PROGRESS REPORT

1. Narrative Section

This progress report is based on the establishment of an undergraduate training program in neuroscience named "Neuroscience Research Opportunities to Increase Diversity" (NeuroID) under the NIH Blueprint initiative ENDURE (5R25GM097635) at the University of Puerto Rico-Río Piedras Campus (UPR-RPC). (The grant proposal was originally entitled NeuroH-Neuroscience Research Opportunities for Hispanics). The achievements reported below are the result of a team effort by the principal investigators (Co-PIs), Dr. García-Arrarás (1.35 Acad. time effort) and Dr. Irving Vega (1.12 Acad. time, 0.9 Summer time effort) administrative personnel and institutional support. The training program main goal is to increase diversity in the Neurosciences by establishing a cohort of interested students that will receive academic and professional training in neuroscience related research and career developmental activities. The program comprises a comprehensive research experience for undergraduate students based on three teaching philosophies: student-citizen, service-learning and research with a purpose. To achieve our goals, the program was divided in three important components:

a. 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. [*No change from the original proposal*]

b. Academic Training – participation in seminars, workshops and selected courses to enhanced their knowledge in neurobiology, and understanding of a research career. [*No change from the original proposal*]

c. Student development activities – participants will enter a mentoring program that includes community outreach activities, scientific writing and oral presentations and other professional enhancement activities. [*No change from the original proposal*]

1.1 Development and Implementation of the Proposed Research Education Program (including education in the responsible conduct of research);

The first year of this funded training program has allowed the establishment of the research, academic and extracurricular activities described in the original proposal. The program started in January with the recruitment of the administrative personnel and announcement to the student community within the sponsored institutions. In this report we highlighted the achievements obtained in each component of the training program.

1.1.1 Program's Administration – A grant administrator (Mrs. Coral Cintrón) and secretary (Mrs. Nicole Peña) were recruited. The grant administrator responsibility includes personnel and students' contracts, purchase ordering, travel orders and budget reports. The secretary is in charged of all clerical duties of the program, including communication with students, university's administrators and mentors, record keeping, and meeting coordination. In order to increase the exposure of the NeuroID program among the student body, collaborators and NIH officials, a webpage was created to serve as communication source among NeuroID participants

and the general community [http://neuroid.upr.edu]. A webmaster was contracted to develop and maintain the website. This information outlet is an important component of the NeuroID program. Furthermore, an evaluation program has been developed to access the impact of the training and education philosophy described in the original proposal (**see section 1.6**).

1.1.2 Research Experience – The first NeuroID class was selected on April 2011. The selected participants chose a mentor from the list of neuroscientists described in the original proposal. During this summer, the selected students are conducting research in the laboratory of their respective mentors and took different workshops as described below. (The exception being Lionel Vazquez who participated in the summer program at University of Virginia under the mentorship of Dr. Jaideep Kappur, a renowned neuroscientist in the study of the neurophysiology of epilepsy.)

During the first summer, the selected participants were involved in an intensive research and training program. As described in the original proposal, the participants participated in a series of workshops to complement and enrich their research experience. At the end of the summer, the student presented their research work. A 20 min oral presentation was given by all student participants. The NeuroID participants were also asked to complete an **on-line research ethics course**. The course is divided on six sections, which are: Ethical Issues in Research, Interpersonal Responsibility, Institutional Responsibility, Professional Responsibility, Animal in Research and Human Participation in Research. The participants were asked to complete all six sections.
Course:[http://ori.dhhs.gov/education/products/montana_round1/research_ethics.html]

1.1.3 Academic Training – NeuroID participants are required to follow an academic program designed to increase their research capacities and knowledge in neuroscience. In the Fall semester, the students will register for the courses described in the original proposal. It is important to highlight that these courses do not add extra credits to the students' curriculum, but are taken as electives.

1.1.4 Student Development Activities – During this summer, the participants have taken workshops directed to increase their capabilities and understanding of a research career, while integrating in the selected laboratory. Every Thursday the students attended a meeting of two hours where different topics were discussed. These workshops were opened to the entire student community at the UPR-Río Piedras. The content of these workshops is described in the following table:

Workshop	Description	Presenter
Laboratory Safety	A 4 hrs seminar on laboratory safety that included: best practices to manage laboratory emergencies and risk assessment; Federal and State Laws that regulate the use and disposal of chemicals; report on chemical and radioactive spills; lab personnel	Official from the Institution's Office of Environmental Protection and Occupational

	responsibilities, among others.	Health
Lab notebook and etiquette	A 2 hrs seminar on the best strategies on recording research data. A guideline was given and discussed with the students. Additionally, an article entitled "*Laboratory Etiquette: The good citizen rules"* was developed. This article described 25 rules for a healthy laboratory environment. The rules were discussed with all students	Dr. I.E. Vega (Co-PI)
How to prepare an Abstract and Poster	Instructions and example on how to prepare an abstract and scientific poster was given to the student in a 2 hrs lecture section.	Dr. J.E. García-Arrarás (Co-PI)
Oral Scientific Presentation: How to be an effective speaker	A 2 hrs lecture on best practices to become an effective speaker. The presentation contained examples on how to prepare effective PowerPoint slides and presenter projection to the audience.	Dr. I.E. Vega (Co-PI)
Neuroethics	A 1 hr open discussion on issues surrounding neuroscience and bioethics. The philosophical and social impact of the emerging and important field of Neuroethics was discussed. The discussion was also based on responsible conduct of research in neuroscience.	Dr. I.E. Vega (Co-PI)
The Graduate School	A 1 hr seminar on Graduate Program's requirements, expectations and application process. The students were instructed on the importance of writing an excellent personal statement and fulfill the requirements established by the Graduate Program that the student wishes to apply.	Dr. J.E. García-Arrarás (Co-PI)

An innovate component of the Student Development program is the involvement of students in Community Outreach. As explained in the original proposal, NeuroID participants are required to participate in community outreach activities. In this regard, the Co-PIs have already coordinated the integration of NeuroID participants to local non-profit organizations that serve citizens with diseases associated to the nervous system. These organizations include: Alzheimer's Disease Association, Parkinson's Disease Association, Down Syndrome, Multiple Sclerosis Association, among others. Alternatively, the participants can opt to give science lectures to high school students to increase their understanding in neuroscience.

1.2 Modifications to the Research Education Program as Originally Proposed;

Our original plan, as stated in our proposal, was for a start-up date of January 1st, 2011. Students would be selected during the spring semester and begin their training in the summer months. However, the grant was funded as of September 2010. Therefore, we were confronted with two alternatives. One would be to modify our plan and begin students in January for their

two year stay in the program. In this way we could spend the funds allocated for the first year of the grant. Alternatively, we could maintain our original plan, knowing that we would have over 25% of the funds left over at the end of the first year.

After discussing the issue among the Co-P.Is and with Dr. Rivera-Rentas, the program officer, we concluded that the first option would create havoc with the program plan, since the original idea was structured for 2 years where the students would be initially trained during the first summer in our Institution and therefore be ready for a second summer in a mainland lab. Selecting students in January would imply several problems. For example, students would start working in a laboratory without the training workshops in ethics, scientific writing, laboratory notebook, laboratory safety and others that would be given during the summer period. Second, at the end of their 2-year stay, students would still have a 6-month period that would not be covered by NeuroID. More importantly, the NeuroID program itself was not in place yet (no secretary, no administrator), and we would have to rush in order to inform students on the program and on the application process.

Thus, we decided **to follow our original plan** for the benefit of the NeuroID Program and students. Our strategy would then be to carry the leftover funds until the end of the grant period (year 5), so that the students that will be at that time in the program can complete their 2-year training without problems. Therefore, in large part, the leftover funds represent funds that would be used to pay for the students' stipends and other Program activities for a 4 month period.

1.3 Description of the Applicant Pool;

The selection process took place as described in the original proposal. Briefly, the interested students submitted an application that was evaluated by the Co-PIs. Pre-selection was made based on the selection criteria established for the program. The pre-selected students were interviewed by three professors from the Department of Biology and the Co-PIs. From a total of 24 applications, 8 students were selected from different departments and institutions.

Applicants	Participation
UPR-Río Piedras	83%
Other Institutions	17%
GPA	range from 3.0 to 4.0
Student by discipline	
Biology	79%
Chemistry	17%
Psychology	4%

The Co-PIs want to increase the applications from universities surrounding the UPR-RPC, such as Metropolitan University (UMET), Interamerican University (Inter) and Universidad del Este. During the next funding period, the Co-PIs will visit these institutions to provide information about the NeuroID program and the application process.

Even though applications from students with GPA above 3.8 could fill the 8 spaces available in the program, the most important criteria used during the evaluation process were the aptitude toward neuroscience and a research career. As shown below, the GPA of the selected students ranges from 3.2 to 4.0.

1.4 Integration with Other Institutional Research-Training Programs Supported by the NIH and/or Neuroscience Blueprint Institutes (i.e., MARC, RISE, IMSD, T32)

As explained above, all our research and student development activities done were opened to the entire student body at the UPR-RPC. In addition, the Co-PIs have been in constant communication with collaborators at T32-Graduate Programs in the mainland. Based on this communications, during the starting Fall semester Dr. Corina Burger from the Neuroscience Training Program at the University of Wisconsin-Madison will talk with the students about opportunities and the application process at her institution. Again, this activity will be opened to all students at the UPR-RPC, specifically to MARC and RISE students. Finally, Dr. Vega (Co-PI) trained an undergraduate from the RISE program at the UMET. She participated in some of the workshops offered by the NeuroID program.

1.5 Collaboration with Research and Research Capacity Building/Infrastructure Programs Supported by the NIH and/or Neuroscience Blueprint Institutes (i.e., SNRP, RCMI, RIMI)

NeuroID participants are starting their first semester in the program. The Co-PIs expect that the students utilize facilities that have been established with the support of NIH through its diverse programs. For example, the NeuroID-student Jaime Vaquer has worked at the Protein Mass Spectrometry Core Facility, which was established in part by funds from NCRR-COBRE program, and the Sequencing and Genotyping Facility supported by the UPR-SNRP program.

As part of the original proposed training plan, the students will receive training in different research techniques. The training activity will be carried out in Core Facilities available at the UPR, which has been established in part by funds from NIH-NCRR. These training activities will be carried out during the next funding period.

1.6 Updates on the Evaluation of the Research Education Program and Dissemination Activities (if applicable);

The Research Education Program is based on "Research-with-purpose" philosophy. Research-with-purpose is a philosophical approach that intends to provide tools for self-motivation, career-engagement, social responsibility and empathy. The incorporation of activities that allow students to see their contribution to society through research, beyond pursuing a Nobel Price or finding the cure of a specific disease, will create real expectations, providing the basis to continue through the difficult, sometime tortuous, path of a research career. This novel approach supplements the formal training program with activities that provide opportunities to engage the community and gain experience on transmitting the acquired knowledge. The incorporation of a community outreach component intends to

confront students with the contributions and importance that research represents to society. Co-PIs intend to publish a manuscript based on this philosophical approach by the end of the next funding period.

The evaluation of all activities associated to the NeuroID program will assess the impact and influence that "Research-with-purpose" has on future career choices made by its participants. For that purpose, the CoPIs have established a contract with the Center for Evaluation and Sociomedical Research (CESR). This Center is an independent entity specialized in conducting evaluation on the performance of research programs and has the capabilities of conducting social studies. The Co-PIs have sustained several coordination meetings with personnel from the CESR to develop the evaluation instruments that will assess the performance of the NeuroID program. One product of these meetings was the development of a Logic Model that described all the activities, expectations and outcomes of the proposed research program. The assessment will be carried out at the end of each participant's year in the NeuroID program. In addition, the CESR will evaluate workshops and seminars throughout the year using web-based surveys sent to the students.

The NeuroID program performed different activities to disseminate its goals, activities and recruitment. The establishment of NeuroID's website exposed our program throughout the worldwide web. Locally, the press office at the UPR interviewed the Co-PIs and posted a story about NeuroID in the institution's website. Additionally, an article was published in the local newspaper El Nuevo Día. The Co-PIs also participated in an interview that was transmitted through the UPR radio station. All these activities have increased the integration and projection of NeuroID within the UPR community and Puerto Rico.

1.7 List of Publications and/or Other Materials Arising from the Research Education Program

a. Articles published about the NeuroID program:
"Proyecto investigación con propósito, neuroid: cultivo de cepa científica" by *Ámbar Gutiérrez Báez* / *Notic@mpus* UPR-Río Piedras (http://noticampus.uprrp.edu/cienciatecnologia002.html)

"**Proyecto de investigación NEUROID en Recinto de Río Piedras**" (April 27, 2011) UPR-Informa (http://informa.upr.edu/?p=1420)

"**Más oportunidades para los universitarios en el campo de la neurociencia**", newspaper El Nuevo Día, May 6, 2011
(http://www.elnuevodia.com/Xstatic/endi/template/imprimir.aspx?id=959671&t=3)

b. Training manuals
The Lab Notebook Guide, by Irving E. Vega, Ph.D.

LABORATORY ETIQUETTE: ***The good citizen rules***, by Irving E. Vega, Ph.D.

2. Data Section

2.1 List of appointed (program-supported) undergraduate participants, their current academic status, degree pursued and institution;

Name	Institution/Department Current Status	Degree	GPA	Mentor	Research
Andrea Silva	UPR-RPC/Chemistry Junior	BS	3.52	Dr. Jennifer Barreto	Cell/Mol substrates of anabolic steroids behavioral effects
Edith Brignoni	UPR-RPC/Psychology Junior	BA	3.7	Dr. Gregory Quirk	Neural mechanisms of fear extinction
Gabriel E. Marrero	UPR-RPC/Biology-Chemistry Junior	BS	4.0	Dr. José Lasalde	Structure-Function Studies of the Nicotinic Receptor
Jaime Váquer	UPR-RPC/Biology Junior	BS	3.55	Dr. Irving E. Vega	Epiproteomics changes underlying neurodegeneration
Jennifer Olán	UPR-RPC/Biology Junior	BS	3.2	Dr. Eduardo Rosa Molinar	Connectomics of the vertebrate spinal cord
Lionel D. Vázquez	UPR-RPC/Biology-Chemistry Junior	BS	4.0	Dr. José García-Arrarás	Gene profiling of nervous regeneration processes
Pablo J. Maldonado	UMET/Biology Junior	BS	3.2	Dr. Sandra Peña	Genomics of learning and memory
Raymond L. Quiles	Inter-Bayamón/Biology Junior	BS	3.67	Dr. Loyda Meléndez	Neuroimmunology of HIV Associated Dementia

2.2 List of presentations, as well as the number of peer-reviewed publications including program-supported participants as co-authors;

As stated above, the participants start during this past Summer (2011). Therefore, no research articles publications or presentations are reported. The Co-PIs expects that participants present their research work by the end of their first year in the program.

2.3 List of former program-supported participants initiating and/or continuing Ph.D. degree training (including name, current academic status, degree pursued and institution);

N/A

2.4 List of former program-supported participants engaged in research careers (including name, institution, and current academic status);

N/A

2.5 Since the BP-ENDURE program is an institutional program, the report must also provide the following information:

Reporting Period: September 31, 2010 to August 31, 2011

Table 1A - Undergraduate (B.S.) Institutional Student Data

Institutional Baseline Data	UR	non UR	NIH prog.	Percent NIH prog.
Total number and percent of undergraduate students that completed B.S. degrees in biomedical	389 (99%)	3 (<1%)	27	6.9
Number that entered professionl degree programs	98 (100%)	0	4	4.1
Number that entered PhD programs at research intensive institutions	21 (100%)	0	18	85.7
Number that entered PhD programs at UPRRP and UPRMSC	13 (100%)	0	2	15.4
Participating programs: Biology Chemistry Gen. Science (pre-med etc)				

Table 1B - Graduate (Ph.D.) Institutional Student Data

Institutional Baseline Data	UR	non UR
Total number and percent of graduate students that completed Ph.D. degrees in biomedical sciences	75	20
Total number and percent of graduate students that completed a Ph.D. degree in biomedical sciences and continue postdoctoral training	18	2
Participating programs: Biology Chemistry		