

BIOGRAPHICAL SKETCH

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NAME: Maria Ramirez

eRA COMMONS USER NAME (credential, e.g., agency login): MARIA10

POSITION TITLE: Research Assistant

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	Start Date MM/YYYY	End Date MM/YYYY	FIELD OF STUDY
University of Puerto Rico, Bayamon Campus, Bayamon, PR	BS	08/2010	05/2015	Human Biology
University of Puerto Rico, Medical Sciences Campus, San Juan, PR	MPH	08/2015	05/2017	Public Health
University of Puerto Rico, Rio Piedras Campus, San Juan, PR	PHD	01/2017		Biology

A. Personal Statement

While pursuing a B.S. in Human Biology, I took a variety of psychological and social sciences courses. This made me realize the importance of understanding biological sciences from a holistic and integrative perspective. That is the main reason why I chose to study a master’s degree in public health and why I took a specific interest in the area of Mental Health and Neurobiology. For this reason, I decided that I want to pursue an academic career in the neuroscience field and eventually work in scientific research. In order to accomplish my goal, I am aware that I need to engage in additional learning experiences that will help me improve my scientific knowledge and skills. Thus, I applied to the doctoral program in biology offered by the University of Puerto Rico, Rio Piedras Campus (UPR-RP).

During my undergraduate studies, I had the opportunity to participate in many extracurricular activities that helped me define my current professional goals. I was given the chance to take part in an investigation performed in the areas of microbiology. The investigations addressed the Characterization of Resistant Genes in Gram Negative Bacteria. Also, I had the opportunity to participate in investigations performed by students of the Eco-Environmental Society concerning the Community's Behavior Towards Disposable Materials at UPR-RP. This research was presented at the iINAS conference at UPR-RP in 2014 and was later introduced and evaluated by the administration of the UPR-RP. As a result, the establishment of policies concerning the banning of commercialized water bottles at the UPR-RP was implanted in the years that followed.

In addition to research activities, I took additional biology courses from and outside the UPR system. These learning experiences include: the Molecular Summer Biology Academy at the Universidad Central del Caribe (UCC), a Certification offered by the UPR-Humacao in Techniques used in Industrial Biotechnology and the Medical Biotechnology and Drug Development Course at Danish Institute for Study Abroad Program in Denmark. The biological techniques that I learned through these experiences have helped me in the course of my academic goal.

During my master’s degree, I had the opportunity to study the relationship between ADHD and Drug Addiction in Latin Male Prison Inmates. Although most of the knowledge gained in this research had a strong social and psychological component, it made me realize the importance of gaining a throughout understanding of the neurological basis of addiction. In addition to this investigation, the entire class participated in a research project during their last month in the program. The purpose of this thesis-like research was to study the risk factors that might lead to an old adult experiencing a fall. For this, we used a standardized survey that analyzed important environmental and biological factors that might help understand in a holistic level the factors that influence a fall. Our main sample was located in Caguas, Puerto Rico where we screened for

adults that were 60 years or older. Our results showed that there are extrinsic and intrinsic factors such as gender, age, the amount of diseases the individual suffers from, polypharmacy and the psychological fear of falling itself that seemed to be related to an increase in falls in this population.

In my graduate studies, I have been working with Dr. Alfredo Ghezzi and his team. Currently, our research focuses on the neurobiology of addiction, looking closely at the relationship between sleep and alcoholism. Our primary objective is to use *Drosophila* as a biological model to decipher the molecular pathways and neuronal circuits associated with alcohol-sleep interactions. This type of research is important as alcohol has been widely used as a sleep aid, leading to drastic changes in circadian rhythms and homeostatic processes. In its first stage, we will study the effect of *slowpoke*, a gene known to regulate neuronal activity, in alcohol-induced sleep behaviors. Later, we will determine the role neurons involved in sleep/wake cycles have in alcohol-sleep interactions and explore the underlying mechanism by which this gene mediates the observed response. I have had the opportunity to present preliminary results concerning this research in the 1st, 2nd and 3rd Puerto Rican *Drosophila* Meeting and in Neuroscience PR. Internationally, I had the chance to present a poster at the Society for Neuroscience Conference (2018) held in San Diego, CA. In addition, I was a co-author for a review article published in the *Journal of Experimental Neuroscience* concerning the epigenetic effects that underlie alcohol responses, looking closely at *Drosophila* as a biological model.

My scientific training and academic education in the area of neuroscience will be enhanced from performing and obtaining the results of this proposal. Attending scientific conferences along with the previous academic background described above have helped me understand my project in a deeper level.

B. Positions and Honors

Position and Employment

2015-2016 Research Assistant, University of Puerto Rico, Medical Sciences Campus
2017-present Research Assistant, University of Puerto Rico, Rio Piedras Campus

Other Experience and Professional Memberships

2012-2013 Member, Eco-Environmental Society UPRRP
2013 Summer Course, Universidad Central del Caribe- Molecular Biology Summer Academy
2013 Summer Course, Medical Biotechnology and Drug Development
2013-2014 Member, Enactus University of Puerto Rico, Bayamon Campus

Honors

2015 Graduated Cum Laude (3.50 GPA) University of Puerto Rico, Bayamon Campus
2017 Selected as one of the most outstanding students of the Graduating Class 2017 for Academic Excellence, University of Puerto Rico, Medical Sciences Campus.

C. Contributions to Science

1. **Master's Thesis:** During my master's degree, the entire graduating class formed part of a research project that took place during our last month in the program. Our mentor, Marisol Peña, guided us in conducting this thesis-like investigation in a short period of time. It focused on understanding the risk factors involved in falls in an old population in Caguas, Puerto Rico. This topic is a major concern in the area of Public Health as an increase in falls leads to lesions, whose effect worsens when taking into consideration the physiological state of the old adult. We used an extensive questionnaire to analyze important extrinsic (external) and intrinsic (biological) factors that might be linked with a higher incidence of falls and evaluated the perception of our individual sample about their environment. Statistical software was used to analyze this questionnaire. In our sample, we found that women tend to fall more than men, and that the fear of falling itself influenced this trend in our female population. Other major factors were linked with an increase in the amount of falls our sample experienced such as age, the amount of diseases the individual suffers from and polypharmacy. I contributed to all areas of the study, from the review of literature, the interviewing and data collection process, data analysis and discussion. The overall result of the research is now found on the archives in the library of UPR-Medical Science Campus.

2. **Doctoral work:** In my Ph.D. years, I have been studying the relationship between alcohol and sleep under the mentorship of Dr. Alfredo Ghezzi. Here, we are focusing specifically on the genetic and neuronal circuits that underlie this behavioral response. At the time, I was looking at how alcohol affects genes involved in synaptic mechanisms. Specifically, we looked at a histone acetyltransferase called Tip60 that regulates chromatin structure and facilitates gene transcription. As it has been observed before that alcohol influences epigenetic factors that affect synaptic genes involved in the development of tolerance and dependence, Tip60 seemed to be a promising candidate. In our experiments, we used the UAS-Gal4 system to express an RNAi transgene of Tip60 in the entire brain of the fly and exposed these flies to alcohol. After sleep was monitored, we found that tip60 knockdown is counteracted the effect of the drug in sleep; these flies demonstrated a decrease in total sleep and an increase in sleep latency when compared to our control group.

Publications:

- a. **Ramirez-Roman ME**, Billini CE, Ghezzi A (2018) Epigenetic Mechanisms of Alcohol Neuroadaptation: Insights from. *J Exp Neurosci* 12:1179069518779809. PMID: 29899666, PMCID: PMC5990879

Posters and Presentations:

- a. **Ramirez-Roman ME**, Anqueira A, Agosto JL, Ghezzi A. (2018) Effect of Tip60 Knockdown on Alcohol Induce Sleep Behaviors. Presented at: 3rd Puerto Rican Drosophila Neurobiology Meeting, Spring 2019 (Poster).
- b. **Ramirez-Roman ME**, Homeostatic mechanisms of alcohol induced sleep disturbances in Drosophila. Presented at: 26th Puerto Rico Neuroscience Conference, Ponce, PR; 2018 (Talk).
- c. **Ramirez-Roman ME**, Billini CE, DeJesus-Ramirez GM, Buffill-Cartagea D, Perez M, De Jesus L, Agosto JL, Atkinson NS, Ghezzi A. Homeostatic mechanisms of alcohol-Induce sleep disturbances in Drosophila. Presented at: Society for Neuroscience meeting, San Diego, CA; 2018 (Poster).
- d. **Ramirez-Roman ME**, Billini CE, Padilla A, DeJesus-Ramirez GM, Buffill-Cartagea D, Agosto JL, Atkinson NS, Ghezzi A. Circadian genes, sleep and alcohol in Drosophila. Presented at: 2nd Puerto Rican Drosophila Neurobiology Meeting, Fall 2018 (Poster).
- e. **Ramirez-Roman ME**, Aleman-Rios JP, Perez M, DeJesus-Ramirez GM, Buffill-Cartagea D, Agosto JL, Ghezzi A. (2017). Effect of Acute Ethanol Exposure on Drosophila Sleep Pattern. Presented at: 1st Puerto Rican Drosophila Neurobiology Meeting 2017 (Talk).

D. Additional Information: Research Support and/or Scholastic Performance

Completed Research Support

FIPI (Fondo Institucional Para la Investigacion), University of Puerto Rico – Rio Piedras

Ghezzi, Alfredo (PI)

10/01/16-06/30/18

Epigenetic Dynamics of Alcohol-induced Neuroadaptation

Role: Key Personnel

Scholastic Performance

Bachelor of Science (Human Biology); University of Puerto Rico, Bayamon Campus GPA: 3.50

YEAR	COURSE TITLE	GRADE
2010-2011	General Biology	B
2010-2011	Pre-Calculus I	C
2010-2011	General Chemistry I	C
2010-2011	General Biology I	B
2010-2011	Pre-Calculus II	A
2011-2012	Microbiology	B
2011-2012	Introduction to Ecology	B
2011-2012	Calculus I	C
2011-2012	Organic Chemistry I	B

2011-2012	Developmental Biology	B
2011-2012	Human Biology III	A
2011-2012	University Physics I	A
2012-2013	Organic Chemistry II	C
2013-2014	University Physics II	A
2013-2014	Human Biology IV	B
2013-2014	General Chemistry II	A
2014-2015	Human Genetics	A
2014-2015	Introduction to Immunology	B

Master in Public Health; University of Puerto Rico, Medical Sciences Campus GPA 4.0

YEAR	COURSE TITLE	GRADE
2015-2016	Introd to Public Health	A
2015-2016	Fundament of Mangement in PH	A
2015-2016	Statistical Analysis	A
2015-2016	PH Services Literacy	A
2015-2016	Foundations Health Promotion	A
2015-2016	Cult Soc Comp Organization	A
2015-2016	Budget Theories and Practice	A
2016-2017	Princ Environment Health	A
2016-2017	Epidemiological Methods	A
2016-2017	Eval of Health Services	A
2016-2017	Computer Applications PH	A
2016-2017	Plan Dev Eval of Health	A
2016-2017	Legislative Process PH	A
2016-2017	Health Politics and Policy	A
2017-2017	Neuroscience	A

Doctoral Courses (Biology); University of Puerto Rico, Rio Piedras Campus GPA: 3.74

YEAR	COURSE TITLE	GRADE
2016-2017	Evolution	A
2016-2017	Supervised Research	A
2016-2017	Colloquium I	PS
2016-2017	Advanced Research	A
2017-2018	Colloquium II	PB
2017-2018	Fundamentals of Molecular and Cellular Biology I	A
2017-2018	Seminar in Zoology	A
2016-2017	Seminar in Zoology	A
2016-2017	Bioinformatics	B
2017-2018	Special Topics in Modern Biology	A
2017-2018	Doctoral Seminar	A
2017-2018	Supervised Research	A
2017-2018	Fundamentals of Molecular and Cellular Biology II	A
2018-2019	Neurobiology	B
2018-2019	Biotechnology	B
2018-2019	Current Trends in Cell Biology	A