capstone Research Assistantship during the second academic year; and 5) an intensive professional development workshop series.

*Specific Aim 2* is to test the hypothesis that this neuroscience research program will positively affect scientific communication skills and confidence with research abilities among undergraduates, thereby raising rates of matriculation into neuroscience PhD programs.

By conducting hypothesis-driven science education research, this project will fill a gap in current knowledge about how best to encourage and prepare students to help address biomedical, behavioral, and clinical research needs, with a focus on students from underrepresented groups. By publishing results in peer-reviewed journals targeting different subpopulations in the scientific community, we will extend beyond the norm of many training programs in terms of contributing to best practices in science education.

### ADDITIONAL CONTACTS:

Ms. Laurie Murrah-Hanson - Program Coordinator - Georgia State University

Dr. Chris Goode - Georgia State University

Dr. Elizabeth Buffalo - Emory University

Dr. Karen Brakke - Spelman College

Dr. William Hopkins - Agnes Scott College

# ENDURE TRAINEE ABSTRACT

## **NAME: MICHELLE AUTREY**

Home Institution and State: **Agnes Scott College, Georgia**

Email: **mautrey@agnesscott.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; May 2013**

Mentors/Advisors at Home Institution: **Dr. William Hopkins**

## **ENDURE Trainee Scientific Interests**

Michelle Autrey is interested in disorders of the nervous system, specifically on Alzheimer's disease (AD), Attention Deficit Hyperactivity Disorder (ADHD), and depression. Autrey is mainly interested in the effects of specific drugs on memory and how these drugs aid in the treatment of AD, ADHD, and depression. Autrey is also interested in memory consolidation, fear memory, and in drug addiction memory.

## **ENDURE Trainee Career Goals and Plan**

After graduation, Autrey plans on pursuing a PhD in Clinical Psychology. She plans on becoming a Clinical Neuropsychologist.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of California, San Diego**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Stephan Anagnostaras**

## **Research Project Title: Dose-Dependent Effects of Citalopram on Conditioned Fear Memory**

Citalopram is a selective serotonin reuptake inhibitor (SSRI) used to treat Attention Deficit Hyperactivity Disorder (ADHD). The specific role of citalopram on ADHD is unknown. However, psychostimulants, such as amphetamine and methylphenidate, have been reported to enhance and impair memory at low and high doses, respectively. The similar function of SSRIs and psychostimulants raises the possibility of citalopram also being involved in learning and memory. In previous studies, citalopram has been reported to improve working memory in depressed patients. However, the dosage effects of citalopram on learning and memory have not received much attention. The present study investigated the effects of citalopram on cued and contextual Pavlovian fear conditioning in mice. In order to examine the dose-dependent effects of citalopram, mice were given high and low doses of the drug before a fear conditioning session in which the discrete cues (tones) were paired with aversive footshocks. Freezing was used to assess memory for cued and contextual fear. Contrary to our hypothesis, citalopram had no significant effect on memory at either high or low doses. Thus, there is a possibility that citalopram is not primarily involved in cognition in ADHD.

# ENDURE TRAINEE ABSTRACT

## NAME: MELISSA CARR-REYNOLDS

Home Institution and State: **Spelman College, Georgia**

Email: **mcarrey@scmail.spelman.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Biology; May 2014**

Mentors/Advisors at Home Institution: **N/A**

## ENDURE Trainee Scientific Interests

The trainee is interested in learning about, studying and doing research on Alzheimer's disease.

## ENDURE Trainee Career Goals and Plan

The trainee desires to attend Medical School. She also plans on continuing research in neuroscience, particularly in the area of Alzheimer's disease.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **Georgia State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution:

Research Project Title: **Paralysis of Crayfish due to Caffeine at the Neuromuscular Junction in Red Swamp Crayfish (*Procambarus clarkia*)**

The research project involved neuroscience research and more specifically, studying the nerve cords of the red swamp crayfish at Georgia State University. The trainee had to then come up with a scientific question on which he or she could conduct research. Once research was conducted, the trainee was then required to present his or her poster at a symposium.

# ENDURE TRAINEE ABSTRACT

## NAME: REBECCA CROSS

Home Institution and State: **Agnes Scott College, Georgia**

Email: **rdcross@agnesscott.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Neuroscience, May 2014**

Mentors/Advisors at Home Institution: **N/A**

## ENDURE Trainee Scientific Interests

Ms. Cross is interested in expanding her understanding of the many intricacies and functions of the brain in order to someday help cure diseases of, and related to, the brain, such as Alzheimer's disease. This program has provided Ms. Cross with opportunities in this area to really wet the research appetite and motivate her to delve further into the brain.

## ENDURE Trainee Career Goals and Plan

Upon graduation from Agnes Scott College, Ms. Cross plans to attend medical school, and perhaps MD/PhD school. She would like to become a medical doctor and she hopes to continue to actively participate in research throughout her life.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **Emory University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Megan Tompkins and Dr. Elizabeth Buffalo**

## **Research Project Title: The Role of the Hippocampus in Relational Memory**

The hippocampus is a critical structure for relational memory. Studies have shown that humans with damage to the hippocampus demonstrate impaired relational memory (Bayley et al., 2005). Glavis-Bloom and Bachevalier tested adult monkeys with neonatal hippocampal lesions on a series of memory discrimination tasks (dissertation, 2010). The lesion group showed no impairment on object-only discrimination, not thought to rely on the hippocampus. Surprisingly, these monkeys also showed no impairment on relational memory discrimination tasks. This lack of impairment may have been related to the early stage of development when the hippocampal lesion was performed. This study will evaluate effects of hippocampal lesions made in adult monkeys using the above tasks. We hypothesize that adult lesioned monkeys will show impairment on discrimination tasks with a relational memory requirement and will not be impaired on non-relational object discrimination tasks. So far, a Discrimination Training Task (DTT), using simple colored squares against a black background, has been introduced to four monkeys, including one with an adult hippocampal lesion. Two of these animals have reached criterion levels of performance. Our preliminary results on the DTT reveal that hippocampal lesions made in adulthood do not produce impairment on this non-relational task.

# ENDURE TRAINEE ABSTRACT

**NAME: NORMA A. HERNANDEZ**

Home Institution and State: **Georgia State University, Georgia**

Email: **nhernandez7@student.gsu.edu**

Undergraduate Academic Level: **Sophomore**

Undergraduate Major and Expected Graduation Date: **Neuroscience; Spring 2015**

Mentors/Advisors at Home Institution:

## **ENDURE Trainee Scientific Interests**

Norma is interested in the molecular aspects of neuroscience. She takes a particular interest in memory functions and neurodegenerative diseases that impair cognitive performance. Through this research experience, Norma has taken an interest in the behavioral and pharmaceutical aspects of memory research.

## **ENDURE Trainee Career Goals and Plan**

After graduation, Norma plans on going to graduate school to pursue a Ph. D in neuroscience. At the moment, she would like to work and learn in a memory related lab, ideally, one that works with Alzheimer's disease. Her career goals are to continue working collaboratively with the neuroscience community by becoming a PI and teaching at a university.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Emory University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Joseph R. Manns, Claire R. Galloway, Evan P. Lebois**

### **Research Project Title: Contribution of the M1 muscarinic acetylcholine receptor to object recognition memory**

Acetylcholine (ACh) is a neurotransmitter known to modulate cognitive functions such as learning and memory. Since ACh serves as the endogenous signaling ligand of muscarinic ACh receptors (mAChRs), the site at which it binds to mAChRs is commonly referred to as the orthosteric site. Since the orthosteric site is so highly conserved among the mAChRs, drugs engineered to act at this site can cause activation of all five mAChR subtypes (M1-M5), resulting in adverse side effects. To combat this nonselective activation, newer drugs are being developed that bind at allosteric sites to selectively activate specific mAChR subtypes. Specifically, the M1 receptor is attractive as a therapeutic target because of its abundance in neocortical brain areas commonly associated with memory functions, such as the hippocampus. In this study high, medium, and low doses of allosteric agonist, VU0364572, and a positive allosteric modulator (PAM), BQCA, were dosed subcutaneously into rats 30 minutes before object recognition memory was tested. Preliminary results indicate that selective M1 activation may affect object recognition memory in rats. Fully understanding the pharmacology of M1 receptors in the brain will be key for developing insight into potential therapies for memory disorders.

# ENDURE TRAINEE ABSTRACT

## **NAME: RUBY M. LAM**

Home Institution and State: **Emory University, Georgia**

Email: **Rubymlam@gmail.com**

Undergraduate Academic Level: **Junior**

Major and Expected Graduation Date: **Neuroscience and Behavior Biology; May 2014**

Mentors/Advisors at Home Institution: **Dr. Shawn Hochman**

## **ENDURE Trainee Scientific Interests**

The research supported by the Endure program involved looking at the molecular changes in monoamine receptors in the nerve chord with repetitive administration of cocaine. Because cocaine blocks the re-uptake of multiple monoamines, the amount of monoamines drastically increase in the synapse, causing the crayfish to first cease movement then behave in erratic movement patterns. This research focused on how the amount of particular monoamine receptor mRNA transcripts and monoamine receptors were present in crayfish with and without cocaine administration over different lengths of time. Understanding the different molecular pieces of the equation build foundations of creating drugs and treatments for affects of chronic cocaine use.

## **ENDURE Trainee Career Goals and Plan**

I would like to gain some experience with the different neuroscience approaches to questions and learn to think more like the scientists my mentors are. I'd like to go to graduate school and spend time asking more questions, learning and doing research. I would also like to someday share this love of inquiry and love of research to the next generations of research scientist by mentoring, tutoring or even teaching some classes at a university setting on the subjects in neuroscience I become most passionate about.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Georgia State University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. M. Black, Dr. Kyle Franz**

**Research Project Title: Effect of Repeated Cocaine Administration on Monoamine Receptors and Behavior in *Procambarus clarkii***

The ENDURE program sponsored researching the effects of repeated cocaine administration on monoamine receptors and behavior in *Procambarus clarkii* (Red Swamp Crayfish). Studies show cocaine administration significantly reduces locomotor activity in crayfish; however when walking is exhibited, the speed and distance increase. Because the Molecular mechanisms behind these behavioral alterations have not been fully explored, the ENDURE program funded a project that aimed not only to verify these behavioral effects of acute and repeated cocaine administration, but also to establish the specific roles of monoamine receptors in either or both of these conditions, including: serotonin, dopamine, and octopamine receptors. Using Western Blot and Reverse Transcriptase PCR in conjunction with behavioral observations, visual representation of changes in monoamine receptor expression were observed. Preliminary data shows a decrease in 5-HT<sub>1A</sub> receptors after repeated cocaine administration, but not after a single dose. Animals receiving repeated cocaine displayed more walking and walked further and faster than animals that received one dose. Further Research using receptor-specific antagonist pretreatments before cocaine administration to test for the necessity of various monoamine receptor subtypes and beginning stages for cloning DA and OA receptors have begun. Ultimately, by identifying the molecular mechanism mediating cocaine-induced behavior, crayfish can be established as a model for vertebrate neurological drug abuse.

# ENDURE TRAINEE ABSTRACT

## **NAME: LAURA SEGURA**

Home Institution and State: **Agnes Scott College, Georgia**

Email: **lsegura@agnesscott.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Neuroscience; May 2014**

Mentors/Advisors at Home Institution: **Dr. Jennifer Larimore, Dr. Barbara Blatchley**

## **ENDURE Trainee Scientific Interests**

At an undergraduate level, I am interested in perfecting all new lab techniques I encounter as well as acquiring as much knowledge as possible about the reality of neuroscience outside of the classroom. By becoming an integral part of a participating lab, my research interest will reside in identifying the effect of specific proteins in *Drosophila* and relate newfound findings to the growing knowledge about Parkinson's disease. At a graduate level, my aim is to narrow my interests and focus on the psychological and biological effects of neurodegenerative diseases and/or mood disorders on the human brain.

## **ENDURE Trainee Career Goals and Plan**

In the long run, my overarching aim is to deeply contribute to the growing knowledge of mood disorders and neurodegenerative diseases within the field of neuroscience. My goal is to research more about the effect that either mood disorders and/or neurodegenerative diseases have on mental and physical wellness. After successfully achieving a terminal degree (Ph.D./M.D.), my passion would be demonstrated through providing therapeutic services to patients, researching about a specific mood disorder/neurodegenerative disease, and teaching students in an academic atmosphere.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **Georgia State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Michael Black, Dr. Don Edwards, Dr. Kyle Frantz, Uzma Tahir, Bryce Chung, Jarod Collens, Dr. Ebony Glover, Adria Lee, Dr. Alysia Vrailas Mortimer**

## **Research Project Title: The Effect of Static Magnetic Fields on the Rate of Recovery in Neural Injury in *Procambarus clarkii***

By using the *Procambarus clarkii* as an invertebrate model, our preliminary research indicates a relationship between exposure to SMFs and the rate of recovery in crayfish neural injury. After crushing the nerve cord between the 5th and 6th abdominal ganglia, we observed a decrease of neuronal activity via electrophysiological recordings in all specimens after 1 day. By the 7th day, injured crayfish exposed to SMFs showed a quicker recovery of neuronal activity in comparison to injured crayfish lacking exposure. Electrophysiological recordings of neuronal activity right above the site of injury as well as behavioral observations noting the tail flip response when mechanically stimulated were documented for 7 days. Unfortunately, behavioral observations failed to complement our electrophysiological findings. As a future direction, we hope to enlarge our pool of crayfish, elongate the experimentation period, and completely sever the nerve cord. By recovering their baseline neuronal activity and behaviorally demonstrating a recovery of the tail flip response in a shorter amount of time, we will confirm the therapeutic effect of SMFs on crayfish recovering from neural injury. Ultimately, future studies will transcend from invertebrates and provide more knowledge about the efficacy of magnetic therapy on vertebrate neural injury.

# ENDURE TRAINEE ABSTRACT

## **NAME: SHEZZA SHAGARABI**

Home Institution and State: **Emory University, Georgia**

Email: **sshagar@emory.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Neuroscience and Behavioral Biology; May 2014**

Mentors/Advisors at Home Institution: **Dr. Joseph Mann and Dr. Elizabeth Buffalo**

## **ENDURE Trainee Scientific Interests**

My interest is in understanding the role of neurotransmitters in memory, and how abnormalities in neurotransmission contribute to Alzheimer's and schizophrenia.

## **ENDURE Trainee Career Goals and Plan**

I aspire to have a career in neuroscience to further the knowledge of disease and mental illnesses brought about through abnormalities in cholinergic pathways.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **Emory University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Manns (PI mentor) and Claire Galloway (Grad mentor)**

## **Research Project Title: Contribution of M1 and M4 muscarinic acetylcholine receptors to object recognition memory**

Muscarinic acetylcholine receptors (mAChRs) are a family of five (M1-M5) G-protein-coupled receptors expressed in brain areas important for learning and memory, such as the hippocampus. Previous work has shown that drugs selective for M1 or M4 receptor subtypes may provide a viable option for enhancing memory, while limiting the side effects that would occur with non-selective mAChR activation. In order to begin examining the contribution of M1- and M4 to memory processes, we assessed the effects of the positive allosteric modulators BQCA (M1 PAM) and VU0152100 (M4 PAM) in rats (n=12) using an object recognition task. Animals were randomly injected subcutaneously 30 minutes prior to testing with either saline, BQCA or VU0152100. The testing paradigm consisted of a study and test phase in which rats explored a total of 24 objects, separated by a 5 minute delay. Preliminary data suggests rats that received the lowest dosages of BQCA (1 mg/Kg), and VU0152100 (3 mg/Kg), had significantly higher discrimination indices compared to rats that received saline alone. These findings suggest that selective M1 and M4 activation may effectively enhance object recognition memory in rats. This work may therefore offer critical insight into viable ways of treating memory disorders.

# ENDURE TRAINEE ABSTRACT

## **NAME: KAELA SINGLETON**

Home Institution and State: **Agnes Scott College, Georgia**

Email: **kaelasingleton@gmail.com**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Neuroscience & Classical History; May 2014**

Mentors/Advisors at Home Institution: **Dr. Jennifer Larimore**

## **ENDURE Trainee Scientific Interests**

I am interested in neuropathology and the role diseases play in the nervous system. As well as the connection modern diseases can relate to the world of Ancient Medicine. In addition, I am also interested in the molecular aspects of neuropharmacology and it's relationship to neurodegenerative diseases.

## **ENDURE Trainee Career Goals and Plan**

After graduating from Agnes Scott, I plan to attend a graduate program that offers a degree in neuropharmacology, neurophysiology and/or neuroendocrinology. If necessary, I plan to take a year off and continue research with a post baccalaureate position and reapply to graduate programs. My top choices as of now are, Emory University, Brown University, and Stanford. After receiving my Ph.D. my goal is to become a professor at a small liberal arts college and continue to do research. My goal is to inspire students in the same way that my current professors and mentors inspire me.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **Georgia State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. K.J. Frantz, Dr. M.P. Black**

## **Research Project Title: Effect of Repeated Cocaine Administration on Monoamine Receptors and Behavior in *Procambarus clarkia***

*Procambarus clarkii* (Red Swamp Crayfish) provide an excellent animal model in drug research due to their simple and accessible nervous system. Studies show cocaine administration significantly reduces locomotor activity in crayfish; however when walking is exhibited, the speed and distance increase. Molecular mechanisms behind these behavioral alterations have not been fully explored. The presently proposed project aims not only to verify these behavioral effects of acute and repeated cocaine administration, but also to establish the specific roles of monoamine receptors in either or both of these conditions, including: serotonin, dopamine, and octopamine receptors. Using Western Blot and Reverse Transcriptase PCR in conjunction with behavioral observations will allow for a visual representation of changes in monoamine receptor expression. Preliminary data shows a decrease in 5-HT<sub>1A</sub> receptors after repeated cocaine administration, but not after a single dose. Animals receiving repeated cocaine displayed more walking and walked further and faster than animals that received one dose. We will use receptor-specific antagonist pretreatments before cocaine administration to test for the necessity of various monoamine receptor subtypes in cocaine-related behavior. Ultimately, by identifying the molecular mechanism mediating cocaine-induced behavior, crayfish can be established as a model for vertebrate neurological drug abuse.

# ENDURE TRAINEE ABSTRACT

## **NAME: JAMEELA STANTON**

Home Institution and State: **Spelman College, Georgia**

Email: **jstanto2@scmail.spelman.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Psychology; May 2014**

Mentors/Advisors at Home Institution:

## **ENDURE Trainee Scientific Interests**

My research interests mainly lie in mood disorders (bipolar disorder, depression) and the brain. I would like to research the specific neurotransmitters and receptors involved in mood disorders development. Additionally I would like to explore methods of treatment for such mood disorders. A better understanding of these types of disorders can lead to less rates of occurrence.

## **ENDURE Trainee Career Goals and Plan**

I am currently figuring out what my specific plans for the future are, but I know that I intend on pursuing a Master's and PhD in my post undergraduate education. For my Master's I intend on pursuing a degree in Neuropsychology or Mental Health Counseling, with the intent of ultimately getting a PhD in Clinical Psychology. My career goal is to work as a psychologist for the Federal Bureau of Prisons, while in the long term I would like to work to do research on Post Traumatic Stress Disorder with the Army.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Emory University, Center for Rehabilitation**  
**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Randy Trumbower and Dr. Heather Hayes**

### **Research Project Title: Exploring the Relationship between Acute Intermittent Hypoxia and Breathing Capacity**

Maximizing the neuroplasticity within the neural pathways of individuals with spinal cord injury (SCI) could improve recovery of function (Trumbower et al., 2012). Previous research supports that acute intermittent hypoxia (AIH) may enhance plasticity by strengthening the drive to respiratory and nonrespiratory motoneurons (Lovett-Barr et al., 2012; Golder and Mitchell, 2005). This increased motor output means there could potentially be improvement in breathing as a result of AIH. By translating discoveries from studies done within rat models, the authors hypothesized the breathing capacity of incomplete SCI patients would increase after AIH. Three adult SCI participants underwent a spirometry breathing test before and after AIH. These results were compared to when they received normal air (SHAM). The breathing capacity of subjects was measured using tidal volume (VT), breathing frequency (BF), and minute ventilation (MV) which is tidal volume multiplied by breathing frequency. During the SHAM intervention most metrics did not change or decreased. AIH seems to increase the MV and VT of subjects, meaning the breathing capacity could potentially be improving.

# ENDURE TRAINEE ABSTRACT

**NAME: MOHAMMAD F. TARIQ**

Home Institution and State: **Georgia State University, Georgia**

Email: **mtariq2@student.gsu.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Neuroscience; May 2014**

Mentors/Advisors at Home Institution: **Dr. Walter William Walthall**

## **ENDURE Trainee Scientific Interests**

I am interested in the study of mechanisms that can neutralize damage to neurons. Many vital functions of the body are under neuronal control. Thus, any damage to neurons resulting from traumatic or genetic causes results in the impairment of such vital functions. Currently, I am involved in researching such a compensatory or neutralization mechanism that allows mutants of neural networks involved in locomotion to exhibit normal forward motion in *Caenorhabditis elegans*.

## **ENDURE Trainee Career Goals and Plan**

I aspire to earn a Ph.D. in Neuroscience and study neuroplasticity, neuroregeneration, and neurogenesis and their applications for medical purposes. After my Ph.D., I am planning to do a post-doc at any one of the federal research facilities like NIH, and then be a researcher there or join a research university as a researcher.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Georgia State University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Walter William Walthall**

**Research Project Title: Decoding the neural networks involved in the locomotion of *Caenorhabditis elegans***

Our project focuses on understanding why forward locomotion in *Caenorhabditis elegans* is resistant to genetic perturbations. Sinuous locomotion in *C. elegans* employs a rhythmic neural activity. Similar rhythmic neural networks control cyclic processes such as breathing and reproduction in higher animals. In *C. elegans*, it has been observed that animals with mutated neural networks for the forward motion are able to compensate for the mutation. Therefore, studying animals that are able to compensate mutations will result in an elaborate understanding of this compensatory mechanism. This understanding could then be applied to the pattern generators in higher animals such as humans to treat disruptions in the pattern resulting from genetic or traumatic causes. Our results support our hypothesis that a compensatory mechanism allows these mutants to neutralize the mutation by altering the rate of excitation and inhibition to the muscles in the face of a mutation.

# ENDURE TRAINEE ABSTRACT

## **NAME: STEPHANIE TIRADO**

Home Institution and State: **Agnes Scott College, Georgia**

Email: **stirado@agnesscott.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Neuroscience; May 2012**

Mentors/Advisors at Home Institution: **Dr. Jennifer Larimore**

## **ENDURE Trainee Scientific Interests**

Spinal cord injury research is the field I am currently interning in. While I find this work extremely interesting I am also highly attracted to research pertaining to mental health. Recently, I have taken an interest to the behavioral aspects of psychiatric disorders and neurodegenerative diseases.

## **ENDURE Trainee Career Goals and Plan**

After completing my undergraduate degree in neuroscience my goals are to be accepted, attend and ultimately graduate medical school. Afterwards, entering the work force, as either a psychiatrist or neurologist, to help the community in psychological and physical need is what I would love to do the rest of my life.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **Emory University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Randy Trumbower**

## **Research Project Title: The Effects of Acute Intermittent Hypoxia on Intact Corticospinal Tract Excitability**

Acute intermittent hypoxia (AIH) has been shown to induce spinal plasticity by strengthening the synapses onto motor neurons. Animal and human studies have revealed substantial recovery in motor skills, such as ladder stepping and walking, after exposure to AIH. These sophisticated, multifaceted abilities are examples of skills highly influenced by the corticospinal tract (CST). A preliminary study was conducted to investigate the effects of AIH on CST excitability in able-bodied participants in order to determine the potential role of the CST in the mechanism of AIH. Once AIH is understood safe and effective dosing can be determined for use of treatment for those whose suffer from spinal cord injury.

# ENDURE TRAINEE ABSTRACT

## **NAME: HOANG NHAT “PETER” TRAN**

Home Institution and State: **Emory University, Georgia**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Neuroscience Behavior and Biology; 2014**

Mentors/Advisors at Home Institution: **Emory University, Psychology Department**

## **ENDURE Trainee Scientific Interests**

I'm fascinated by the reward system in its entirety. In particular, I seek to understand the extent of the reward system's neuroanatomical components, along with their respective roles in cognition. Additionally, I seek to understand how drugs and addiction affect the reward system, especially with their effects on behavior, brain damage and long-term neuroplasticity. Using this, I hope to develop therapies to both reverse damage and restore normal cognitive function. Although less explored, I have interests in learning the many ways of improving cognition, with applications against the cognitive deficits from aging, TBI, SUD, PTSD, and socioeconomic adversities.

## **ENDURE Trainee Career Goals and Plan**

Currently, I am on a pre-medical academic track, with original plans for medical school, followed by service as a Naval Medical Corpsman. Clinically, I plan to specialize in either Emergency Medicine or Neurology. I've held original interests in pursuing neuropharmacological research, specifically for substance-addiction therapies or nootropic development. Recent research experiences have informed my decision to consider additional fields, such as neurotoxicology and understanding age-related deficits. Because of the clinical applications and heavy academic medicine involvement in my plans, I'm currently leading towards an M.D-Ph.D program, should I choose to specialize in research.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **Emory University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Georgia State University and Emory University**

## **Research Project Title: Attentional Deficits Following Transient Deactivation of the Ventromedial Nucleus of the Thalamus in Rats**

The ventromedial nucleus of the thalamus (VMT) holds special cognitive interest, as it innervates the entire rat frontal cortex. Most behavioral studies on VMT manipulations have concentrated on gross motor effects; none have been done in observing attentional effects. The 5-Choice Serial Reaction Time Task (5-CSRTT) was utilized as a reliable procedure in studying attention in rats. Objectives: We studied behavioral effects from transient deactivation of the VMT, using the 5-CSRTT to quantify results from two different volumes of the same dose of muscimol. Methods: In 5-CSRTT testing, rats must continuously monitor the brief (1.25 sec) presentation of lights and nose-poke in the illuminated hole to receive a food pellet. In VMT deactivation trials, rats (n=4) were infused with 20 ng of muscimol, with each of the following volumes: 0.5  $\mu$ L, 1.0  $\mu$ L. Results: 1.0  $\mu$ L muscimol infusions showed both statistically significant increases in errors of omissions and decreases in response accuracy, while 0.5  $\mu$ L muscimol infusions showed both nonsignificant increases in errors of omissions and decreases in response accuracy. Conclusions: Our results from VMT deactivation are consistent with concurrent frontal cortex deactivation. Results using 0.5  $\mu$ L muscimol showed potential age differences when compared to young rats' results.

# ENDURE TRAINEE INFORMATION AND RESEARCH ABSTRACTS

## **BP-ENDURE AT HUNTER COLLEGE**

### HUNTER COLLEGE

Principal investigator: *Dr. Vanya Quinones-Jenab*

Partner institution: New York University

**PROGRAM DESCRIPTION:** Hunter College of the City University of New York (CUNY) recognizes that increasing the number of highly qualified neuroscientists from these underrepresented populations is integral to our future as an academic and research institution. Hunter College aims to increase the number of well-trained, diverse neuroscientists. The overall goal of this application is to develop a neuroscience training program at Hunter that will encourage and prepare students from diverse backgrounds to enter into and succeed in PhD programs in the neurosciences.

Hunter has developed a research-educational partnership with four outstanding T32-awarded universities-New York University, Brown University, University of Michigan, and Vanderbilt University. This partnership will expose 12 BP-ENDURE-trainee students per year to a research-intensive curriculum and an environment of excellence and active research. Moreover, because of the diversity of the proposed mentors, students will be exposed to a broad spectrum of researchers, including basic neuroscientists interested in central nervous system (CNS) issues and applied neuroscientists from the areas of clinical, social, health, developmental, and cognitive neuropsychology.

To achieve our goals, the following aims are proposed: (1) To develop an outstanding group of undergraduate students with diverse backgrounds dedicated to neuroscience research; (2) To provide scientific skill and research experiences to our trainees through research placement with actively funded neuroscientists; (3) To develop academic development and curriculum enhancement activities rooted in the student's research activities; (4) To maintain an effective Administrative Core to support our students' needs and development.

Our measurable objectives during the requested funding period include: (1) 85 to 90% acceptance of trainees to graduate school programs in neuroscience; (2) improvement of our students in quantitative skills and academic achievements as well as their (3) scientific writing and oral presentations. Outcome from evaluations of the Steering Committee, the external evaluator, and the Administrative Core will guide future modifications to our training initiatives.

### ADDITIONAL CONTACTS:

Judith Diaz, Program Administrator - Hunter College

Dr. Regina Miranda – Hunter College

Dr. Chiye Aoki – New York University

# ENDURE TRAINEE ABSTRACT

**NAME: HEYSOL C BERMUDEZ CABRERA**

Home Institution and State: **Hunter College, New York**

Email: **hbermude@hunter.cuny.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; June 2013**

Mentors/Advisors at Home Institution: **Dr. Carmen Melendez**

## **ENDURE Trainee Scientific Interests**

I am interested in studying how the brain modulates voluntary motor movements in order to better assess and understand motor disorders.

## **ENDURE Trainee Career Goals and Plan**

I plan to pursue a PhD in Neuroscience. During my Ph.D. training, I would like to focus on studying which brain areas are involved in the planning and execution of motor movements.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Brown University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Jerome Sanes**

### **Research Project Title: Motor adaptation and brain activation following sudden or gradual application of visual distortions**

Acquiring motor skills requires learning and consolidating an internal model (IM) of the external sensory-motor environment. In humans, the size of error produced while performing a motor task can affect the brain mechanisms engaged during IM formation. In the present research, we gradually applied a visual distortion when humans performed visually targeted movements; data from sudden applications of a 30° visual rotation were already available. We acquired functional magnetic resonance images while young adults performed these movements to identify brain networks specifically involved in sudden compared to gradual visual distortions. Prior work has suggested that cerebellar and basal ganglia networks may become differentially engaged during adaptation to sudden or abrupt changes in the visual motor environment, thereby suggesting different roles for these regions in IM formation.

# ENDURE TRAINEE ABSTRACT

**NAME: ANNA J. CHANG**

Home Institution and State: **New York University, New York**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Neural Science; May 2013**

Mentors/Advisors at Home Institution: **Dr. Chiye Aoki**

## **ENDURE Trainee Scientific Interests**

I am interested in the neurobiology of mental disorders. Specifically, I am interested in the sex differences present, such as the higher prevalence of early-onset disorders such as ADHD, Autism, and Tourette's syndrome in males than females. Furthermore, I am interested in the dysfunction of the dopaminergic system, particularly in schizophrenia and drug addiction.

## **ENDURE Trainee Career Goals and Plan**

In the fall, I plan on applying to doctoral programs in neuroscience. Following graduate school, I hope to find a post-doctoral position to continue refining my research skills and interests. Ultimately, I hope to do research and teach at a research university.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Vanderbilt University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Ariel Deutch**

### **Research Project Title: Dopamine receptor expression in target-specific prefrontal cortical projection neurons: dendritic spine regulation**

Post-mortem studies of patients with schizophrenia reveal a decreased volume of the prefrontal cortex (PFC), consistent with a reduction of dendritic spines. Anatomical data point to a decreased dopamine innervation of the PFC in schizophrenia, and our lab has shown that dopamine denervation of the PFC elicits dendritic spine loss. This spine loss is restricted to layer V pyramidal cells (PC), and is seen in projection target-defined subpopulations of layer V PCs. For example, PFC PCs that project to the nucleus accumbens (NAc) and the mediodorsal nucleus of the thalamus (MD) display a marked spine loss, whereas PCs that project to the ventral tegmental area (VTA) and amygdala do not. Because we have shown that dendritic spine loss is present in D1 receptor knockout mice, we hypothesized that PFC layer V PC dopamine receptors may contribute to the changes. Using laser capture microdissection, we targeted individual PFC PCs of layer V and VI innervating the MD. The two populations were subjected to qPCR to determine if they differentially expressed any of the five dopamine receptors. Preliminary data suggest that the spine loss seen in layer V but not layer VI PCs innervating the MD is not attributable to expression of one of the five dopamine receptors.

# ENDURE TRAINEE ABSTRACT

## NAME: JENNIFER GARRAWAY

Home Institution and State: **Hunter College, New York**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; 2013**

Mentors/Advisors at Home Institution: **Dr. James Gordon**

## ENDURE Trainee Scientific Interests

I am interested in conducting research with veterans who are suffering from PTSD. Many vets are returning from Afghanistan and Iraq without the disorder. Understanding why some vets are able to develop better coping mechanisms than their counterparts is key in identifying which type of soldier is at risk for PTSD.

## ENDURE Trainee Career Goals and Plan

After graduating from Hunter College, I plan to attend graduate school and earn a PhD in clinical neuropsychology. I hope to be able to secure a position working for a VA hospital where I will treat vets suffering from PTSD, military sexual trauma, and substance abuse, in addition to doing my own research as to why some vets are afflicted with these disorders and some are not.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **Vanderbilt University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Michael Aschner**

## **Research Project Title: The Effects of Broad Spectrum Antibiotics and other Glutamate Inhibitors on Astrocyte Function**

The neurotransmitter, glutamate glial transporter-1 (GLT-1) plays a key role in preventing excitotoxicity by removing excessive glutamate from the synaptic clefts. When glutamate levels around the synaptic clefts reach levels higher than 1mM nerve cells are damaged and killed. Excitotoxicity or the overstimulation of glutamate receptors can be caused by a host of neurodegenerative disorders for instance Parkinson's and Huntington's disease, amyotrophic lateral sclerosis (ALS), Alzheimer's disease, multiple sclerosis, drug and alcohol abuse. Additionally neuronal damage such as stroke, traumatic brain injury and spinal cord injury has the potential to over activate glutamate receptors as well. We have analyzed whether five different beta-lactams, which are a class of broad-spectrum antibiotics, Captopril, a drug used to treat high blood pressure and heart failure, and L-trans-2,4-PDC (L- trans-2,4-pyrrolidine dicarboxylate), a synthetic glutamate uptake inhibitor could attenuate the uptake of glutamate in rat neonatal primary astrocyte cultures.

# ENDURE TRAINEE ABSTRACT

**NAME: DAVID KATTAN**

Home Institution and State: **Hunter College, New York**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; 2013**

Mentors/Advisors at Home Institution: **Dr. Douglas Mennin**

## **ENDURE Trainee Scientific Interests**

I am interested in investigating the biological predispositions to coping mechanisms, as well as the biomarkers that may help predict effectiveness of psychotherapy treatments. In accordance with the biomedical trend of moving towards personalized medicine, I would like to conduct neuroscience research that could be applied and translated into personally-tailored mental health interventions.

## **ENDURE Trainee Career Goals and Plan**

Ultimately, I would like to pursue a neuroscience research career in a college/university setting. In addition to facilitating my own research career, working in an academic setting will allow me to teach and mentor young students on their way to pursue research careers.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Hunter College**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Douglas Mennin**

### **Research Project Title: Phasic Heart Rate Variability Changes Predict Clinical Outcomes Of Emotion Regulation Therapy For Generalized Anxiety Disorder And Comorbid Depression**

Emotion Regulation Therapy (ERT) integrates traditional and recent CBT approaches to GAD and MDD within an affect science framework. Patients learn regulatory skills in the first half of treatment (tx), which are utilized in service of exposure to approach-avoidance contexts in the latter half. Although encouraging findings suggest the efficacy of this approach both acutely and longer term, it is vital to test whether improvements result from changes in expected mechanisms. One such mechanism is heart rate variability (HRV), a parasympathetic marker of emotion regulation. In the present study, 26 patients with GAD were assessed for HRV during a neutral film, a fearful film, and following a recovery period. At pre-tx, GAD patients displayed a flattened HRV response throughout the experimental period; however, at mid-tx, patients displayed a normalized quadratic HRV pattern. Period-averaged levels of HRV at mid-tx also increased to within 1 SD of the levels of a healthy control sample. Further, increases in HRV from pre- to mid-tx were associated with a pre- to post-tx gains in symptom severity and functional outcome. These findings suggest that ERT may normalize HRV patterns and that this normalization may be associated with greater therapeutic effects of ERT in individuals with GAD.

# ENDURE TRAINEE ABSTRACT

## **NAME: HAMEDA KHANDAKER**

Home Institution and State: **Hunter College, New York**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **2014**

Mentors/Advisors at Home Institution: **In progress**

## **ENDURE Trainee Scientific Interests**

I want to study the cellular and neural pathways that underlie various neurodegenerative diseases that affect behavior and cognitive performance, and also mental health. My foci of interest in this area include sleep, memory, stress, and hormonal/neural deficiencies in regard to emotional and cognitive health. Lab rotations in ENDURE will help narrow my interest in neuroscience.

## **ENDURE Trainee Career Goals and Plan**

The goal I hope to achieve through my research opportunities is to first be able to conduct my own research in a lab setting as my summer 2012 mentor, Dr. Gina Poe (University of Michigan), does. I want to attend graduate school for PhD work and progress towards becoming a psychologist, if possible. The ENDURE program helps greatly in getting their students into graduate school as many graduate schools require lab experience when applying. ENDURE provides that opportunity.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Michigan**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Gina Poe, Dr. Jill Priestly**

## **Research Project Title: Locus Coeruleus Optogenetic Stimulation Alters Sleep Structure and Cognitive Performance**

PTSD (Post Traumatic Stress Disorder) is characterized by a lessened ability to fall or stay asleep and by abnormally high levels of norepinephrine during sleep. Memory integration and depotentiation have been found to occur primarily during slow-wave sleep which requires low levels of norepinephrine. We sought to develop a rat model of sleep in PTSD through stimulation of the Locus Coeruleus (LC), the primary source of norepinephrine in the forebrain in rats to make their sleep comparable to sleep in PTSD patients. 4 Long-Evans rats were pre-trained on an octagonal maze. We measured EEG activity via two drives – one hippocampal and one in the LC. Rats were then trained on the maze again, this time stimulating the rat's LC optogenetically during sleep via bilateral fiber optics. We hypothesized that LC would alter sleep structure in that sleep spindles would be suppressed and subjects would experience more REM phasic events and that these alterations would impair the rat's memory integration. Rats indeed showed significant suppression of sleep spindles and an increase in phasic events, altering density and structure of sleep. However, duration and occurrence of REM sleep was not significantly affected.

# ENDURE TRAINEE ABSTRACT

## **NAME: SAIMA MACHLOVI**

Home Institution and State: **Hunter College, New York**

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Undergraduate Academic Level: **Rising Senior**

Undergraduate Major and Expected Graduation Date: **Fall 2012**

Mentors/Advisors at Home Institution: **Dr. Maria Figueiredo - Pereira**

## **ENDURE Trainee Scientific Interests**

My main goal in research is to identify the molecular pathways that underlie neurodegenerative disease, and I think that we have the potential to make major progress in this area as we are blessed with the technology. This will directly translate into better understanding, prevention and treatment of neurodegenerative diseases. Moreover, understanding the impact of genetics and molecular mechanisms is so crucial to understanding the biology of disease that I know it would provide fundamental training for almost any kind of research I might decide upon in the future.

## **ENDURE Trainee Career Goals and Plan**

Over my undergraduate career I have had the great fortune to work with a series of excellent professors and research mentors. I have been inspired by their intelligence, diligence and ambition, and have benefited tremendously from their advice and assistance. As a result, I fully appreciate the important role of scientist as an educator, and ultimately hope to follow suit with a career in academic research.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Michigan**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Rachael Seidler**

### **Research Project Title: Preferred Motor Tempo in Parkinson's Disease**

Parkinson's disease (PD) is a neurodegenerative disorder characterized by slowness of movement (bradykinesia), which some have hypothesized to be due to a slowing of the 'internal clock.' An individual's preferred motor tempo (PMT), or preferred rate of finger tapping, is believed to directly measure the rate of the internal clock. Only two studies have investigated PMT in PD patients and report that the internal clock either speeds up or slows down. Here, we extended this work and considered whether anti-Parkinson medications affected hand or preferred speech timing PMT in PD patients. PD patients had faster hand and speech PMT relative to the older adult controls, but PMT did not differ based on medication or affected hand ( $p > .42$ ). Speech PMT was slower than hand PMT for both PD patients and older adults ( $p < .001$ ). Finally, we found strong correlations between hand and speech PMT in older adults and PD patients ( $r = .79, p < .001$  and  $r = .56, p = .01$  respectively). Our findings suggest that the internal clock speeds up in PD patients and that speech and non-speech timing rely upon a common internal clock in both older adults and PD patients.

# ENDURE TRAINEE ABSTRACT

## **NAME: ARIEL MEILICH**

Home Institution and State: **Hunter College, New York**

Email: **arimeilich@gmail.com**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **May 2013**

Mentors/Advisors at Home Institution: **Dr. Paul Glimcher**

## **ENDURE Trainee Scientific Interests**

My interest in neuroscience revolves around the way people make decisions. Individuals show different attitudes toward risk, ambiguity, temporal discounting, choice overload, etc., and these differences must be rooted in neural differences. Linking these behaviors to the brain regions responsible of them would allow us to understand these individual differences.

## **ENDURE Trainee Career Goals and Plan**

I am a rising senior at Hunter College, while working at the Glimcher Lab in NYU. I plan to attend graduate school after finishing my degree, for a doctorate in cognitive neuroscience. I will focus my research on neuroeconomics, decision-making, and motivation.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: New York University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Paul Glimcher**

### **Research Project Title: The Impact of Perceptual Biases on Decision-Making under Risk**

Do the stakes that individuals encounter affect their future risk attitudes, or are risk attitudes independent of context? Expected Utility theory, one of the most prominent theories on decision-making under risk, would predict no such linkage, since it assumes that decisions are examined in isolation. However, abounding evidence in neuroscience affirms that, at least at the sensory level, our nervous system is context-dependent. In this paper, we provide evidence suggesting that context-dependency also occurs in the valuation system. We designed an experimental tool that allows us to assess the individual degree of tolerance toward risk. We found evidence suggesting that individual risk attitudes are context-dependent. Our data show that people are more risk averse when they adapt to stakes of large values. This study supports the hypothesis that choice history affects risk attitudes and decision-making, and that processes previously documented in the sensory system may operate in a similar fashion, and be responsible for choice biases, when it comes to the valuation system.

# ENDURE TRAINEE ABSTRACT

**NAME: MAHFUZUR RAHMAN MIAH**

Home Institution and State: **New York University, New York**

Email: **mahfuz@nyu.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Neural Science; 2013**

Mentors/Advisors at Home Institution: **Dr. Dan Sanes**

**ENDURE Trainee Scientific Interests**

In general, I am interested in cognitive neuroscience and neuroimaging to see which parts of the brain become activated in relation to human behavior. In particular, my interest lies in the neurological underpinnings of language acquisition and processing, especially in bilinguals. I am intrigued by questions such as how the brain stores two words of two languages to reference the same physical (or abstract) thing or how the brain is able to switch between two different language structures. I hope to be able to develop the skills to study these questions under the mentorship of BP-ENDURE.

**ENDURE Trainee Career Goals and Plan**

My long-term career goals include having a balance between the role of professor and researcher at an institution that gives priority to both mentoring students and progressing research. I also hope to be involved in politics so that there are more scientists who are shaping the laws that enable or restrict the progress of research. I hope that BP-ENDURE will help to fashion me as a prime candidate for a Ph.D program that will increase my knowledge base and give me sufficient research training.

**ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Michigan – Ann Arbor**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Susan Shore**

**Research Project Title: What Kind of Inputs Project to the Cochlear Nucleus? An Exploration of the VGLUT Distribution in the CN of C57 Mice**

In exploring the neural basis of tinnitus, a phantom auditory sensation affecting more than 37 million Americans, researchers have found both auditory and non-auditory inputs into the cochlear nuclei (CN) of guinea pigs. Vesicular glutamate transporter (VGLUT) distributions have been found to correlate with the auditory nerve (VGLUT1) and non-auditory (VGLUT2) inputs into the CN of the guinea pig, enabling researchers to examine auditory versus non-auditory inputs in the CN. We seek to study tinnitus further through genetically mutated C57 mice, commonly used to model genetic mutations. We laid the groundwork for this by examining VGLUT distributions, via fluorescent tagging, in the CN of 3 wild-type C57 mice to see if they correlate with the distributions from guinea pigs. Six subdivisions in the CN of the C57 mice were analyzed for differences in VGLUT expression, including the interstitial region of the ventral CN, not previously studied in guinea pig. Our preliminary results show VGLUT distribution that trend toward the distribution we see in guinea pig. Future studies will be conducted with a larger sample. We hope to use this groundwork to compare VGLUT distribution changes (or how they may not change) in the CN of these mice in future experiments.

# ENDURE TRAINEE ABSTRACT

## **NAME: TEMIDAYO OREDERU**

Home Institution and State: **Hunter College, New York**

Email: **torederu@hunter.cuny.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; 2014**

Mentors/Advisors at Home Institution: **Candance Raio and Dr. Elizabeth Phelps**

## **ENDURE Trainee Scientific Interests**

Temidayo is interested in the neural circuitry underlying individual differences that lead to susceptibility to addiction and subsequent addictive behaviors – specifically, decision-making among individuals who suffer from addiction and the ability to self-regulate unwanted impulses.

## **ENDURE Trainee Career Goals and Plan**

Temidayo looks forward to graduating with a B.A. in Psychology, with a concentration in Behavioral Neuroscience and Biology and Chemistry minor. She plans to pursue an MD/PhD and ultimately work as a physician-investigator in a research institute or academic medical center.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Brown University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Wael Asaad**

### **Research Project Title: Model-Based vs. Model-Free Reinforcement Learning**

When faced with novel situations, individuals compare expected outcomes to actual events, computing the discrepancy between the two values. Such an index, called a prediction error, drives learning by constantly altering expectations so they approach accuracy. A reward prediction error, for example, is the difference between an actual and expected reward. This signal is associated with model-free reinforcement learning, whereby a person learns from trial-and-error and makes habitual responses. In contrast, a state prediction error is associated with model-based learning, whereby a person learns by building a model of state transitions and consciously selects an action plan based on the model. We can identify behavioral differences between these two types of learning using a 4x4 "world" in which each point is a state, identified by a visual cue. Participants use a joystick to navigate from a random start state to a goal state using trial-and-error learning. They will simultaneously construct a cognitive map of the relationship between states. We can observe behavior during this task, particularly focusing on responses to specific manipulations, to determine the extent to which participants rely on model-free or model-based learning strategies.

# ENDURE TRAINEE ABSTRACT

**NAME: LASHAWN PEÑA**

Home Institution and State: **Hunter College, New York**

Email: **lpe0020@hunter.cuny.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; Spring 2012**

Mentors/Advisors at Home Institution: **Dr. Sairt Golub**

## **ENDURE Trainee Scientific Interests**

My research interests include learning and memory. I have a fascination with understanding the complex memory processes that occur during sleep. I am also interested in synaptic plasticity, LTP, and depotentiation, and understanding the role each mechanism plays in memory consolidation.

## **ENDURE Trainee Career Goals and Plan**

My current career goal is to obtain a PhD in Neuroscience. I intend to go into a graduate program immediately after obtaining my bachelors degree. After obtaining my PhD, I intend to work in academia while also having my own research lab.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Michigan**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Gina Poe**

## **Research Project Title: Memory Consolidation Impairments through Optogenetic Stimulation of Locus Coeruleus**

Post-traumatic stress disorder (PTSD) is a severe reaction to a traumatic event that involves the constant replaying of the incident through flashbacks. Individuals with PTSD have higher norepinephrine (NE) levels throughout their sleep that disrupts memory consolidation. Under normal conditions, NE is absent during TR and REM sleep. To better comprehend how these memory consolidation impairments occur, this project focused on the optogenetic stimulation of the locus coeruleus (LC) in rat models. The LC is the major source of NE in the brain, and we sought to understand how its presence during stages of sleep, specifically the transition to REM (rapid eye movement) and REM sleep, inhibits important hippocampal processes vital to memory. We hypothesize that the natural release of NE through optogenetic stimulation of the LC during the transition to REM (TR) and REM sleep will impede depotentiation of hippocampal synapses and hinder reversal learning and extinction. Preliminary results suggest that the presence of NE during REM sleep in fact disrupted rats' normal memory consolidation activity.

# ENDURE TRAINEE ABSTRACT

## **NAME: MARIEL RIOS**

Home Institution and State: **New York University, New York**

Email: **mbr306@nyu.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Neural Science; 2013**

Mentors/Advisors at Home Institution: **Dr. Chiye Aoki**

## **ENDURE Trainee Scientific Interests**

The biological basis of psychiatric illnesses and disorders, ranging from eating disorders to Autism, are of high interest to the trainee. Disorders that can be investigated at the molecular level and have a psychological component are of particular interest. Thus far, Mariel has worked primarily with mouse models, a method she intends to continue using in her career.

## **ENDURE Trainee Career Goals and Plan**

After completing her B.S. Mariel intends to work as a Research Assistant in a biomedical lab, ideally participating in the NIH Postbac IRTA program. Mariel will further her career by pursuing a PhD in neuroscience. After completing her doctoral degree and a post-doctoral fellowship, Mariel would like to pursue an academic based career such as becoming a professor and scientific writer.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Vanderbilt University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Jennifer U. Blackford and Suzanne Avery**

### **Research Project Title: Multi-locus risk model: the role of serotonin genotype in psychiatric risk**

While psychiatric illnesses are highly heritable, searches for genetic risk factors yield modest results. This may be due to the heterogeneity and complexity of psychiatric disorders – made up of numerous traits that vary widely– and genetic factors, which may contribute uniquely to risk traits rather than individual disorders. An alternative approach is to identify genetic factors underlying risk traits that lead to increased risk for multiple disorders, independent of diagnosis. Both inhibited temperament–the predisposition to react to novelty with wariness and avoidance–and amygdala and hippocampal volumes may serve as important dimensional traits.

We created a risk model across 5 serotonin genes of 10 SNPs with alleles that have been previously associated with psychiatric risk and/or temperament, the serotonergic system itself implicated in psychiatric illnesses and with amygdala and hippocampal volume and temperament. Subjects with temperament and genotyping data from two existing data sets (n = 333) were given risk scores based on the number of risk alleles they had out of the 10 possible, weighted so each gene carried the same maximum value. A subset (n = 209) also had structural MRI data. Healthy controls and individuals with psychiatric diagnoses were included. All analyses were co-varied for race.

# ENDURE TRAINEE ABSTRACT

## **NAME: YASMIN ZAKINIAEIZ**

Home Institution and State: **Hunter College, New York**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology, Psychology, Behavioral Neuroscience; June 2013**

Mentors/Advisors at Home Institution: **Dr. Mariann Weierich**

## **ENDURE Trainee Scientific Interests**

With over three years of research experience in neuroscience, I've quickly grown to love this evolving field. I am interested in behavioral, cognitive, clinical, and translational neuroscience. In particular, I am interested in understanding the causes of drug addiction and how they affect specific neural networks in the brain.

## **ENDURE Trainee Career Goals and Plan**

I intend to graduate in June of 2013 and attend graduate school to obtain a Ph.D. degree in neuroscience. Ultimately, I wish to work in academia and marry my interests in biology, psychology, research, and education. I intend to work independently post-graduate school at a university conducting my own research and teach biopsychology, neuroanatomy, and other neuroscience-related courses.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Brown University**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Tara White**

## **Research Project Title: Amphetamine Effects on Default Mode Network during Emotional Processing in Healthy Young Adults**

The Default Mode Network (DMN) is a fronto-parietal resting state brain network involved in memory retrieval, envisioning, and self-monitoring. It is implicated in multiple disease states, including substance use disorder and addiction, where it appears downregulated. Psychostimulants affect the activity of fronto-parietal brain networks subserving working memory and attention. While stimulants such as d-amphetamine (d-AMP) enhance cognitive task neural networks, there is very little information on the impact of amphetamines on DMN which can inform us about addiction. The present study investigates the impact of d-AMP on DMN during emotion processing. Thirty-eight healthy adults completed an International Affective Picture Set (IAPS) task during fMRI imaging, 90 minutes after consumption of 20mg d-AMP and placebo in a two-session, double-blinded, within-subjects design. Sixteen bilateral a priori regions of interest (ROI) constituting the main components of DMN were selected for analysis. Compared to placebo, d-AMP reduced DMN activity in dmPFC, [F(1,37)=4.05,p=0.05], HF [F(1,37)=10.78,p<0.005], LTC [F(1,37)=5.99,p<0.05] and precuneus [F(1,37)=4.83,p<0.05]. Emotional content relative to non-emotional content enhanced DMN activity in dmPFC [F(1,37)=6.38,p<0.005], HF [F(1,37)=9.22,p=0.0001] and cuneus [F(1,37)=12.94,p=0.0001], with greater activation in the positive than the negative condition. There were no drug by valence interactions. The findings indicate that d-AMP and emotional events impact DMN, linearly.

# ENDURE TRAINEE INFORMATION AND RESEARCH ABSTRACTS

## **BUILDING RESEARCH ACHIEVEMENT IN NEUROSCIENCE (BRAiN)**

UNIVERSITY OF COLORADO DENVER

Principal Investigator: *Dr. Diego Restrepo*

Partner Institution: New Mexico State University

**PROGRAM DESCRIPTION:** Student Training through Institutional Partnerships will bridge the Neuroscience research participation gap by preparing diverse undergraduates in the Rocky Mountain and Southwest Region for successful entry to Neuroscience Ph.D. programs.

BRAiN unites preexisting formal research and education programs at diverse institutions: the Neuroscience Graduate Program at the University of Colorado Denver in the Anschutz Medical Campus (NSP at UCD-AMC), home to a T32 Neuroscience Training Grant; the RISE to Excellence biomedical research education program at New Mexico State University (NMSU), a Hispanic serving minority institution; and the undergraduate Brain and Behavior program of the Department of Psychology at the University of Colorado Denver downtown campus (UCD-DT). BRAiN aspires to expand through developmental partnerships with Colorado State University- Pueblo and other colleges in the region.

Broad participation in the Ph.D. Neuroscience/Behavior pipeline will be enabled through pursuit of three specific aims: (1) Recruitment of 67 BRAiN Scholars from diverse demographic groups that are nationally underrepresented in biomedical and behavioral neuroscience research; (2) Development of the Neuroscience/Behavior research expertise and professional skills of BRAiN Scholars; (3) Retention of BRAiN Scholars in Neuroscience/Behavior research through enrollment in postgraduate programs.

BRAiN will provide intensive training that combines mentored independent research with student development of a rich knowledge base in Neuroscience core concepts. Curriculum integration will be achieved through a common Neuroscience Seminar Series and a Neuroscience Core Course. Emphasis will be placed on enhancement of mentorship skills through activities such as the Neuroscience Mentor Academy where faculty will meet to discuss student training, program evaluation, and curriculum reform. Taken together, proposed activities will provide an integrated research and professional development experience across multiple sites that leverages 21st century resources for scientific investigation and is responsive to practical aspects of contemporary student life.

#### ADDITIONAL CONTACTS:

Dr. Ernesto Salcedo – University of Colorado Denver Anschutz Medical Campus

Dr. Sondra Bland – University of Colorado Denver Downtown Campus

Dr. Elba Serrano – New Mexico State University

# ENDURE TRAINEE ABSTRACT

## **NAME: MARIA BURKE**

Home Institution and State: **University of Colorado, Denver, Colorado**

Email: **maria.burke@ucdenver.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; August 2012**

Mentors/Advisors at Home Institution: **Dr. K. Schulz, Dr. S. Bland, Dr. D. Restrepo, Dr. E. Salcedo**

## **ENDURE Trainee Scientific Interests**

I am currently studying nicotinic acetylcholine receptors, specifically the  $\alpha 4\beta 2$  and  $\alpha 7$  subunits, and the effects of prenatal stress on the levels of these receptors in the hippocampus of Sprague-Dawley rats. I have really enjoyed the nicotinic work thus far and look forward to continuing this work in the coming year. I also have a strong interest in developmental and behavioral neuroscience, and am looking to explore more developmental neuroscience in graduate school.

## **ENDURE Trainee Career Goals and Plan**

I have recently graduated from the University of Colorado, Denver campus, and am currently looking at graduate programs. I will be attending graduate school in a neuroscience program next fall. I plan to focus on development and behavior, and have a strong interest in fetal brain development. After obtaining my Ph.D. I also, have a strong interest in teaching. I would like to incorporate teaching into my research career.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of Colorado, AMC Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Kalyan Schulz**

## **Research Project Title: Prenatal Stress in Rats Alters Hippocampal Nicotinicacetylcholine Receptor Levels in Adult Offspring**

Prenatal stress in humans is associated with psychiatric problems in offspring such as anxiety, depression, and schizophrenia. These same illnesses are also associated with neuronal nicotinic receptor (nAChR) abnormalities. Despite the known associations between prenatal stress exposure and offspring mental illness, and between mental illness and nAChR abnormalities, it is unknown whether prenatal stress exposure impacts nAChRs. Thus, we tested the hypothesis that maternal stress alters the development of hippocampal  $\alpha 4\beta 2$  and  $\alpha 7$  nAChR levels in offspring. Female Sprague-Dawley rats experienced unpredictable variable stressors 2-3 times daily during the last week of gestation. At weaning (21d) the offspring were assigned to same-sex prenatally stressed or nonstressed groups. In adulthood, offspring brains were collected and processed for quantitative autoradiography using an  $^{125}\text{I}$ -epibatidine ( $\alpha 4\beta 2$  nAChR-selective), and  $^{125}\text{I}$ -alpha-bungarotoxin ( $\alpha 7$  nAChR-selective) ligands. We found that prenatal stress significantly increases epibatidine binding in the hippocampus and the dentate gyrus, suggesting that prenatal stress significantly increases hippocampal  $\alpha 4\beta 2$  receptor levels. No effects of stress or interactions between sex and stress were observed for epibatidine binding. Stress did not alter  $\alpha 7$  nAChR levels. Our results suggest that nicotinic receptors may be an important link between prenatal stress exposure and risk for neuropsychiatric illness.

# ENDURE TRAINEE ABSTRACT

## **NAME: ROBERT COURTNEY**

Home Institution and State: **New Mexico State University, Las Cruces, New Mexico**

Email: **buck1@nmsu.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Engineering Physics; December 2012**

Mentors/Advisors at Home Institution: **Dr. Boris Kiefer**

## **ENDURE Trainee Scientific Interests**

My research as a BRAiN trainee has been focused on computer based simulations and modeling. At my home institution I work with atomistic simulations of potential drug delivery systems on the nano-scale. We use the principles of materials science to simulate atomic structures in a biological environment. I have also worked to develop mathematical models for the biophysical parameters involved in the inhibitory post synaptic currents from MNTB principle cells in the auditory system. The results will lead to a greater understanding of some of the function and mechanisms of the auditory system.

## **ENDURE Trainee Career Goals and Plan**

My goals for the future are to pursue a graduate degree in neuroscience and medicine. I would like to focus on the application of modern engineering and technology to biological/neurological systems in order to increase the medical well-being of the population and forward the advance of medical science.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico, Río Piedras Campus**  
**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Sandra Peña de Ortíz**

### **Research Project Title: Modeling the inhibitory response of the Medial Nucleus of the Trapezoid Body (MNTB) principle cells**

The Medial Nucleus of the Trapezoid Body (MNTB) is an auditory brain stem nucleus involved in sound localization, as well as spatial separation of different sound sources. MNTB neurons receive both excitatory and inhibitory inputs, and while the excitatory inputs which are mediated by the calyx of Held are fairly well understood, almost nothing is known of the inhibitory inputs.

To better understand their functional role, we modeled the dynamic changes in strength of the inhibitory post-synaptic currents (IPSCs) in response to complex and ongoing activity patterns. We used a vesicle release model that modeled synaptic depression, synaptic facilitation, pool size, release probability, and recovery time constants from depression and facilitation. Previous work in which the corresponding excitatory synaptic currents were modeled, revealed that this parameter set is more than adequate to describe the dynamic changes of synaptic currents. However, in the case of the inhibitory inputs, the parameter set resulted in relatively poor fits. Ongoing work includes additional physiological parameters in an effort to better describe the dynamic changes in neural inhibition to the MNTB.

# ENDURE TRAINEE ABSTRACT

## **NAME: MIRIAM G. FAVELA**

Home Institution and State: **New Mexico State University, New Mexico**

Email: **mgfavela@nmsu.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biochemistry; May 2014**

Mentors/Advisors at Home Institution: **Dr. Elba Serrano, Dr. William Maio**

## **ENDURE Trainee Scientific Interests**

My scientific and research interests are geared toward mechanisms, behavior and the effects pharmaceuticals have in altering biochemical pathways. This interest has come as a result of being close to a friend that suffers Juvenile Myoclonic Epilepsy (JME). The Biochemical Pathways involved in Neurological disorders are what piques my interest the most. I am very interested in Neurogenesis, Neuroplasticity, Molecular Neuropharmacology, and Neurochemistry. What greatly interests me, however, is epileptogenesis and my plan includes research in biochemistry and neuroscience with specialization in neurology with a focus on epilepsy.

## **ENDURE Trainee Career Goals and Plan**

My ultimate goal, post-graduation, is to be accepted into a Neuroscience program that will help establish my future career in academia as a professor who conducts research and teaches. I aim to be the principal investigator of my own laboratory and it is my intent and objective to research the biochemical pathways of epilepsy and seizure activity and find alternative treatments and management of symptoms.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of Colorado, AMC Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Amy Brooks-Kayal and Dr. Heidi Grabenstatter**

## **Research Project Title: JAK/STAT Regulation of Connexin Expression Following Pilocarpine Induced SE**

The Janus Kinase and Signal Transducer and Activator of Transcription (JAK/STAT) pathway is activated after Status Epilepticus (SE). Specifically, SE significantly increases phosphorylation of STAT3 1-6 h following the onset of SE. WP1066 (a pSTAT3 inhibitor) administered at onset of SE reduces seizure-induced increases in phosphorylated STAT3 (pSTAT3) levels and inhibits the progression of epileptogenesis. STAT3 is a transcription factor of the gap junction subunit protein Connexin 43. The goal of these experiments is to characterize changes in Connexin 43 protein expression that may be involved in abnormal gap-junction coupling following SE. SE was induced in adult Sprague Dawley rats using pilocarpine with scopolamine pretreatment to block peripheral cholinergic effects. Control rats received a sub-convulsive dose of pilocarpine. To determine protein expression of Connexin 30 (Cx30) and Connexin 43 (Cx43) in chronically epileptic rats, whole hippocampi were collected 30 days after SE and Western Blots were conducted using standard protocols. Cx43 protein levels increase 30 days after the onset of SE in chronically epileptic rats relative to control rats. No significant change was detected in Cx30 protein levels compared to controls 30 days after SE. Increases in Cx43 expression is a potential contributing factor to increased glial networking and neuronal hyperexcitability in chronically epileptic rats. These findings suggest that the disease modifying effect of pSTAT3-inhibition could be mediated in part by effects on Cx43 expression.

# ENDURE TRAINEE ABSTRACT

## **NAME: MICHAEL FERREYROS**

Home Institution and State: **University of Colorado, Denver, Colorado**

Email: **Michael.ferreyros@ucdenver.edu**

Undergraduate Academic Level: **Postbac Student**

Undergraduate Major and Expected Graduation Date: **Biology/Chemistry; May 2014**

Mentors/Advisors at Home Institution: **Dr. Curt Freed, Dr. Amanda Charlesworth**

## **ENDURE Trainee Scientific Interests**

Michael Ferreyros is interested in Developmental, Cell & Molecular Biology as a means of better understanding and contributing to the fields of Clinical Pharmacology & Toxicology, Gene Therapy, Gene Regulation and/or Cell Therapy.

## **ENDURE Trainee Career Goals and Plan**

Michael Ferreyros is aiming to achieve an MD/PhD to better understand the biological mechanisms behind what drives the human brain and to facilitate the progression from bench research to novel treatments for neurodegenerative diseases. He hopes to make significant contributions to our understanding of microRNA and their potential role in Stem Cell, Gene and Cell Therapy Research.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of Colorado – Anschutz**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Curt Freed**

## **Research Project Title: Can microRNA reprogram fibroblasts to dopamine neurons?**

Parkinson's Disease is the second leading neurodegenerative disorder, affecting one in 100 people over the age of 60. The physical characteristic of the disease is the progressive loss of dopaminergic neurons (DNs) located in the substantia nigra as a result of oxidative stress and alpha-synuclein accumulation. Currently the course of treatment for Parkinson's is a daily regimen of drugs; however, in the late 90's it was shown that implantation of fetal DNs alleviated the clinical symptoms attributed to the dopaminergic cell loss characteristic of the disease. Unfortunately, the tissue used for the clinical trial is difficult to harvest and other means of obtaining DNs needs to be found before the procedure is a viable treatment option. Differentiating DNs from embryonic stem cells (ES) shows promise; however, the efficiency is low and purification of DNs is difficult and necessary, as any undifferentiated ES will cause teratomas. Reprogramming fibroblasts to DNs has emerged as a promising method for obtaining DNs. Furthermore, the use of microRNA has been shown to be two orders of magnitude more efficient at producing induced pluripotent stem cells (iPS) from fibroblasts over virally transfecting transcription factors. Therefore, the question presents itself "Can microRNA reprogram fibroblasts to dopamine neurons?"

# ENDURE TRAINEE ABSTRACT

## **NAME: ANTOINETTE FOSTER**

Home Institution and State: **University of Colorado Anschutz Medical Campus, Colorado**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; May 2013**

Mentors/Advisors at Home Institution: **Dr. Kim Heidenreich**

## **ENDURE Trainee Scientific Interests**

My scientific and research interests are to examine issues involving the human condition. I am interested in a variety of subjects; however I am most interested in subjects that compromise our health. The issues that compromise our health are typically issues that will not be addressed if we cannot conduct valuable translational research. My ultimate interest is broad: to improve the lives of others through scientific and translational research.

## **ENDURE Trainee Career Goals and Plan**

My priority educational goal is to obtain my PhD in Neuroscience. My career goal is more loosely defined, as I am currently unsure what specific topics I would like to focus my research on. I am sure that I would like my research to be translational, however, that term includes a variety of research areas that I would be interested in. As I just starting in the field of research, my personal goal is to become more familiar with several fields of research, in order to find one that is best fit for me.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of Colorado, AMC Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Kim Heidenreich**

## **Research Project Title: Closed head injury in wild-type and 5-LO knockout mice**

Traumatic brain injury (TBI) results in biphasic injury. Primary injury is caused by the initial insult, while secondary injury occurs later by complex signaling cascades. Increasing evidence indicates that leukotrienes, inflammatory lipid mediators, contribute to secondary injury. Administration of MK-886, an inhibitor of leukotriene synthesis, attenuates leukotriene production, edema, and cell death after fluid percussion injury in rats. As MK-886 has reported off-target actions, this project uses a genetic approach to verify the importance of leukotrienes in TBI. Wild type (C57BL/6) and 5-lipoxygenase (5-LO) knockout mice were subjected to a closed head injury (CHI). Experimental groups included naïve, sham, and CHI-injured mice. The severity of injury was assessed using a neurological severity score (NSS). Leukotrienes were measured by reverse phase liquid chromatography coupled to tandem mass spectrometry. Apoptotic cell death and diffuse axonal injury were measured by Western blots using antibodies to active-caspase 3 and  $\beta$ -amyloid precursor protein, respectively. CHI-injured WT mice demonstrated a higher NSS score compared to controls. Injured WT mice had increased levels of active-caspase 3 (hippocampus), but had similar levels of  $\beta$ -APP (hippocampus and cortex) compared to controls. Results comparing injury related outcomes in WT and 5-LO knockout mice will be discussed.

# ENDURE TRAINEE ABSTRACT

## NAME: PETER HOLGUIN

Home Institution and State: **New Mexico State University, New Mexico**

Email: **peter581@nmsu.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; Spring 2014**

Mentors/Advisors at Home Institution: **Dr. Graciela Unguez**

## ENDURE Trainee Scientific Interests

I am greatly interested in neuroscience. In particular, I would like to learn more about neuropathology and the many diseases that affect the nervous system as well as neurodevelopmental biology.

## ENDURE Trainee Career Goals and Plan

I am interested in pursuing an advanced degree in neuroscience and possibly a career in academia.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **University of Colorado Denver**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Angeles Ribera**

## **Research Project Title: PigK Dependent Regulation of Sodium Current**

Nervous system function requires voltage gated sodium channels ( $Na_v$ ). Mechanisms underlying the *in vivo* regulation of sodium current ( $I_{Na}$ ) are poorly understood. The zebrafish mutant *macho* (*mao*) provides a novel way to study this. *mao* is a touch insensitive mutant that shows reduced sodium current density in Rohon-Beard (RB) mechanosensory neurons. The *mao* mutation occurs in the *pigk* gene coding for an enzyme required to attach glycosylphosphatidylinositol (GPI) anchors to the carboxy (C)-terminal region of proteins.

$Na_v$  are composed of  $\alpha$ - and  $\beta$ - subunits and associate with other proteins to form macromolecular complexes. Neither the  $\alpha$ - or  $\beta$ - is GPI anchored protein. It is not obvious how mutation of *pigk* leads to a decrease in  $I_{Na}$ . I tested whether the cell line ND7/23, which is a mouse neuroblastoma and rat neuron hybrid, could serve as an appropriate model system. I used reverse transcription polymerase chain reaction (RT-PCR), rat *pigk* siRNA to knock-down PigK, and whole cell patch clamping to record  $I_{Na}$  in individual control and siRNA transfected ND7/23 cells approximately 24 hours post transfection. Overall, the data support the use of ND7/23 cells as a reduced model system for study of the cellular mechanisms underlying the *mao* mutation.

# ENDURE TRAINEE ABSTRACT

**NAME: ESTEBAN M LUCERO**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Fall 2013**

Mentors/Advisors at Home Institution: **Dr. Timothy Wright**

## **ENDURE Trainee Scientific Interests**

My research goals and interests include vocal communication, behavior and creativity. I would like to investigate how our mind interprets and expresses biologically relevant information and emotion from movements of music and sound. One of the questions I would like to answer is how do different combinations of frequency affect behavior and emotion. I would like to investigate the chemical and cellular pathway frequency takes when influencing emotion. Working in the lab of Dr. Timothy Wright through an NIH BP-Endure grant I have been able to discover and work with the genetic mechanisms involved in vocal communication and have learned many lab skills that will help me in my journey of scientific discovery.

## **ENDURE Trainee Career Goals and Plan**

My future goals and plans are to become a lifelong learner. After finishing a B.S. in biology at New Mexico State University I plan on entering graduate school and eventually earn a PhD. Becoming a scientist and college professor will allow me to keep my knowledge sharp and continue my education furthermore while being able to answer life's questions and give back to the world and my community.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Colorado, AMC Campus**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Kristin Artinger and Dr. Kristi LaMonica**

### **Research Project Title: The role of Prdm1 in cranial nerve development**

Neural crest cells generate a diverse array of tissue types during development. Along with bone and cartilage of the face neural crest cells also give rise to cranial nerves. In zebrafish the transcription factor Prdm1 has been shown to influence posterior craniofacial development. This project focused on investigating the role Prdm1 plays in influencing other derivatives of neural crest cells, primarily cranial nerves in a mammalian model. Using a tamoxifen induced knockdown of Prdm1 in mouse, we harvested embryos at embryonic day 9.5, 10.5, and 11.5. An RNA in situ hybridization probe was utilized to observe the expression of Sox10, a marker of cranial nerves, in both the control and mutant embryos. The results show that with the knockdown of Prdm1 in the endoderm leads to greater expression of Sox10 in the developing trigeminal (V), facial (VII) and vestibulocochlear (VIII) cranial nerves in E9.5 and E10.5 mouse embryos. It is unclear if reduced Prdm1 expression results in greater transcription of Sox10 within the neurons or glia that make up the cranial nerves or more neuronal/glia cell bodies within the cranial nerves. The greater area of expression of Sox10 implies that there may be increased innervation by the cranial nerves.

# ENDURE TRAINEE INFORMATION AND RESEARCH ABSTRACTS

## **SOUTH TEXAS ADVANCED RESEARCH TRAINING: UNDERGRADUATE PROGRAM (START-UP)**

UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER, SAN ANTONIO

Principal Investigator: *Dr. Alan Frazer*

Partner Institutions: University of Texas, San Antonio; Lady of the Lake University; St. Mary's University; Trinity University; and University of the Incarnate Word

**PROGRAM DESCRIPTION:** The overall goal of our Program is to encourage and prepare junior and senior undergraduates from the San Antonio and South Texas Region to enter doctoral programs in neuroscience, to complete them successfully, and become well-trained and competitive neuroscientists. To accomplish this, a comprehensive program is proposed for students accepted into the program, involving extensive research experiences in the laboratories of successful neuroscientists, and opportunities to develop and improve their writing, speaking, and time management skills.

Students will be recruited into START-UP from five partner institutions in San Antonio, namely Our Lady of the Lake University, St. Mary's University, Trinity University, University of the Incarnate Word, and the University of Texas, San Antonio. Collectively these schools have 24,527 undergraduates who are URMs (based on ethnicity), of whom 2,947 are Science Majors. Also, these schools have a high number of students from low-income families, many of who are the first in their families to attend college. Faculty contacts have been established at each school to assist us recruit suitable students into START-UP. Thirty-one training faculty have been identified (including three from UTSA), who are appropriate to mentor these students in their laboratories. The students will participate in laboratory research for an average of 12 hours per week during the two academic semesters, and 40 hours/week during a 10-week intensive summer research exposure. Students will also have an opportunity to work in one of seven major neuroscience programs at institutions outside of San Antonio during the summer.

In addition to their laboratory research, the students will also attend seminars and journal clubs, research retreats, and have exposure to neuroscientists from other institutions. The students will all receive instruction on the responsible conduct of research. The Co-Directors of the Program are Drs. Alan Frazer and David Weiss, experienced scientists and administrators, who have run programs similar to START-UP previously. They will be members of an Executive Committee that will oversee all aspects of the Program. There is a formal evaluation plan for the Program, as well as an outcomes assessment process. Further, a plan is described to disseminate nationally all materials developed for the design and implementation of START-UP.

#### ADDITIONAL CONTACTS:

Dr. Timothy Raabe – St. Mary's University    Dr. James Hall – Our Lady of the Lake University

Dr. James Roberts – Trinity University        Dr. Glenn James – University of the Incarnate Word

Dr. Edwin Barea-Rodriguez – University of Texas San Antonio

# ENDURE TRAINEE ABSTRACT

## **NAME: LUCERO ALVARADO**

Home Institution and State: **University of Texas Health Science Center at San Antonio, Texas**

Email: **luceroa09@gmail.com**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Biology; May 2014**

Mentors/Advisors at Home Institution: **Dr. Xin-Yun Lu**

## **ENDURE Trainee Scientific Interests**

My research interest is to determine the biological basis for depression and other mood disorders. The mechanisms for depression are not well understood therefore treatments are not effective. Since depression affects many people worldwide an effective anti-depressant is necessary. The effects of anti-depressants on the brain remain to be clarified because depression affects cognitive functions which in turn can influence daily life.

## **ENDURE Trainee Career Goals and Plan**

My career goals consist of obtaining a PhD degree in Neuroscience. The ENDURE program has helped me with this goal by providing research experience and opportunities to meet with scientists.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Texas Health Science Center at San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Xin-Yun Lu**

## **Research Project Title: The role of leptin receptor neurons in response to stress**

The adipocyte hormone Leptin displays anti-depressant effects. Leptin is released by adipose tissue, circulates the blood then crosses the blood-brain barrier and acts on receptors in the brain. Since leptin displays anti-depressant effects, evaluating depression symptoms and their effect on leptin receptor neurons remains to be clarified. Stress is a risk factor for depression. The goal of my study is to determine the effect of stress on leptin receptor neurons in all areas of the brain. The results will provide a better understanding of the role of leptin receptor neurons in response to stress.

# ENDURE TRAINEE ABSTRACT

## NAME: AUDREY AVILA

Home Institution and State: **University of Texas Health Science Center at San Antonio, Texas**

Email: **aavila90@yahoo.com**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; May 2013**

Mentors/Advisors at Home Institution: **Dr. Paul Fitzpatrick**

## ENDURE Trainee Scientific Interests

I have been working with the enzyme tyrosine hydroxylase which is the rate limiting enzyme of catecholamine biosynthesis. This pathway catches my interest in the way that certain changes in this system have the ability to cause drastic effects on a human being. Whether observing effects of drugs on this system, looking at specific abnormalities within this pathway which cause a wide variety of disorders, or looking at how this pathway has evolved to the way it functions now, I find this specific pathway to be remarkable.

## ENDURE Trainee Career Goals and Plan

If possible I would like to obtain my M.D./Ph.D. or get a concentration in research with a medical degree in neurology and/or pediatrics.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **St. Mary's University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. S. Colette Daubner**

## **Research Project Title: Effect of Substitution of Aromatic Amino Acids at Substrate Specificity Position in Tyrosine Hydroxylase**

One project that I have been working on is a proteolysis experiment for the theory that the protein 14-3-3 zeta binds to tyrosine hydroxylase and protects it from proteolysis. I am using chymotrypsin which is normally found in the pancreas to mimic any proteolysis that might normally occur.

Another project I have been working on regards the theory that Ser19 in tyrosine hydroxylase won't cause the catalytic domain in tyrosine hydroxylase to bend back and open the active site unless it becomes phosphorylated. This occurs by the binding of CaMKII or MAPKAPKII which have the ability to phosphorylate at both positions 19 and 40. Since CaMKII only phosphorylates at places where there are two arginine residues near each other I designed several mutants to mimic phosphorylation in order to help me test this theory. Then DOPA on/off experiments were done to measure the K<sub>d</sub> of each mutant. Specifically we wanted to know whether our mutants interacted with serine phosphate and if they did then the removal of them will cause a non activatable mutant. Also using a colorimetric assay measuring DOPA formation I used the Michaelis-Menten equation to find the V<sub>max</sub>'s and K<sub>m</sub>'s of each mutant.

# ENDURE TRAINEE ABSTRACT

## **NAME: ERIN BOLDT**

Home Institution and State: **Trinity University, Texas**

Email: **eboldt@trinity.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; May 2013**

Mentors/Advisors at Home Institution: **Dr. Kimberly Phillips, Dr. James Roberts**

## **ENDURE Trainee Scientific Interests**

I am extremely interested in sensory perception (particularly visual) and temporal perception. I am interested in brain plasticity, both learning and unlearning, and the capabilities of the human brain. I am interested in the different ways living beings can perceive and utilize energy in their environments and am curious as to the ways that these animal and plant adaptations could be translated to human systems and utilized for human benefit (health, technology, etc.). I have also recently become interested in the benefits of meditation on the human brain and its potential as a clinical tool in the treatment of mood disorders.

## **ENDURE Trainee Career Goals and Plan**

I am still very much exploring the various potential career paths that a degree, and possibly a PhD, in neuroscience would open up. I know I want to keep learning about neuroscience (and biology, chemistry, and physics) and I know I would like to somehow further knowledge in the field while also making a difference in individual lives.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Texas Health Science Center at San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Qitao Ran, Ren Na**

## **Research Project Title: Role of UPS in Alzheimer's Pathogenesis using GRDX2 Transgenic Model**

This project aims at further investigating the role of mitochondrial dysfunction in cognitive impairment associated with Alzheimer's disease (AD) and aging, focusing specifically on the role of the ubiquitin proteasome system (UPS), as protein damage due to oxidative stress caused by ROS is known to trigger ubiquitination and alterations to the UPS (abnormal aggregation or integration of ubiquitinated proteins into hallmark structures of AD). We are therefore comparing ubiquitin aggregation in young versus old mice and in AD versus wild type mice. If differences are found, we will compare the aggregation of ubiquitinated proteins in GRDX2 transgenic mice versus wild type mice and AD mice to determine if reduction of glutathionation is at least partially responsible for AD pathogenesis.

# ENDURE TRAINEE ABSTRACT

## NAME: JONATHAN CHEMELLO

Home Institution and State: **University of Texas Health Science Center at San Antonio, Texas**

Email: **jmc2011@yahoo.com**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; December 2012**

Mentors/Advisors at Home Institution: **Dr. Alan Frazer**

## ENDURE Trainee Scientific Interests

I am interested in the research of depression and depression treatments. In particular, vagal nerve stimulation (VNS) therapy as a potentially effective long-term treatment for recurrent treatment-resistant depression. The lab I'm currently working in looks at behavioral and molecular effects of both acute and chronic VNS in rats to determine how it produces its beneficial clinical effects. I am also interested in brain imaging research, such as fMRI and CT scans, in relationship with various psychiatric diseases, brain damage, stroke, etc.

## ENDURE Trainee Career Goals and Plan

I am going into my last year at The University of Texas at San Antonio and plan to graduate with a Bachelor of Science degree in Biology. I plan to continue my education at an MD/PhD program in the state of Texas. There I will specialize in the field of Psychiatry and do clinical research. I also plan to undergo residency in the state of Texas and become a practicing Psychiatrist. As a practicing Psychiatrist, I plan to treat patients and conduct clinical research and possibly hold a teaching position at a university.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **University of Texas Health Science Center at San Antonio**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Alan Frazer**

## **Research Project Title: Microarray- VNS vs. Antidepressants**

This summer's research project in Dr. Alan Frazer's lab was a microarray analysis of hippocampal tissue from vagal nerve stimulation (VNS) therapy and antidepressant-treated male Sprague Dawley rats. The purpose of this analysis was to detect over-expression or under-expression of particular genes related to depression. The microarray detects mRNA by using hybridized DNA templates and can determine the expression levels of genes by measuring the amount of mRNA bound to these templates.

This was a chronic 14-day experiment, where animals were treated with desipramine at 7.5 mg/kg, escitalopram at 10 mg/kg, or VNS (0.25 mA, 20 Hz, 250  $\mu$ s, 30s on, 5 min off). A control group was given 10% ethanol in water. The antidepressant groups and control group underwent pump surgery where an osmotic pump injected the drug at a specific rate over the course of 14 days. VNS treated animals underwent surgery a week before the pump surgeries and were turned on the day of the pump surgeries. At the end of the 14 day treatment period, the hippocampal tissue was dissected out, stored at -80°C, and later sent for microarray analysis. The lab is currently waiting on the results from the experiment.

# ENDURE TRAINEE ABSTRACT

## **NAME: MELLISSA DELCONT**

Home Institution and State: **Trinity University, Texas**

Email: **mdelcont@trinity.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Neuroscience; December 2012**

Mentors/Advisors at Home Institution: **Dr. Jimmy Roberts**

## **ENDURE Trainee Scientific Interests**

I am interested in the investigation of the cellular and molecular mechanisms involved in pediatric neurological diseases. This interest extends across many research disciplines, including neuroscience, biochemistry, pharmacology, and molecular biology.

## **ENDURE Trainee Career Goals and Plan**

I am working on my applications to 15 MD/PhD programs throughout the country. I hope to matriculate into an MD/PhD program in the fall of 2013. I also completed the Texas Medical and Dental Schools Application Service to be considered as an MD only applicant. In my future career, I want to lead a basic science research laboratory that studies a specific pediatric neurological disease. Better understanding of the disease pathology will lead to therapeutic discoveries that I hope to bring to the bedside of pediatric patients.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Texas Health Science Center at San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. James Lechleiter**

### **Research Project Title: The Role of MICU1 in Astrocyte Metabolism-mediated Neuroprotection**

Neuronal survival depends on the maintenance and protection provided by astrocytes, particularly after insult or injury. We previously demonstrated that astrocyte neuroprotection against oxidative stress is enhanced by stimulating astrocyte mitochondrial metabolism. This protection involved activation of the purinergic P2Y receptor and IP3-mediated calcium release. To test if calcium uptake by the mitochondria also plays a role in this neuroprotective pathway, knock down of the calcium sensor (MICU1) for the mitochondrial calcium uniporter was performed using lentiviral shRNA interference in C8D1A cells. Astrocyte resistance to oxidative stress after MICU1 knockdown is still being tested, but we hypothesize that decreased MICU1 levels will reduce astrocyte survival. If so, these data will indicate that mitochondrial calcium uptake is important in astrocyte metabolism-mediated neuroprotection.

# ENDURE TRAINEE ABSTRACT

**NAME: ANDREW HANSEN**

Home Institution and State: **St. Mary's University, Texas**

Email: **andrewh914@gmail.com**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **BS of Biochemistry w/ Math minor; May 2014**

Mentors/Advisors at Home Institution: **Dr. Daubner, Dr. Raabe, and Dr. Schoonover**

## **ENDURE Trainee Scientific Interests**

I am interested in the interneuronal communication systems involved in higher cognitive functions. Particularly, how their differences in communication and structure contribute to the emergent variances in processing characteristics. I intend to focus my attention towards the underlying biochemical systems and novel differences among them with respect to their contributions in the behavior of neural circuitry.

## **ENDURE Trainee Career Goals and Plan**

I am currently a senior and intend to graduate in May 2014 with a BS in biochemistry and a minor in math. I hope to acquire a MS in applied mathematics, biophysics, or bioinformatics but am still undecided on this issue. I then intend to obtain a PhD in neuroscience and wish to focus on connectomics and the neuromathematical modeling of the neural circuits involved in higher cognitive functions, specifically learning, memory, and fuzzy logic.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: UTHSCSA Biochemistry department**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Daubner**

## **Research Project Title: The Molecular Mechanism of Tyrosine Hydroxylase Regulation**

Tyrosine hydroxylase (TyrH) is the rate controlling enzyme for the catecholamine biosynthetic pathway and is responsible for hydroxylating L-tyrosine to form L-DOPA. As such, the repercussions for its dysfunction can include hypertension, tachycardia, and various other problems resulting from changes in its activity. Because of this, its regulatory mechanisms are valuable in understanding the means by which its activity may be altered to counteract the negative consequences resulting from its dysfunction. Phosphorylation plays a role in its regulation and TyrH is phosphorylated by c-AMP-dependent protein kinase at serine40, our work pertains to how phosphorylation causes structural changes within the regulatory domain of TyrH that afford it the regulatory mechanisms by which the production of L-DOPA is controlled. This is being performed through the selective substitution of amino acids to determine through the observed change in behavior how specific amino acids in wild-type TyrH contribute to its functionality.

# ENDURE TRAINEE ABSTRACT

## **NAME: CEDRIC HENSON**

Home Institution and State: **St. Mary's University, Texas**

Email: **chenson1@stmarytx.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Chemistry; December 2013**

Mentors/Advisors at Home Institution:

## **ENDURE Trainee Scientific Interests**

I'm interested in the effects of drugs of abuse on impulsive choice. There is a positive correlation between impulsive behavior and drug abuse; that is, people who are more impulsive are more likely to abuse drugs. This is a complex interaction in which the order of causality is unclear. My current interests focus on how drugs of abuse modify impulsivity by examining their effects on the operant behavior of rats responding under delay-discounting choice procedures and interactions of drugs with environmental variables (e.g. the sequencing of delays).

## **ENDURE Trainee Career Goals and Plan**

As an undergraduate researcher, I am focused on completing the current experiment and, from the data collected, constructing a manuscript that will be submitted for publication. I plan on pursuing a career as a researcher in the department of pharmacology. Therefore, it is necessary that I first complete my undergraduate studies and obtain my bachelor's degree. After, I will enroll in a graduate school so that I may pursue a PhD. The overall goal is to become a noteworthy scientist and to make significant contributions to the scientific community.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: UT Health Science Center San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Charles P. France and Dr. David R. Maguire**

## **Research Project Title: Effects of morphine on delay discounting in rats: Interactions with order of delay presentation**

Drug abuse may be a cause or consequence of increased impulsivity. Morphine, a commonly abused mu opioid receptor agonist, increases impulsive choice in rats responding under a delay-discounting task. In delay-discounting procedures, rats have the choice of responding for reinforcers differing in magnitude and presented after delays that systematically change throughout the session. Delay-discounting procedures assess changes in impulsivity that occurs as a consequence of drug abuse; however, most research has only tested a single delay order that increased across blocks within a session. Effects on impulsive choice due to stimulants differ when the order of delay presentation is changed. In the current study, subjects responded under a delay-discounting procedure that assessed the generality of the effects of morphine on impulsive choice under different orders of delay presentation. There was no difference in responding across the two groups experiencing different orders of delay (i.e. ascending and descending within session). Morphine decreased responding for the larger reinforcer in both groups; though responding in the group experiencing the descending order was more sensitive to doses of morphine. Therefore, impulsive choice due to morphine does not differ across different orders of delay. I plan to present these data at the Neuroscience 2012 conference.

# ENDURE TRAINEE ABSTRACT

## **NAME: MIGUEL IBARRA**

Home Institution and State: **University of the Incarnate Word, Texas**

Email: **miibarra@student.uiwtx.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; Fall 2013**

Mentors/Advisors at Home Institution: **Dr. Lisa Gerak**

## **ENDURE Trainee Scientific Interests**

I will be continuing the research of Dr. Lisa Gerak. It has been shown that prolonged benzodiazepine treatment can develop tolerance to other benzodiazepines and not neuroactive steroids. We are now trying to see if this tolerance may either be altered or eliminated by specific treatment conditions.

## **ENDURE Trainee Career Goals and Plan**

Eventually I would like to attend pharmacy school and become a pharmacist. By participating in this program I hoped to gain more insight into the world of pharmacology, as well as gain some experience in the researcher's aspect.

## **ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of Texas Health Science Center at San Antonio**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Lisa Gerak**

## **Research Project Title: The alteration of benzodiazepine tolerance through specific treatment conditions**

As mentioned before, prolonged benzodiazepine treatment has been shown to develop cross tolerance to other benzodiazepines and not to neuroactive steroids. The goal of our research is to examine whether specific treatment conditions can alter or eliminate the developed tolerance. Some treatments conditions to be considered include co-administration of benzodiazepines with neuroactive steroids or the administration of neuroactive steroids post benzodiazepine tolerance development.

# ENDURE TRAINEE ABSTRACT

**NAME: MIRANDA MORGAN**

Home Institution and State: **University of the Incarnate Word, Texas**

Email: **jjt924@my.utsa.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; December 2012**

Mentors/Advisors at Home Institution:

**ENDURE Trainee Scientific Interests**

Neuroscience- stress, depression, and the immune system

**ENDURE Trainee Career Goals and Plan**

MD/PhD would like to pursue a career in academic medicine and clinical research.

**ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Texas Health Science Center at San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. David Morilak and Jennifer Donegan**

**Research Project Title: Role of the Neuro-Immune System in Stress Induced Cognitive Deficits**

Investigating how cytokine signaling in the orbitofrontal cortex affects reversal learning in the rat. Using the attentional set-shifting test as a behavioral assay and manipulating IL-6 in the OFC in stressed and non-stressed animals.

# ENDURE TRAINEE ABSTRACT

**NAME: CODY JAMES TYLER TILLMAN RABY**

Home Institution and State: **University of Texas Health Science Center at San Antonio, Texas**

Email: **CJTTR25@gmail.com**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology (Conc: Neurobiology); May 2013**

Mentors/Advisors at Home Institution:

## **ENDURE Trainee Scientific Interests**

I am interested in the synaptic regulation of dopaminergic neurons in response to drug-related and feeding behaviors. Utilizing patch clamp electrophysiology and mice as a model system, it is possible to study the neurophysiological changes in various dopamine cell characteristics. A better understanding in these adaptations could possibly forge the way to the treatment of addiction in humans.

## **ENDURE Trainee Career Goals and Plan**

I am currently in the process of applying to medical school for the Fall of 2013, with the intent to specialize in reconstructive surgery. However, with my interest and experience in the research field, continuing with research is my back up plan should I not be accepted or choose to not move forward with medical school the following year.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Texas Health Science Center at San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Michael Beckstead**

**Research Project Title: Synaptic Regulation of Dopamine Neurons in response to light-cycle and acute food-restriction**

My project is to investigate the synaptic regulation of dopamine neurons in response to two factors: light-cycle and feeding state. Dopamine neurons in the substantia niagra of mice brain slices are autonomous pacemakers. When iontophoresed with aspartic acid, this characteristic firing is replaced with rapid burst firing followed by a pause or recovery period. Although changes in firing have been studied in chronically food-restricted animals, my intent is to investigate this phenomenon in acutely food-restricted mice (24 hour food deprivation). As well, I will study how the animal's light cycle regulates dopamine neuron firing compared to the alterations recorded due to feeding state.

# ENDURE TRAINEE ABSTRACT

**NAME: ANGELICA SALINAS**

Home Institution and State: **St. Mary's University, Texas**

Email: **asalinas35@mail.stmarytx.edu**

Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **May 2014**

Mentors/Advisors at Home Institution:

## **ENDURE Trainee Scientific Interests**

I am interested in conducting research in the neuroscience field and learning more about it, particularly Alzheimer's disease. This disease that attacks the brain is a mystery, since it happens sporadically in over 90% of the cases. Through this program, I will become more educated in the field.

## **ENDURE Trainee Career Goals and Plan**

Through the ENDURE program, I have been given the opportunity to work in a lab. It has encouraged me to continue pursuing a career in the neuroscience field, conducting medical research. It has also helped me learn more about the field and work and analyze real-life data.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Texas Health Science Center at San Antonio**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Salvatore Oddo and Antonella Caccamo**

### **Research Project Title: Different Stages of Pathology in Alzheimer's Disease in 3xTg-AD Mice**

Through the ENDURE program, I will be able to analyze the different stages of pathology involved with Alzheimer's disease in relation to age. This will be done by immunohistochemistry. Several brain slices will be probed with certain antibodies and then stained. There are four different groups, separated by age, with between seven to eleven different 3xTg-AD mice brains in each group. There are six specific regions that will be analyzed once the slices have been stained. The results will be recorded and compared between age groups and regions.

# ENDURE TRAINEE ABSTRACT

## NAME: COREY SMOLIK

Home Institution and State: **University of Texas Health Science Center at San Antonio, Texas**

Email: **smolick@uthscsa.edu**

Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; May 2013**

Mentors/Advisors at Home Institution: **Dr. Gould and Dr. Daws**

## ENDURE Trainee Scientific Interests

I have worked at the lab at Kenedy Otto Kaiser Hospital and UTHSCSA. The labs are my favorite classes to take in college. I tend to learn more when it deals with hands-on learning. I get a great deal of joy when I learn something new every day. I believe I would do great in research since I like this type of work. Hopefully, one day we can solve a mystery and change the world.

## ENDURE Trainee Career Goals and Plan

I have been to the hospital a lot and if it weren't for the doctors, I wouldn't be where I am today. I want to give back by helping people in some way that deals with the medical field because it is really important for the patients. I feel I have an upper advantage since I have been to the hospital regularly and know what it feels like.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **University of Texas Health Science Center at San Antonio**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Gould, Dr. Daws**

### **Research Project Title: Effects of uptake 2 blockode alone, or with risperidone, on social and repetitive behaviors in socially- deficient mice**

We hypothesize that D-22 produces its effects on social behavior by blocking OCTs or other uptake-2 sites in the mouse brain. Saturation binding of [3H] D-22 in mouse hippocampal homogenates revealed a KD of  $\approx 3-4$  nM, and a Bmax of  $700 \pm 167$  fmol/mg protein (N=3). Binding of [3H] D-22 was partially blocked by the Parkinson's inducing neurotoxin 1-methyl-4-phenylpyridinium (MPP+), a known substrate of OCTs. In OCT expressing HEK cells, [3H] MPP+ uptake by OCT1, OCT2 and OCT3 was blocked by D-22 and ethanol with IC50 values ranging from 3-8  $\mu$ M and 4-27 mM, respectively (N=5). OCTs have affinity for and/or transport many endogenous and xenobiotic compounds.

# ENDURE TRAINEE INFORMATION AND RESEARCH ABSTRACTS

## **NEUROSCIENCE RESEARCH OPPORTUNITIES TO INCREASE DIVERSITY (NeuroID)**

UNIVERSITY OF PUERTO RICO RIO PIEDRAS

Principal Investigator: *Dr. Jose Garcia-Arraras*

Partner Institutions: Inter-American University of Puerto Rico, Bayamon Campus and Universidad el Este

PROGRAM DESCRIPTION: Neuroscience Research Opportunities to Increase Diversity (NeuroID) from the University of Puerto Rico Rio Piedras Campus aims to increase the opportunities available for undergraduate students in the area of Neurosciences. The proposal makes use of the strong Neuroscience expertise among UPR investigators and fortifies the underlying neuroscience network that joins undergraduate students, island investigators and their collaborators in mainland institutions.

The training program consists of three major components: (1) Research Experience - An intense research experience during the academic year and a summer experience in a laboratory at an institution in the mainland USA, such as Harvard, Yale, Univ. Colorado Denver, Univ. of Vermont, Northwestern University, Univ. Miami, that have active T32 training grants in neuroscience and/or excellent track record in recruiting and training underrepresented minorities. (2) Academic training participation in seminars, workshops and selected courses to enhanced their knowledge in neurobiology, and understanding of a research career. (3) Student development activities - Participants will enter a mentoring program that includes community outreach activities, scientific writing and oral presentations and other professional enhancement activities.

The proposed activities together with an established mentoring program with members of the Neuroscience community will serve to increase the student competitiveness and enhance their interest in continuing a research career in neuroscience. The NeuroID program will extend the impact of other successful programs at the University of Puerto Rico, not only by focusing on the Neuroscience field but also by greatly expanding the number of possible mentors, increasing the pool of available applicants as well as providing an inclusive and broader training program.

#### ADDITIONAL CONTACTS:

Dr. Irving Vega – University of Puerto Rico – Rio Piedras

Dr. Coral Cintron – Program Administrator, University of Puerto Rico – Rio Piedras

Dr. Lilliam Lizardi - Universidad del Este, SUAGM

Dr. Karen Gonzalez - Universidad Metropolitana, SUAGM

Dr. Armando Rodríguez - Interamerican University – Bayamón

# ENDURE TRAINEE ABSTRACT

## **NAME: IOANNISELY BERRIOS TORRES**

Home Institution and State: **University of Puerto Rico, Río Piedras Campus, Puerto Rico**

Email: **ioannisely.berrios@upr.edu**

Undergraduate Academic Level: **4th year student, junior**

Undergraduate Major and Expected Graduation Date: **Psychology; May 2014**

Mentors/Advisors at Home Institution: **Dr. Giovanni Tirado and Dr. Guillermo Bernal**

## **ENDURE Trainee Scientific Interests**

Being a psychology major, the area of neuroscience that interests me the most is neuropsychology. In my research experience at the University of Puerto Rico I have worked closely with that area and I see myself pursuing it in the future. More specifically, I would like to study cognitive neuropsychology as a graduate student. But, I am also interested in behavioral neuroscience and neuropsychopharmacology.

## **ENDURE Trainee Career Goals and Plan**

After I graduate, I would definitely apply to graduate school to achieve a PhD in neuroscience, specializing in cognitive or behavioral neuropsychology. Then I would continue my research training as postdoctoral fellow in neuropsychopharmacology to achieve my goal of being a neuropsychology researcher and college professor.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico, Río Piedras Campus, Institute of Psychological Investigations**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Guillermo Bernal and Dr. Giovanni Tirado**

## **Research Project Title: Processing of emotional content and brain activation in adolescents treated with either cognitive behavioral therapy or SSRIs for major depression**

The main goal of this investigation is to study brain activity associated with the processing of emotional stimuli in adolescents diagnosed with major depression disorder (MDD) both before and after CBT treatment or Selective Serotonin Reuptake Inhibitor treatment (fluoxetine). For this, 45 participants are interviewed first, using a series of instruments to classify the subjects in control group or MDD group. The control group will consist of 15 adolescents (13 - 17 years old) and the MDD group of 30 adolescents. Then, the participants will undergo a series of Magnetic Resonance imaging (MRI) sessions to assess brain activity associated to the processing of emotional content as measured by fMRI, fcMRI, DTI, and MRI. All participants will undergo scanning at intake but the participants of the MDD group will also be scanned immediately at the end of treatment and 6 months after. The study aims to see if short and long term efficacy of these treatments are related to any changes in post treatment emotional content processing or to levels of brain activity.

# ENDURE TRAINEE ABSTRACT

## **NAME: EDITH BRIGNONI-PÉREZ**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; May 2013**

Mentors/Advisors at Home Institution: **Dr. Gregory J. Quirk**

## **ENDURE Trainee Scientific Interests**

My scientific interests focus on the knowledge expansion of Neurosciences to improve the quality of life and health care in contemporary societies. I pursue my academic development and research experience in Psychology and Neuroscience motivated by the mind-body debate. In this debate what fascinates me the most is the inter-relation between both the physical and the mental aspects in humans. My main scientific interest is based on the exploration of the neural circuits and behavioral responses of learning and memory processes related to anxiety disorders alongside the relation of these processes with emotions.

## **ENDURE Trainee Career Goals and Plan**

Among my career goals and plans are to continue working in my undergraduate thesis project; to enroll in a Neuroscience PhD program; and, have the opportunity of a teaching assistantship to develop and refine teaching skills. Also, I expect to finish my PhD degree with respectable published works, beyond the required work of the program. After completing the PhD degree and my post-doc research experience, I aspire to engage in a faculty position to continue doing my research in Neuroscience and Psychology as well as bringing the knowledge generated at the bench to the classroom.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: New York University - Center for Neural Science**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Elizabeth A. Phelps**

### **Research Project Title: The Influence of Stress on Extinction Recall**

Extinction learning is a form of inhibitory learning that allows an organism to associate a previously aversive cue with new, safe outcome. Examining the conditions under which extinction learning is retained and recalled is important for understanding anxiety disorders such as phobias and PTSD. The ventromedial prefrontal cortex (vmPFC) is critical to the learning and recall of such memory of safety. A number of influences may affect these memory processes, including uncontrollable events that elicit stress. This is mainly because the same regions of the vmPFC that support extinction recall are often impaired by stress. Studies in animals demonstrated that stress exposure post-extinction lead to the reemergence of a conditioned fear memory, however, it remains unclear what the effect of stress might be on extinction recall in humans. In light of this, we examined the influence of acute stress on extinction remembrance. Participants underwent a fear-conditioning paradigm, and extinction training.

# ENDURE TRAINEE ABSTRACT

**NAME: ALMA RUBÍ CÁATALA VALENTÍN**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Cellular and Molecular Biology; May 2014**

Mentors/Advisors at Home Institution: **Dr. Sandra Peña, Dr. Nataliya Chorna**

**ENDURE Trainee Scientific Interests**

During my research experience this summer (2012), I've been working with the role of fatty-acid synthase (FASN) in spatial memory. My current research interest is the role of the FASN in running-induced neurogenesis, gliogenesis, and the balance between this two. Derived from this, I'm also interested in the link between spatial learning and memory with neurogenesis, specifically the way that inhibiting FASN at different stages of neurogenesis affects spatial learning and memory. Another area of investigation that interests me for future research work is neuro-oncology, and the effects that brain tumors and their treatments have in cognition and other functions.

**ENDURE Trainee Career Goals and Plan**

Among my short-term goal are, being able to publish a paper of my current research work. Initiating an MD program, applying for research grants such as the American Brain Tumor Association (ABTA) Research Grants, and obtain a PhD focused in neurobiology of disease. After concluding a MD/PhD degree, I want to start with my post doctorate studies. During my studies, I want to keep doing volunteer work to always keep in touch with the real reason of my research work. My long-term goal is to develop treatments for patients with neurological diseases.

**ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Sandra Peña and Dr. Nataliya Chorna**

**Research Project Title: The Role of Fatty Acid Synthase in Running-induced Neurogenesis**

Running increases fatty acid synthase (FASN) expression in the hippocampus, increasing the levels of stearic acid and palmitic acid. This increase in FASN expression enhances spatial learning and memory. We want to know the role of FASN at the proliferation stage of neurogenesis, and how the inhibition of FASN affects learning and memory. First, FASN was irreversibly inhibited with c75 at the beginning of the proliferation stage of neurogenesis. The results indicated that proliferation occurred only in the running vehicle-control group, suggesting that running enhances cell proliferation and also that FASN is required for cell proliferation. Also the vehicle-control group had better results in spatial learning and memory tests than the groups treated with c75, suggesting that FASN activity is beneficial for spatial learning and memory. Future studies will be directed to determine FASN's role in different stages of neurogenesis and spatial learning and memory.

# ENDURE TRAINEE ABSTRACT

**NAME: KATHERINE CEPEDA RIVERA**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Psychology; December 2014**

Mentors/Advisors at Home Institution: **Dr. Sandra Peña de Ortíz**

**ENDURE Trainee Scientific Interests**

My interests revolve around how the brain works; how we learn and remember. Thus, my scientific interests center around the neurobiological and neuropsychological bases of behavior. In particular, I am interested exploring learning and memory processes as continual developmental mechanisms driving cognitive functions. My intent is to enquire aspects related to neuronal structures, their functions and their relationship with cognitive processes. During the past summer, I collaborated in research pertaining to the anatomical and molecular aspects of conditioned memory in mice. Such experience has helped me understand different facets and perspectives within the field of molecular and cognitive neuroscience.

**ENDURE Trainee Career Goals and Plan**

My short-term educational plans are conducting research regarding cognitive processes and completing my bachelor's degree in General Psychology at University of Puerto Rico. My mid-term plans involve completing a Masters in Cognitive Sciences and Education, while my long-term plans are a PhD in Neurobiology and finally a Post Doc in Philosophy of Education. These three educational stages will help me build what may become a research center for developing educational programs more in tune with cognitive development.

**ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico, Río Piedras Campus**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Sandra Peña de Ortíz**

**Research Project Title: The role of Nurr1 on memory consolidation and reconsolidation in the hippocampus**

Different Neuropsychiatric disorders are characterized by memory processing aberrations; schizophrenia, bipolar and post- traumatic stress disorders. To find treatment for these mental disorders, it is necessary to understand the requirements for healthy memory functioning. Two stages of declarative memory will be studied in order to explore the functions of the nuclear transcription factor Nurr1 in these process. Declarative (explicit) memory is the memory of facts and events. It is formed over the course of experience and together with the genome, determines human individuality. Formation of declarative memory involves the acquisition, consolidation, retrieval, and reconsolidation. Using immunohistochemistry, context fear conditioning and antisense technology, Peña's laboratory demonstrated that the gene Nurr1 is induced and required for memory consolidation in the CA3 region of the hippocampus. However, the scientific community still debates on the different requirements for the consolidation and reconsolidation processes. More research in the field of reconsolidation is still necessary for the eventual conclusion of this debate. The aforementioned techniques will help to explore whether or not Nurr1 is also induced and require during the process of memory reconsolidation. Contrary to what was found in the consolidation experiment, a variation at the site of Nurr1 induction of the hippocampus is also expected.

# ENDURE TRAINEE ABSTRACT

## **NAME: RIGO G. CINTRÓN-COLÓN**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **General Sciences; May 2014**

Mentors/Advisors at Home Institution: **Dr. Irving E. Vega**

## **ENDURE Trainee Scientific Interests**

As trainee of the ENDURE program, I'm working on understanding the molecular processes underline neurodegenerative disease, such as Alzheimer's disease. I like working in this area and upon finishing my undergraduate studies, I would like to continue working in the same area as a graduate student. In addition, neuro-regeneration is also an area of interest. Research directed to discover ways to treat spinal cord injuries and paralysis; it's something that I am also interested.

## **ENDURE Trainee Career Goals and Plan**

I would like to continue my training in neuroscience, and learn more molecular techniques. As the first choice, I would like to apply to an M.D. / Ph.D. program, concentrating my research work in neuroscience, in this way I can combined my interest in clinical research and academics.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico, Río Piedras Campus**  
**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Irving Vega**

### **Research Project Title: Molecular characterization of pathological tau transmission**

Taupathies are a family of neurodegenerative diseases, which pathological hallmark is the accumulation of filaments of the microtubule associated protein tau. The best known tauopathy is Alzheimer's disease (AD). Filamentous tau is characterized by conformational changes due to posttranslational modifications, such as hyperphosphorylation and truncation. The spreading of tau pathology at specific brain regions is known to directly correlate with the progression of cognitive and/or movement decline in tauopathies. Recent studies demonstrated that tau pathology progression is done by transmission of pathological tau proteins from one neuron to a neighboring neuron. The identity of the tau pathological specie and the mechanisms of tau transmission are still poorly understood. Therefore, in vitro cultured human neuroblastoma cells and mouse primary neurons will be treated with recombinant full length tau. The recombinant tau protein will also be subjected to posttranslational modifications prior to add it to the cultured cells to determine the molecular requirements for tau transmission. This study will provide useful information in the quest to understand the process of tau transmission.

# ENDURE TRAINEE ABSTRACT

**NAME: PABLO J MALDONADO-CÁTALA**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **May 2013**

Mentors/Advisors at Home Institution: **Dr. Sandra Peña de Ortíz and Dr. Adrinel Vázquez**

## **ENDURE Trainee Scientific Interests**

One of the areas of research that interests me is learning & memory. This was the area of research that first caught my attention when I learned about neuroscience. I'm also interested in stem cells research due to its potential use in the treatment of neurodegenerative diseases or neural injuries. The third area of research that interests me the most is the dopamine reward system. I have been intrigued with the idea that motivation is a big part of our lives and I would like to see how it affects different types of behavior such as social behavior.

## **ENDURE Trainee Career Goals and Plan**

My short-term goal is to obtain my Bachelor's degree in Biology. Then I hope to get into a good neuroscience graduate program at a U.S. institution. I wish to complete my PhD. while at the same time write scientific articles for a local magazine if I have the chance. Once I obtain a PhD. I want to continue towards a post-doc position. Once I have obtained enough experience I want to establish my own research lab and keep writing scientific articles for the general public.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Wisconsin-Madison**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Ken O'Riordan and Dr. Corinna Burger**

### **Research Project Title: Is the mGluR 5/Homer1c interaction required for LTP?**

Long-term potentiation (LTP) is a form of synaptic plasticity proposed to mediate certain forms of learning and memory. The activation of different types of membrane receptors is important for LTP induction. Among such receptors are group 1 metabotropic glutamate receptors (mGluR1/5), which are composed of mGluR1 and mGluR5. Several studies have demonstrated that Homer proteins mediate mGluR1/5 activation. Application of dihydroxyphenylglycine (DHPG), an mGluR1/5 agonist, promotes the conversion of a weak non-LTP inducing stimulus to an LTP inducing stimulus. These studies indicate that activation of mGluRs by DHPG activates a molecular switch to induce LTP. However, the molecular mechanisms involved in this form of synaptic plasticity are not completely known. We used this stimulation paradigm to test the hypothesis that Homer1c plays a role in mGluR1/5-dependent synaptic plasticity. We found that in wild-type mice, blocking of mGluR1 with its antagonist LY did not affect LTP induction and maintenance, however application of mGluR5 antagonist MPEP led to decreased potentiation and LTP persistence. In Homer heterozygous mice that were injected with Homer1c, we saw that LY did not affect LTP induction but it reduced LTP persistence although not to baseline levels. MPEP reduced LTP induction and persistence in a manner similar to wild types.

# ENDURE TRAINEE ABSTRACT

**NAME: GABRIEL E. MARRERO RIVERA**

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Undergraduate Academic Level: **Rising Senior**

Undergraduate Major and Expected Graduation Date: **Molecular Biology; May 2013**

Mentors/Advisors at Home Institution: **Dr. Irving E. Vega**

## **ENDURE Trainee Scientific Interests**

My research interest lies in the study of neurodegenerative diseases such as Alzheimer's disease and contribution to the advancement of knowledge on these conditions. While translating to the general public scientific knowledge that lead to health awareness and better methods of patient treatment, other research areas of interest are synaptic plasticity involved in hearing and diverse treatments for deafness and hearing disorders.

## **ENDURE Trainee Career Goals and Plan**

Through research, community outreach, and selected courses, I have realized that my desire to incorporate neuroscience into a medical career is evident since this field has captivated me with its intricacy and substantial significance to the health of our society. Specially, as a physician, my main aspiration is to focus in the areas of neurodegenerative diseases, such as Alzheimer's and Parkinson's disease, as well as the development of innovative diagnostic techniques and treatments for these diseases.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: NYU SURP Program**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Einar M. Sigurdsson**

### **Research Project Title: Characterization of Tau Autoantibodies in Human Plasma**

Throughout the summer, I had the privilege to work in Dr. Sigurdsson's lab, which focuses mainly on the study of pathogenesis, diagnosis and therapy of Alzheimer's disease and related neurodegenerative and protein conformational disorders. My project aimed to the characterization of tau autoantibodies in human plasma and their role as a possible therapeutic approach for Alzheimer's disease. Tau immunotherapy, pioneered by Sigurdsson's laboratory, has become a very promising therapeutic approach for Alzheimer's disease (AD). As cognitive functions correlate well with the degree of tau pathology, tau-immunotherapy may be effective in the later stages of the disease. Detection of tau antibodies in plasma of AD patients and healthy subjects raises the question whether these autoantibodies may be a marker of the disease and possibly slow down its progression. Therefore, through ELISA assays and immunohistochemical staining, we verified the presence of autoantibodies against tau in human plasma. A positive correlation was found between antibody binding to phosphorylated tau in ELISA assay and to apparent tau aggregates in AD human brain sections. Ultimately, the research goal is to perform longitudinal studies on these plasma antibodies to determine if their levels and certain characteristics correlate with cognitive decline.

# ENDURE TRAINEE ABSTRACT

## **NAME: CELIMAR NEGRÓN MORALES**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **May 2014**

Mentors/Advisors at Home Institution: **Dr. Eduardo Rosa Molinar – University of Puerto Rico-Río Piedras**

## **ENDURE Trainee Scientific Interests**

My research interests are focused in the area of circuit neuroscience. I am currently working on elucidating the three-dimensional (3D) cytoarchitecture (cellular organization) of gap junction-mediated electrical excitatory synapses (i.e. mixed synapses hereafter) in the spinal motor system. The project addresses the novel concept that the strength of mixed synapses is achieved by dynamically regulating the 3D cytoarchitecture of mixed synapses. Because mixed synapses have been shown to promote coordinated neuronal activity, dysfunction of this regulation could have profound pathological implications, including contributing to motor impairment and epilepsy.

## **ENDURE Trainee Career Goals and Plan**

Upon completing my undergraduate degree (B.S.) in the area of Biotechnology, I intend to pursue and obtain a Doctor of Philosophy (Ph.D.) degree in the area of neuroscience. My ultimate goal is to become a neuroscientist working in academic setting with an active competitive research program.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico, Río Piedras Campus**

**Mentors/Advisors at ENDURE Summer Research Experience Institution Dr. Eduardo Rosa Molinar**

## **Research Project Title: Developing a Synaptome: The 3D Cytoarchitecture of NMDA-Type Glutamatergic Mixed Synapses**

The goal of this project is to elucidate the three-dimensional (3D) cytoarchitecture (cellular organization) of gap junction-mediated electrical excitatory synapses in the spinal motor system. Mixed synapses between interneurons have been shown to be crucial for generating rhythmic motor outputs in invertebrates, but little is known about their role between rhythmic interneurons in networks mediating spinal motor activity in vertebrates. The limited information can be at least partially attributed to difficulties identifying homogeneous populations of locomotor-related spinal interneurons. Using new neural tract tracers and their selective application, we have shown that spinal interneurons, specifically commissural primary ascending interneurons (CoPA INs) are dye-coupled via gap junction-mediated electrical excitatory synapses (i.e. glutamatergic mixed synapses). The model system to use is Western Mosquitofish, *Gambusia affinis* (Baird and Girard, 1853; Mosquitofish hereafter). Mosquitofish has a distinct advantages over traditional mammalian model organisms; the abundance and locations of glutamatergic mixed synapses between spinal motor neurons and spinal interneurons makes it possible to rapidly identify, quantify and elucidate 3D cytoarchitecture that allow bi-directional propagation of signals, including electrical stimuli that allow the fastest mode of electrical propagation across neurons, and are now known to be important in synchronizing neural activity across networks and controlling synchronized fast behavior. (i.e. gonopodial circumduction) The proposed research addresses the novel concept that the strength of glutamatergic mixed synapses is achieved by dynamically regulating the 3D cytoarchitecture. Because glutamatergic mixed synapses have been shown to promote coordinated neuronal activity, dysfunction of this regulation could have profound pathological implications, including contributing to motor impairment and epilepsy.

# ENDURE TRAINEE ABSTRACT

## **NAME: RAYMOND LOUIS QUILES**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Biology; June 2013**

Mentors/Advisors at Home Institution: **Dr. Loyda Melendez**

## **ENDURE Trainee Scientific Interests**

The area of neuroscience that interests me the most is the study of neurodegenerative diseases and the molecular mechanisms underline these neurological disorders. As a future graduate student, I plan to embark in studies that focus on cognition and memory in order to better understand how the human memory function, which will enable me to have a more profound knowledge on the way different brain diseases disrupt these vital portion of what gives a person his identity.

## **ENDURE Trainee Career Goals and Plan**

My career goals is to pursue a MD/PHD dual degree, in which I could investigate specific brain related conditions and contribute to decipher the pathobiology and develop potential treatments that could improve the health of many patients. Short terms goals are to publish research articles and fellowships that will help me during my training and establishment as independent scientist.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Nebraska Medical Center**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Shilpa Buch**

### **Research Project Title: Nonmuscle myosin light-chain kinase mediates microglial migration induced HIV TAT**

During this summer I participated in the Undergraduate Research Program at the University of Nebraska Medical Center. I was mentored by Dr. Shilpa Buch. Specifically, I worked on studying one of the toxic mediators that is release by HIV-1 infected microglia known as Tat. TAT is responsible for neuronal damage. Our research dealt with studying the critical role of non-muscle MYLK in microglial adhesion and migration towards Tat.

# ENDURE TRAINEE ABSTRACT

**NAME: MÓNICA CRISTINA QUIÑONES-FRÍAS**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Cellular Biology; May 2014**

Mentors/Advisors at Home Institution: **Dr. José García-Arraras**

**ENDURE Trainee Scientific Interests**

I am interested in the molecular neuroscience, in part, due to effects that molecular events have in behavior and neural function. An example of this is the role of different genes in sea cucumber neural regeneration. Since I've been involved in this area of research, neurodegenerative diseases have also caught my attention. Another area of research that interests me is cellular differentiation during development.

**ENDURE Trainee Career Goals and Plan**

I have a strong interest in biomedical research with emphasis in neuroscience. I will like to integrate research and clinical work. Therefore, I decided to pursue an M.D./Ph.D. degree. In the future I would like to integrate research with teaching.

**ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico Río Piedras Campus**  
**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. José García-Arraras and Dr. Irving Vega**

**Research Project Title: NLI found on cDNA database and its expression in different regenerative stages post evisceration of *H. glaberrima***

*Holothuria glaberrima* is an echinoderm known for its regenerative ability. Many of the molecular events that occur in intestinal regeneration in the sea cucumber are not known. To elucidate this, we have characterized the expression of the LIM homeodomain proteins, *Islet* and *Lhx3*, during intestinal regeneration. These proteins are dependent on the cofactor Nuclear LIM Interactor (NLI) or LIM domain binding protein 1 (*Ldb1*). We have now analyzed contigs from a *H. glaberrima* database and identified sequences corresponding to the holothurian NLI. The sequence was studied using bioinformatics tools, such as NCBI BLAST, NCBI Conserved Domains and ExPASy Tools. Results confirm that the gene was NLI. Semi-quantitative PCR was performed to determine the expression of NLI in different intestinal regenerative stages and in control non-eviscerated animals. A decrease in the levels of NLI was observed during the first and second week of regeneration. This apparent downregulation of NLI in the regenerating tissues is surprising in view of the observed upregulation of its associated proteins, *Islet* and *Lhx3*. This might indicate an unusual path of gene modulation not previously recorded. Future experiments are aimed at exploring this issue.

# ENDURE TRAINEE ABSTRACT

## NAME: JEAN F. SÁENZ MAISONET

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Biology; May 2014**

Mentors/Advisors at Home Institution: **Dr. José García-Arraras**

## ENDURE Trainee Scientific Interests

Though I was initially and still am interested in behavioral and cognitive neuroscience (the parts most involved with psychology and science of religion), my summer research experience has made me see the value of molecular techniques in neuroscience and how interesting developmental neuroscience can be. The whole branch of developmental neuroscience focused in the generation and regeneration of nerve tissue has interested me in the possible applications research such as this could have on reducing risk of disease and improving cognitive function in human beings.

## ENDURE Trainee Career Goals and Plan

I've yet to decide completely what I want to do when I finish my undergraduate studies, but I'm extremely interested in a career in neuroscience as an MD/PhD that does research in cognitive neuroscience. Up until now I've geared up my studies towards the MD side, because of this I want to have the opportunity to have ample experience in research that will help me decide my future goals more concretely and familiarize myself with the nuances of the day to day life of a researcher.

## ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: **University of Puerto Rico**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. José García –Arraras**

## **Research Project Title: Characterization of enteric system labeling monoclonal antibody the *Holothuria glaberrima***

Echinoderms are a phylum of great interest given their status as deuterostomes and close precursors of the chordates. Our laboratory uses the echinoderm *Holothuria glaberrima* as a model for studying the organization and regeneration of the echinoderm nervous system. One of the main hurdles in this study is the availability of cell markers that can identify specific cell and fiber populations. Monoclonal antibodies provide useful markers to identify specific cell populations. In order to obtain echinoderm cell markers, we injected mice with a intestinal luminal cell homogenate. One of the antibodies obtained was named EN1 (Enteric Nervous-1). EN1 labels cells and fibers of the holothurian intestine that appear to be neuronal in nature. The labeling is restricted to the enteric nervous system and cannot be found in the radial nerves. The labeled cells are found in both epithelial layers and in the connective tissue. Similar results were found in other holothurian species. This antibody provides an exceptional tool to classify distinct populations of enteric neurons. In turn, we will be able to obtain a better picture of the holothurians nervous system and its regeneration.

# ENDURE TRAINEE ABSTRACT

## **NAME: STEPHANIE SANTIAGO MEJIAS**

Home Institution and State: **University of Puerto Rico, Río Piedras Campus, Puerto Rico**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Psychology; May 2014**

Mentors/Advisors at Home Institution: **Dr. Karen Martinez**

## **ENDURE Trainee Scientific Interests**

My curiosity in understanding why we act the way we do and the underlying neurobiological mechanisms which control our actions is the basis for my interest in the area of behavioral and cognitive neurosciences. I have been working in a research project focused on studying fear learning and the development of anxiety disorders through the use of neuropsychological tests and genetics. This topic has strongly engaged my mind, persuading me to search answers for my unquenchable desire to comprehend how fear can be learned and extinguished.

## **ENDURE Trainee Career Goals and Plan**

My passion to learn about the nervous system's workings led me to strive for a doctorate degree in clinical neuropsychology. Having the opportunity to work in a laboratory for the summer has enhanced my interest in this research area, thus leaving an indelible desire to also become a principal investigator. I aspire to publish my research work and initiate a neuroscience academic programs that will enlighten students' enthusiasm to pursue careers within this intriguing field. Neuroscience is an innovative discipline and my objective steers towards learning and discovering new knowledge to reach an understanding of the complexity of our most important organ, the brain.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico Río Piedras Campus - Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Karen Martinez**

## **Research Project Title: Using the 5HTTLPR polymorphism to predict fear and the development of Anxiety Disorders**

Dysfunction in the Serotonin Transporter (5HTT) has been implicated in the pathophysiology of mood and anxiety disorders. Studies have demonstrated the association of fear circuitries in the brain, such as the amygdala, hippocampus and prefrontal cortex areas, and the etiology of anxiety disorders. Using fear conditioning and extinction paradigms, we measured skin conductance responses (SCR) in healthy controls and subjects with DSM-IV criteria for any anxiety disorder to explore if the Serotonin Transporter Linked Promoter Region (5HTTLPR) polymorphism is related to the function of the fear interconnected regions associated to the physiological responses in SCR. Participants were exposed to a visual context displayed in a computer monitor and shocked after a colored light, conditioned stimulus (CS+), and extinguished in a different context by presenting the same colored light without the aversive stimulus (CS-). Through saliva samples, we analyzed the structure and function of the 5HTTLPR polymorphism. We hypothesize that 5HTTLPR short (S) allele carriers will have increased fear conditioning and decreased extinction compared to long (L) homologues. Genetic variation in the 5HTT may cause negative emotional traits, harm avoidance and fear extinction deficits.

# ENDURE TRAINEE ABSTRACT

**NAME: ANDREA SILVA-GOTAY**

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Undergraduate Academic Level: **Junior**

Undergraduate Major and Expected Graduation Date: **Chemistry; May 2014**

Mentors/Advisors at Home Institution: **Dr. Jennifer L. Barreto-Estrada**

**ENDURE Trainee Scientific Interests**

I happen to have various scientific interests, since I am majoring in chemistry and I have also developed certain passion for the biological and biomedical sciences, especially for the neuroscience field. As a chemist, I like to know how things work. That's why neuroendocrinology is the research area that interests me the most. Neuroendocrinology studies the interaction of the nervous system with the endocrine system, and involves the study of how neurochemical substrates of the brain mediates or influence certain behaviors. Thus, the understanding of how molecular events are translated into complex behaviors is my main scientific interest.

**ENDURE Trainee Career Goals and Plan**

My goal is to find the right graduate program that is compatible with my scientific interests. I plan to finish my B.S. in Chemistry at UPR-Rio Piedras and apply for graduate school. I already have several graduate schools that are of my interest, but haven't picked a favorite yet. Regardless, I plan to apply to those graduate programs that in addition to have a strong research program on my scientific area of interests also has to have a track record in mentoring and fostering the career of underrepresented minorities.

**ENDURE Trainee Summer Research Experience**

ENDURE Summer Research Experience Institution: **University of Puerto Rico, Medical Science Campus,**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Jennifer L. Barreto-Estrada**

**Research Project Title: Role of synthetic androgens in the development of social play behavior into full sexual development in rats**

The objectives of the research project was to assess the social play behavior of adolescent rats, which is called rough-and-tumble play behavior, and to determine the effects of synthetic androgens in the development of rough-and-tumble play to full sexual competence. Rats exhibit the rough-and-tumble play behavior during their juvenile/peri-pubertal stage, especially male rats. The experiments consisted in observing how the exposure to anabolic androgenic steroids (AAS) affected the rough-and-tumble play behavior. It was expected that AAS would decrease the play behavior and set forward the sexual maturation in the male rat or show an increase in the sexual behavior, i.e., increase in mounts, decrease in play behaviors like pouncing, pinning, boxing and wrestling. Results did show a decrease in some play behaviors, but an increase in mounts and play behaviors associated with body contact and socio-sexual encounters such as pouncing and wrestling. This suggests that early AAS exposure accelerates the transition of social play behavior towards the early stages of sexual behavior.

# ENDURE TRAINEE ABSTRACT

## **NAME: JAIME VAQUER-ALICEA III**

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Cell and Molecular Biology; 2013**

Mentors/Advisors at Home Institution: **Dr. Irving E. Vega**

## **ENDURE Trainee Scientific Interests**

I am interested in understanding the molecular mechanisms underline complex neurodegenerative disorders. Specifically, I am most attracted to those that represent the most concern to our society and for which there is no form of prevention or treatment. My research experiences in the University of Puerto Rico-Río Piedras and Harvard Medical School have sparked particular interest in the field of Alzheimer's disease research. As a future graduate student, I am searching for programs that enable me to go from basic to translational research in a high-quality research setting, and that it is composed of established faculty with strong background in the field.

## **ENDURE Trainee Career Goals and Plan**

In the short term, I would like to position myself in the top tier of applicants for graduate school by publishing my undergraduate work from UPR and the summer research program at Harvard Medical School. These achievements will aid in obtaining a competitive research fellowship with agencies such as NIH or NSF during my graduate studies, which I expect to make significant contributions to the field of Alzheimer's research. After obtaining a Ph.D., I plan to further my studies and experience with a post-doctoral fellowship and later achieve my career goal of establishing a research laboratory and becoming a Principal Investigator in an academic institution.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Harvard - Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Michael Wolfe**

### **Research Project Title: The $\alpha$ -helical transmembrane domain stability of APP modulates its proteolysis by the $\gamma$ -secretase complex**

One of the main neuropathological hallmarks of Alzheimer's disease (AD) is the formation of amyloid plaques. These plaques results from extracellular accumulation and deposition of amyloid- $\beta$  peptides (A $\beta$ s) of varying lengths. Because of their increased insolubility and rate of fibrillization, the longer forms of A $\beta$  are more abundant within the plaques. Recent studies suggest that after APP is initially cleaved by  $\beta$ -secretase the remaining fragment (APP-CTF) is cleaved by the membrane embedded aspartyl protease  $\gamma$ -secretase in a processive manner at four different sites (i.e.  $\epsilon$  first, then  $\zeta$ , then  $\gamma$  and finally  $\gamma'$ ) to produce A $\beta$ s of different lengths. Surprisingly, the mechanism of processive cleavage of APP to produce the spectrum of A $\beta$ s is not well understood. The present study undertakes the assessment of APP-CTF's transmembrane  $\alpha$ -helical stability requirements for its processing by  $\gamma$ -secretase. We have generated APP-CTFs bearing mutations that alter the helical conformation of the transmembrane domain adjacent to the cleavage sites. Our data suggests that diminishing the helical conformation of the peptide between the first two  $\gamma$ -secretase cleavage sites ( $\epsilon$ -  $\zeta$ ) increases  $\epsilon$  cleavage. Moreover, the  $\epsilon$  site appears to be the rate limiting step for the processive proteolysis of APP-CTF. Our findings may provide essential insights into the nature of the interaction between  $\gamma$ -secretase and APP, and the determinants of the amounts and types of A $\beta$ s produced.

# ENDURE TRAINEE ABSTRACT

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Cellular-Molecular Biology/Chemistry; 2013**

Mentors/Advisors at Home Institution: **Dr. José García-Arraras and Dr. Irving Vega**

**ENDURE Trainee Scientific Interests**

As a neuroscientist, I am interested in cognitive neuroscience, particularly the study of memory formation and learning. Though a great deal about key molecular players in memory formation are thought to be known, the gap between what psychologists and biologists know of memory circuits has yet to be successfully bridged. My goal is to decipher what memories are at the cellular and molecular level, how they are created and stored, and how those findings in the brain correspond to what is known about the mind.

**ENDURE Trainee Career Goals and Plan**

I am interested in acquiring a M.D./Ph.D. joint degree. I hope the M.D. will give me in-depth knowledge and experience in dealing with human subjects and eventually do translational research on learning and memory formation. My ultimate goal is to understand the biological basis of the human learning process and develop pharmacological tools to enhance human learning and retention.

**ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: Baylor College of Medicine**

**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Roy Sillitoe**

**Research Project Title: Modeling circuit formation in a mouse model of hereditary ataxia**

In the last few years, the Sillitoe lab has established a critical requirement for the carbonic anhydrase 8 (car8) gene in establishing brain architecture. Importantly, mice that lack Car8 exhibit severe motor and postural deficits that are strikingly similar to human patients that also have mutations in the Car8 gene. Coupled with their apparent lack of neuronal loss and erratic firing of purkinje cells, Car8-null transgenic mice have become attractive animal models for studying cerebellar ataxia and dystonia. My goal during this summer was to test the hypothesis that Chlorzoxazone (CHZ), an FDA-approved potassium channel activator, may improve motor deficits in Car8-null mice, based on preliminary studies in which Dr. Sillitoe's lab showed that CHZ could correct the erratic firing of cerebellar Purkinje cells. Towards this goal, I carried out a motor behavior paradigm called rota-rod, which affords the possibility of quantifying changes in motor performance before and after drug treatment. I compared the length of time the mutants lasted on an accelerating rod with a wild type control group. I found that Car8-null mice significantly improve their motor performance during CHZ treatment to a level comparable to control animals and the improvement is maintained even in absence of CHZ.

# ENDURE TRAINEE ABSTRACT

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Undergraduate Academic Level: **Senior**

Undergraduate Major and Expected Graduation Date: **Chemistry; May 2014**

Mentors/Advisors at Home Institution: **Dr. Jose A. Lasalde-Dominicci**

## **ENDURE Trainee Scientific Interests**

My research interest is in neurology, specifically in pharmacology applied to neurology. My current work has played a main role in this interest because it involves working with a drug treatment (fluoxetine) on a syndrome (Slow-channel Congenital Myasthenic Syndrome) at the neuromuscular level. I plan on continuing this research field with other drugs and diseases. I find the accelerating and fulfilling the experience of being at a position to help others from a scientific perspective.

## **ENDURE Trainee Career Goals and Plan**

Although my short-term academic goals are well defined, my long-term goals are not yet completely established. For now, I plan on finishing my Bachelor Degree in Chemistry in two years. I currently work with the graduate student Vivianette Alicea in the project "Slow Channel Congenital Myasthenic Syndrome Genes". This has increased my inclination towards completing a Ph.D. and a research career mainly because of the opportunity the laboratory and the NeuroID program have given me to expand my research abilities and curiosity.

## **ENDURE Trainee Summer Research Experience**

**ENDURE Summer Research Experience Institution: University of Puerto Rico, Río Piedras Campus**  
**Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Jose A. Lasalde-Dominicci**

### **Research Project Title: The effect of different concentrations of fluoxetine in the Slow-Channel Congenital Myasthenic Syndrome**

The congenital myasthenic syndromes (CMS) are a group of disorders that affect the neuromuscular junction (NMJ). The slow-channel congenital myasthenic syndrome (SCS) is one of those disorders, but it differentiates from the others since it prolongs the open-channel state of the acetylcholine receptor (AChR). Patients suffering from SCS are usually treated with quinidine sulfate, which targets the general fatigability and muscle weakness. For those patients that do not tolerate quinidine sulfate, fluoxetine is another option. The dose-effect of fluoxetine is not yet fully understood. To shed some light in the field we will analyze the effect of different fluoxetine concentrations in the endplate potential current and the AChR open-state time of transgenic mice containing the SCS caused by a  $\alpha$ C418W mutation. For this purpose, the voltage clamp technique will be used on the diaphragm muscle fibers perfused with different concentrations of fluoxetine. In accordance to previous research, we expect fluoxetine to be effective in shortening the open-state length of the AChR.

## COMPLETE ENDURE STUDENT ACTIVITIES AT SFN: October 13 – 16, 2012

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<p><b>SATURDAY</b> <b>Oct 13</b></p>	<p><b>7:00 – 10:30 am</b>    ENHANCING NEUROSCIENCE DIVERSITY THROUGH UNDERGRADUATE RESEARCH EDUCATION EXPERIENCES (ENDURE) 2<sup>nd</sup> ANNUAL MEETING WESTIN NEW ORLEANS CANAL PLACE, BALLROOM II (100 Rue Iberville New Orleans, Louisiana 70130)</p> <p>*7:00 – 7:30 am                      <b>Registration</b> 7:30 – 9:30 am                      <b>Featured Speakers</b> 9:30 – 10:30 am                    <b>T32 Recruitment Fair and Networking</b></p> <p>1:00 - 2:00 pm                      <b>GETTING THE MOST OUT OF SFN: THE ANNUAL MEETING AND BEYOND, Ernest N. Morial Convention Center, 356</b></p> <p>Students and others new to the annual meeting are invited to this session where experienced participants will share tips on how to get the most value both during and after Neuroscience 2012. Whether you are looking for networking strategies or simple ways to make your experience productive and enjoyable, this session will be beneficial. The SfN Program Committee, SfN Committee on Neuroscience Departments and Programs, and the Faculty for Undergraduate Neuroscience will provide strategies for navigating the annual meeting, discuss professional development tools available during and after the meeting, and answer questions from participants.</p> <p><b>6:30 - 8:30 pm</b>                      <b>DIVERSITY IN NEUROSCIENCE POSTER SESSION, Ernest N. Morial Convention Center, HALL E</b></p> <p>There will be a gathering of graduate students and postdoctoral fellows from the American Psychological Association Diversity Fellowship program, Meharry- Vanderbilt Alliance for Training, Texas Consortium in Behavioral Neuroscience, SNRP students, SfN-NINDS Neuroscience Scholars and ENDURE Program to present their research findings. There will be a few short alumni presentations and awards. We encourage you to come enjoy the refreshments and to meet with graduate and post-doctoral students from these various programs.</p> <p><b>8:30 - 10:00 pm</b>                    <b>CAREER DEVELOPMENT TOPICS: A MENTORING AND NETWORKING EVENT, Ernest N. Morial Convention Center, HALL E</b></p> <p>Now's your chance to meet and network with SfN mentors. Many experienced professionals will be available to discuss a number of topics in a round-table format. Participants from diverse backgrounds, fields, and work sectors are encouraged to attend. The event is open to all.</p>
<p><b>SUNDAY</b> <b>Oct 14</b></p>	<p>MORNING AND AFTERNOON Attend Scientific Program</p> <ul style="list-style-type: none"> <li>• Featured lectures                      • Symposia</li> <li>• Special lectures                        • Minisymposia</li> </ul> <p><a href="#">Plan Your Itinerary for Neuroscience 2012</a></p>

## COMPLETE ENDURE STUDENT ACTIVITIES AT SFN: October 13 – 16, 2012

**MONDAY**  
**Oct 15**

**11:30 - 1:30 pm** Successful Career Advancement through Networking: Is it Who You Know? Ernest N. Morial Convention Center, **353**

Organizer/Moderator: Erich D. Jarvis, PhD; Sherilynn J. Black, PhD

**Panelists:**

Brian Davis, PhD, University of Pittsburg

Mary Heyer, PhD, The Scripps Research Institute

Stephen Scheff, PhD, University of Kentucky

Anne West, PhD, MD, Duke University Medical Center

Networking is not just about making a connection, but maintaining that meaningful connection with others. Being part of a network also means having indirect connections to others. A network can be used as a powerful tool that can dramatically enhance your scientific efficacy. This session will cover how networking has affected the careers of scientists at all levels, starting in graduate school and continuing throughout a career of tenure-track and established positions. People use networks in a variety of ways and to different ends. This session will explore useful strategies to maximize the benefits of interactions with others.

**12:00 – 1:00 pm** Graduate School Fair: Day 1, Ernest N. Morial Convention Center, **Hall E**

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**MORNING AND AFTERNOON**

Attend Scientific Program

- Featured lectures
- Symposia
- Special lectures
- Minisymposia

[Plan Your Itinerary for Neuroscience 2012](#)

**12:00 – 1:00 pm** Graduate School Fair: Day 2, Ernest N. Morial Convention Center, **Hall E**

**6:45 - 8:45 pm** Faculty for Undergraduate Neuroscience Social, Hilton Riverside: Grand Salon ABC

Socialize and exchange ideas with others interested in undergraduate neuroscience research and education. See the FUN website for information ([www.funfaculty.org](http://www.funfaculty.org)).

**7:00 – 8:00 pm** DIVERSITY NEUROSCIENCE RECEPTION ,  
Westin Canal Place, **Magnolia 3**

The SfN Committee on Diversity in Neuroscience cordially invites you to attend a special reception in honor of the SfN diversity programs and the NINDS funded R25 Neuroscience Scholars Program. There will be brief presentations by the President and President-elect of the SfN. All are welcome to attend and to enjoy the refreshments.

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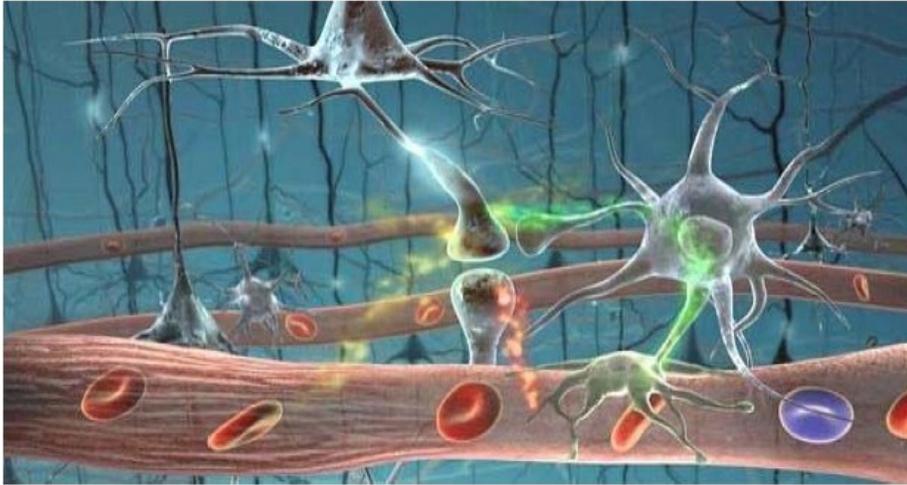
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