



TITLE V

MSC - UPR

CLINICAL AND TRANSLATIONAL RESEARCH (CTR) WITH AN INTERDISCIPLINARY AND ENTREPRENEURIAL APPROACH FOR STUDENTS AND FACULTY FROM UNDERGRADUATE PROGRAMS IN PUERTO RICO

NEWS



SUPPORTED BY THE US DEPARTMENT OF EDUCATION: TITLE V GRANT AWARD # PO31S200104

PILOT PROJECT PROGRAM (PIP)

During the first year (2020-21) of this five-year project (2020-25), we have implemented a Pilot Project Program (PiP) to provide research incentives for: a) Faculty members that successfully graduated (PiP-FG) from the RETO-MOTOR-IDEARIO programs offered through the Title V Cooperative project between University of Puerto Rico-Medical Sciences Campus (UPR-MS) and Universidad Central del Caribe (UCC), which ran from 2016-2020; or b) Established Researchers (PiP-ER) from any post-secondary institution in Puerto Rico. The main purpose of the PiP project is to provide a venue for these researchers to do Clinical and Translational Research (CTR), while also providing training in CTR for faculty members of undergraduate programs from any higher education institution in Puerto Rico, as well as undergraduate and graduate students. It is a requirement of the PiP program that grantees (PiP-FG and PiP-ER) organize research teams which include students and an undergraduate program's faculty member. The PiP-FG program will also select mentors that may help advance the research. All participants on the PiP programs will receive additional training through different tutorials, workshops and lectures, as well as access to a variety of resources and consultants with experts in scientific writing and statistics, sponsored by the Center for Research, Entrepreneurship and Scientific Collaborations (CRESCO). We are pleased to highlight the first projects that have received grants during the current year in each type of PiP.

PiP FG

Project: "Sonography evaluation of liver health among pediatric population in Puerto Rico"



Dr. Bárbara L. Riestra Candelaria

Principal Investigator: Dr. Bárbara L. Riestra Candelaria, Assistant Professor, Department of Anatomy and Cell Biology, UCC School of Medicine, Bayamón, PR.

Mentor: Dr. Loida A. González-Rodríguez; Associate Program Director – Endocrinology Training Program, UPR-MS School of Medicine.

Team members: Prof. Miriam E. Rodríguez Figueroa, Undergraduate Faculty, UCC; Dr. Wilma Rodríguez Mojica, Research Radiologist, UPR-MS School of Medicine; and Samilee Torres Marrero, Undergraduate Student, UCC.

Abstract: Pediatric obesity is established as a global public health concern that will develop liver complication as a Non-alcoholic fatty liver disease (NAFLD). Although obesity has been associated with NAFLD, it is not clear how obesity is affecting the size, volume, and texture of the liver in pediatric population. The long-term goal of this study is to establish a clinical ultrasound algorithm as a screening tool to identify changes in size, volume and texture features of the liver associated with unhealthy body weight in children. Our objective is, for the first time, to establish the association between unhealthy body weight and liver size, volume, and texture in Puerto Rican children. The central hypothesis of our study is that liver size, volume and texture will be affected among obese children, particularly when fatty infiltration is noted. This research study will follow one specific aim: 1) Elucidate the impact of obesity in pediatric liver regarding to: A) right liver lobe length using a recently established measure by Riestra et al., 2018); B) liver volume and C) liver texture. This approach is innovative because will allow us to establish, for the first time, the association between unhealthy body weight and anatomic liver changes in Puerto Rican children using sonography. This contribution is significant because once an economically viable clinical algorithm is determined in pediatric population, it may be possible to include sonography as part of the routine clinical follow-up to monitor pediatric liver morphological changes before developing major complications, improve quality health and decrease future health costs.

Project: "Characterization of Microbiota and Identification of Associated ARGs in Human Breast Milk"

Principal Investigator: Dr. Edna E. Aquino Piñero, Professor, Dept. of Microbiology and Medical Zoology, UPR-MSU School of Medicine.

Mentors: Dr. Maribel Campos Rivera, UPR-MSU School of Dental Medicine, and Dr. Filipa Godoy Vitorino, Interim Director Department of Microbiology and Zoology, UPR-MSU School of Medicine.

Team members: Undergraduate Students from UPR Río Piedras: Andrea Lorenzo Meléndez, Adriana Lorenzo Meléndez; Graduate Student: Angeliz Rivera Meléndez.



Dr. Edna E. Aquino Piñero

Abstract: Antibiotic resistance (AR) is a significant concern for public health worldwide. The neonates are one of the populations most impacted by this phenomenon since they can acquire antibiotic resistance genes (ARGs) at birth. One way to transfer the ARGs is through breastfeeding, which is the most recommended form of nutrition for its myriad benefits providing optimal growth and development of the newborn. Human breast milk (HBM) is an excellent source of nutrients, bioactive compounds, and bacteria that helps to establish the microbiota in the infant's gut. It also serves as a vehicle in the acquisition of ARGs associated with Mobile Genetic Elements (MGEs) that promote the dissemination to pathogenic bacteria. This study aims to evaluate and characterize the microbiota of HBM in Puerto Rican mothers to identify the composition and diversity of bacteria that can harbor ARGs that could confer resistance to antibiotics. Bacterial isolation, antibiotic susceptibility test, DNA extractions for PCRs, 16S rDNA amplification and

sequencing will be performed. Microbiota bioinformatics and biostatistics analyses will be conducted using QIIME2 with standard pipelines following the human microbiome project (HMP) guidelines. The hypothesis proposes that ARGs found in bacteria in HBM will be producing antibiotic-resistance phenotypes and may be related to the diversity of bacteria. This is the first study that will correlate the microbial community structure and ARGs in HBM of Puerto Rican women. The information obtained through this pilot project will help understand which ARGs are associated with specific bacteria, their capability to produce AR, and the need to implement preventive, therapeutic strategies.

PiP ER

Project: "Clinical, Translational and Science Education Research on Sexual Differentiation"

Principal Investigator: Dr. Juan Carlos Jorge Rivera, Professor, Department of Anatomy and Neurobiology, UPR-MSC School of Medicine.

Team members: Dr. María Inés De Jesús, Faculty UPR Cayey ; Undergraduate students: Aryana A. Vélez-Fraguada, UPR Río Piedras; Krystal Santiago-Colón, UPR Cayey; Carlx Sepúlveda-Lespier, UPR Mayagüez; Graduate and Medical Students UPR-MSC: Lizbeth Vázquez-Casul, Jennyvete Trinidad-Piñeyro, Gisette Rodríguez-Cintrón, and Leidy E. Valerio-Pérez, Resident in Internal Medicine UPR-MSC.

Abstract: Sexual differentiation is punctuated by drama. The fetus becomes male at the expense of obliterating the female developmental program or the fetus becomes a female at the expense of demolishing the male. When this developmental process is interrupted by genetics or environmental factors, the resulting body will express itself somewhere along the gradient between the two ends of the male or female spectrum. Such 'inter'-sexed body will be atypical. From undescended testis (cryptorchidism) at birth to subfertility issues later in life to the anatomical co-existence of male and female reproductive organs at birth -such as in the Persistent Mullerian Duct Syndrome-, will depend on the exact biological signature that marked sexual differentiation processes during intrauterine development. The objective of the study Clinical, Translational and Science Education Research on Sexual Differentiation is to underscore the spectrum of sexual phenotypes that result from varied developmental programs. Our long-term goal is to produce knowledge on human sexual differentiation by focusing on the intersectionality that basic sciences, clinical and translational sciences, and science education research can bring to a broader understanding of Disorders/Differences of Sex Development (DSDs).

Dr. Margarita Irizarry Ramírez, PiP Program Coordinator and Project's Activity Co-Director, and Dr. Rubén Garía García, Director, on behalf of the Title V Project, extend their congratulations to the grantees.

More news for the development of CTR...

- March 1, 2021 - The School Liaisons, Component 1 - Training in CTR, offered an Orientation Activity in the virtual mode to the chairs of health sciences and sciences programs from UPR campuses.
- April 30, 2021 - the Project submitted the Internal Performance Report (IPR) for its first six months which covered from October 1, 2020 to March 31, 2021. Activities during this period were done completely in a virtual remote fashion.
- July 26, 2021 - the Project received the Grant Award Notification (GAN) for its second year – covering from October 1, 2021 to September 30, 2022 – with the maximum annual budget of \$600,000.



Dr. Rubén García García, Dr. Margarita Irizarry Ramírez, Dr. Juan C. Soto Santiago and Prof. Edgardo L. Rosado Santiago as they shared with the chairs of health sciences and sciences programs about opportunities for training in CTR.