

NIH Blueprint

for Neuroscience Research



3rd Annual NIH Blueprint

Enhancing Neuroscience Diversity through Undergraduate Research Education Experiences (ENDURE)

2013 Program Meeting

November 9, 2013

San Diego, CA

The NIH Office of the Director and these NIH Institutes and Centers participate
in the NIH Blueprint for Neuroscience Research:

- NCATS
- NIAAA
- NIDCD
- NIMH
- NCCAM
- NIBIB
- NIDCR
- NINDS
- NEI
- NICHD
- NIEHS
- NINR
- NIA
- NIDA
- NIGMS
- OBSSR



NIH National Institutes of Health
Turning Discovery Into Health

TABLE OF CONTENTS

ENDURE PROGRAM AND MEETING GOALS.....	3
ENDURE MEETING AGENDA.....	4-5
BIOGRAPHICAL SKETCHES- PANEL SPEAKERS	6-7
T32 RECRUITMENT FAIR PARTICIPANTS.....	8-9
MENTORING RESOURCES AND PROFESSIONAL CONFERENCES.....	10
ENDURE TRAINEE INFORMATION AND RESEARCH ABSTRACTS.....	11 -113
• BP-ENDURE-ATLANTA: ENGAGING UNDERGRADUATES IN NEUROSCIENCE RESEARCH.....	11
• BP-HUNTER COLLEGE.....	38
• BUILDING RESEARCH ACHIEVEMENT IN NEUROSCIENCE (BRAIN).....	59
• SOUTH TEXAS ADVANCED RESEARCH TRAINING: UNDERGRADUATE PROGRAM (START-UP)...	78
• NEUROSCIENCE RESEARCH OPPORTUNITIES TO INCREASE DIVERSITY (NEUROID).....	88
ENDURE COMPLETE ACTIVITIES AT SFN.....	114 -115
PARTICIPANT LIST	116 - 120
NOTES.....	121-123

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 neurosciences. 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 with 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. Michelle Jones-London (NIH)

Dr. Mark Chavez (NIH)

Ms. TaRaena Yates (*Synergy Enterprises, Inc.*) Ms. Tyauna Brown (*Synergy Enterprises, Inc.*)

For further information about the program and its training sites:

http://neuroscienceblueprint.nih.gov/bp_nih-supported_training/endure_programs.htm

3rd ANNUAL ENHANCING NEUROSCIENCE DIVERSITY THROUGH UNDERGRADUATE
RESEARCH EDUCATION EXPERIENCES (ENDURE) 2013 PROGRAM MEETING

November 9, 2013
HILTON SAN DIEGO BAYFRONT, SAPPHIRE BALLROOMS UJMN

AGENDA

7:00 – 7:30 am REGISTRATION

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

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

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

Dr. Tom Insel, National Institute of Mental Health (NIMH), Institute Director

Dr. Story Landis, National Institute for Neurological Disorders and Stroke
(NINDS), Institute Director - Q&A

8:10 – 9:30 am Panel on “PATHWAYS AND PERSPECTIVES ON BEING A RESEARCHER”

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

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

*Each accomplished researcher will share their 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.*

- ❖ Dr. Erich Jarvis – Duke University Medical Center, Associate Professor of
Neurobiology, Investigator, Howard Hughes Medical Institute
- ❖ Dr. Cassie Mitchell – Georgia Institute of Technology and Emory University,
Research Engineer II (Research Faculty) in Wallace H. Coulter Department of
Biomedical Engineering
- ❖ Ms. Theanne Griffith – Northwestern University, Ph.D. Candidate, Molecular
Pharmacology & Biological Chemistry Department
- ❖ Ms. Jimena Santillan - University of Oregon, 2nd year Doctoral Student,
Cognitive Neuroscience Program, Former BP-ENDURE Scholar from Hunter
College

9:30 – 11:00 am

CONCURRENT NETWORKING SESSIONS

(A) T32 RECRUITMENT FAIR AND NETWORKING (BACKROOM OF BALLROOM) -
Institutions with a strong focus on neuroscience, and interest in recruiting for
predoctoral research programs

(B) ENDURE ALUMNI NETWORKING ROOM (AQUA 306) – A presentation of NIH funding
opportunities followed by round table discussions of various research and
development topics

Presenters and Moderators:

Dr. Albert Avila, Acting Director of Special Populations Office, National Institute on Drug
Abuse (NIDA), NIH

Dr. Janet L. Cyr, Program Director, Hearing and Balance, National Institute on Deafness
and Other Communication Disorders (NIDCD), NIH

BIOGRAPHICAL SKETCHES - PANEL SPEAKERS

Each accomplished researcher will share their 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.



Erich Jarvis, Ph.D.
*Duke University Medical Center
Associate Professor of Neurobiology
Investigator, Howard Hughes Medical Institute*

Neurobiologist Erich D. Jarvis was born in the Harlem neighborhood of New York City. Growing up in an artistic but poverty-stricken household, Jarvis found an early passion for dance, which led him to the High School of the Performing Arts. He graduated from high school and turned down an audition for the African American dance company, Alvin Ailey to attend Hunter College. As an undergraduate, he worked as a Minority Access to Research Careers (MARC) Fellow and researched protein synthesis genes in bacteria. After obtaining his B.A. degree in mathematics and biology, Jarvis pursued his Ph.D. degree in molecular neurobiology and animal behavior at The Rockefeller University where he researched vocal learning in songbirds. He received his Ph.D. degree in 1995 and remained at The Rockefeller University to conduct postdoctoral research.

Upon completion of his postdoctoral training, Jarvis joined the faculty of The Rockefeller University as an adjunct assistant professor and also participated in the Science Outreach Program of New York where he taught laboratory skills to inner city high school students. He left Rockefeller in 1998 to become an assistant professor in the Department of Neurobiology at Duke University. Jarvis also served as an assistant professor in the Department of Cognitive Neuroscience and the Center for Bioinformatics and Computational Biology. In 2002, the National Science Foundation awarded Jarvis its highest honor for a young researcher, the Alan T. Waterman Award. In 2005 he was awarded the National Institutes of Health Director's Pioneer Award providing funding for five years to researchers pursuing innovative approaches to biomedical research. That same year, he also led the Avian Brain Nomenclature Consortium, a team of twenty-eight neuroscientists, who proposed a new nomenclature for the bird brain to better reflect a bird's similarities with mammals in cognitive abilities, and became a tenured associate professor at Duke. In 2008 he was chosen to become an Investigator for the Howard Hughes Medical Institute (HHMI). He has been an invited contributor for several books and has published more than fifty scholarly articles. (Bio adapted from *The HistoryMakers*, February 2012)



Cassie Mitchell, Ph.D.
*Research Faculty
Georgia Institute of Technology and Emory University
Wallace H. Coulter Department of Biomedical Engineering*

As a researcher and a quadriplegic, Dr. Cassie S. Mitchell has an intimate understanding of the impact of neuropathologies and a passion to leverage both personal and scientific research experiences to positively impact the lives of patients. Her research as a "neuropathology forecaster" develops computational techniques to quantitatively predict disease mechanisms, progression and potential treatment outcomes using data from both clinical and experimental models. With a B.S. in Chemical Engineering (Oklahoma State University, 2004) and a Ph.D. in Biomedical Engineering (Georgia Institute of Technology and Emory University, 2009), she has

eleven years of industrial and academic research experience developing computational and analytical techniques to assess complex biological systems. Dr. Mitchell is currently Primary Investigator of two National Institute of Health grants seeking to develop groundbreaking predictions for the motoneuron disease, Amyotrophic Lateral Sclerosis (ALS or Lou Gehrig's disease). Additionally, Dr. Mitchell is an elite athlete for the USA Paralympic Track & Field and Cycling Teams, where she holds multiple World Championship and World Record titles. For more information, see Dr. Mitchell's research website, www.pathology-dynamics.com, or visit her personal website, www.cassie-mitchell.com.



Theanne Griffith
Northwestern University
Doctoral Candidate,
Interdepartmental Neuroscience Program

Theanne Griffith is a fourth year graduate student in the neuroscience program at Northwestern University. Originally from Alexandria, Virginia, she received her undergraduate degree from Smith College in Massachusetts as a dual Neuroscience and Spanish major. While at Smith, she worked for four years in the laboratory of Dr. Adam Hall investigating the role of novel cyclohexanol compounds in GABA_A receptor modulation and their use as potential anesthetics, work which was partially funded by Smith's Underrepresented Science Students Program. As an undergraduate Theanne studied abroad in Santiago, Chile, and moved there after graduation. She undertook two years of post-baccalaureate research at the Pontifical Catholic University of Chile in the laboratory of Dr. Nivaldo Inestrosa where she studied the neuroprotective effects of a St. John's wort derivative in a double transgenic model of Alzheimer's disease. In 2010 Theanne moved to Chicago to begin graduate training at Northwestern University where she is studying the role of kainate receptors in neuronal function and synaptic plasticity in the laboratory of Dr. Geoffrey Swanson. Her dissertation work is focused on understanding the structural basis of kainate receptor functional modulation by their auxiliary subunits, Neto1 and Neto2. Theanne's current research is funded by an American Heart Association predoctoral fellowship.



Jimena Santillan
University of Oregon
Doctoral Student, Cognitive Neuroscience Program
Psychology Department

Jimena Santillan is a second year doctoral student in the Cognitive Neuroscience program at the University of Oregon. She received her B.A. in Psychology and Interdisciplinary Studies from Hunter College of the City University of New York, where she was a BP-ENDURE scholar, as well as an NIMH-Career Opportunities in Research program scholar. As part of the Brain Development Lab, she works on delivering and testing an evidence-based intervention designed to enhance brain systems supporting selective attention in children at risk for academic failure, employing electroencephalography to measure its effects. Supported by a Graduate Research Fellowship from the National Science Foundation, her research examines the effect of environmental factors on neuroplasticity, with the goal of identifying potential protective factors that counteract the deleterious effects of growing up in poverty on brain development.

T32 RECRUITMENT FAIR PARTICIPANTS

University/School	Representative
BROWN UNIVERSITY	Diane Lipscombe, PhD Professor of Neuroscience
COLUMBIA UNIVERSITY	Darcy Kelley, PhD Harold Weintraub Professor of Biological Sciences
GEORGETOWN UNIVERSITY	Karen N. Gale, PhD Professor of Pharmacology & Physiology
HARVARD MEDICAL SCHOOL	Richard T. Born, MD Professor of Neurobiology
NORTHWESTERN UNIVERSITY FEINBERG SCHOOL OF MEDICINE	Julius Dewald PhD Professor, Chair Department of Physical Therapy and Movement Sciences
NEW YORK UNIVERSITY	Chiye Aoki, PhD Professor Bernardo Rudy, PhD, MD Professor Lynne Kiorpes, PhD Associate Professor Nina Gray, PhD Graduate Program Manager
OHIO STATE UNIVERSITY COLLEGE OF MEDICINE	Denis Guttridge, PhD Professor, Director of Muscle Health and Neuromuscular Disorders
OREGON HEALTH AND SCIENCE UNIVERSITY	Andrey Ryabinn, PhD Professor
TEMPLE UNIVERSITY	Ellen Unterwald, PhD Professor, Director, Center for Substance Abuse Research
UNIVERSITY OF ALABAMA AT BIRMINGHAM	Anne B. Theibert, PhD Director, Undergraduate Neuroscience Program
UNIVERSITY OF CALIFORNIA, LOS ANGELES	Jack Feldman, PhD Distinguished Professor, Neurobiology Dwayne Simmons, PhD Professor/ Director, MARC and Bridges Undergraduate Research
UNIVERSITY OF CALIFORNIA, SAN DIEGO	Yishi Jin, PhD Professor, Director Neurosciences Graduate Program Gentry Patrick, PhD Associate Professor, Chair, Diversity Committee Erin Gilbert Program Administrator, Neurosciences

UNIVERSITY OF COLORADO DENVER	Diego Restrepo, PhD Director, Center for NeuroScience (CNS)
UNIVERSITY OF MARYLAND, BALTIMORE	Jessica Mong, PhD Associate Professor, Incoming Director of Graduate Education for the Program in Neuroscience
UNIVERSITY OF MICHIGAN	Edward L. Stuenkel, PhD Professor of Molecular and Integrative Physiology Director of the Neuroscience Graduate Program
UNIVERSITY OF MINNESOTA	Paul Mermelstein, PhD Associate Professor
UNIVERSITY OF NORTH CAROLINA CHAPEL HILL	Rick Meeker, PhD Professor
UNIVERSITY OF PENNSYLVANIA	Irwin Lucki, PhD Professor of Pharmacology and Psychiatry
UNIVERSITY OF ROCHESTER	Anna Majewska, PhD Associate Professor Douglas Portman, PhD Associate Professor
UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT SAN ANTONIO	David Morilak, PhD Director, Neuroscience Graduate Program Director, Center for Biomedical Neuroscience
VANDERBILT UNIVERSITY	Mark T. Wallace, PhD Director, Vanderbilt Brain Institute Director, Neuroscience Graduate Program Doug McMahon, PhD Associate Director Vanderbilt Brain Institute
WAKE FOREST UNIVERSITY	Carol Milligan, PhD Professor
YALE UNIVERSITY SCHOOL OF MEDICINE	Michael Crair, PhD William Ziegler III Associate Professor, Director of Graduate Studies

MENTORING RESOURCES AND PROFESSIONAL CONFERENCES

"MENTOR: SOMEONE WHOSE HINDSIGHT CAN BECOME YOUR FORESIGHT"

Society for Neuroscience Mentoring Program

<http://neuroline.sfn.org/Mentoring1/AboutMentorMatch>

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>

Making the Right Moves and Training Scientists to Make the Right Moves

<http://www.hhmi.org/educational-materials/labmanagement/moves.html>

Individual Development Plan (IDP), a Web-based career-planning tool created to help graduate students and postdocs in the sciences define and pursue their career goals

<http://myidp.sciencecareers.org/>

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: : The BP- ENDURE-Atlanta project led by Georgia State University (GSU) along with member institutions Agnes Scott College, Emory University, and Spelman College, will provide a two-year neuroscience research immersion and integration program for students from underrepresented groups.

We aim to engage outstanding undergraduates 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 one of 15 partner T32 training programs in the second summer; 4) a Capstone Research Assistantship during the second academic year; and 5) an intensive professional development workshop series. Key program events include a poster session at the end of the BRAIN summer program, slide presentations at our annual Spring Symposium, and attendance at the international Society for Neuroscience meeting for first-year participants.

Program evaluation will record participant views on all program elements (formative evaluation), as well as potential progress in communication skills, confidence with research abilities, and pathways toward successful careers. Mentors are requested to evaluate student progress in research skills using a newly developed instrument. Outcomes data will help to 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.

ADDITIONAL CONTACTS:

Ms. Emily Hardy - Program Coordinator - Georgia State University

Dr. Chris Goode - Georgia State University

Dr. Yoland Smith - Emory University

Dr. Karen Brakke - Spelman College

Dr. Jennifer Larimore - Agnes Scott College

ENDURE TRAINEE ABSTRACT

LAURA ALARCON

Home Institution and State: Emory University, Georgia

Email: lalarco@emory.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience and Behavioral Biology, December 2014

Mentors/Advisors at Home Institution: Yolanda Smith, Ph.D., & Todd Preuss, Ph.D.

ENDURE Trainee Scientific Interest

My research interests involve learning more about human brain evolution through computer models and non-invasive imaging techniques and using these methods to find out more about neurological disorders, such as Alzheimer's and Parkinson's.

ENDURE Trainee Career Goals and Plan

My career goals are to enter a graduate school program in neuroscience and get my PhD in neuroscience. From there, I'd like to go on to become a professor and head of my own lab.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Morten Rastaad, M.D., Ph.D.

ENDURE Research Project Title: In an Alzheimer mouse model grey matter axons show morphological pathology 4-5 months before mice develop symptoms

Morphological differences were observed in gray matter axons between wild-type mice and transgenic familial Alzheimer's model (5-FAD) mice. Axons were visualized using a fluorescent dye which diffuses through plasma membrane. Images were analyzed using ImageJ viewing technology. Interbouton interval (IBI) and bouton intensity were recorded and analyzed using statistical methods. No significant differences between WT and 5-FAD mice were found in terms of IBI in the hippocampus. Significant differences ($p=0.027$, 0.013 , 0.037) were found between WT and 5-FAD axons in terms of bouton intensity. These results support the observation (from visual inspection) that 5-FAD axons in general have brighter, larger boutons and that interbouton interval is under some type of unknown control. These results also suggest that Alzheimer's may show morphological changes long before the onset of symptoms.

ENDURE TRAINEE ABSTRACT

AIYANA BATTON

Home Institution and State: Spelman College, Georgia

Email: abatton@scmail.spelman.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology, May 2015

Mentors/Advisors at Home Institution: Karen Brakke, Ph.D., & Ebony Glover, Ph.D.

ENDURE Trainee Scientific Interest

In discovering the field of neuroscience, I ventured into a discipline where my interest of molecular biology and my curiosity about the inner workings of the brain converged. I have several research interests surrounding neuroscience. In the coming years I hope to begin research on the development of neurodegenerative diseases such as Alzheimer's as well as the potential biomarkers surrounding the disease. I am also interested in better understanding the neurobiology behind self-awareness and consciousness by studying infants during their early developmental stages.

ENDURE Trainee Career Goals and Plan

My most ambitious educational goal is to join an M.D./Ph.D. program after graduating from Spelman College. My long-term career goal is to become a physician scientist so that I can conduct biomedical research and make key discoveries towards the prevention and treatment of neurological diseases, while at the same time delivering health care services to disadvantaged socioeconomic groups. Toward those goals I plan to act as first- author on the publication of a scientific paper and presenting at an international biomedical conference before graduating from Spelman College in two years. First I will act as co-author a publication and present my research at four research symposia by the end of this academic year, including the annual Society for Neuroscience Conference.

ENDURE Trainee Summer Research Experience

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

Mentors/Advisors at ENDURE Summer Research Experience Institution: Ebony Glover, Ph.D. and Kerry Ressler, Ph.D.

ENDURE Research Project Title: Childhood maltreatment correlates with amygdala and prefrontal activation to threatening faces in women with and without post-traumatic stress disorder.

Early life stress, such as childhood maltreatment, is a significant risk factor for adult posttraumatic stress disorder (PTSD). Animal models of early life maltreatment show profound long-term alterations in brain regions involved in threat processing and emotion regulation, such as the hippocampus, amygdala and prefrontal cortex. To examine the neurobiological correlates of childhood maltreatment in humans, we utilized functional magnetic resonance imaging (fMRI) to

identify neural activation patterns in adult women with and without childhood maltreatment histories during attention to threatening faces. A total of 19 adult females recruited from Grady Hospital in Atlanta, GA, completed a childhood trauma questionnaire (CTQ) and underwent fMRI while responding to a dot probe attentional task that utilized threatening versus neutral and happy faces. CTQ scores (total abuse, as well as physical, sexual, and emotional abuse scores) were used in regression analyses predicting neural activation. We found that activation in the dorsal anterior cingulate cortex (dACC) was negatively associated with level of childhood maltreatment ($R^2=0.10$, $p<0.05$) during attention to threatening faces. On the other hand, incidence of childhood maltreatment (CTQ total score) correlated positively with activation in the amygdala during attention to threatening facial expressions ($R^2=0.33$, $p<0.05$). The relationship between the dACC and maltreatment was significant for childhood emotional and physical abuse, but was strongest for physical abuse, $p<0.01$. These findings suggest that childhood maltreatment is associated with atypical neural activation patterns in brain regions linked to emotional regulation and PTSD.

ENDURE TRAINEE ABSTRACT

NATASHA BROWDER

Home Institution and State: Agnes Scott College, Georgia

Email: nbrowder@agnesscott.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience, May 2015

Mentors/Advisors at Home Institution: Jennifer Larimore, Ph.D., and Stacey Dutton, Ph.D. (Emory University)

ENDURE Trainee Scientific Interest

My research interest is focused on studying the neurological disorder Epilepsy. Epilepsy is the fourth most common neurological disorder in the United States. Nearly 5% of people in their lifetime will be diagnosed as epileptic, meaning they have had at least two unprovoked, spontaneous seizures. Specifically, I am interested in studying genetic epilepsy with febrile seizures plus (GEFS+), which results from mutations in the SCN1A gene encoding the voltage-gated sodium channel Nav1.1. GEFS+ is a highly variable epilepsy disorder characterized by a variety of epilepsy phenotypes and differences in seizure severity among affected family members. More specifically, I am interested in researching the effects of the human D1866Y mutation in the orthologous mouse location in Scn1a.

ENDURE Trainee Career Goals and Plan

My career goals are centered primarily on revolutionizing how minority students view the field of science, while maintaining the integrity of the field. Upon my completion of college, I intend to split my time between scientific illustration, in an effort to create more comprehensive and accurate scientific illustrations for textbooks, while pursuing a career in scientific education. Long term, I envision myself having a kindergarten through high school academy that will foster scientific inquiry in underrepresented minority and inner city youth. As a part of the curriculum, I intend to incorporate science into every aspect of education, with an emphasis on critical thinking and problem solving. Lastly, I foresee myself as being an educator within the same demographic, helping to provide opportunities and exposure for underrepresented minorities in the STEM fields.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Stacey Dutton, Ph.D., and Andrew Escayg, Ph.D.

ENDURE Research Project Title: Characterization of the seizure phenotypes and survival for the D1866Y Scn1a mouse model of genetic epilepsy with febrile seizures plus (GEFS+)

Mutations in the SCN1A gene, which encodes the voltage-gated sodium channel (VGSC) Nav1.1, have been linked to a variety of epilepsy conditions including genetic epilepsy with febrile seizures

plus (GEFS+). Within a GEFS+ family, affected members can display a variety of epilepsy phenotypes that differ in severity and age of onset. The D1866Y (DY) SCN1A GEFS+ mutation was first identified in an Italian family with four affected members displaying different epilepsy phenotypes. Due to the location of the DY mutation in the cytoplasmic loop, it is hypothesized that the mutation interferes with α and β subunit interaction and subsequently alters the biophysical properties of the Nav1.1 channel. To gain a better understanding of the effect of the novel DY mutation on seizure thresholds, mice containing the human GEFS+ DY mutation were evaluated for their susceptibility to the proconvulsant flurothyl and 6 Hz induced seizures. For the flurothyl seizure induction paradigm, the average latencies to the first myoclonic jerk and the tonic-clonic seizure were compared between mutants and wild type (WT) littermates. It was determined that heterozygous females have increased susceptibility to flurothyl-induced seizures. However, no significant difference in seizure susceptibility between heterozygous males and their WT littermates was observed. Similarly, DY mutants demonstrated increased susceptibility to 6 Hz-induced seizures. We also determined the effect of the DY mutation on mouse weight and survival. Mice were weighed every other day beginning at P5 until P30 and then once a week up to P90 (3 months).

ENDURE TRAINEE ABSTRACT

JILLYBETH BURGADO

Home Institution and State: Emory University, Georgia

Email: jburgad@emory.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience and Behavioral Biology, May 2015

Mentors/Advisors at Home Institution: Yolanda Smith, Ph.D., and Gretchen Neigh, Ph.D.

ENDURE Trainee Scientific Interest

Neuroscience is a broad and interdisciplinary field that has captured my attention because it provides the necessary methods to explore our nervous system. Generally, I am interested in behavioral and cognitive areas of neuroscience. Due to my current work with rodents, the use of animal models of depression and/or anxiety is an essential part of my future plans. By utilizing these models, I can study how environmental factors, such as stress and diet, influence these disorders. I would like to research how these environmental factors interact with behavior and brain development during critical time points and, in turn, alter adult behavior. I am also interested in studying religion with the tools provided by cognitive neuroscience. I would like to use brain imaging and evolutionary analyses to explain the historical development of religious thought and its role in society.

ENDURE Trainee Career Goals and Plan

After obtaining a Ph.D. in neuroscience and completing any additional training, I plan to become a faculty member in a university setting, as either a lecturer or on a tenure-track position. As a principal investigator on tenure track, I would like to continue behavioral or cognitive neuroscience research. Specifically, my research would include studying environmental factors (likely stress and drug use/abuse) on development and depression. Overall, if I continue to do research my goal is to run a small lab and take on a medium teaching load. Alternatively, as a lecturer my goal is to teach several undergraduate and graduate level classes each year and therefore directly interact with students in the academic environment. Furthermore, I would like to take a direct role in science and/or research-oriented educational programs for high school or college students. In this context, I could complete some educational research regarding teaching strategies that work best in the sciences.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Gretchen Neigh, Ph.D.

ENDURE Research Project Title: Behavioral characterization of miR-21 knock-in mice: Exploring the underlying mechanisms of depression and fatigue after chemotherapy treatment

Patients suffering from breast cancer are frequently placed through chemotherapy treatment. Although these treatments are useful in eliminating cancerous cells, they have been linked to an increase in depression among breast cancer patients. The exact mechanism underlying this increase in depression incidence is not clearly understood but some researchers point to the critical role of inflammatory cytokines. Preliminary work has not only shown an increase in proinflammatory cytokines in patients after chemotherapy but also a decrease in DNA methylation of several CpG sites. Some of these sites are within the promoter region of microRNA-21 (miR-21) and are correlated with the increase in inflammatory markers. Because of these relationships, my summer project aimed at characterizing the behavior of mice overexpressing miR-21 in order to determine if this microRNA plays an essential role in the development of depression and/or anxiety. Several well-established, behavioral tests, including open field, tail suspension, and marble burying, were used to measure depressive- and anxiety-like behaviors in the knock-in and wildtype male mice. Furthermore, animals were exposed to 15 days of chronic predatory stress and their post-stress behavior analyzed. We concluded that overexpression of miR-21 was not directly involved in the onset of depressive-like behaviors in male mice.

ENDURE TRAINEE ABSTRACT

ERDONG CHEN

Home Institution and State: Emory University, GA

Email: erdong.chen@emory.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology and Economics, May, 2015

Mentors/Advisors at Home Institution: Yoland Smith, Ph.D., and Jean-Francois Paré

ENDURE Trainee Scientific Interest

I am interested in biology, neuroscience, and medicine. My present interests focus primarily on neurodegenerative disease. My current research aims to examine the potential for outcome improvement by combinatorial treatment of Parkinson's disease by application of new drugs developed by the Vanderbilt Center for Neuroscience Drug Discovery in conjunction with current treatment methods. I am in the process of analyzing the anatomical substrate through which these drugs could mediate their effect.

ENDURE Trainee Career Goals and Plan

After graduation from Emory University, I plan on applying to M.D/Ph.D. programs in pursuit of a career as a researcher and a physician. I believe it is essential for clinicians to be on the cutting edge of research in their treatment of disease in order to allow patients to receive the best possible care and reach optimal outcomes. Though I am not set on what specialization I would like to pursue, some possible areas of interest include neurology, anesthesiology, and parasitology.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Yerkes National Primate Research Center of Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Yoland Smith, PhD and Jean-Francois Paré

ENDURE Research Project Title: Localization of T-type Calcium Channels in the Monkey Thalamus

The motor dysfunctions of Parkinson's disease (PD) result from degeneration of midbrain dopaminergic projections to the striatum, and consequential functional changes of basal ganglia-thalamocortical circuits. Electrophysiologically, thalamic burst discharges are also associated with Parkinsonism. A common form of abnormal burst activity observed in PD is "rebound bursting", a type of bursting commonly mediated by de-inactivation of T-type calcium channels (Cav3) following neuronal hyperpolarization. Because increased rebound bursting has been described in animal models of PD, it is reasonable to believe that T-type calcium channel antagonists may normalize electrical activity, decrease rebound bursting and, possibly, alleviate Parkinsonian motor deficits. As part of an ongoing project to address this issue, we characterized the anatomical substrate through which such drugs could mediate their effects upon thalamic activity. Using light

microscopy and electron microscopy immunoperoxidase and immunogold methods with specific Cav3.1 antibodies, we studied the localization of the Cav3.1 subtype of T-type calcium channel in the ventrolateral and centromedian/parafascicular thalamic nuclei, the main thalamic targets of basal ganglia outflow, in rhesus monkeys. Preliminary results indicate that Cav3.1 channel immunoreactivity is expressed in the perikarya and dendrites of VL and CM/Pf neurons. Aggregates of Cav3.1 immunoperoxidase labeling is commonly found at the post-synaptic densities of putative asymmetric glutamatergic synapses, suggesting a possible role in excitatory transmission. Occasional pre-and post-synaptic labeling is also associated with some symmetric synapses, suggesting a possible role in inhibitory transmission. Ongoing studies will further characterize the spatial distribution of these channels at synaptic and extrasynaptic sites in both normal monkeys and MPTP treated Parkinsonian monkeys.

ENDURE TRAINEE ABSTRACT

JASMINE FISHER

Home Institution and State: Agnes Scott College, GA

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience, May 2015

Mentors/Advisors at Home Institution: Jennifer Larimore, Ph.D., and Walter Walthall, Ph.D.
(Georgia State University)

ENDURE Trainee Scientific Interest

My research interests are focused on the Neural Development, Prion Diseases, Demyelinating Diseases, as well as the molecular mechanisms underlying these diseases. Specifically, the research interest of examining the underlying molecular mechanisms of prion and demyelinating diseases could be combined with my newly-developed interest in Neuropharmacology. Once there is abundant knowledge on which genes and proteins influence the development and progression of these diseases, targeted molecular and gene therapies can be developed for treatment in addition to an increased awareness for how these diseases can otherwise be early detected or prevented.

ENDURE Trainee Career Goals and Plan

After completing my baccalaureate studies at Agnes Scott College, I will most likely attend Graduate School for PhD in Neuroscience. Recently, I have also been drawn to the idea of studying Neuropharmacology, which allows for the consideration of participating in a Neuropharmacology or Molecular Pharmacology graduate program. My ultimate career goals are to work as a researcher in the field of Neuroscience and combine the interests of Neuroscience and Research into a business of my own.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Georgia State University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Walter Walthall, Ph.D., and Richard Campbell

ENDURE Research Project Title: A Forward Genetic Analysis of GAD/unc-25 Expression to Determine Possible Regulators of GABAergic Differentiation of Neurons

The process of neural development is critical to the overall functionality of an organism. Disruptions of the neural developmental process can result in a failure to develop a complete nervous system and cause neurodevelopmental disorders, such as cerebral palsy, that effects the organism's coordination. In this study, we examine the development of GABAergic neurons in the free-living species of nematodes (*Caenorhabditis elegans*) through the interaction of gene networks. An enzyme, Glutamic acid decarboxylase (GAD), serves as a link between the

developments of GABAergic neurons in both humans and *Caenorhabditis elegans*. In our model organism, GAD is activated through the interaction between transcription factor UNC-30 and the *unc-25* gene. Our aim is to determine how UNC-30 is activated in these GABAergic neurons through inducing mutations in the model organism and observing the animals for the expression of GABAergic neurons under fluorescence. We expect to not only find *unc-30* mutants, but also mutants for the regulators of *unc-30*.

ENDURE TRAINEE ABSTRACT

JASMINE HOPE

Home Institution and State: Emory University, GA

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience and Behavioral Biology, May 2015

Mentors/Advisors at Home Institution: Yoland Smith, Ph.D., Tara Stoinski, Ph.D., and Regina Gazes, Ph.D. (Zoo Atlanta)

ENDURE Trainee Scientific Interest

My interest in research stems from my desire to know the reasons why human and non-human primates behave the way they do. I am particularly interested in cognitive behavior and comparing the abilities of the two groups. The capacity of humans and other primates to apply their knowledge to a variety of cognitive tasks such as sequencing, memorization, and distinguishing stimuli, fascinates me. The structural similarities of the brain between both groups seem to be linked to the cognitive abilities of the two. Utilizing comparative analyses, it may be possible to tease apart the roles of culture and biology in behaviors that stem from neurobiological similarities and differences. I am fascinated by the multitude of mechanisms in the brain that underlie the varying cognitive behaviors that can be seen in primates and the different adaptations that have led to them.

ENDURE Trainee Career Goals and Plan

In the future I want to become a professor at a research-centered university and have a lab that is part of a primate research center. I want to have enough space and resources to support a variety of primate species as well as a separate area for human subjects. My main research would probably be centered in Comparative Psychology with a focus on cognitive behavior. I would teach psychology courses that deal with primate behavior and cognition. In order to achieve these career goals I will graduate from Emory University with an Honor's Thesis then proceed to graduate school. Ideally I would get into a Neuropsychology or Comparative Psychology program. During graduate school I plan to gain teaching experience by becoming a Teacher's Assistant. After graduate school, I would hope to conduct post- doctoral research overseas.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Emory University and Zoo Atlanta

Mentors/Advisors at ENDURE Summer Research Experience Institution: Tara Stoinski, Ph.D., and Regina Gazes, Ph.D.

ENDURE Research Project Title: Spatial-Magnitude Congruity and Attentional Shifts in Orangutans

Humans appear to organize magnitude information spatially in a "mental-magnitude line." For

example, they show the Spatial-Numerical Association of Response Codes (SNARC) effect; when two different magnitudes are displayed bilaterally, they are faster to respond to lower magnitudes on the left side of space and to higher magnitudes on the right side of space. The direction of this effect appears to be mediated by cultural factors such as reading and counting direction, but it is unclear the extent to which biological factors also contribute. Preliminary data from orangutan subjects suggests that non-humans may also exhibit the SNARC effect. However the direction of the effect appears to vary between individuals. If the direction of the SNARC effect is indicative of the representational direction of a broader spatial-magnitude congruity, then the direction of the SNARC effect on a quantity discrimination task by a given individual should predict the direction of the SNARC effect on other spatial-magnitude congruity tasks. We presented 5 orangutans with a quantity discrimination task to assess SNARC direction and a quantity mediated attention task to assess spatial shifts in attention based on magnitude. In the quantity discrimination task, subjects chose either the smaller or larger quantity of black dots displayed inside 2 white bilateral squares. In the attention task, a square containing black dots of varying magnitudes appeared in the center of the screen between two smaller squares. A red dot would flash in either the left or right square and the subject would have to touch the square in which the dot had appeared. SNARC directions on the two tasks were compared to determine if individuals showed a consistent spatial magnitude congruity effect across tasks. If individuals show this spatial consistency, it will suggest that the spatial-magnitude congruity effect may have biological bases that are shared with non-humans.

ENDURE TRAINEE ABSTRACT

TANISHA LONDON

Home Institution and State: Spelman College, GA

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology, May 2015

Mentors/Advisors at Home Institution: Karen Brakke, Ph.D.

ENDURE Trainee Scientific Interest

My scientific and research interests are in the discipline of neuroscience. Neuroscience produces such proficient scientist being versed in the numerous disciplines that make neuroscience. I enjoy studying and understanding how the nervous system develops and the many structures and their functions. Since being a part of the Neuroscience community I have been introduced to many fields and techniques but I prefer behavioral research and working with human participants. I am intrigued by personality theory and anxiety/social disorders. I think I relate to this field more because I often display atypical social behaviors and it's fascinating to analyze something you already understand from a researcher's perspective and as someone who exhibits the behavior as well.

ENDURE Trainee Career Goals and Plan

Research is my focal concentration in career development and sustaining it for long-term opportunities within my career as a research neurologist. My ideal career is a pediatric research neurologist. I do not want to practice medicine but study past research to analyze the most appropriate treatment for children with neurological conditions while researching new diseases and or cures to transform current research methods. I feel what could only be described as a sense of comfort when in hospital environments. I chose neurology and pediatrics because that is what I feel to be my calling and my forte. I take pride in being skillful in communicating and interacting with children as well as being proficient in subjects pertaining to neuroscience.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Georgia Institute of Technology

Mentors/Advisors at ENDURE Summer Research Experience Institution: Audrey Duarte, Ph.D.

ENDURE Research Project Title: The Role of VLPFC-Mediated Post Retrieval Selection in Overcoming Age-Related Changes Effecting Proactive Interference

Proactive Interference is the phenomenon when previous information conflicts with the acquisition of new information. Behavioral research suggests that older adults are significantly less able to overcome proactive interference than young adults. Neuroimaging evidence in young adults suggests overcoming interference in memory may require post-retrieval selection, a process shown to be mediated by the left mid-ventrolateral prefrontal cortex (VLPFC). We propose to investigate whether age-related changes in the VLPFC mediated post-retrieval selection

underlie deficits in overcoming interference in old adults using an fMRI. Participants completed a computer-based task requiring them to remember which associate was paired with each object most recently during the time of the study under conditions of high and low interference. Behavioral results showed that as interference increased, associative memory performance decreased and older adults showed an overall deficit in associative memory performance. We expect left mid-VLPFC activity to increase as interference increases but older adults may show less VLPFC activity reflecting impaired post-retrieval selection. The results of our study should improve understanding of age-related effects on proactive interference.

ENDURE TRAINEE ABSTRACT

TAMRA NEBLETT

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology, May 2015

Mentors/Advisors at Home Institution: Karen Brakke, Ph.D., and Shawn Hochman, Ph.D. (Emory University)

ENDURE Trainee Scientific Interest

Overall I am interested in neuroscience, though over the summer I also developed an interest in developing novel uses for electronics. I would like to know more about programming electronics for use in the lab. Mainly I am interested in neurosurgery and the different techniques that are being used in mobile prosthetics. Prosthetics are fascinating but I would also like to look into some ways of communicating with the brain for those who have lost sight to possibly receive input from their environment. The technology development and clinical trials for that are really interesting to me. Another thing of interest to me though not really related to technological development is the treatment and prevention of different neurodegenerative diseases especially Alzheimer's disease. This is especially close to my heart given that my paternal grandfather died of complication due to Alzheimer's.

ENDURE Trainee Career Goals and Plan

My goal is to become a neurosurgeon. Currently my first step, as far as future plans are concerned, involves taking the MCAT in the coming spring. From there the application process begins. I plan to apply to medical schools specifically focusing on the Uniformed Service University because I would like to go to medical school through the Navy and have a chance to support the nation's troops by giving them the best care. Upon completing medical training I would owe the Navy seven years and if I like the service I will stay in for longer otherwise I am off to pursue medicine in a civilian capacity. I would like to continue to do research while working at a hospital and making useful contributions to the scientific community.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Shawn Hochman, Ph.D., and Donald Noble

ENDURE Research Project Title: The Novel Use of Plessey Electric Field Sensors for Measuring Respiration and Other Physiological Parameters in an Animal Model

The least invasive way of measuring respiration in an animal model is whole-body plethysmography. Because we wanted to measure other physiological signals outside of

respiration, we began looking into alternatives and came upon Plessey Electric Potential Integrated Circuit (EPIC) sensors. Use of Plessey EPIC sensors, that detect change in the electric field between them, may present a low-cost alternative that overcomes the lack of versatility in plethysmography. To validate this alternative methodology, recordings from the Plessey sensors were attained by placing awake and behaving Sprague-Dawley rats into acrylic chambers. Sensors were fixed to the chamber in varying positions. Signals from the chips were sampled at a rate of 10,000Hz and converted to raw voltage signals using pCLAMP data acquisition and analysis software (Molecular Devices). A bandpass filter was applied with limits at 1Hz (highpass) and 10Hz (lowpass). Power spectral analysis was then performed on sections of the recorded file corresponding with different behaviors. Separate experiments were conducted using a ketamine-xylazine-acepromazine mixture for anesthesia, which provides adequate sedation for 45-60 min. Paired EKG electrodes were attached to the animal's forepaw and hindpaw, and Plessey sensors were again attached to the chamber in varying positions. Recordings from the Plessey sensors were collected and compared to conventional EKG. Animals were allowed to recover in the plethysmography chambers fitted with the Plessey sensors. During the recovery, recordings were taken from the Plessey sensors and plethysmograph using LabVIEW (National Instruments). To date, we show that the sensors reliably record respiration from awake and freely behaving animals; they may also provide characteristic signals for stereotyped rodent behaviors. Furthermore, conventional plethysmographic and electrocardiographic (EKG) methods of measuring respiration and heart rate validate Plessey sensors as a novel low-cost alternative to monitor cardiorespiratory variables in real-time.

ENDURE TRAINEE ABSTRACT

DAVID NGUYEN

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology, May 2015

Mentors/Advisors at Home Institution: Chris Goode, Ph.D., Robert Gross, M.D., Ph.D., (Emory University) and Claire-Anne Gutekunst (Emory University)

ENDURE Trainee Scientific Interest

After spending time in a research lab over the summer learning various techniques and concepts of neuroscience, my interest lies in brain injury research. Within the context of brain injuries and aging, I want to investigate how damage to the central nervous system (CNS) can affect the connectivity within the brain leading to what would be categorized as a traumatic brain injury (TBI). Many young adults suffer and die from TBI a tragedy that I believe can be prevented should there be more available treatments and information. Hearing stories on the news regarding athletes such as football players falling into bouts of madness or succumbing to the afflictions years after playing a high impact sport, I feel it that more research should be done in order to treat this neurological disorder.

ENDURE Trainee Career Goals and Plan

In the future, after completing my undergraduate studies, I plan on applying for a MD-PhD program. Becoming a doctor is a lifelong goal of mine. The idea of practicing medicine and working in a hospital has always been something I am attracted to. After the 10-week summer research program, I have taken a greater interest in research. Conducting cellular research was quite eye opening in regards to what life is like for a researcher. Taking both careers into consideration, I want to go into both fields. Through working in a clinic as an MD, I may have the opportunity to work with those suffering from TBI gaining knowledge directly from the source and then use this knowledge to help drive my research in the lab. By working in both fields, I am providing myself with a broader spectrum of knowledge that would not be readily available.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Robert Gross, M.D., Ph.D., and Claire-Anne Gutekunst, Ph.D.

ENDURE Research Project Title: Optic nerve crush as viable model for axonal regeneration via C3 Transferase gene therapy

Parkinson's disease is a neurodegenerative disease that primarily affects the central nervous system. The cause lies in the degeneration of the nigrostriatal dopaminergic pathway, which is

responsible for connecting the substantial nigra to the striatum. This degeneration prevents the release of dopamine in the striatum, leading to a loss in motor function, one of the key symptoms of Parkinson's disease. For our research, we use C3 transferase as the key component in a gene therapy. Through this bacterial inhibitor, we aim to inhibit the signaling of RhoA GTPase, a signaling cascade protein, within the regenerating axon growth cones of the CNS neurons. Optic nerve crush model (ONC) provides a minimally invasive avenue into the understanding of axonal damage and regenerative properties of the optic nerve. We hypothesize that C3 would enhance axon growth in the optic nerve crush model. We will perform ONC on adult B6 albino mice. To this end, the ONC model is an ideal approach as it allows for a unique perspective when looking at axonal damage and recovery in the CNS specifically the retina. By crushing the optic nerve, severing the axons we hope to create a simplistic model illustrating the degenerating of the nigrostriatal dopaminergic pathway shown in people suffering from Parkinson's. Following the ONC, we will perform a subretinal injection with a virus created in the lab. Through these two surgical procedures, we hope to see whether or not the C3 transferase will help with axonal regeneration in the optic nerve. Preliminary data suggest that C3 is a viable candidate for inhibiting RhoA. However, virus injections into the optic nerve remain to be carried out.

ENDURE TRAINEE ABSTRACT

SHEKINAH PHILLIPS

Home Institution and State: Agnes Scott College, Georgia

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology, May 2015

Mentors/Advisors at Home Institution: Jennifer Larimore, Ph.D., and Audrey Duarte, Ph.D. (Georgia Institute of Technology)

ENDURE Trainee Scientific Interest

A specific research interest that I have is to study cancer and HIV/AIDS among children. Specifically, I would like to determine if there is a connection between HIV/AIDS and cancer in regards to any neurological foundations. I would like to focus on whether brain tumors are directly related to neurological imbalances. Ultimately, my research interests entail participating in a lab that aims to find the cure for childhood cancer and HIV/AIDS.

ENDURE Trainee Career Goals and Plan

After receiving a B.S. in Biology, my career goals are to earn an M.D./Ph.D in Cancer Biology or Immunology. Afterwards, work in a children's hospital practicing Pediatric Surgery and specializing in neuro-oncology or immunology. During this time, I would work in a lab that focuses on finding a cure for cancer and HIV/AIDS among children.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Georgia Institute of Technology

Mentors/Advisors at ENDURE Summer Research Experience Institution: Audrey Duarte, Ph.D., and Sarah Reaves

ENDURE Research Project Title: The effect of retrospective attention on memory systems

This research project studies how retrospective attention can improve both visual short term memory (VSTM) and long term memory (LTM), to support the idea that they are interactive systems. Retrospective attention is attention deployed to past events. VSTM represents visual information that is no longer available through sensory input. Retrospective cues ("retro-cues") improve VSTM performance by reducing effective memory load. By monitoring contralateral delay activity (CDA) through electroencephalography (EEG), an index is generated to determine how much information is held in VSTM. As a result, less information is being maintained as the CDA reduces. This research project recorded EEG on human subjects during a VSTM task using concrete objects as stimuli, where retro-cues and spatially uninformative cues were presented during the task, ultimately producing data that suggests an interactive systems memory account and are not a discreet system.

ENDURE TRAINEE ABSTRACT

TIERRA SANDERS

Home Institution and State: Spelman College, GA

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology, May 2015

Mentors/Advisors at Home Institution: Karen Brakke, Ph.D., Kyle Frantz, Ph.D., (Georgia State University), and Bradley Cooke, Ph.D. (Georgia State University)

ENDURE Trainee Scientific Interest

My interest is investigating mental illness and its underlying neural mechanisms. I have a passionate interest in social phobia and depression so, I aspire to conduct research pertaining to at least some form of depression and disorders that deal closely with anxiety or somatic symptoms I choose to do this program for research opportunities and my research interest seems to fall under neuroscience just because of the questions I ask myself when curious. I really want to find a way to incorporate medicine, psychology, and neuroscience, because I feel they are interdisciplinary. I found that depression and anxiety seem to be heavily influenced in my life and I really want to understand the foundation of these thought changes and how the brain is interacting to make a person do certain thing. I want to know why a person appetite changes, irregular sleeping pattern, perspiration. I feel like there is something deeper that has not been recognized.

ENDURE Trainee Career Goals and Plan

My career goals are to become a physician possibly in the psychiatry field with clinical research, or maybe I will just go for my MD-PhD. Also, I found out that there is a field called neuropsychiatry that I am interested in pursuing. Furthermore, I want to conduct research on cases that are inspired by my patients. I hope over the summer I can find a site that supports my research interest and maybe even possibly have some medical education and training along with neuroscience. My goal is to prove that my field interest can interconnect with each other and become highly influential together.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Georgia State University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Bradley Cooke, Ph.D., and Kyle Frantz, Ph.D.

ENDURE Research Project Title: Effects of heroin experience and development on nucleus accumbens neurons

The developmental stage of adolescence is insinuated to be a vulnerable period for developing drug abuse, which is predicted to increase the risk of drug addiction. Nonetheless, male rats that self-administer heroin as adolescents show reduced drug seeking following abstinence,

compared with adults. In this study, we investigate a role for neural activity in the nucleus accumbens in age-dependent heroin seeking. Adolescent (35-day old at start; adolescent –onset) and adult (86-day-old at start) male rats acquired lever-pressing maintained by heroin using a fixed ratio one reinforcement schedule (0.05 and 0.25 mg/kg per infusion). Following 12 days of forced abstinence, rats were tested for heroin-seeking over 1 hr by measuring the number of lever presses on the previously drug-paired lever. Brains were extracted and sections prepared for analysis of Fos protein immunoreactivity. Impartial stereology was used to estimate the number of Fos-ir + and Fos-ir- neurons in the nucleus accumbens core and shell. As before, adolescents and adults self-administered similar amounts of heroin, but subsequent heroin-seeking was reduced in the adolescent rats. In contrast to prior results with the medial prefrontal cortex, however, adolescent–onset groups may show some significant neural activation in the nucleus accumbens, whereas adults may show more Fos-ir+ neurons than their saline counterparts in both sub regions of the nucleus accumbens. Ultimately, the overall number of neurons in the nucleus accumbens may be greater in the rats from the adolescent-onset group than adults. The nucleus accumbens therefore may also contribute to age-dependent effects of heroin self-administration.

ENDURE TRAINEE ABSTRACT

LIGIA SELAGEA

Home Institution and State: Agnes Scott College, GA

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience and Public Health, May 2015

Mentors/Advisors at Home Institution: Jennifer Larimore, Ph.D., and Daniel Brat, M.D., Ph.D. (Emory University)

ENDURE Trainee Scientific Interest

My research interests center around the genetic alterations that results in carcinogenesis, cell cycle dysregulation, epithelial-to-mesenchymal transition (ETM), invasion and apoptosis in malignant neoplasms of the brain, such as glioblastoma multiforme (GBM), as well as tumor-derived stem cells.

ENDURE Trainee Career Goals and Plan

Following successful completion of my Bachelor's of Science degree in Neuroscience at Agnes Scott College, I aim to pursue a combined M.D/Ph.D. program in Neurobiology/Cancer Biology, followed by a neurosurgical residency and fellowship. My ultimate goal is to be a neurosurgeon specializing in neuro-oncology, a principal investigator unraveling the molecular mechanism underlying tumor development and progression, as well as a professor of neurosurgery and oncology at a major research institution.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Winship Cancer Institute of Emory University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Daniel Brat, M.D., Ph.D., Monika Anand, Ph.D., and Carol Tucker-Burden

ENDURE Research Project Title: Effect of common genetic alterations on C/EBP β expression in Glioblastoma multiforme (GBM)

Glioblastoma multiforme (GBM) is the most common and the most aggressive primary brain tumor. Despite advances in cancer therapeutics, the prognosis for GBM is still dismal, with less than 5% of patients surviving past the second year. The most common genetic alterations observed in GBM are mutations in the following genes: Epidermal Growth Factor Receptor (EGFR), Phosphatase and Tensin Homolog (PTEN) gene and Tumor Protein 53 (TP53). CCAAT/enhancer-binding protein beta (C/EBP β) is a bZIP transcription factor that has been shown to regulate numerous genes involved in immune and inflammatory response, and has recently been determined to be a master transcriptional regulator, driving the mesenchymal phenotype of GBM. We examined baseline levels of C/EBP β , EGFR, and STAT3 in GBM cell lines and patient-derived neurospheres. These studies showed high basal level of C/EBP β in GBM cell lines and neurospheres. U87MG, EGFRwt, EGFRvIII, 23.11 cells (PTEN inducible) and 20.24 cells (TP53

inducible) were treated with EGF and the downstream effects of EGFR signaling on C/EBP β expression were examined utilizing western blotting and immunofluorescence. Upon EGF stimulation, we observed activation of the receptor, followed by translocation of C/EBP β from the cytoplasm into the nucleus. These results suggest that C/EBP β 's main role is in the nucleus where it may act as a transcriptional regulator of its target genes in GBM. Further studies are needed to confirm the role of EGFR signaling as an important modulator of C/EBP β function.

ENDURE TRAINEE ABSTRACT

RAPHEAL WILLIAMS

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neuroscience, May 2015

Mentors/Advisors at Home Institution: Chris Goode, Ph.D., and Kyle Frantz, Ph.D.

ENDURE Trainee Scientific Interest

My current scientific interests include both pharmacology and sleeping disorders. My pharmacological interests include the neurobiology and behavior of drug-seeking, including methods of addiction and the neural pathways in which addiction begins. I am interested in investigating addiction to very detrimental and physically harmful drugs. I would like to further my research within the aforementioned field. Sleeping disorders are a topic that I have always been interested in, but have not completed any research about them. I would like to learn more about the neural mechanisms of sleeping, why humans need to sleep, how humans dream, and if other animals dream. The disorders of sleep that I am specifically interested in are sleepwalking, sleep apnea, and sleep paralysis.

ENDURE Trainee Career Goals and Plan

Research is one of the main focuses of my career. I would like to continue to perform research in a number of labs starting in my undergraduate experience. I would like to work in labs that can assist my lack of knowledge in the research interests that I have. There are so many more questions that I possess in the field of neuroscience, and I intend to answer as many of them as possible. I am not interested in going to medical school for the time being, so graduate school is my graduate learning experience of choice. I would like to get my Ph.D. in the neuroscience field and further my experience working in labs. One day, after a post-doctorate fellowship, I hope to have a lab of my own. I would like to either work as a lecturer/professor while in the lab or work for a private company, carrying out the goals of the company of employment.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Georgia State University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Kyle Frantz, PhD and Bonnie Williams

ENDURE Research Project Title: Differential effects of simple vs. complex stimulus arrays (discrete cues vs. cues + context) on reinstatement of cocaine-seeking in adolescent and adult male rats

Relapse to drug-taking after abstinence among human and experimental animals can be triggered by specific drug-paired cues and/or contextual stimuli associated with drug intake. Preliminary

results from our laboratory suggest that cue-induced reinstatement of cocaine-seeking is less robust among rats that self-administered cocaine as adolescents, compared with adults. On the other hand, reinstatement triggered by contextual + discrete cues did not differ across age groups, as behavior among younger rats increased to the level of adults. The present experiment tested for generalization of these results to a shorter abstinence period (60 vs. 30 days), different rat strain (Wistar vs. Sprague-Dawley), and background noise conditions (white noise vs. quiet). Male Sprague-Dawley rats (n=12; PND 35 or 84-88 at start) were allowed to acquire lever-pressing maintained by i.v. infusions of cocaine (0.37 mg/kg per infusion, FR1, with 10 sessions, 2 hr each, over 14 days). After 30 days of forced abstinence from the drug, rats underwent one of two test procedures: cues alone (5 1-hr extinction sessions followed by a single 1-hr cue-induced reinstatement test) or context + cues (a single 1-hr reinstatement test in the drug-taking environment and in the presence of discrete drug-paired visual and auditory cues). In our previous behavioral study following a 60-day abstinence period and five-hour extinction session, adolescent rats within a cue-induced reinstatement model had lower active lever presses during reinstatement compared to their adult cohorts. Adolescent rats under the compound exposure conditioning pressed the active lever at a rate similar to that of adult rats. Data comparing these results with new parameters of abstinence, rat strain, and noise conditions will be presented. Results will determine whether complex stimulus arrays drive up reinstatement behavior in rats that self-administered cocaine as adolescents.

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

DANYAL ALAM

Home Institution and State: Hunter College, New York

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology/Chemistry, May 2015

Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest

I am interested in the neural circuitry behind memory and learning

ENDURE Trainee Career Goals and Plan

I hope to continue researching in graduate school, working towards a Ph.D. in Neuroscience

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Michigan

Mentors/Advisors at ENDURE Summer Research Experience Institution: Gina Poe, Ph.D.

ENDURE Research Project Title: The Effects of Single Prolonged Stress on Reversal Learning

Post-traumatic stress disorder (PTSD) is a trauma and stress related disorder partially characterized by a lessened ability to sleep and by learning and memory deficits. The locus coeruleus (LC) and hypothalamic- pituitary-adrenal axis are hyper responsive in PTSD patients. Hippocampus volume in PTSD patients is significantly reduced, which may lead to differences in spatial learning. The goal of this study is to determine the relationship between neural activation in the LC, amygdala, paraventricular nucleus (PVN) and PTSD induced learning and memory deficits. To this end we are using the SPS rat model—which mimics PTSD symptoms in rats. We assessed neural activation in these areas through activation of FOS protein, an early intermediary gene. Reversal learning deficits were determined by measuring errors made on an 8 box maze. Preliminary analysis shows lowered activation in SPS rats than in non-stressed rats. The average errors made per lap on days 3 and 4 of the reversal learning. There was lowered FOS activation in the LC and amygdala. Future research will focus on measuring the firing rates of the LC using microelectrodes as well as exploring the relationship between the circuit and behavior.

ENDURE TRAINEE ABSTRACT

STEFANIE BALBUCA

Home Institution and State: Hunter College, New York

Email: stefanie1955@gmail.com

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology & Biology, 2015

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

ENDURE Trainee Scientific Interest

Stefanie Balbuca is interested in the biological and chemical aspects that underlie behavior. Environmental factors can shape the behaviors we learn and acquire. However, different types of behaviors are observed among all cultures. Like the recognition of facial emotions. We do not acquire this ability but are born with it. In other words, it seems to be encrypted in us. In our genetic code. Therefore, I believe that many of the abilities we possess as human beings are already coded in our DNA, and finding the genes that encode for them, would allow us to determine what genes are expressed or are not being expressed in individuals that show maladaptive and deviant behaviors

ENDURE Trainee Career Goals and Plan

I'm a Biology and Psychology major at Hunter College and after my graduation; I plan to apply to an Phd/MD program. I want to concentrate my research on behavior and the biological characteristics of it. I would like to perform knock out experiments in mice and see how the knockout of those genes affect behaviors such as recognizing a previously presented stimulus.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Michigan

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Robert Thompson

ENDURE Research Project Title: The Role of MicroRNAs in Depression

Depression is one of the most common mental maladies in the United States, and it affects approximately 121 million people worldwide. Thus, it is of great importance to know and understand not only what environmental factors play a role in the development of depressive-like behavior, but also the biological and genetic factors that underlie depression. A class of non-coding RNA sequences called microRNAs (miRNAs) has been shown to be involved in many human maladies such as cancer and psychiatric illnesses. Previous work done in our laboratory has shown differences in miRNA levels—including miRNAs miR-187 and miR-320 in mice that underwent a Chronic Variable stress paradigm (CVS) as compared to wild type mice. We have also shown that Egr1 expression changes in CVS mice. The purpose of our research is to investigate the role of miRNAs, miR-187 and miR-320 in the expression of the genes Rac1 and Egr1.

ENDURE TRAINEE ABSTRACT

ALEX CHEN

Home Institution and State: New York University, New York

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neural Science, May 2015

Mentors/Advisors at Home Institution: Thomas J. Carew, Gary T. Philips, and Ashley Marie Kopec

ENDURE Trainee Scientific Interest

I am interested in better understanding certain behaviors such as learning and memory within organisms using molecular and cellular techniques. I believe that molecular and cellular indications of behavior is more powerful and more substantial than those found through cognitive studies. Using a simple model organism, we can find more about how the organism behaves and more importantly why it behaves the way it does. With the discovery of molecular mechanisms we have the potential to relate it to higher organisms such as humans.

ENDURE Trainee Career Goals and Plan

I will pursue a Ph.D in neuroscience in a graduate school after undergraduate. Ultimately, my goal would be to have a lab of my own and do research in the area I find most intriguing and fascinating.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Michigan

Mentors/Advisors at ENDURE Summer Research Experience Institution: Shawn Xu Zhaoyu Li
Jianke Gong

ENDURE Research Project Title: Identification of neural mechanisms underlying cold detection in *C. Elegans*

In my project in University of Michigan, I've sought to identify a molecular mechanism that is responsible for the detection of acute cold temperatures in *C. elegans*. Through creating many different elementary thermosensory assays, I was able to standardize an assay capable of detecting a difference between dopamine lacking mutants and its wild-type counterparts in their ability to detect and resist low temperatures. I further identified the dopamine3 receptor in *C. elegans* to be remotely associated with this higher resistance to cold waters in the same thermosensory assay.

ENDURE TRAINEE ABSTRACT

METTE CHRISTIANSEN

Home Institution and State: Hunter College, CUNY, NY

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology, 2015

Mentors/Advisors at Home Institution: Vanya Quinones-Jenab, Psychology Department Chair, Director, BP-Endure Regina Miranda, Co-Director BP-Endure

ENDURE Trainee Scientific Interest

I am broadly interested in cognitive and behavioral neuroscience, particularly in human learning and memory.

ENDURE Trainee Career Goals and Plan

My immediate goal is to go to a graduate/phd program in psychology/neuroscience and to pursue clinical and research work.

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 Phelps - Head of Phelps lab, and Elizabeth Goldfarb, Ph.D student

ENDURE Research Project Title: The effect of acute pre-learning stress on implicit hippocampal memory

The effect of acute pre-learning stress on implicit hippocampal memory Mette Christiansen,^{1,2} Elizabeth Goldfarb,² Elizabeth A. Phelps^{2,3,4} 1 Department of Psychology, Hunter College, CUNY, New York, NY, 10065, USA; 2 Department of Psychology, New York University, New York, NY, 10012, USA; 3 Center for Neural Science, New York University, New York, NY, 10012, USA; 4 Emotional Brain Institute, Nathan Kline Institute for Psychiatric Research, Orangeburg, NY, 10962, USA Stress is prevalent and a serious concern in healthy individuals as well as in those with psychiatric illnesses. While it is recognized that stress can both enhance and impair declarative memory, known to depend on the hippocampus, contextual memories that are implicit have also been shown to depend on the hippocampus. The effect of acute stress on this implicit contextual memory is under studied. Here we aim to determine how implicit hippocampal memory for spatial configurations is impacted by acute pre-learning stress. We hypothesized that acute stress introduced prior to learning would impair implicit hippocampus-dependent memory. We used the contextual cueing task, in which repeated spatial configurations cue participant response, to assay the influence of acute stress on this process. Memory for repeated spatial configurations in this task has been shown to depend on the hippocampus and is not declarative. The cold pressor test was employed to induce an acute pre-learning stress response, as it has been shown to reliably activate the hypothalamic-pituitary-adrenal axis, resulting in elevated levels of the stress

hormone cortisol. Participants (N = 32; 7 males, 25 females) were randomly assigned to stress or no stress groups. Preliminary results indicate that the stressor was effective; resulting in significantly increased salivary cortisol levels in the stress group. Further, stress impaired implicit hippocampal memory, illustrated by decreased learning over the course of the experiment. Importantly, neither stressed nor unstressed participants showed explicit, declarative memory for the repeated configurations. Taken together our results suggest that acute pre-learning stress impairs implicit hippocampal memory, with important implications for patients experiencing stress-related memory deficits as well as healthy populations. This project was supported in part by the NIH-NINDS BP-Endure Grant R25NS080686; NSF Graduate Research Fellowship to EG; NIH R01MH097085 to EAP.

ENDURE TRAINEE ABSTRACT

LAURA CRACIUM

Home Institution and State: New York University, New York

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neural Science, May, 2015

Mentors/Advisors at Home Institution: Dr. Adam Carter, New York University

ENDURE Trainee Scientific Interest

My main interests lie in exploring the functional properties of neurons and their circuitry in the prefrontal cortex, an area of the brain involved in high-level processing and behaviors. I am currently looking at a subpopulation of D1-positive neurons in the deep layer of the PFC and examining their inputs and outputs.

ENDURE Trainee Career Goals and Plan

After graduating from NYU with a major in neural science, my goal is to enroll in an MD/PhD program to continue research in the growing field of neural science and combine it my interests in medicine.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Brown University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Rosa Martinez-Garcia (2), Dr. Mark Zervas (2) and Dr. Barry W. Connors (1) Departments of (1) Neuroscience and (2) MCB, Brown University

ENDURE Research Project Title: Classification of Neurons in the Thalamic Reticular Nucleus

The thalamic reticular nucleus (TRN) plays an important role in the regulation of information transfer between thalamus and the neocortex, controlling firing patterns through negative feedback and feedforward circuits. Nicknamed “the attentional gate,” it has been proposed that the TRN influences the processing of sensory information. All TRN cells are GABAergic and inhibitory. Inhibitory interneurons can be classified by the expression of specific proteins. We examined the expression patterns of three proteins in the TRN: the calcium-binding protein parvalbumin (PV), the neuropeptide transmitter somatostatin (SOM), and the ionotropic serotonin receptor (5HT3aR) to determine whether these biomarkers define subtypes of TRN neurons; this could lead to a better understanding of the TRN’s poorly understood functions. Mouse brain slices were obtained from different angles and marked by immunofluorescence staining to show expression of each protein in the TRN. We found that PV was highly expressed in all TRN cells, cells with SOM expression were patchier and dorsally concentrated, and 5HT3aR-expressing cells were completely absent. Future studies should examine the correlation between mappings of the TRN’s interneurons and their physiological and cellular properties. This project was supported in part by the BP-Endure NIH-NINDS Grant # R25-NS080686 and by Brown University.

ENDURE TRAINEE ABSTRACT

JENNIFER GARRAWAY

Home Institution and State: Hunter College - City University of New York

Email: jgarrawa@hunter.cuny.edu

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology and Sociology, May 2014

Mentors/Advisors at Home Institution: Dr. James Gordon

ENDURE Trainee Scientific Interest

Jennifer is currently writing her honors thesis in Dr. Jim Gordon's Visual Psychophysiology Lab at Hunter College. Her research project in Dr. Gordon's lab is to determine if the mechanisms of post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) have an impact on the visual processing areas of the brain. Research using PET scans have detected increased blood flow, edema and hemorrhaging in areas of the brain in individuals with PTSD and TBI. Jennifer is exploring whether these neurological deficits produce changes in inhibitory and excitatory processes of the brain. By using visual evoked potentials (VEPs) to record electrical signals in the brain she can measure spatial activity in the brain and quantify underlying cortical processes.

ENDURE Trainee Career Goals and Plan

After graduating from Hunter College, Jennifer plans to participate in a summer long post baccalaureate international neuroscience program in Denmark. Hopefully she will be afforded the opportunity to increase her awareness of international research issues in the area of neuroscience. This experience in addition to her internship at Samaritan Village, a residential and out-patient treatment facility for veterans who suffer from PTSD and substance abuse will undoubtedly prepare Jennifer for a future conducting research studies involving individuals suffering from an array of neurological deficits including addiction. Jennifer's plans for graduate school will hopefully lead her to a PhD program in neuropsychology where she can continue to research and study the neuropathology of neurological diseases and hopefully help to identify biomarkers that will be essential in determining an individual's predisposition to PTSD.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Brown University

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

ENDURE Research Project Title: Stimulant Effects on Emotion in Healthy Volunteers

Drug abuse costs the United States economy hundreds of billions of dollars in health care costs, crime, and lost productivity. Recent research has increased our understanding of addiction, which is now recognized as a chronic relapsing brain disease expressed in the form of compulsive behaviors and emotional responses. Our aim was to determine if stimulant effects have the

potential to cause a direct correlation between emotional responses and responses in the brain. To this end, we conducted a placebo-controlled study using the Drug Effects Questionnaire (DEQ), to determine and quantify emotional response to stimulants. A sample of 45 healthy volunteers aged 18 – 35 assessed their mood state by indicating from 1 to 100, four subjective states: 'Feel Drug', 'Like Drug', 'Feel High' and 'Want More' after ingesting amphetamine. A significant interaction over time on drug effects was observed [(DEQ1) $F(7,36)=6.2$, $p<.001$, (DEQ2) $F(7,36)=5.4$, $p<.001$, (DEQ3) $F(7,36)=7.8$, $p<.001$, (DEQ4) $F(7,36)=6.1$, $p<.001$]. Thus suggesting that exposure to amphetamine has a significant effect on mood and emotional responses over time. This study clearly indicates what an important role lifestyle plays in addiction.

ENDURE TRAINEE ABSTRACT

THEMASAP KHAN

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neural Science, May 2015

Mentors/Advisors at Home Institution: Dr. Dimitris Placantonakis

ENDURE Trainee Scientific Interest

The scientific research funded by the ENDURE program regards neuroscience and oncology related fields. The research is interested in understanding the formations of gliomas and their true roots of mutation.

ENDURE Trainee Career Goals and Plan

My career goals are enrolling in a MD-PhD after completion of the program and post-graduation.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Vanderbilt University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Alfred George

ENDURE Research Project Title: Drug Discovery for Alternating Hemiplegia of Childhood

Alternating Hemiplegia of Childhood (AHC) is a rare, yet especially devastating pediatric neurological disorder characterized by dystonic attacks, dyspnea, nystagmus, and other developmental cognitive impairments all presenting before 18 months of age. AHC has been theorized to be a de novo missense mutation in the ATP1A3 gene which codes for the $\alpha 3$ subunit of the Na,K-ATPase, ubiquitously expressed neuron-specific $\alpha 1$ isoform. We developed and optimized a thallium flux protocol, previously utilized in the study of potassium channels and transporters, for a high throughput drug screen on HEK cells overexpressing the $\alpha 3$ isoform of the Na,K-ATPase. The goal of this assay development is the eventual performance of a high throughput screen on a candidate library of potential pharmaceuticals. Two mutations (D801N, E815K), were integrated into HEK cells to make stable cell lines and were then tested using Ouabain, a cardiac glycoside, drug resistance and sensitivity. Previous research has shown $\alpha 3$ -specific concentrations of Ouabain disrupt neuronal firing concluding the importance of $\alpha 3$ function in the central nervous system. Therefore, discovery of a drug that can act either as an activator or an inducer of successful transportation of the protein to the cell membrane could potentially act as a therapeutic agent in this neurological disease. This project was funded by BP-ENDURE grant # R25-NS080686 and by The Alternating Hemiplegia of Childhood Foundation.

ENDURE TRAINEE ABSTRACT

HAMEDA KHANDAKER

Home Institution and State: CUNY - Hunter College, New York

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: May 2014

Mentors/Advisors at Home Institution: Dr. Victoria Luine

ENDURE Trainee Scientific Interest

My major interest in neuroscience lies in the biological and behavioral aspects of the brain in conjunction with emotions, cognition, stress, and memory. I aspire to become a professor conducting research in mental-health related studies. Mental-health research has primarily focused on negative emotions such as fear, anxiety and stress. It would be interesting to know how the more positive emotions are processed and analyzed in the brain and in what ways negative emotions can become a major preoccupation in people with depression and other emotion-related disorders.

ENDURE Trainee Career Goals and Plan

I aspire to become a professor in a college setting conducting my own research regarding mental health disorders. BP-ENDURE has exposed me greatly to vast regions of neuroscience related research and is helping me become more grounded in my interests. Participating in summer abroad research internships and working with a mentor at our home institutions for 2 years helps to expose to the full experience of conducting research and gathering Intel on how various mentors teach their students. BP-ENDURE has also greatly helped with developing my psychology linguistic skills.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Vanderbilt University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Alexander Maier

ENDURE Research Project Title: Contour Adaptation Does Not Survive Prolonged Absence of Visual Stimulation

The motion after-effect (MAE) is a well-studied visual illusion in which adaptation to unidirectional motion causes subsequently viewed static images to seemingly move in the opposite direction. MAE is not disrupted by intervening periods of darkness or alternate patterns between adaptation and the static probe suggesting that the visual system builds up perceptual memory, or storage, of the motion adaptation. Contour Adaptation (CA) is a recently described illusion in which adaptation to contrast-reversing boundaries of shapes leads to subsequent perceptual invisibility of their solid counterparts when presented in the adapted region. We aimed to see if CA exhibited storage similar to MAE by varying the time between adaptation and shape presentation. We found

that storage of CA adaptation lasts for ~ 200ms subsequent to 2s of adaptation, which contrasts with previous findings for MAE and related phenomena. This difference in storage capacity between CA and MAE may be due to the fact that MAE is believed to involve processing in higher level brain areas than CA. We argue that MAE relies on activity in motion-sensitive area MT+, while CA may be predominantly processed in the primary visual cortex, which may be less susceptible to long-term effects of visual adaptation. Our results suggest that CA is fundamentally different in its basic characteristics than other aftereffects, implying more basic routes of visual processing in the brain in comparison. Work was supported by a Tom Slick Research Award from the Mind Science Foundation and BP-ENDURE grant NIGMS-NIH R25 NS 080686. We thank P. Newburn for help with the data collection, and B. and R. Williams for technical support. MC is supported by a graduate research fellowship of the National Science Foundation (DGE-0909667), AM is supported by grants from the Whitehall Foundation and the Sloan Foundation.

ENDURE TRAINEE ABSTRACT

TEMIDAYO OREDERU

Home Institution and State: CUNY Hunter College, New York

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, 2014

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

ENDURE Trainee Scientific Interest

Temidayo is interested in the neural networks that give rise to decision-making and emotion regulation as well as the situations that result in their failure. She is specifically interested in regulation among individuals who suffer from mental pathologies such as anxiety disorders.

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 minors. 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: New York University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Candace Raio and Dr. Elizabeth Phelps

ENDURE Research Project Title: Stress Impairs the Reversal of Conditioned Fear

Stress Impairs the Reversal of Conditioned Fear. Temidayo Orederu¹, Candace M. Raio², Catherine Hartley^{2,3}, Elizabeth A. Phelps^{2,4,5}; ¹Department of Psychology, Hunter College; ²Department of Psychology, New York University; ³Department of Developmental Psychobiology, Weill Cornell Medical College; ⁴Center for Neural Science, New York University; ⁵Nathan Kline Institute for Psychiatric Research Conditioned fear can be modified when cues come to predict different outcomes, a process that involves the amygdala, striatum and prefrontal cortex (PFC). Previous studies have found that such regulatory processes decrease the expression of conditioned fear, however, these studies do not account for situations where stress is also present. Furthermore, stress has been shown to interfere with cognitive flexibility and PFC-dependent tasks. We tested the hypothesis that stress decreases the ability to update affective responses. To this end, 62 participants underwent a Pavlovian fear-conditioning paradigm whereby one conditioned stimulus (CS+) was paired with a wrist shock on a subset of trials while the other (CS-) was never paired with shock. Participants returned 24 hours later for a similar session; however, the cue contingencies were reversed (the previous CS- was paired with shock and the original CS+ became a safety signal). Consistent with past work, we expect control participants to flexibly change their responses to the stimuli. However, due to the impairing effects of stress, we hypothesize that stressed participants will show impairments in their ability to update conditioned fear responses. Such a demonstration would suggest that the stress that accompanies fearful circumstances reduces one's ability to adequately modify fear. This work was supported by the NIH Grant 1R01MH097085 to EAP & NIH-NINDS R25NS080686.

ENDURE TRAINEE ABSTRACT

LASHAWN PENA

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: May 2014

Mentors/Advisors at Home Institution: Dr. Vanya Quinones-Jenab and Dr. Regina Miranda

ENDURE Trainee Scientific Interest

My scientific and research interests are in learning and memory. I am interested in understanding the biological mechanisms of emotional memory, particularly in how the brain learns and stores information about danger.

ENDURE Trainee Career Goals and Plan

Immediately after my undergraduate studies, I want to go to graduate school and obtain my PhD in Neuroscience. As for what I want to accomplish in the future, I want to hopefully one day enter academia. It is my desire to have my own lab at an institution where in addition to running my research lab, I can teach undergraduate psychology/neuroscience courses.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: New York University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Joseph LeDoux

ENDURE Research Project Title: Effects of Amygdala Damage and Reversible Inactivation on Aversive Pavlovian-to-Instrumental Transfer in a Rodent Sidman Avoidance Paradigm

Pavlovian-to-instrumental transfer (PIT) demonstrates the ability of classically conditioned stimuli (CS) to modulate instrumental responding, either through specific or general processes. While the neural circuits underlying these different forms of PIT in appetitive conditioning have been found to include the amygdala and ventral striatum, very little is known about the neural control of aversive PIT. My projects involves an aversive PIT task using rats in which presentation of an aversive CS augments ongoing 2-way shuttling behavior that had previously been trained on a Sidman active avoidance schedule. Using this task to determine a PIT baseline for each subject, the impact of electrolytic lesions of the lateral (LA), basal (B) or central (CE) amygdala on PIT will be evaluated by performing additional tests following recovery from surgery.

ENDURE TRAINEE ABSTRACT

MICHAEL RABADI

Home Institution and State: New York University

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Neural Science, September 2014

Mentors/Advisors at Home Institution: Lynne Kiorpes, Najib Majaj, and Chiye Aoki

ENDURE Trainee Scientific Interest

I am interested in the perception of objects in primates and how object recognition develops over the lifespan. I am currently studying how non-human primates are able to categorize objects based on complex visual stimuli. The goal is to develop a computational model to describe non-human primate object recognition and compare their behavioral performance to both inferior temporal cortex recordings and human psychophysics data.

ENDURE Trainee Career Goals and Plan

I am seeking a PhD so that I may continue basic research in neural science at the systems and computational level. I am especially interested in the computations that the brain performs on visual input that eventually gives rise to object recognition and perception. I plan to eventually apply my research to both computer vision and brain computer interfacing. I hope to one day to be the primary investigator of my own research and run my own lab. I am also passionate about education and a major personal goal is to utilize modern technology to find novel ways to improve public scientific literacy.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Brown University

Mentors/Advisors at ENDURE Summer Research Experience Institution: David Sheinberg

ENDURE Research Project Title: Perceptual Limits of Primate Object Invariance

Human adults effortlessly recognize objects regardless of their relative size, pose, place in the visual field, or other identity preserving transformations, a property called invariance. Many studies suggest that the population response of inferior temporal cortex neurons gives rise to the perceptual experience of objects. However, the neurophysiological studies are conducted in monkey cortex and it is unclear whether monkeys perceive and categorize objects the same way that humans do. To address this problem, we are exploring the limits of object perception in monkeys. Utilizing an “odd-man out” task, we ask the monkey to select the odd one of three stimuli despite invariant transformations of size, changes in relative rotation, and across background composition. Preliminary data suggests that monkeys are able to recognize the odd-man despite variations in size, but only over a restricted range. Surprisingly, the monkeys’ performance is unaffected by in-plane rotation of the stimuli. Monkeys’ performance is also unaffected by backgrounds, suggesting good discrimination of stimulus from background. If we can understand the perceptual experience of monkeys, then we will be able to compare their object recognition abilities to humans and directly relate their performance to the underlying neural representation.

ENDURE TRAINEE ABSTRACT

PRIYANKA RAMESHA

Home Institution and State: New York University; New York

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Neural Science, May 2015

Mentors/Advisors at Home Institution: Andrew Varga (at Eric Klann's Lab)

ENDURE Trainee Scientific Interest

I am interested in studying the interplay between sleep and memory (where the bigger picture would be to understand the neural mechanisms of synaptic plasticity, etc). Currently, to aid my interest, I work as a research assistant in the Klann lab at NYU.

ENDURE Trainee Career Goals and Plan

I plan on obtaining a Ph.D in Neuroscience and eventually go into academia, where I would like to become a tenured professor at a research institution.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Michigan

Mentors/Advisors at ENDURE Summer Research Experience Institution: Jonathan Morrow

ENDURE Research Project Title: The Effects of Hippocampal Lesions on Sign-Tracking and Conditioned Fear

Drug addiction and post-traumatic stress disorder (PTSD) involve the excessive transfer of salience to conditioned cues. Both disorders have core behavioral traits, such as the “sign-tracking” and “goal-tracking” behaviors, that contribute to variation among individuals in the motivational value assigned to predictive cues. We hypothesized that the hippocampus plays a role in mediating this difference because of its role in contextual learning/fear and that hippocampal lesioning would facilitate the development of both conditioned activity to food- and fear-related cues while diminishing conditioned responses to context. To test this hypothesis we are using animal models. Sign trackers are animals that learn to interact more with a cue predicting reward; goal trackers are animals that learn to go to the location of the reward. Sign-trackers show greater conditioned responses to discrete cues, while goal-trackers appear to be more influenced by contextual cues. We performed hippocampal lesions by injecting the neurotoxin NMDA on rats. After the surgery, we used a conditioning procedure (“autoshaping”) to examine their sign/goal tracking behavior. After autoshaping, the animals underwent fear conditioning, where we observed their freezing to discrete cue vs. contextual cue. We expected to see a difference in tracking behavior, where more rats sign track, but no significant results were found.

ENDURE TRAINEE ABSTRACT

AMANDA RINCON

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, August 2014

Mentors/Advisors at Home Institution: Tracy Dennis

ENDURE Trainee Scientific Interest

I am interested in understanding the affects emotions have on behavior and the dynamics between emotional responses and day to day behaviors. Specifically, I want to work with individuals whom may suffer from mental disorders such as bipolar disorder, post-traumatic stress disorder, depression, anxiety, etch and explore how different emotional states affect their behavior. Understanding emotions and the mental functions that are associated with them will provide me with a better understanding of the psychological processes that drive behavior while looking at the behavioral processes that are going on in an individual and how they differ from person to person.

ENDURE Trainee Career Goals and Plan

In the upcoming semesters I hope to gain more experiences through the BP ENDURE program so that I may better define my areas of interest while learning new methods in which to conduct research. I also hope to gain experience by participating in a post baccalaureate in Europe that will help shape my understanding of mental functions and behaviors. In the Fall of 2015 I look forward to attending graduate school so that I may obtain a Ph.D. in Behavioral Neuroscience and eventually conduct research in an academic setting.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Vanderbilt University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Laurie Cutting

ENDURE Research Project Title: Whole Brain Volumetric Analysis of the Relationship Between Attention-Deficit/Hyperactivity Disorder and Depressive Symptoms in Adolescents

Previous research indicates that volumetric abnormalities exist in attention-deficit/hyperactivity disorder (ADHD) and are linked to ADHD symptomology. Volumetric abnormalities have also been reported in depression. Additionally, there is overlap between ADHD symptoms and depression. However, it is unclear whether there are substantial overlaps in ADHD and depressive symptoms in terms of their linkage to brain structure. For example, research studies have reported volumetric differences in the caudate of individuals with a depressive disorder, a finding that has also been reported in ADHD; however, it is unclear whether caudate abnormalities can be attributed to ADHD or depressive symptoms. The present study examines correlations between

brain volumes, ADHD, and depressive symptomology. To this end, this study examines the relationship between ADHD and depressive symptoms with whole brain volumes. A sample of 135 children ages 9-14 years old were tested using the child behavior checklist (CBCL; used to measure the degree of ADHD and depressive symptoms). Magnetic resonance imaging was used to acquire anatomical scans (T1 3D TFE with 1mm³ voxels) and data were analyzed on FreeSurfer. Our results will provide a better understanding of the relationship between ADHD and depression symptomology and brain structure by providing a means to differentiate neurobiological findings.

ENDURE TRAINEE ABSTRACT

CRISMELDY VELOZ

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, May 2014

Mentors/Advisors at Home Institution: Dr. James Gordon

ENDURE Trainee Scientific Interest

The human visual system undergoes major early developmental changes that lead to differences between males and females in cortical brain structural. Interestingly, behavioral tests show that females tend to have better color vision while males tend to have better spatial vision. For this reason, my current interest is to investigate the neural mechanisms underlying the visual spatial differences. In particular I am interested in looking at the long and short range lateral interaction in males and females. I am also interested in conducting research studies based on the primary causes and consequences of autisms and epilepsy.

ENDURE Trainee Career Goals and Plan

I plan to peruse a PhD in hopes of studying the aspects of epilepsy and/or autistic spectrum disorders. In addition I would also like to conduct research where I can connect the inherited components of these types of diseases utilizing neurogenetics. I also look forward to forming a research training group where mentors can visit high school students and provide them with information about careers and training in research.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Vanderbilt University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Carissa Cascio

ENDURE Research Project Title: Multifaceted Empathy Test in Relation to Autistic and Schizophrenia Traits.

Many psychiatric disorders (including autism and schizophrenia) have common abnormalities in cognitive, self-processing and other emotional components. Behavioral tests show that individuals with autism spectrum disorders (ASD) are impaired in cognitive empathy but they do not differ from controls in emotional empathy. This study was designed to measure the spectrum of autistic and schizophrenic traits in the general population in relation to cognitive and emotional empathy measured with the multifaceted empathy test (MET-J). Our goal was to investigate where in the continuum of symptoms individuals in the general population fit if they do not present clinical-level symptoms. It is hypothesized that healthy participants that score higher on cognitive empathy measured with the (MET-J) will show less aloof personality in the broad autism phenotype questionnaire (BAPQ); and less social anxiety, less constricted affect and show signs of not having close friends in the schizotypal personality questionnaire (SPQ). Our lab tested this hypothesis

using the multifaceted empathy test (MET-J) task in relation to the BAPQ and the SPQ traits. We observed 27 control healthy participants, 18 males and 9 females within the ages of 20-54. Responses from the MET-J task and the BAPQ and SPQ questionnaires were compared using Pearson correlation coefficients. Our current data support previous studies and now we will look at a general population to look at brain activation in the insula and investigate how it is related to cognitive empathy. BP-ENDURE NIH-NINDS # R25-NS08068

ENDURE TRAINEE ABSTRACT

TAMAR K. WINER

Home Institution and State: Hunter College; City University of New York

Email: twiner@hunter.cuny.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology, May 2015

Mentors/Advisors at Home Institution: Glenn E. Schafer, Ph.D.

ENDURE Trainee Scientific Interest

My research interests include learning and memory, neural plasticity, circuitry of temporal lobe structures, and mechanisms of epilepsy.

ENDURE Trainee Career Goals and Plan

I hope to be pursuing graduate studies (Ph.D.) within the neurosciences, after earning my baccalaureate degree. Once I successfully obtain my doctorate, I hope to continue as a researcher, professor, and clinician within academia.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Michigan, Ann Arbor

Mentors/Advisors at ENDURE Summer Research Experience Institution: Michael A. Sutton, Ph.D., and Erin M. Johnson-Venkatesh, Ph.D.

ENDURE Research Project Title: Regulation of SIRP α Cleavage by the Intracellular Domain

SIRP α 's (Signal regulatory protein α) extracellular domain promotes excitatory synaptic development. The lab previously found that activity dependent active domain shedding of SIRP α facilitates presynaptic maturation. Neural activity promotes the cleavage the extracellular domain of SIRP α , and the ectodomain shed sequentially promotes presynaptic terminal maturation. Alterations and defects in hippocampal synapse maturation have been linked to several neurodevelopmental disorders such as autism and schizophrenia. We hypothesize that the efficiency of extracellular cleavage could be regulated by the intracellular domain. In order to further understand the regulation of SIRP α and to test the hypothesis, we deleted intracellular domain (SIRP-C) and measured changes of SIRP α cleavage using Western Blot analysis. The blots were probed with anti-SIRP antibody (N terminus). We then compared the level of protein secreted within the media of the transfected cells to the amount in the lysate of the samples (both WT and SIRP-C) and an underlying trend was found where the SIRP-C cleaved more efficiently than the WT. The results suggested that cleavage of SIRP α is more efficient without the intracellular domain.

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

JESSICA AUGHENBAUGH

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

Email: jaughenmsu@gmail.com

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Chemical Engineering, April 2015

Mentors/Advisors at Home Institution: Dr. Jessica Houston

ENDURE Trainee Scientific Interest

Dr. Houston's lab focuses on improving the ability to measure the fluorescent lifetime of different cellular environments with the use of a method known as flow cytometry. My interest lies in the ability of the FACSVantage flow cytometer to identify the autofluorescent characteristics of the cell type known as P-19 Embryonal Carcinoma (Mus Musculus). The purpose is to introduce a new biological cell type into the lab and perform sorting based applications when the cells are differentiated into neural/glia cells by exposure to Retinoic Acid and cardiac/skeletal cells by treatment with DMSO.

ENDURE Trainee Career Goals and Plan

Currently, I am entering into my 2nd semester in BRAiN. My career plan is directed to achieving admission into a neuroscience graduate program, specifically related to Bioengineering and the study of neurological pathways in the brain correlating sensory input to motor output, and the development of new technology aimed to improving mobility of individuals suffering from paralysis and/or loss of limb.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Diego Restrepo, Dr. Ernesto Salcedo, Dr. Emily Gibson, Mariana Potcoava, Greg Futia, and Isabel Schlaepfer

ENDURE Research Project Title: Analysis of Raman Spectra of Cancer Cells Drugged with MPA and R1881

Raman spectroscopy is an optical, noninvasive technique used to study the biochemical makeup of cell and tissue samples. In the Raman process, light is inelastically scattered off of a vibrating molecule, and results in a change in the wavelength of the scattered light dependent on the vibrational energy. A spectrometer spatially separates the different wavelength photons along a sensitive CCD (Charged Couple Device) camera for detection. These measured Raman spectra contain a molecular-specific "fingerprint" that represents the chemical makeup of the sample. In this study, Raman spectroscopy is used to evaluate the chemical changes of lipids present in cancer cells that are treated with medroxyprogesterone acetate (MPA) and Metribolone (R1881). Using the measured spectra, we compared the treated cancer cells with untreated cells. Cancer

cells were plated on coverslips and placed in 6-well plates and treated with MPA (10nM), R1881 (10nM), or untreated. Cells were fixed in 4% formaldehyde prior to imaging. Raman spectra show clear differences between the treated and untreated cell lines. Additionally coherent anti-Stokes Raman scattering microscopy was used to image the lipid content in the cells. Raman spectroscopy can have broad use for examination of lipids in the other tissues, including the brain.

ENDURE TRAINEE ABSTRACT

JESSICA BAYNARD

Home Institution and State: University of Colorado, Denver

Email: jessica.baynard@ucdenver.edu

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, May 2014

Mentors/Advisors at Home Institution: Dr. Sondra Bland

ENDURE Trainee Scientific Interest

At my home-lab I have worked closely with Dr. Sondra Bland to understand the implications of isolation rearing on neural activity in the medial prefrontal region of rats. We hypothesized that isolate reared rats presented with a novel conspecific, either aggressive or non-aggressive, would show hypofunction in the medial frontal cortex. Using immunohistochemistry I was able to analyze the neural activity levels of these rats. My current research project, in this lab, looks at the implications of isolation rearing on the cannabinoid receptors in the amygdala.

ENDURE Trainee Career Goals and Plan

I career goal is to complete a PhD in Clinical Neuropsychology, as I find human behavior and the brain one of the most fascinating aspects of life. Everyone sees the world slightly different than everyone else, based solely on his/her own personal experience. For some individuals the world is vastly deviated because of a neurological disorder. I want to learn the skills necessary to improve the quality of life for as many of those individuals as possible. My goal is to learn to assess clients, provide them with the tools to improve their mental health, and move towards research with human models.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado, Anschutz Medical Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Daniel Raible, and Dr. Amy Brooks-Kayal

ENDURE Research Project Title: Examination of the GABA type A receptor subunits and short term memory after traumatic brain injury

Post-traumatic Epilepsy (PTE) is a process that can develop weeks to years after an initial Traumatic Brain Injury (TBI). However, little is known about the molecular and cellular causes of PTE. In our lab, the Janis Kinase/Signal Transducer and Activator of Transcription (JaK/STAT) pathway is being researched in mice to determine the downstream effect of pathway activation, shown by phosphorylation of STAT3, after TBI. In this research, we characterized mice that have undergone an experimental TBI, controlled cortical impact (CCI). Prior TBI research has revealed a positive correlation between the severity of TBI and likelihood of developing PTE. Therefore, in this

experiment the severity of CCI ranges from a moderate (1mm depth impact) to severe (2mm depth impact). Previous research displayed decreased levels of GABA type A receptor alpha 1 subunits which correlated with increase phosphorylation of STAT3 in the hippocampus of rats immediately after TBI. Through the use of immunoblotting we found a significant decrease in the GABA type A receptor alpha 1 subunit levels in the ipsilateral hippocampus of mice 12, 14 and 16 weeks after a severe CCI injury. More so, the GABA type A receptor alpha 4 subunit levels in the ipsilateral hippocampus of these mice have significantly increased after the severe CCI injury. This variation in the GABA type A receptor alpha 1 and GABA type A receptor alpha 4 subunit levels suggest subunit composition may be altered, since five subunits are needed for a functional GABA type A receptor subunit. Additionally, this study examined the behavioral aspects of TBI using the novel object recognition and placement (NOR) testing. NOR is a well-established test to evaluate memory function in animals. CCI mice were placed in a wooden box, and tested 4 times for 5 minutes on each test. Mice were given an open field test, an object acquisition test, a novel placement test, lastly a novel object test. The tests were video recorded at two and 12 weeks after initial CCI. Recordings were reviewed by a blinded party to determine what influence CCI and PTE on short-term memory. We found CCI injured and sham mice show no significant difference in exploration of objects in the acquisition and novel placement tests.

ENDURE TRAINEE ABSTRACT

DENNIE BRADY

Home Institution and State: University of Colorado Denver, Colorado

Email: dennie.brady@ucdenver.edu

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: BS Psychology, May 2014

Mentors/Advisors at Home Institution: Bruce Mandt, Ph.D.

ENDURE Trainee Scientific Interest

I came into this program with a broad interest in Neuroscience, which persists today. Currently I am performing research focused on alcohol abuse, my interest stemming both from personal experience (family) and the recognition of its prevalence and effects on society.

ENDURE Trainee Career Goals and Plan

I plan on applying to MD-PhD programs starting in the Spring of 2014. As a professional, I plan to be able to both practice medicine as well as perform research to further contribute to and advance the field. I have additional interests in Global Health, which will expose me to a broad range of perspectives as I travel abroad as a physician/researcher.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado Denver and Anschutz Medical Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Bruce Mandt, Ph.D., Sondra Bland, Ph.D., Diego Restrepo, Ph.D., and Ernesto Salcedo, Ph.D.

ENDURE Research Project Title: Genetic differences in initial sensitivity to alcohol as a predictor of alcohol self-administration behaviors

Alcohol abuse remains a serious public health concern. According to the CDC, excessive alcohol consumption cost the United States \$223.5 billion in 2006. The five-year average for annual alcohol-attributable deaths between 2001-2005 was 79,000. Thus, identifying risk factors for the development of alcohol use disorders is critical for disease prevention. Research into twins, siblings, and adoptees has shown alcoholism to be a heritable disease. However, a familial history of alcoholism is not the only indicator of a risk for alcoholism; studies have shown that an individual's initial response to alcohol can also be indicative of risk for future alcohol use disorders. Specifically, individuals with a low initial response to alcohol have been found to be at a greater risk of alcohol abuse or dependence later in life. Similar to humans, individual differences in alcohol (i.e., ethanol; EtOH) responsiveness also can be seen in rats. For example we have selectively bred rats for differential sensitivity to acute EtOH and have now identified the responsible quantitative trait loci (QTL). However, the relationship between individual differences in acute EtOH sensitivity and EtOH self-administration behaviors has yet to be determined. Thus,

this study utilized paradigms of EtOH self-administration in selectively bred congenic rats to test the hypothesis that QTLs responsible for an initial low sensitivity to acute EtOH also increase EtOH self-administration behavior. Rats were trained to self-administer EtOH using a sucrose fade procedure (10% - 0% Sucrose; 0% - 10% EtOH) under a fixed ratio 1 (FR1) schedule of reinforcement. The response requirement was then increased to a FR4 schedule of reinforcement and dose-consumption testing was conducted (10% - 30% EtOH). Finally, motivation to respond for 10% EtOH was assessed using a progressive ratio schedule of reinforcement. Currently, we have not found consistent differences in EtOH intake between the various congenic strains; however, data collection is still underway. We are also in the process of testing the relationship between these QTLs and additional measures of EtOH consumption (e.g., binge-like drinking behavior). Ultimately, these studies will further our understanding of the genetics underlying individual differences in acute alcohol sensitivity and an increased risk for the development of alcohol use disorders.

ENDURE TRAINEE ABSTRACT

ELIZABETH FARRO

Home Institution and State: UCCS, Colorado

Email: Elizabethfarro@gmail.com

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, May 2014

Mentors/Advisors at Home Institution: Dr. Michael Kisley

ENDURE Trainee Scientific Interest

I am primarily interested in the social implications and functional applications of the human mirror neuron system, but I enjoy a variety of research topics, including olfaction, emotion recognition, emotion regulation, and attention deployment.

ENDURE Trainee Career Goals and Plan

I will earn a Ph.D. in either neuroscience or cognitive science.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: UC Denver's Anschutz Medical Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Ernesto Salcedo and Dr. Diego Restrepo

ENDURE Research Project Title: The Role of TRPM5 Channels in the Detection and Processing of Pheromones

Recent research has shown that a subset of olfactory sensory neurons express the TRPM5 calcium channels in olfactory sensory neurons response to pheromones, but not to other odorants. In this study, we explore the role that the TRPM5 channel plays in exploratory olfactory behavior and in the construction of the odor map in the mouse main olfactory bulb. We used two transgenic strains of animals: (1) TRPM5-GFP, in which the green fluorescent protein (GFP) expression is driven by the TRPM5 promoter; and (2) TRPM5-KO, which has 2.4 kb deletion in the TRPM5 gene that prevents proper expression of the TRPM5 channel. Adult male TRPM5-GFP and TRPM5-KO mice were exposed to the pheromone DMP and filtered air in a 3min to 2min ratio for a total of 30 minutes. Mouse activity was video recorded during exposure to the odor. Behavioral analysis indicates that the TRPM5 KO mouse demonstrated impaired or delayed odor habituation to the pheromone odor. Mice were immediately perfused after the behavior experiments, and their bulbs extracted for immunohistochemical processing. Serially cryosectioned tissue was stained with GFP antibodies, imaged, and mapped using our GLOM-MAP MATLAB mapping toolbox. Mapping analysis indicated that TRPM5 KO mouse had fewer glomeruli on the ventral portion of the olfactory bulb and had a slightly smaller bulbs overall. These preliminary results suggest that TRPM5 plays an important role in pheromone detection the mouse main olfactory system and may play a critical role in the construction of the odor map seen on the surface of the bulb.

ENDURE TRAINEE ABSTRACT

CHELSEA GALLEGOS

Home Institution and State: New Mexico State University, NM

Email: cg12swim@nmsu.edu

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Kinesiology December 2013

Mentors/Advisors at Home Institution: Dr. Robert Wood and Dr. Elba Serrano

ENDURE Trainee Scientific Interest

I am interested pursuing a graduate degree in the field of biomechanics as it pertains to pain and neurorehabilitation. Biomechanics encompasses many different areas and has a lot of potential for research. I am currently doing research involving gait in the elderly population, this field of research is very important because people are living longer which puts more wear on the body; so the need for rehabilitation methods and reduction in injury is very important. Many biomechanists also do research involving prosthetics; this area really sparks my interest because it is a growing field and affects so many individuals.

ENDURE Trainee Career Goals and Plan

I am in my 2nd semester of the BRAiN program and am thankful for all the opportunities that it has brought me. I have been exploring a couple of different post-graduation goals; I am interested in obtaining a doctoral degree in a neuroscience program that provides opportunities for training in biomechanics. As for career goals, I enjoy helping people and interacting with people, so doing research involving body movement or rehabilitation with human subjects in either an industry or academic setting is what I am hoping for.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado, Anschutz Medical Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Diego Restrepo

ENDURE Research Project Title: Smelling Light: Behavioral observation during optogenetic stimulation

This past summer, I had the opportunity to work with optogenetics in mouse olfaction. Determining how temporally precise olfaction is using past methods has been difficult, but optogenetics has provided new techniques to test the olfactory system. The protein that allows optogenetics to function is channel rhodopsin (ChR2), which is found in *Chlamydomonas reinhardtii*. When stimulated by 470nm blue light, the ChR2 allows sodium ions to enter to depolarize and activate neurons. Studies have shown that mice are able to detect light at different stages during the sniff phase. We were interested in determining whether mice could differentiate between different light durations and what it looked like through electrophysiology recordings.

After implanting cannulas and/or tetrode drives into the olfactory bulbs, we trained the mice through many stages to be able to discriminate between different light durations. Results showed that mice were able to discriminate between light and no light. Preliminary data on one mouse we trained showed that it could discriminate between different light durations; as the study continues and more mice are trained, we hope to see similar results. I was able to gain knowledge and experience that will help me later on in life.

ENDURE TRAINEE ABSTRACT

ESTEBAN M. LUCERO

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

Email: emlucero@nmsu.edu

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Bachelor of Science, Biology, expected May 2014

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

ENDURE Trainee Scientific Interest

I am primarily interested in neuroethology. I would like to investigate the genetic and neural mechanisms behind both learned and innate behavior of animals. I would like to use an epigenetic approach to bridge the gap between the nature vs. nurture debate. Along those same lines I would like to investigate how our brains interpret biological relevant information from movements of sound frequency based on Bach's music theory, and how the combination and change of frequency over time influences our emotions and behavior. My research experience at NMSU, UC Denver, and the Smithsonian have introduced me to the field of genomics and genetics. I have learned and work with the genetic mechanisms behind behavior and neural development. Along the way I have learned many lab techniques and skills such as genome sequencing. These skills will help me along my journey of scientific discovery.

ENDURE Trainee Career Goals and Plan

I am a 4th semester NMSU BRAiN Scholar. After graduating in May 2014 I will continue my education as a graduate student. I hope to earn my Ph.D. in neuroscience and continue with a career in research as a college professor. This will allow me to contribute to the academic advancement of generations of students, while continuing to learn myself.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Smithsonian Institution Center for Conservation and Evolutionary Genetics (2nd summer experience, non BPENDURE Institution)

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Jesus Maldonado. Research scientist Smithsonian Institute Center for Conservation and Evolutionary Genetics. Non-BP-ENDURE.

ENDURE Research Project Title: Non-invasive genetic techniques to document the distribution, and genetic characteristics of the endangered Kit Fox.

This past summer I was able to intern at the Smithsonian Institute for Conservation and Evolutionary Genetics. Our investigation was part of a larger ongoing conservation project. We used non-invasive genetic techniques to map the distribution and genetic characteristics of the endangered Kit Fox that inhabits an area of the topaz solar farm in the San Joaquin Valley CA. This

experience broaden my knowledge introduced me to many techniques within the field of genomics, such as genome sequencing and fragment analysis. During summer 2012 I worked in the lab of Dr. Kristin Artinger investigating the genetic mechanisms behind the fate of neural crest cells, by looking at how the transcription factor Prdm1 influences cranial nerve development. At NMSU, my primary research project sponsored by the ENDURE program in the Wright laboratory uses budgerigars as a model to investigate how social environment may influence the expression of FoxP2 in the vocal learning center of adult brains.

ENDURE TRAINEE ABSTRACT

HANNA MOLLA

Home Institution and State: University of Colorado Denver

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Biology and Psychology, 2014

Mentors/Advisors at Home Institution: Dr. Bruce Mandt, Dr. Richard Allen, and Dr. Sondra Bland

ENDURE Trainee Scientific Interest

My research interest is in electrochemistry and the role of dopamine in addiction, as well as the pathology and etiology of neurodegenerative and neuropsychiatric diseases, more specifically in Parkinson's Disease and Schizophrenia

ENDURE Trainee Career Goals and Plan

My career goals and plans are to continue on with graduate school to gain more of an understanding of how the brain and nervous system works. I plan to use that knowledge to help in addiction and neuropsychiatric/neurodegenerative diseases, and devote my career to research in hopes to continue to learn and explore the causes and possible treatments of addiction, and neuropsychiatric/neurodegenerative diseases.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado Anschutz Medical Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Curt Freed, Dr. Ernesto Salcedo, and Dr. Diego Restrepo

ENDURE Research Project Title: Can DJ-1 Infusions Treat Parkinson's Disease?

Parkinson's Disease (PD) affects up to one million people in the United States, and is the second most common neurodegenerative disease. PD causes debilitating motor function symptoms including rigidity, body tremors, slow movement and impaired coordination. PD is caused by the loss of A9 dopaminergic neurons in the substantia nigra. The cause of cell death is due to oxidative stress and aggregation of alpha synuclein in the soma of the cells. One gene that contributes to Parkinson's Disease is PARK7 which codes for a conserved protein called DJ-1. Early onset autosomal recessive PD is caused by a loss or mutation of the DJ-1 protein. A single amino acid mutation (L166P) in the DJ-1 protein prevents the dimerization of DJ-1, which is needed to initiate cell regulation of oxidative stress and protein aggregation. It is understood that endogenous DJ-1 is critical for cell survival in this aspect. This research focuses on determining the cell's ability to take up exogenous DJ-1, and possibly be used as a treatment for patients with PD. An experiment was performed with wild type mice. Mice were given subcutaneous infusions of recombinant DJ-1 over the course of one hour. Control mice were infused with a vehicle. Mice

were then sacrificed and protein samples were collected from the plasma, muscle and brain. A western blot analyzed the presence of the recombinant DJ-1 protein in the collected protein samples. The western blot indicated presence of the recombinant DJ-1 in both the plasma and muscle of the protein samples collected from infused mice. There was no presence of the recombinant DJ-1 in the protein samples collected in the brain. This indicates that the infused DJ-1 may not have had the ability to cross the blood brain barrier, which suggests that DJ-1 infusions may not be helpful in treating Parkinson's Disease at this time.

ENDURE TRAINEE ABSTRACT

ISABELLA RAMOS

Home Institution and State: University of Colorado Denver

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Public Health, Fall 2014

Mentors/Advisors at Home Institution: Kalynn Shulz

ENDURE Trainee Scientific Interest

My research revolves around the biological and behavioral effects of mild chronic stressors using rodent models. Specifically, I've examined how prenatal stress impacts nicotinic acetylcholine receptor levels of the hypothalamus. I've also begun looking at the combined effects of prenatal and adolescent stress on estrous cyclicity and disruption.

ENDURE Trainee Career Goals and Plan

As a public health major I hope to take what I gain from my experiences in the lab and apply it in my future career. Stress is a real issue amongst minority and disadvantaged populations that leads to further health issues such as mental disorders and chronic disease. What I do now I think is very applicable and should be applied in real life situations.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado Denver

Mentors/Advisors at ENDURE Summer Research Experience Institution:

ENDURE Research Project Title: Sex Differences in the Effects of Prenatal Stress on the Nicotinic Acetylcholine Receptors of the Rat Hypothalamus

Prenatal stress is associated with many reproductive dysfunctions in offspring. Nicotinic acetylcholine receptors (nAChR) in the hypothalamus regulate these same processes, but whether the effects of prenatal stress on reproductive function are mediated by altered nAChRs is not known. Given that prenatal stress alters levels of nAChRs in other brain regions, we tested the hypothesis that maternal stress alters the development of hypothalamic alpha7 nicotinic acetylcholine receptor levels in offspring. Pregnant female Sprague-Dawley rats experienced unpredictable variable stressors 2-3 times daily during the last week of gestation. At weaning the offspring were assigned to same-sex prenatally stressed or nonstressed groups. In adulthood, offspring brains were collected and processed for quantitative autoradiography using a 125I-alpha-bungarotoxin (alpha7 nicotinic receptor selective) ligand. Binding levels were quantified in the periventricular nucleus, ventromedial nucleus, and the arcuate nucleus. In the arcuate nucleus, the analysis revealed a significant interaction between prenatal stress and sex [$F(1,30)=8.70$, $p=0.0061$]. This interaction was driven by an increase in alpha7 receptors in females ($p=0.012$), but not in males ($p=0.34$). Data from the other hypothalamic nuclei is currently being analyzed. These current data suggest that hypothalamic nAChRs may be a link between prenatal stress exposure and reproductive dysfunction in females.

ENDURE TRAINEE ABSTRACT

KATHRYN SANCHEZ

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

Email: ktsanch@nmsu.edu

Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology, May 2015

Mentors/Advisors at Home Institution: Elba Serrano, Ph.D., Biology, New Mexico State University

ENDURE Trainee Scientific Interest

My father's Multiple sclerosis has sparked my interest in neurodegenerative diseases. I have undertaken two projects investigating neurodegenerative diseases. I am embarking on one as a first semester BRAiN scholar that will investigate myelination of the VIIIth cranial nerve. Myelin sheath degradation impairs balance and hearing (Meniere's disease). Another project, undertaken as a summer intern at the University of Pennsylvania, set parameters for a controlled experiment that will measure hippocampal oxygen consumption using high resolution respirometry in Mucopolysaccharidosis (MPS) VII. MPS is a lysosomal storage disease characterized by enzyme deficiency resulting in the buildup of mucopolysaccharides. Neurological implications of MPS include cognitive impairment and hydrocephalus. MPS is not considered a metabolic disease, but metabolic complications can be addressed if found. I will present at this work at SFN-FUN.

ENDURE Trainee Career Goals and Plan

With the intent of cultivating my interests in science and public policy, I plan to pursue a PhD in neuroscience and later a Juris Doctor (J.D) to prepare myself to serve on bioethics committees and teach science policy courses and law. To better society, I plan to focus my scientific endeavors on neurodegenerative disease. This interest was sparked by my father's diagnosis of Multiple sclerosis. The PhD will enable me have the proper understanding of ethical dilemmas in neuroscience, seeing as technology plays an important role when considering how to formulate policy. This background will also enable me to conduct research in a governmental setting, such as the Department of Defense. I will need to understand the changes in technology in addition to its implications for our society due to those changes.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Pennsylvania Department of Pediatrics

Mentors/Advisors at ENDURE Summer Research Experience Institution: John Wolfe, VMD, Ph.D., Pediatrics, University of Pennsylvania and Children's Hospital of Philadelphia (non-ENDURE)

ENDURE Research Project Title: Assessing Hippocampal Metabolism in Mice by High Resolution Respirometry

Mucopolysaccharidosis (MPS) VII is a lysosomal storage disease characterized by the lack of the enzyme beta-glucuronidase. The buildup of glycosaminoglycans, or mucopolysaccharides, in MPS

causes pathology in many tissues including the brain. Neurological implications of MPS include cognitive impairment and hydrocephalus in children with MPS. Although mitochondrial abnormalities have been observed in neurodegenerative diseases, little is understood about the functional effects. Previous indications of a metabolic difference in MPS mice was found using indirect calorimetry. To evaluate cellular respiration, high resolution respirometry using the substrate uncoupler inhibition titration method was used to assess basal respiration and maximum respiration in hippocampal tissue of normal mice. This was done to set the parameters for a controlled experiment to compare oxygen consumption of MPS VIII mice vs. wild type mice. MPS VII has not been considered a metabolic disease, but if there are implications of decreased basal (routine) respiration rate, this will enable proper treatment of the metabolic symptoms that MPS VII may cause in children.

ENDURE TRAINEE ABSTRACT

ISMAIL SOLA

Home Institution and State: University of Colorado at Colorado Springs, Colorado

Email: ismailsole@yahoo.com

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Biology-Cellular and Molecular, May 2014

Mentors/Advisors at Home Institution: Dr. Eugenia Olesnicky-Killian

ENDURE Trainee Scientific Interest

I investigate the role of the RNA binding protein shep (RBMS3) in the developing nervous system of *Drosophila melanogaster*. Using tissue specific RNAi and overexpression with the UAS/Gal4 system, and also a shep mutant loss of function, I try to look for phenotypes to get an insight into gene function. For imaging I use in-situ hybridization, immunostaining, immunofluorescence, and dual immunofluorescence, to look at the nervous system especially the midline, ventral nerve cord, and peripheral nervous system neurons.

ENDURE Trainee Career Goals and Plan

I plan to pursue a developmental neurobiology Ph.D., program starting in 2014. My long term goal is to continue basic science research.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Colorado Denver Anschutz Medical Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Kristen Artinger

ENDURE Research Project Title: The Role of RBMS3 in the Developing Nervous Systems of *Drosophila melanogaster* and *Danio rerio*

During embryonic development, neurons take on diverse, often complex morphologies that ultimately enable neuronal function and the formation of appropriate neural circuits. One way to regulate this diversity is by post-transcriptional gene regulation, including mRNA localization and translational repression, which plays an important role in the generation of asymmetric cell divisions and expression of environment cues. RNAi knockdown of the well-conserved *Drosophila melanogaster* RNA binding protein, RBMS3 or Alan shepard (Shep) results in dendrite morphogenesis defects in Class IV dendritic arbor (da) neurons. In-situ hybridization and immunofluorescence indicates that shep is expressed during neurogenesis in a subset of cells of the peripheral nervous system (PNS) and the central nervous system (CNS). Consistent with this, loss of function of shep results in PNS and ventral nerve cord defects. In Zebrafish, the shep homolog RBMS3 is expressed in the embryonic sensory Rohon-Beard (RB) sensory neurons. Knockdown of RBMS3 by Morpholino results in a decrease numbers of RB neurons as well as a reduction of the area of the dendritic field in RB neurons. Taken together our results suggest that *Drosophila shep* and its homolog RBMS3 in Zebrafish play multiple roles in the development of their nervous systems including the genesis of sensory neuron dendrite morphology in both model systems indicating functional homology.

ENDURE TRAINEE ABSTRACT

CRAIG STOFLET

Home Institution and State: University of Colorado Denver

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: B.S. Chemistry with a Biochemistry Emphasis, Spring 2014

ENDURE Trainee Scientific Interest

Translation of scientific discoveries to clinical treatments through the means of pharmaceuticals and/or genetic engineering. How RNA and proteins are regulated within the cell and their effects on the phenotypes of the host organism. Nervous system transduction in order to regulate homeostasis due to congenital or contracted disorders.

ENDURE Trainee Career Goals and Plan

Clinical aspirations are what sparked my initial intrigue into the fields of science through academia. The road to becoming a medical doctor is a very long one, which allowed for new experiences to unfold themselves into previously unknown interests. For me, one of my unknown interests was that of scientific research. Since then I've been pursuing an MD/PhD combined degree, which will allow me to directly observe the effects of therapeutics so that they can be integrated into lab work and evolve the focus of my study.

ENDURE Trainee Summer Research Experience

Summer Research Experience Institution: University of Colorado Anschutz Medical Campus
Mentors/Advisors at ENDURE Summer Research Experience Institution: Amanda J. Law MSc, Ph.D.; Clare Paterson BSc, Ph.D.

ENDURE Research Project Title: Investigation of ErbB4 Isoform Gene Expression in the Hippocampus and Prefrontal Cortex of Mice Overexpressing Neuregulin 1 (NRG1) type IV

Schizophrenia is a debilitating mental disorder characterized by dysfunctional thought processes and irregular emotional responses that affects ~1% of the global population. Typical symptoms include auditory hallucinations, exaggerated paranoia, disorganized speech and thinking. Schizophrenia is highly heritable and several candidate genes have been identified and include the growth factor *Nrg1* and its receptor ErbB4. *Nrg1*-ErbB4 signaling is key for migration, myelination, and neurotransmission. Mice developed to specifically overexpress human Neuregulin1 type IV (NRG1-IV) in the brain, have altered behaviors and brain biochemistry relevant to schizophrenia. The effects of NRG1-IV overexpression on other members of the NRG1-ErbB signaling pathway has not yet been fully investigated. To determine the downstream effect of NRG1-IV overexpression on the neuregulin signaling cascade real time PCR and western blotting will be used as a means to quantify gene expression at the transcriptional and translational levels. Other recently genetically modified mouse models with upstream and downstream functions within the NRG1-ErbB4 pathway have also been engineered. Similar protocols will be used to identify molecular interactions and functions of these models so that larger conclusions can be developed for this pathway.

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

LUCERO ALVARADO

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

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Biology, May 2014

Mentors/Advisors at Home Institution: Dr. Georgianna Gould

ENDURE Trainee Scientific Interest

My research interests consist of better understanding psychiatric disorders such as Autism using behavioral models. In order to do this I will examine how excitatory monoamine neurotransmission is regulated in the brain, and to uncover the relationship between such regulation and social behavior.

ENDURE Trainee Career Goals and Plan

My career goals consist of obtaining a PhD 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 Michigan

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Margaret Gnegy

ENDURE Research Project Title: Validation of a D2DR-specific Antibody

Dopamine is a neurotransmitter that is involved in many important processes. The D2 dopamine receptor (D2DR) also functions as an autoreceptor. Activating D2DR in the pre-synaptic neuron decreases extracellular dopamine. Currently, commercial D2DR antibodies are not suitable for use due to lack of specificity. The purpose of this study was to validate a D2DR antibody in D2DR transfected neuroblastoma (N2a) cells and mouse and rat striatal lysate. Several D2DR antibodies were tested in D2DR or vector transfected N2a cells. The Millipore antibody (AB5084P) produced bands in the D2DR cells and no bands in the vector cells whereas the other antibodies tested showed non-specific bands in the vector cells. For this reason, we continued using the Millipore antibody over the other antibodies. After testing various sample preparation conditions, we found lysing the samples in 0.1% dodecyl maltoside (DDM) solubilization buffer as well as heating the samples to 55 °C for 30 minutes prior to running the western blot generated specific bands at the appropriate molecular weight for D2DR. Future studies can be conducted with this procedure and antibody in which in order to study the D2DR in native tissue from the mouse.

ENDURE TRAINEE ABSTRACT

MARISA DE GUZMAN

Home Institution and State: University of the Incarnate Word, University of Texas Health Science Center at San Antonio, Texas

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Biology, B.S. & Psychology, B.A., May 2014

Mentors/Advisors at Home Institution: Alan Frazer, Ph.D., Flavia Carreno, Ph.D., and Aparna Shah, Ph.D., Candidate

ENDURE Trainee Scientific Interest

Next semester I will graduate with a Biology B.S. and a Psychology B.A. (experimental track). I am greatly interested in animal behavior as well as comparative psychology. The START-UP program has provided me with a unique opportunity to gain neuroscience research experience which relates to both of my fields of interest. I have seen the use of two different behavioral tests to measure antidepressant and anxiolytic drug efficacy in a rodent model. I have also been able to study in the animal model some of the neurobiological processes involved in Major Depressive Disorder and the molecular targets of ketamine, a novel antidepressant treatment.

ENDURE Trainee Career Goals and Plan

After completing my undergraduate work, my plan is to pursue graduate school. I hope to enter a PhD program for animal behavior, comparative psychology, or behavioral neuroscience. The START-UP program has allowed me to experience first-hand how research is done, complete independent sub-projects, as well as meet and work with PhD candidates and post-doctoral fellows. The program has given me valuable insight into what a graduate school experience may be like and it has better prepared me for applying and making an informed decision.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Univ. of Texas Health Science Center at San Antonio

Mentors/Advisors at ENDURE Summer Research Experience Institution: Alan Frazer, Ph.D., Flavia Carreno, Ph.D., and Aparna Shah, Ph.D., Candidate

ENDURE Research Project Title: Antidepressant-like effects of sub-anesthetic low doses of ketamine: pre-clinical studies

The lab has focused on the NMDA receptor antagonist, ketamine, as a treatment for treatment refractory depression. The effects of a single i.p. sub-anesthetic dose of ketamine were investigated using two behavioral tests: the Novelty Suppressed Feeding Test (NSFT) measured anxiolytic effects and the Forced Swim Test (FST) was used to measure its antidepressant-like effects. For the NSFT, a decrease in latency to feed was found 24 hours and 10 days after

treatment. In another study, pre-treatment with K252a, a general tyrosine kinase inhibitor, into the ventral hippocampus (vHipp) via cannulae inhibited the antidepressant-like effect of ketamine in the FST one week after treatment. In addition, Western blot data revealed an increase of phosphorylation of the BDNF receptor, TrkB, in the hippocampus only 30 minutes after ketamine treatment. Cryostat brain sectioning of the fresh frozen rat brain tissue from this study was followed by Cresyl Violet staining and analyses by a light scope to verify cannula placement in the vHipp. The data point to TrkB in the vHipp as an important target for the anti-depressant like effects of ketamine

ENDURE TRAINEE ABSTRACT

JENNIFER DELGADO

Home Institution and State: Our Lady of the Lake University, University of Texas Health Science Center at San Antonio, Texas

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Biology, May 2014

Mentors/Advisors at Home Institution: Dr. Jason O'Connor and Dr. Susan Murphy

ENDURE Trainee Scientific Interest

The Endure program has allowed me to gain perspective in the field of neuroscience. As a Biology major and psychology and chemistry minor it allows me the opportunity to work in a field where I can use my knowledge of both fields and apply it to real world situations and in scientific situations. My interest in neuroscience lies mainly in disorders such as Schizophrenia, Parkinson, Alzheimer, and other similar disorders.

ENDURE Trainee Career Goals and Plan

My future plans are to attend graduate school and enter a microbiology field where I can focus on virology. My career goal is to continue working in research, however teaching at higher level institutions is a career I would consider.

ENDURE Trainee Summer Research Experience

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

Mentors/Advisors at ENDURE Summer Research Experience Institution: University Health Science Center at San Antonio

ENDURE Research Project Title: Regulation of oxidative stress in mouse microglial cells

This summer I have been working with BV2 microglia cells. The purpose of my project was to determine if exposure to the bacterial cell wall component, LPS, would cause the BV2 cells to show signs of oxidative stress. The lab focuses on neuroimmunology, and is interested in understanding how the immune system plays a role in depression. By working with the BV2 cells, we can see what is happening at the molecular level, which complementary to behavior studies will create a deeper understanding of the immune systems role. Throughout the summer I have collected data to determine the effects of LPS on nitrate production, lipid peroxidation, and ROS production. After establishing the in vitro conditions required for LPS-induced oxidative stress, I am now performing experiments to determine the potential contribution of microglial kynurenine metabolism.

ENDURE TRAINEE ABSTRACT

DIEGO A. ESCOBAR GARCÍA

Home Institution and State: St. Mary's University, University of Texas Health Science Center at San Antonio, Texas

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: December 2014

Mentors/Advisors at Home Institution: Christine Gray, Ph.D., Consuelo Walss-Bass, Ph.D.

ENDURE Trainee Scientific Interest

My research interest lies in the grasp an understanding of psychiatric disorders at the molecular level, which is precisely what I accomplish a the laboratory of Dr. Walss-Bass. I have learned proteomic and genetic techniques. In silica techniques are also implemented as well of cytokine analysis.

ENDURE Trainee Career Goals and Plan

I would like to pursue a graduate education in neurosciences, with particular interest in neuronal physiology and how these physiological processes give arise to cognition. Another potential area of investigation is connectomics, a growing field that seeks to determine a person's self-identity based on neuronal connections of the nervous system with the rest of the body.

ENDURE Trainee Summer Research Experience

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

Mentors/Advisors at ENDURE Summer Research Experience Institution: Consuelo Walss-Bass Ph.D.

ENDURE Research Project Title: Gene Expression of Novel Genes Associated with Schizophrenia

During this summer I was taught how to perform Real-Time Polymerase Chain Reaction (RT-PCR). I was also engaged on learning how to extract RNA using the Zymo kit. Complementary DNA was also taught to me. Finally, I was also engaged on how to read the RT-PCR utilizing the available software. Finally, I was also taught how to analyze cytokines utilizing Millipore's extraction kit. I was introduced to Schizophrenia and the types of symptoms (negative, positive and cognitive) patient experiences. I was also introduced to second-generation antipsychotics and how some affect more the body when prescribed. I also learned how these antipsychotic might affect the metabolism of patients with the disease.

ENDURE TRAINEE ABSTRACT

ERIC FLORES

Home Institution and State: Our Lady of the Lake University, University of Texas Health Science Center at San Antonio, Texas

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Chemical Biology, May 2015

Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest

Chronic pain management is a major pharmacological challenge due to limited efficacy, adverse effects, and risks of dependency associated with currently available analgesics. My girlfriend experiences chronic neuropathic pain, and I found myself extremely passionate about the translational research conducted by Dr. Hargreaves, an internationally recognized clinician scientist in pain research. Dr. Hargreaves' lab is a neuropharmacology research group that studies the mechanisms of inflammatory, burn, and chronic pain. In my project, I utilize behavioral pharmacology to assess the in vivo efficacy of compounds to reduce nerve growth factor (NGF)-induced persistent pain in rats. Understanding the molecular mechanisms of NGF-induced persistent pain can help lead to the development of novel treatments for chronic inflammatory pain conditions in which NGF levels are elevated, such as chronic migraine, chronic osteoarthritis, and chronic lower back pain.

ENDURE Trainee Career Goals and Plan

As of right now, my long-term career goals consist of post-secondary education and training in an MD-PhD program, and to become a recognized and reputable clinician scientist in academic research.

ENDURE Trainee Summer Research Experience

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

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Kenneth Hargreaves

ENDURE Research Project Title: The Role of Oxidized Lipids in NGF-induced Persistent Allodynia

Nerve growth factor (NGF) is a neurotrophin that has been demonstrated to acutely sensitize primary afferent nociceptors. NGF is elevated in several chronic pain conditions, and a single NGF administration is sufficient to cause chronic pain in healthy humans. However, the mechanisms of how NGF causes persistent pain remain unknown. Our group has developed a rodent model of NGF-induced persistent thermal and mechanical allodynia (a reduced pain threshold) and demonstrated that plasma membrane transient receptor potential vanilloid 1 (TRPV1) ion channel expression was increased after NGF. More recent preliminary studies suggest that persistent

activation of TRPV1 by endogenous oxidized lipid agonists, such as oxidized linoleic acid metabolites (OLAMs), may be a peripheral mechanism contributing towards a persistent, long-term nociceptive state after NGF administration. So, this project will test the central hypothesis that NGF causes persistent thermal and mechanical allodynia via increased activities of TRPV1 channels and increased production of endogenous oxidized lipid TRPV1 agonists. I will test this hypothesis using behavioral pharmacology approaches to evaluate whether inhibition of endogenous TRPV1 agonist production reduces NGF-induced persistent allodynia. Additionally, I will compare central and peripheral TRPV1 contributions to persistent allodynia after NGF administration.

ENDURE TRAINEE ABSTRACT

GERALDO MEDRANO

Home Institution and State: St. Mary's University, University of Texas Health Science Center at San Antonio, Texas

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: May 2015

Mentors/Advisors at Home Institution: Dr. Raabe and Dr. Eaton

ENDURE Trainee Scientific Interest

We are researching the neuronal effects of proprioception and nociception in the *Drosophila Melanogaster*. We are trying to figure out what neuronal pathways are either missing or damaged and how they affect the mutant larvae and adult flies.

ENDURE Trainee Career Goals and Plan

I plan on attending graduate school in order to delve into the studies of neurology. I also would like to attend Optometry school and then once that is accomplished, go to medical school to specialize in Ophthalmology.

ENDURE Trainee Summer Research Experience

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

Mentors/Advisors at ENDURE Summer Research Experience Institution: Bethany Reid and Dr. Eaton

ENDURE Research Project Title: Synaptic proteasome regulation

We are trying to understand the molecular mechanisms that build and degrade the synaptic connections. The loss of synaptic contacts is the basis to many neurodegenerative diseases that suggests a possible link between mechanisms normally involved in synaptic remodeling and neurodegenerative disease. Through figuring out the ways the pathways work we will be able to suggest possible treatments to neurodegenerative disease through further studies.

ENDURE TRAINEE ABSTRACT

ANGELICA SALINAS

Home Institution and State: St. Mary's University, University of Texas Health Science Center at San Antonio, Texas

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: May 2014

Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest

This experience supported by the ENDURE program has truly been an amazing opportunity to learn more about the many options available and the many areas in neuroscience. During this time, I have developed a great interest in the role microtubule associated protein tau and amyloid beta play in the brain. The mystery behind it is truly mind-blowing and trying to understand the pathway is one of my goals. It is a big puzzle where the main goal is to find all the causes and effect. I hope to have a better understanding at the end of the program and plan on pursuing further education in this field.

ENDURE Trainee Career Goals and Plan

This program has helped get a better grasp of what is expected of me if I decide to continue my education. The ability to work with other students who have pursued a further education has been a big help and has helped me become more competitive. I plan on graduating in May with a Bachelor of Science and plan on starting graduate school as soon as possible. I plan on taking my GRE soon and start applying to grad school shortly.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Texas Health Science Center

Mentors/Advisors at ENDURE Summer Research Experience Institution: Rochelle Buffenstein and Miranda E. Orr

ENDURE Research Project Title: Rapamycin alters the effects of a high sucrose diet in 3xTgAD mice

This experiment consists of an eleven-week treatment on a triple-transgenic Alzheimer's disease's mouse model (3xTgAD). Their diet consisted of normal mouse chow. However, their water was exchanged for a 20% sucrose mixture. The mice's weight was monitored and recorder throughout the experiment. Behavior tests, such as water maze and open field, were performed after eight weeks. After behavior analysis was performed, the brains were harvested and underwent preparation for histological analysis. Other tissues, such as liver and fat were harvested as well in order to see the effects of a high sucrose diet on this mouse model. A dual energy x-ray absorptiometry scan was performed in order to analyze body fat and bone density. This was done in order to ensure that the weight gained was solely fat and not an increase in bone density.

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

IOANNISELY BERRIOS-TORRES

Home Institution and State: University of Puerto Rico

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, May 2014

Mentors/Advisors at Home Institution: Irving Vega, Ph.D. and Giovanni Tirado-Santiago, Ph.D.

ENDURE Trainee Scientific Interest

As a strongly focused student, I have a set of long term goals that I am determined to fulfill, the main one being getting a PhD in cognitive neuroscience. Currently, I am part of the Neuroscience Research Opportunities program to Increase Diversity (Neuro ID), an undergraduate student fellowship from the NIH. Through this program, I work at the Institute for Psychological Research (IPSI) in a project called Neuro Imaging and Depression. The aim of our study is to evaluate different changes in brain plasticity that may occur as a result of treatment with two types of therapy for Major Depression Disorder (MDD) in adolescents. My role in the lab constitutes on carrying out and analyzing the scans utilized within the research.

ENDURE Trainee Career Goals and Plan

My long-term goals are strongly driven by giving back to the community. I see myself contributing in the academia as a professor and creating a Cognitive Brain Imaging Research Center in Puerto Rico to train the next generation of cognitive neuroscientists. This aim stems from my experience working in brain imaging and the obstacles I had to overcome in order to get my job done. Giving back to the community is important to me since I owe it the knowledge and experience that makes me the person I am today. As vice president of fraternity Alpha Phi Omega, a community service organization, I have appreciated the relevance of giving back to the community. Aside from giving back to the community, I understand the challenges of being a scientist. Therefore, I am also prepared to pursue post-doctoral training that would allow me to write innovative grants which would expand basic knowledge in my field of study.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: The Ohio State University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Hojjat Adeli and Dr. John Buford

ENDURE Research Project Title: Analysis of Reticulospinal and Corticospinal Combination and Competition for Motor Control.

My summer research aimed to demarcate the roles of the Ponto Medullar Reticular Formation in the regulation of reaching movements during a instructed delay reach task in old world monkeys. The primary goal was to understand how the reticular formation and cortex compete for control

and/or inhibition of muscle activity. This revealed interactions between the two areas and provided insight to neural circuits regulating different motor patterns. The findings of this research could translate into rehabilitative mechanisms for stroke patients. Three crab-eating *Macaca fascicularis* male monkeys were used in this experiment which employed stimulation of cortical and PMRF areas along with electromyography (EMG) recordings of upper limb muscles. Analysis exposed a considerable percentage of unknown neural circuits that elicited muscle facilitation and suppression activity outside a typical neurophysiological pathway. These unknown activation patterns might explain new circuits of motor regulation providing improved understanding of both motor systems. Also, the circuits would exhibit how the interaction modulates motor control in reach. Neural diagrams were created to explain the most recurring patterns and how these circuits could have modulated the observed patterns. The diagrams would provide a theoretical platform to approach the understanding of both the physiologically predictable patterns as well as the unknowns.

ENDURE TRAINEE ABSTRACT

RIGO G. CINTRÓN-COLÓN

Home Institution and State: University of the Sacred Heart, San Juan, Puerto Rico

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: General Natural Sciences /May 2014

Mentors/Advisors at Home Institution: Irving E. Vega, Ph.D.

ENDURE Trainee Scientific Interest

As trainee of the ENDURE program, I have been working in the understanding of the molecular mechanism that mediates Paclitaxel-induced neuropathy. My current research interests are in neurological disorders and diseases, brain cell interactions and neurobiology of drug abuse

ENDURE Trainee Career Goals and Plan

During this semester I'll be applying to neuroscience graduate programs around the mainland. I would like to do my PhD degree in neuroscience at an institution that fosters interdisciplinary approaches to resolve complex scientific questions. I'm looking forward to join a very intense/productive laboratory. After graduate school, I will continue post-doctoral training in order to reach the ultimate goal of establishing an academic research program as Principal Investigator

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: The Scripps Research Institute

Mentors/Advisors at ENDURE Summer Research Experience Institution: R. Luke Wiseman, Ph.D., T. Kelly Rainbolt, BS

ENDURE Research Project Title: The effects of environmental and genetic stress on mitochondrial homeostasis

Dr. Wiseman's laboratory focuses on the study of mitochondrial homeostasis. Mitochondrial inner membrane protein function is maintained by ATP dependent proteases, such as YME1L, AFG3L2 and Paraplegin. Previous work shows that ymel-1 mutant animals have a reduced lifespan in comparison to wild type animals and ymel-1 mutant animals are selectively sensitive to oxidative stress late, but not early, in adulthood, in the presence of specific oxidative stress drug that disrupts mitochondrial homeostasis such as methyl viologen dichloride hydrate 98%. After using an oxidative stress drug that directly disrupts mitochondrial homeostasis, we were interested in finding out if nonspecific oxidative stress drugs would affect YMEL-1 mutants in the same way. The experiments were performed using synchronized age C. elegans, where the oxidative stress drugs such as Vitamin K3* 2-Methyl-1,4-naphthoquinone and sodium (meta) arsenite were delivered at larval stage 4 of their life cycle, 24 hours later using microscopy survivals Day 1 adults for this treatment were counted. For older animals, drugs were administrated at day 4 of adulthood and survivals were measured 24 hours later at Day 5 of adulthood. I found that loss of YMEL-1 function provides protection in young and old animals during nonspecific oxidative stress

ENDURE TRAINEE ABSTRACT

SOFIANYELÍ COLÓN-REQUEJO

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology; May 2015

Mentors/Advisors at Home Institution: Dr. Karen Martinez

ENDURE Trainee Scientific Interest

As a Psychology student I have been interested in understanding human behavior and the possible anomalies in biological and behavioral aspects of the individual. Research is a key activity into the comprehension of those anomalies, therefore, significantly important when it comes to the development of ways to treat, and if possible, eliminate them. Brain is responsible for our behavior in almost every way possibly explained, from motor abilities to the complex interaction of neurons into the formation of our cognitive abilities. The systematical study of brain functions is simply necessary for the improvement of possible ways of treating behavioral issues. Neurological understanding, in correlation to psychological and social perspectives, is essential for an integrated comprehension of individuals. In my opinion, those three aspects are equally important for an outstanding formation as a professional in Psychology and Neurosciences fields. Working in human research has provided me the opportunity to integrate my two major academic interests: research and a biopsychosocial approach to human behavior and pathologies.

ENDURE Trainee Career Goals and Plan

Being an undergraduate researcher as part of the ENDURE program has given me the opportunity to expand my interest for research, making me confirm its importance. I am also especially interested in the clinical aspect of Psychology and in comprehending its immediate impact on society, but considering it is also of imperative importance to understand research as a prevailing factor in the expansion of science. Therefore, I am fully committed to finish graduate studies and to continue my formation as a professional, a journey I truly enjoy.

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

ENDURE Research Project Title: The impact of trauma in fear learning and extinction

Abnormal physiological response to a mild shock (SCR) during fear conditioning and extinction has been identified in people who have PTSD. Studying whether trauma also has an effect on fear learning and extinction in healthy subjects could improve our understanding of how fear processing differs in PTSD. We therefore studied fear learning and extinction in 62 human

subjects without any type of anxiety diagnosis. Of those subjects, 31 met criteria 1 A (life threatening trauma) during a standardized clinical interview, the rest of them had not reported significant trauma. All of the subjects were exposed to an experimental fear conditioning protocol using a visual conditioned stimulus (CS) and their skin conductance response (SCR) was measured during habituation, conditioning and extinction; recall and renewal of fear was measured 24 hours later. We hypothesize subjects with trauma history will respond less to the shock due to emotional bluntness.

ENDURE TRAINEE ABSTRACT

IVÁN J. ORTIZ COLÓN

Home Institution and State: Universidad de Puerto Rico, Rio Piedras

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Celullar and Molecular Biology, May 2015

Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest

I am passionate about understanding any incident, problem or anomaly in the field of biology. However, I am most interested to conduct research in areas related to neuroscience, especially pathological events associated to neurodegenerative diseases such as Alzheimer, Parkinson, Huntington, among others. I aspire to contribute in the understanding and bring forward new knowledge on the pathobiology of these diseases. Therefore, my area of research interest is neurobiology of disease.

ENDURE Trainee Career Goals and Plan

My first research experience in undergraduate research was in the area of public health, which helped me develop as a young scientist. This experience also helped me identified my research interest toward neurological disorders and declared that I would like to pursue a research career in neurosciences, specifically in the area of neurobiology of disease. In order to start preparing for this career goal, I successfully applied to the ENDURE-NeuroID program at the University of Puerto Rico (UPR). I joined the Dr. Irving E. Vega's laboratory that focuses in the identification of biomarkers associated to the progression of tau-mediated neurodegeneration. This undergraduate research experience and the course work at the UPR will provide the opportunity to develop the skills and fundament knowledge in preparation to graduate school. In the near future, I want to apply and complete an MD/PhD degree, specialized in understanding the pathobiology of neurodegenerative disorders such as Alzheimer's disease.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Universidad de Puerto Rico, Rio Piedras

Mentors/Advisors at ENDURE Summer Research Experience Institution:

This summer, I had the opportunity to join a laboratory directly related to neuroscience. I started learning molecular and biochemical techniques such as how to prepare SDS-PAGE, western blot and protein-protein interaction assays. Definitely, this experience gave me a clear understanding of what is needed to become a scientist. The research project that I am involved focusses in the correlation of aging biomarkers with the progression of tau-mediated neurodegeneration. During this experience, I also acquired vast knowledge on how to report new results, participated in different technical workshops and community outreach activities

ENDURE Research Project Title: Relationship between tau-mediated neurodegeneration and aging

Aging is characterized by the progressive functional decline of multiple organs and tissues, eventually culminating in death. The ageing process precipitates alterations in the physiology of all organisms, including reduced cellular function, the resistance to pathological agents, and increasing developing of age-related diseases. The most prevalent pathologies associated with ageing are disorders such as Alzheimer's, disease. For that reason, we want to know if there is a correlation between molecular changes associated to ageing and tau-mediated neurodegeneration. The ageing process is not a programmed development, in the sense that no genes are known to have evolved specifically to cause damage and senescence. At the molecular level, an attractive approach is to use changes in gene expression as biomarkers of ageing. DNA arrays can be used to scan a large fraction of the genome for changes in gene expression in ageing. The AGEMAP cataloged genes that are differentially expressed in different tissues during aging. We use this information to identify different gene candidates that could be used to detected protein abundance differences during the progression of neurodegeneration in the tauopathy mouse model JNPL3. This molecular profiling will allow us to determine if neurodegeneration induces molecular changes associated to aging.

ENDURE TRAINEE ABSTRACT

STEPHANIE ORTIZ DOMENECH

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

Email: stephanie.ortiz.do@gmail.com

Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: December, 2014

Mentors/Advisors at Home Institution: Guillermo Bernal, Ph.D.

ENDURE Trainee Scientific Interest

Within the field of psychology I have an interest in neuroscience and Cognitive Psychology. What I'm interested in neuroscience is to develop a diversity of approaches to the study of the biological basis of mental phenomena and clinical disorders. Regarding the research technique, I would like to work using functional neuroimaging including PET and fMRI studies of decision-making, attention, and memory, and EEG studies. As for my interest in Cognitive Psychology, what interests me most about this approach is the research in perception, human learning and memory, consciousness, thinking and problem solving, language, and intelligence, studies of sensation and perception, social cognition, moral decision making, and neurological disorders, as well as with applications of this basic research to everyday settings. Also, an important aspect of Cognitive Psychology is the use of computer-based behavioral tests and web-based surveys to assess functional patterns in behavior, as well as functional neuroimaging techniques to study the neural bases of various components of cognition and behavior.

ENDURE Trainee Career Goals and Plan

As a college student I always take in consideration the importance of work, responsibility and dedication in achieving my goals. I always have in mind my long-term goals without forgetting that there are some very important steps I must follow first. For example, in my short-term goals, I work to graduate from my Bachelor in Psychology from the University of Puerto Rico, Rio Piedras Campus. Besides qualifications, it is important to participate in research programs and internships that allow me to gain experience in research. Finally, I want to finish my research of The Relationship between obsessive beliefs and Obsessive Compulsive Disorder in order to provide more information about this disorder to the Puerto Rican scientific community. In the long term I want to continue my graduated studies in psychology with a focus in Behavioral Neuroscience and Cognitive Psychology. Also, as a future Ph.D. student in Neuroscience, I want to integrated knowledge both in the cognitive area and in related disciplines, such as computer science, linguistics, philosophy, and statistics.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Neuro Id. University Of Puerto Rico, Rio Piedras Campus

Mentors/Advisors at ENDURE Summer Research Experience Institution: Guillermo Bernal, Ph.D.

ENDURE Research Project Title: Meta Analysis of Latino Adolescents in Treatment

There is a large body of evidence that supports the efficacy and effectiveness of psychological treatments for mental health conditions. However, ethnic and language minorities have not been part of these efficacy studies. Because of the lack of inclusion of diverse populations in efficacy trials, it is not at all clear the degree to which EBTs are beneficial or even appropriate for these groups. Aims: The purpose of the study is to identify and collect all efficacy and effectiveness studies that evaluate outcomes of psychological treatments for mental health conditions in Latino populations. Another purpose is to compare the relative effects of different types of treatments (behavioral, interpersonal, cognitive, etc.) to determine which treatment is more beneficial for Latinos. Method: We will use the integration of research through statistical analysis of the analyses of relevant effectiveness studies of treatments with Latinos. To carry out this study we are going to include published and unpublished articles, with at least 40% of Latinos in the sample, all treatments for mental illness, emotional distress, family problems, and behavior problems. Also, we will include those studies that provide quantitative data regarding client's experiences in mental health treatments that explicitly report on client culture, ethnicity, or race. For the statistical analysis we will calculate the effect and then compare the effect size for conditions such as anxiety and depression from the studies with Latinos to the effect size reported from the non-minority studies on these conditions.

ENDURE TRAINEE ABSTRACT

CLAUDIA LOPEZ

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Biology; May 2015

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

ENDURE Trainee Scientific Interest

My interests lie in studying two very similar processes: development and regeneration. These processes demonstrate how complex the development of an organism can be and how difficult it can be to elucidate the mechanisms that occur to make it happen. Specifically, I am interested in understanding how neurogenesis occurs throughout developing organisms and after a lesion in the organisms that carry out regeneration of the central nervous system. Also, I am interested in the study of the molecular mechanisms that underlie neurodegenerative disease, such as Alzheimer's disease and Parkinson's disease. This study along with the study of stem cells leads to the possible development of new cell-based therapies for neurodegenerative conditions.

ENDURE Trainee Career Goals and Plan

My goals are to graduate with a Bachelor's degree in Cellular-Molecular Biology with a strong background in Psychology and Neuroscience. After achieving this, I would like to obtain a Ph.D. in Neuroscience and pursue a career as a researcher in the area. Regarding research, I plan on continuing research in the area of developmental neurobiology or neurodegenerative diseases. I plan to be part of associations related to Neuroscience because I believe it is necessary to integrate newfound knowledge into the context of the society we live in. Through my academic and non-academic efforts, I wish to contribute beneficially to the area of Neuroscience not only by carrying out important research, but also by bettering the treatment of neurodegenerative diseases.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Vermont

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Felix Eckenstein

ENDURE Research Project Title: Identification of neuronal subpopulations in the regenerating radial nerve cord of *Holothuria glaberrima*

Regeneration mechanisms within the central nervous system have yet to be unraveled. Our model organism, *Holothuria glaberrima*, provides us with the basis for the study of the regeneration of neurons and fibers post-lesion via its amazing regenerative capacities. It has been observed that three commercial antibodies (anti-Pax6, anti-Nurr1, and anti-Phosphohistone H3) identify distinct neuronal subpopulations within the radial nerve cord of the central nervous system of *H. glaberrima*. We sought out to characterize the expression of these distinct subpopulations during

the regeneration of the radial nerve cord. Sea cucumbers were injured by injuring the radial nerve cord with a scalpel and left to recover. They were sacrificed at different days post-injury: two, six, 12, 21, and 28 days. The subpopulations were then studied using immunohistochemical analysis. At 2dpi, the neuronal subpopulation marked by anti-Pax-6 seems to regenerate before the other subpopulations suggesting that it could be guiding other neurons to regenerate later on. At present, we are analyzing the expressions of these distinct subpopulations at later stages. These results will give insight into the spatial and temporal regeneration, and possible roles of the subpopulations.

ENDURE TRAINEE ABSTRACT

CELIMAR NEGRÓN-MORALES

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Biotechnology, May 2014

Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest

My research interest lies in the field of biomedical imaging, specifically neuroimaging. I want to apply the lessons learned during my tenure in the ENDURE program developing neuroimaging tools and methodologies for three-dimensional (3D) microscopy to develop tools and methods that will allow the assessment of benign or malignant brain tumors in their 3D space because they are “space-filling lesions”. It is of utmost importance to develop, validate, and clinically implement quantitative, biology-driven neuroimaging tools methodologies such as those under development in the laboratory in which I am working and those that I intend to develop in the future. My goal is to develop tools and methodologies that will aid in the selection and development of appropriate therapies, assessment of treatment efficacy, failure, and provide accurate and clinically relevant biologic end points for high-risk, but potentially high-reward, tumor-specific therapies tailored to the unique biology of an individual brain tumor.

ENDURE Trainee Career Goals and Plan

After completing my undergraduate degree (B.S.) in the area of Biotechnology, I will apply to a graduate school on the mainland U.S., with the goal of obtaining a Doctor of Philosophy (Ph.D.) degree in the area of neuroscience/biomedical imaging. I am in the process of completing entrance exams (i.e. GRE and TOEFL) with the goal of beginning graduate school in August 2014. My ultimate goal is to become a neuroscientist working in an academic setting and to develop a competitive research program in neuroscience biomedical imaging.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: New York Department of Health, Wadsworth Center, Albany, New York

Mentors/Advisors at ENDURE Summer Research Experience Institution: I was accepted by and attended a summer Research Experience for Undergraduates (NSF-REU’ “Networked Ventures for Collaborative Biological Discovery”) at the New York Department of Health, Wadsworth Center, Albany, New York (<http://www.wadsworth.org/educate/molcel.htm>).

ENDURE Research Project Title: Developing a toolkit for exploring the impenetrable and indefinable jungle: correlating 3D-EM imaging at different scales

During my tenure in the ENDURE program, I have been working in collaboration with the principal investigator and staff of the laboratory developing a new en bloc staining technique that not only

takes advantage of new electron-based imaging technologies, such as serial block-face imaging technologies, but also overcomes a major challenge to other types of electron-based imaging technologies, such as electron tomography. The new en bloc staining technique overcomes challenges posed by charging, radiation, and ion beam-and electron-induced surface contamination/artifacts by making the neural tissue electron-conductive prior to embedding it in a non-conductive resin. This new en bloc staining technique allows us to take full advantage of the resolution capabilities of field-emission scanning electron microscopy (block-face) and transmission electron microscopy (thin section) by reducing tissue charging; it also allows us to easily segment clearly defined neuronal boundaries with a resolution sufficient to follow the thinnest neuronal processes. Supported by NS-080687; GM-108470; MH-086994; NSF-1062963, and NSF-0964114.

ENDURE TRAINEE ABSTRACT

Yvis del Mar Ortiz-Vélez

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

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Bachelor in Forensic Investigation, May 2015

Mentors/Advisors at Home Institution: Dr. Irving Vega Ph.D., University of Puerto Rico, Dr. Pérez Berenguer M.D., Forensic Science Institute, Medical Science Institute, University of Puerto Rico, Medical Science Campus, Department of Pathology and Laboratory Medicine, VA Caribbean Healthcare System

ENDURE Trainee Scientific Interest

As Forensic Investigation student I'm also interested in neuroscience. I want to apply the acquired knowledge in forensic investigation to neurobiological questions. The combination of both fields opens the possibility of new areas of research or complementing research areas in the area of behavioral neuroscience and the justice system. The forensic neuroscience contribution in medical-legal and criminal cases provides a scientific assessment of factors involved in criminal or deviant behavior. The idea to apply what we know about the brain for the study of a victim and victimizers in a social, behavioral, and molecular aspect is my main research interest.

ENDURE Trainee Career Goals and Plan

As a Forensic Investigation student and as a trainee of the ENDURE program I am interested in applying my academic training with neuroscience. First, my short term career goals are to complete my bachelor degree and acquire research skills. Then, I plan to pursue graduate studies in the area of forensic neuroscience. In order to prepare for this goal, I am conducting neuropathological studies on neurological disorders and planning to apply for a summer program where I can further develop my skills in neuroscience research. In addition, I am working toward publishing my current research work. After post-doctoral studies in Forensic Neuroscience, my long term career goals are to become a forensic neuroscientist and college professor while maintaining a close relationship with the community.

ENDURE Trainee Summer Research Experience

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

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Irving Vega Ph.D., University of Puerto Rico Dr. Pérez Berenguer M.D., Forensic Science Institute, Medical Science Institute, University of Puerto Rico, Medical Science Campus, Department of Pathology and Laboratory medicine, VA Caribbean Healthcare System

ENDURE Research Project Title: Neuropathological Studies of Neurological Diseases

Neurodegenerative disorders, such as Alzheimer's and Parkinson's disease, are characterized by

neuropathological markers. The identification and quantification of these molecular markers through neuropathological analyses contributes to improving the diagnosis of neurodegenerative disorders with similar symptoms and clinical presentations. At present, the diagnoses of neurodegenerative disorders are not neuropathologically confirmed in Puerto Rico. Therefore, postmortem brain tissue from patients with a diagnosis of neurodegenerative disorders available at the Puerto Rico Institute of Forensic Sciences will be subjected to immunohistological analysis. The results obtained will be used to validate diagnostic practices and identify putative pathological markers of neurodegenerative disorders in an exclusively Latino population.

ENDURE TRAINEE ABSTRACT

MÓNICA C. QUIÑONES-FRÍAS

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Cellular and Molecular Biology, 2014

Mentors/Advisors at Home Institution: Dr. José E. García-Arrarás (Principal Investigator and Co-program director of ENDURE-NeuroID) Dr. Irving E. Vega (Co-Program director of ENDURE-NeuroID)

ENDURE Trainee Scientific Interest

During my undergraduate research experience, I have studied the establishment of nervous components during intestinal regeneration of the sea cucumber, *H. glaberrima*. Through this time, I have become interested in the study of the development of the nervous components during embryogenesis. There are many questions that remain to be answered concerning the complex development of the nervous system, especially the brain. I am fascinated by the brain's capacity to store information and how its structure defines our behavior. Due to its importance, I want to study these particular processes in order to generate new insights of the complex wiring of the brain.

ENDURE Trainee Career Goals and Plan

My research experiences have reaffirmed my desire to pursue a Ph.D. in order to provide new scientific knowledge. I will fully engage in my research to provide answers to questions that will provide a better understanding of the complexity of the development of the nervous system. During this period, I will establish the questions I want to answer relating to the development of nervous components. After acquiring my Ph.D., I want to pursue a Postdoctoral Fellowship. This will allow me to explore translational aspects of the research that I will perform during graduate school. I want to complement the basic science elements acquired through my Ph.D. to elucidate understanding and approaches to neurological diseases and disorders. My long-term goals are to become a professor and conduct my independent research. I want to be able to contribute to my scientific community not only by research but also by teaching others.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Harvard Medical School

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Michael Wolfe (Principal Investigator) Dr. Sheila Thomas (Summer program director) Dr. Karl Munger (Summer program director)

ENDURE Research Project Title: Characterization and Identification of Transcription Factors that may have a Role in Neuronal Differentiation during Intestinal Regeneration of *Holothuria glaberrima*

The enteric nervous system (ENS), similar to other components of the peripheral nervous system,

has some regenerative capabilities. Unfortunately, many of the molecular events that occur during ENS regeneration remain unidentified. We have used an echinoderm model, the sea cucumber *Holothuria glaberrima*, for insights into this process. We identified transcription factor (TF) genes that might be involved in the regulation of neuronal differentiation during regeneration. Here we identify the holothurian homologues of Sox B1 and the LIM homeobox genes, *Islet* and *Lhx3*, and characterize their expression profile during intestinal regeneration. We also characterized the LIM domain binding protein 1 (*Ldb1*), in view that it might be required for some of the TF actions of the LIM homeodomain proteins. SQ-PCR analyses showed that *Ldb1* and *Lhx3* expression was restricted to early stages of regeneration while *Islet* expression seemed to increase gradually throughout the regenerative process.

ENDURE TRAINEE ABSTRACT

Ana Isabel Quiñones- Ramos

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

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Cellular and Molecular Biology, May 2015

Mentors/Advisors at Home Institution: Dr. José E. García- Arrarás

ENDURE Trainee Scientific Interest

As part of the ENDURE program, my current research interest initially includes the use of a monoclonal antibody against a population of enteric neuron cells and fibers (EN-1) as a characterization tool to better understand the innervation of the intestine during organogenesis. My scientific interests also include Developmental, Computational, and Cellular and Molecular Neuroscience.

ENDURE Trainee Career Goals and Plan

My future career goals include pursuing a PhD in Cellular and Molecular Neuroscience, and later on having my own research laboratory where I will continue my passion for learning and discovering new things and also train and mentor students. My main goal is to learn and understand the role of gene expression in controlling the trajectory of neuronal precursors and neurons during development and apply this knowledge in the study of the regeneration of the nervous system.

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 E. García- Arrarás

ENDURE Research Project Title: Characterization of a *Holothuria glaberrima* population of enteric neurons and fibers using the monoclonal antibody EN-1

Echinoderms are deuterostomes that are known for their great regenerative capacity after amputation or autotomy. We focus on the sea cucumber *Holothuria glaberrima* as a model organism for its ability to regenerate its internal organs after an evisceration process. During intestinal organogenesis; a new, functional, and histologically mature organ can be observed in approximately 30 days. This new organ arises from the healing of the wounded mesentery. The formation of the new enteric nervous system has been studied, bringing increasing questions and new experimental designs as new data becomes available. A new monoclonal antibody (EN-1) is being used to identify a population of enteric neurons and fibers by immunofluorescence. Our aim is to characterize the cells and fibers in different regenerative stages of intestinal tissues and in in vitro cultures obtained from regenerating tissues using EN-1. Preliminary results show the presence of these cells and fibers in the luminal and coelomic epithelia, and in connective and mesothelial layers. In vitro, neuron-like cells were also identified. Subsequent experiments include immunoprecipitation and peptide analysis in order to identify the antigen recognized by this antibody.

ENDURE TRAINEE ABSTRACT

KATHERINE M. CEPEDA RIVERA

Home Institution and State: University of Puerto Rico

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: Psychology, May 2014

Mentors/Advisors at Home Institution: Jennifer Barreto Estrada, University of Puerto Rico, Medical Sciences Campus

ENDURE Trainee Scientific Interest

I am interested in conducting research on the neurobiological and neuropsychological basis of learning and memory. I'm particularly interested in pursuing studies that explore human and animal learning, as a process of development and coordination of cognitive functions. My intent is to enquire on neuronal structures and their relationship with cognitive processes.

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 the University of Puerto Rico. My mid-term plans involve completing a masters degree in Cognitive Sciences and Education, while my long-term plans are a PhD degree in Neurobiology and finally a post-doctorate degree 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 human beings cognitive development.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Pittsburgh

Mentors/Advisors at ENDURE Summer Research Experience Institution: Edda Thiels and Jon Johnson

ENDURE Research Project Title: The anabolic steroid, 17 α -methyltestosterone, impairs inhibitory avoidance learning in periadolescent rats.

Human consumption of anabolic androgenic steroids (AAS) has been related to anxiety, aggression, and mood disorders. AAS are used in high doses by adolescents and adults to increase muscle mass and enhance athletic performance. Previous studies have shown the cognitive effects of AAS in adult rodents; however, the implications of AAS administration during puberty and adolescence are unknown. We answered this question using the three trial Inhibitory Avoidance Task (IAT) and the Elevated Plus Maze (EPM). We found that acute and chronic treatment (17 α -methyltestosterone; 17 α -meT- 7.5 mg/kg) impaired the acquisition of the IAT in periadolescent males, but not in females. Anxiogenic behavior was not observed in males or female rats. Future studies will aim to assess the duration of the cognitive impairment. Recently, we published the results about the effect of ASS in the periadolescent stage and we hope to establish the long term implications of those drugs.

ENDURE TRAINEE ABSTRACT

NILDA YARELIS RIVERA

Home Institution and State: University of Puerto Rico

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: May 2015

ENDURE Trainee Scientific Interest

My research interests are in neuroscience. As a psychology major, I love to study the human behavior and I do like to learn the neurobiology processes underline them. The studies of the biology of the brain that occur in humans provide insights on how our nervous system directs our mental and psychological processes. I am very interested in understanding the interaction between behavior and the nervous system. Therefore, I would like to pursue a Ph.D. in neuropsychology in order to combine neuroscience and psychology.

ENDURE Trainee Career Goals and Plan

I am studying psychology and mental health, but it is important for me to mention that what I like most from psychology is the neuroscientific approach. My interest is to get a Ph.D. in a field of study related to psychology and neuroscience, as neuropsychology. Working toward a Ph.D. in clinical psychology would be a perfect fit for me, because in the future I can work as a psychologist and as a researcher. My research goals are in the area of neuropsychological processes and cognitive diseases. I'm planning to get postdoctoral training in neuropsychology so I can develop my research career and excel as an excellent neuropsychologist.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Puerto Rico, Rio Piedras

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Irving Vega

ENDURE Research Project Title: Effect of efhd2 gene deletion: a behavioral assessment
EFhd2 protein was found associated with pathological forms of tau in Alzheimer's disease. This protein binds calcium and self-oligomerize in vitro, but its physiological function in the central nervous system is still unknown. In order to gain insight into the physiological role of this protein an efhd2 knockout mouse was developed. Characterization of the efhd2 knockout mice line includes analysis of their general health and behavior. The battery of tests performed cover several domains of neurological function such as: autonomic, neuromuscular and sensorimotor function, excitability and physiological measurements. Preliminary results show that EFhd2 deficiency does not prevent fertility in both males and females, nor parturition or milk ejection in females analyzed. No gait abnormalities have been detected in efhd2+/- or efhd2-/- animals when compared to control efhd2+/+ animals at 16 weeks of age. However, preliminary results showed that as the efhd2-/- mice aged (52 weeks old), they tend to perform better in the hanging grip test and gain less weight than efhd2+/+ and efhd2+/- mice, suggesting that deletion of the efhd2 gene may protect against aging. Further characterization of efhd2 knockout mice will provide valuable insights into its physiological and pathological role.

ENDURE TRAINEE ABSTRACT

PABLO ABNER PAGAN RIVERA

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Psychology, May 2015

Mentors/Advisors at Home Institution: Dr. Gregory Quirk and Dr. Maria Diehl

ENDURE Trainee Scientific Interest

During the time I've been doing research in neuroscience I've discovered a great passion for this field. The three main areas of my interest are the behavioral, cognitive and translational neuroscience. As a psychology student, the behavior have been a very important area of study but also, how processes such as learning, memory and regulation of emotions in the brain can manipulate this one. Since the beginning of my immersion to research, I knew that I wanted to do research with purpose. This, by helping with my results to the development of more effective ways of treatments for helping people with mental disorders of all kinds.

ENDURE Trainee Career Goals and Plan

After graduation I'm interested on applying to a graduate school to pursue a Ph.D. in Neuroscience. As part of my long term goals, I want to be a well-recognized researcher in the field and to become a professor to teach college students interested in neuroscience, psychology and other related fields. As an undergraduate student, I'm focused on learning as much as possible and on developing the skills and the discipline that will help me to get where I want to be in the future. Doing research on a lab that reunites all these factors have helped me to decide and determine that this is want I really want to do for the rest of my life.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: University of Puerto Rico, Medical Sciences Campus, Laboratory of Fear Learning

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Gregory Quirk

ENDURE Research Project Title: The role of prelimbic prefrontal cortex in avoidance behavior

Our lab previously presented a new avoidance task in which rats can avoid a tone-cued foot shock by stepping onto a nearby platform. Studies from our laboratory showed that the prelimbic cortex (PL) and other structures are involved in avoidance behavior and that PL neurons are tone-responsive. Still, the causal role of PL in avoidance behavior is unknown. After giving the animals 10 days of platform avoidance conditioning, we will measure avoidance expression using a two-tone test, where the first tone is laser-OFF and the second tone is laser-ON for 30s (onset of tone). Given that pharmacologically inactivating PL disrupts avoidance behavior, we hypothesize that optogenetically silencing PL with halorhodopsin (HALO) during the tone of a platform avoidance paradigm will decrease avoidance behavior.

ENDURE TRAINEE ABSTRACT

STEPHANIE SANTIAGO

Home Institution and State: University of Puerto Rico, Rio Piedras

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Undergraduate Academic Level: Senior

Undergraduate Major and Expected Graduation Date: May 2014

Mentors/Advisors at Home Institution: Karen Martinez, M.D., MSc and Francisco Amador, M.D.

ENDURE Trainee Scientific Interest

I am interested in the study of cognition, specifically human memory, learning and emotional processing. I currently work at the University of Puerto Rico- School of Medicine, in a project led by psychiatrist Dr. Karen Martinez and neurophysiologist Dr. Gregory Quirk. We focus on studying how fear is learned and extinguished, the use of neuropsychological tests, and the impact of genetics on these behaviors. As a Psychology major, it has been an incredible experience to get out of my comfort zone and explore an interdisciplinary emphasis by seeking to identify genetic and environmental biomarkers that impact individuals at risk for anxiety disorders. For this reason, I want to obtain a broad knowledge of the workings of the nervous system and develop skills that can help me further understand human behavior, and how it is influenced by external factors.

ENDURE Trainee Career Goals and Plan

My passion for understanding the underlying mechanisms of the brain motivated me to pursue a doctorate degree in clinical neuropsychology. Having the opportunity to work in a laboratory as an undergraduate student has enhanced my interest in research, motivating me to also become a principal investigator. My goal is to learn more about learning, memory and emotional processes and their effect on mood and anxiety disorders, and to contribute to scientific knowledge within the behavioral neurosciences field. I seek to become a scientist-practitioner and provide clinical therapy while being immersed in the world of research.

ENDURE Trainee Summer Research Experience

ENDURE Summer Research Experience Institution: Northwestern University

Mentors/Advisors at ENDURE Summer Research Experience Institution: Dr. Joan Chiao

ENDURE Research Project Title: Genetic variation of the Serotonin Transporter (5-HTTLPR) and Threat Processing

Fear conditioning and extinction are associative models of learning theoretically related to the etiology of anxiety disorders. Functional neuroimaging during fear learning paradigms reveal that subjects with anxiety disorders show altered activation of brain areas known as the fear circuit. We hypothesize that genetic variations altering protein expression and function of these fear circuit regions might influence fear learning. Altered activity of the Serotonin Transporter (5-HTT)

protein has been related to changes in fear circuit areas such as the amygdala and prefrontal cortex, which have been implicated in the pathophysiology of mood and anxiety disorders. Our objective is to examine if fear responses in humans are influenced by the functional genetic polymorphism of 5-HTT, the Serotonin Transporter-Linked Polymorphic Region (5-HTTLPR). Healthy subjects were screened using a structured clinical interview (SCID), to rule out any DSM-IV disorder. Included subjects underwent an established fear conditioning and extinction paradigm using visual cues paired with an electric shock to elicit skin conductance responses (SCR), and DNA from saliva samples were analyzed to identify alleles of the 5-HTTLPR. Given the relationship of the genetic variation in the 5-HTT to fear learning, this variation might also be a risk factor for anxiety in healthy individuals.

ENDURE TRAINEE ABSTRACT

KARINA TORRES TRISTANI

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

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Undergraduate Academic Level: Junior

Undergraduate Major and Expected Graduation Date: Cellular and Molecular Biology, May 2015

Mentors/Advisors at Home Institution: Dr. Carmen S. Maldonado-Vlaar and Arlene Martínez-Rivera

ENDURE Trainee Scientific Interest

My scientific interests revolve around behavioral neuroscience. The sub-specializations that I look forward to study are those involved with the processes of learning and memory mechanisms, so that I can have a better knowledge in neurological diseases, such as Alzheimer's. Among other interests in this field, I am also inclined into learning about the functions of the circadian rhythm and its effect on human behaviors. Overall I look forward to compliment these types of researches to have a better understanding of different diseases in the nervous system.

ENDURE Trainee Career Goals and Plan

Among my short-term goals are the opportunity of publishing a paper of my current research project and gaining my Bachelor's Degree with honors in Cellular and Molecular Biology at the University of Puerto Rico. After graduating, I will pursue an MD/PhD degree so that I can incorporate my scientific experience in neuroscience with medical practice. After, I will sub-specialize in neurosurgery and keep doing research to, hopefully, one day find a treatment for a neurological disease using both my research and medical knowledge.

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. Carmen S. Maldonado-Vlaar and Arlene Martínez-Rivera

ENDURE Research Project Title: Effects of a positive allosteric modulator of the metabotropic glutamate receptor 5 within the Nucleus Accumbens shell during environmental elicited cocaine conditioning.

Recent data from our laboratory suggest that the associative learning required for cocaine conditioning is disrupted by mGluR5 antagonist treatment within the NAc. Specifically, we demonstrate that mGluR5 blockade decreased environmental-elicited cocaine conditioning response. This significant reduction was not found in the control or the cocaine-unpaired subjects. Our results imply that mGluR5 could be modulating the memory processes regulated within the NAc essential for the association of environmental cues with cocaine effects. In contrast, previous results report that mGluR5 positive allosteric modulators (PAMs) enhance synaptic plasticity, improve spatial learning and has beneficial effects in the treatment of cognitive impairment associated with schizophrenia. Moreover, limited numbers of studies have examined the effects of

mGluR5 PAMs on cocaine addiction. However, no study to date has investigated the therapeutic potential of other mGluR5 PAM novel compounds on specific aspects of cocaine addiction such as conditioned locomotor response. Therefore, this research seeks to unveil the role that a selective PAM of mGluR5 within NAc shell has on cocaine conditioning. Our hypothesis is that the mGluR5 selective agonist CHPG (RS)-2-chloro-3-hydroxyphenylglycine will promote and enhance the expression of the cocaine conditioned response. Rats were implanted with cannulas within NAc shell, and separate groups were exposed to a multimodal environment within activity chambers that signaled cocaine (paired) or saline (controls, unpaired). Prior to placing the animals in the chambers, rats received systemic injections of saline or cocaine for 10 consecutive sessions. On the day of the conditioned response expression, different groups of rats were microinjected with vehicle or the agonist CHPG into the NAc shell and then they were placed in the activity chambers. Interestingly, results show no change in the expression of the conditioned response in cocaine paired experimentally treated animals. Future studies are needed to further characterize these effects.

COMPLETE ENDURE STUDENT ACTIVITIES AT SFN: November 9 -13, 2013

<p>SATURDAY Nov 9</p>	<p>7:00 – 11:00 am ENHANCING NEUROSCIENCE DIVERSITY THROUGH UNDERGRADUATE RESEARCH EDUCATION EXPERIENCES (ENDURE) 2nd ANNUAL MEETING Hilton San Diego Bayfront, Sapphire Ballrooms IJMN (1 Park Blvd, San Diego, CA 92101)</p> <p>*7:00 – 7:30 am Registration (also can early register Friday evening between 5 – 7pm) 7:30 – 9:30 am Featured Speakers 9:30 – 11:00 am T32 Recruitment Fair and Networking</p> <p>1:00 - 2:00 pm GETTING THE MOST OUT OF SFN: THE ANNUAL MEETING AND BEYOND, San Diego Convention Center , 31C 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 out of the annual meeting experience, both during and after Neuroscience 2013. Whether you are looking for networking strategies or simply 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.</p> <p>6:30 - 8:30 pm DIVERSITY IN NEUROSCIENCE POSTER SESSION, San Diego Convention Center – Hall A</p> <p>There will be a gathering of students and postdoctoral fellows from the American Psychological Association Diversity Fellowship program, Meharry-Vanderbilt Alliance for Training, Texas Consortium in Behavioral Neuroscience, SNRP students, ENDURE and the SfN-NINDS Neuroscience Scholars Program to present their research findings. We encourage you to come enjoy the refreshments (<i>Funded by SfN</i>) and to meet with undergraduate, graduate and post-doctoral students from these various programs.</p> <p>8:30 - 10:00 pm CAREER DEVELOPMENT TOPICS: A MENTORING AND NETWORKING EVENT, San Diego Convention Center – Hall A</p> <p>Experienced neuroscientists will be on hand to offer mentoring on a wide range of topics in an informal, roundtable format. Topics include work-life balance, securing grants, career transitions, careers away from the bench, choosing graduate schools of postdoctoral fellow positions, and many others.</p>
<p>SUNDAY Nov 10</p>	<p>MORNING AND AFTERNOON Attend Scientific Program Featured lectures Symposia Special lectures Minisymposia Plan Your Itinerary for Neuroscience 2013 http://www.sfn.org/Annual-Meeting/Neuroscience-2013/Abstracts-and-Sessions/Program</p>

COMPLETE ENDURE STUDENT ACTIVITIES AT SFN: November 9 -13, 2013

MONDAY
Nov 11

12:00 – 2:00 pm Graduate School Fair:, San Diego Convention Center , Sails Pavilion

The Society for Neuroscience and the Committee on Neuroscience Departments and Programs invite you to meet face-to-face with student advisors, program faculty, and graduate schools and representatives at the second annual Graduate School Fair

MORNING AND AFTERNOON

Attend Scientific Program

- Featured lectures
- Symposia
- Special lectures
- Minisymposia

Plan Your Itinerary for Neuroscience 2013

12:00 – 2:00 pm Day 2 Graduate School Fair:, San Diego Convention Center , Sails Pavilion

12:00 - 2:30 pm Actively Managing Your Career: What They Didn't Teach You in School, San Diego Convention Center 31C

You have the “hard” skills needed to advance your research, but have you mastered the “soft skills” that are equally important for career success? This workshop offers practical advice and tactics to help you navigate an increasingly complex and competitive environment – from creating a personal mission statement to gaining skills for effective time management, communications, networking, finding and leveraging mentors, negotiating to get what you want, and more. Learn how actively managing your career and life can lead to increased satisfaction and success. Marty Nemko is an acclaimed career coach, author, blogger, and radio host with a PhD in educational psychology. His most recent book is How to Do Life: What They Didn't Teach You In School.

6:45 - 8:45 pm Faculty for Undergraduate Neuroscience Social, San Diego Marriott Marquis: Marriott 3 and 4

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

7:00 – 8:00 pm DIVERSITY NEUROSCIENCE RECEPTION , Marriott Marquis & Marina - Marina Room E

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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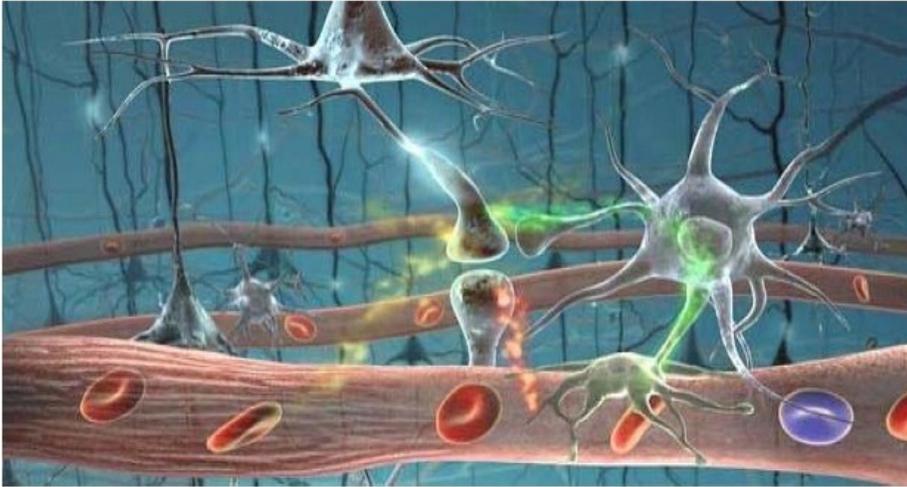
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