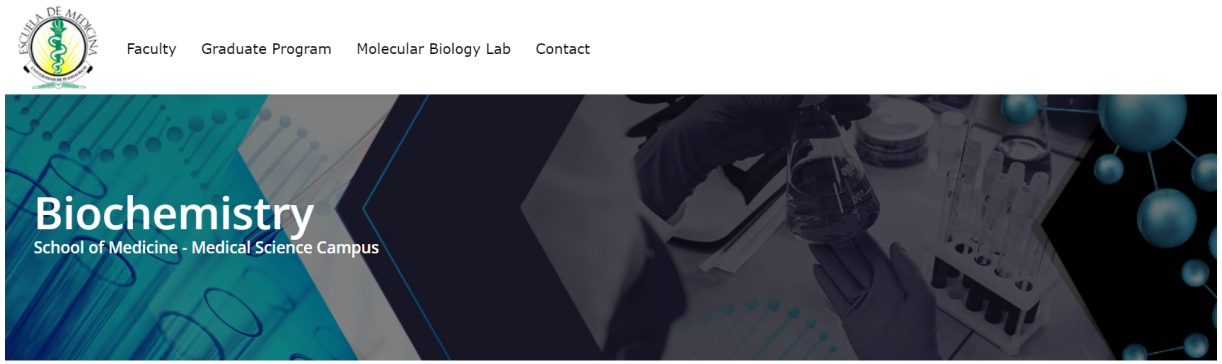
Department of Biochemistry

University of Puerto Rico School of Medicine

https://md.rcm.upr.edu/biochemistry/



The graduate program in Biochemistry began in 1960 starting with the offering of Masters in Science (M.S.) and doctor in Philosophy (Ph.D.) degrees in Biochemistry and Nutrition. The name of the department was changed in 1992 to Department of Biochemistry. The graduates of our program can be found throughout the industrial, academic and government environment in Puerto Rico, the U.S. mainland and in Latin America. The department faculty actively seeks external funds to support our graduate students and have been able to improve our research facilities with state of the art instrumentation.

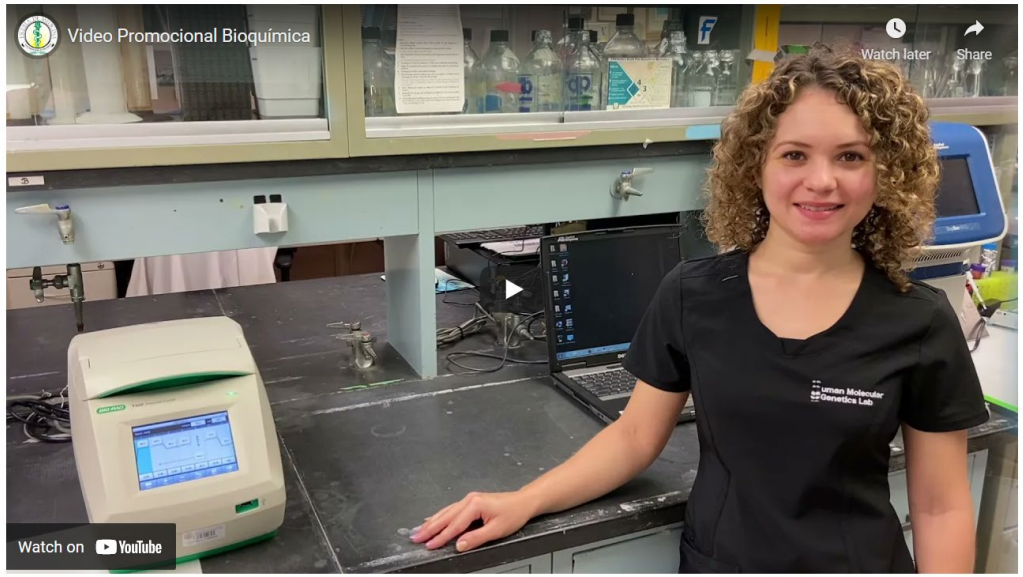
The Department of Biochemistry characterizes itself by conducting research in the following areas: Molecular and Genetic Alterations in Disease, Biochemistry of Proteins, Protein Structure/Function Relationships, Biochemistry of Glycoconjugates and Cellular Differentiation, Interactions between Nutrition and Disease, Aging and Oxidative Stress, Ocular Biochemistry, Clinical Biochemistry, Analytical Biochemistry, Biochemical and Molecular Toxicology,

Biochemistry News

Course List

Facilities

First Biochemistry S



FACULTY

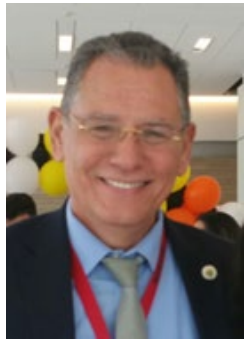
Carmen Cadilla, PhD
Human Molecular Genetics
carmen.cadilla@upr.edu

Abel Baerga, PhD
Laboratory of Enzymology and Chemical Biology
abel.baerga@upr.edu

Suranganie Dharmawardhane, PhD
Experimental Therapeutics for Molecular Targets in Breast Cancer
su.d@upr.edu

Nataliya Chorna, PhD
PRINBRE Metabolomics Research Core
nataliya.chorna@upr.edu

Pablo Vivas, PhD
Drug resistance in ovarian cancer, role of miRNA and Drug nanoparticles
pablo.vivas@upr.edu



Jose Rodriguez Medina, PhD
Deciphering the stress signaling mechanism in fungi
jose.rodriguez123@upr.edu

Dipak K. Banerjee, PhD
Glycobiology and Cell Function Laboratory
dipak.banerjee@upr.edu

Braulio Jimenez, PhD
Molecular & Biochemical toxicology
jose.rodriguez139@upr.edu

Jose Rodriguez Orengo, PhD
Biochemical Pharmacology in HIV, HCV, Steatosis and Cancer
jose.rodriguez139@upr.edu

Ruth León Vazquez, PhD
Assistant Professor
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Laboratorio 6to piso
Edificio Guillermo Arbona

Centro Comprensivo de Cáncer

Edificio de Ciencias Moleculares
Cupey, SJ-PR

ESCUELA DE MEDICINA
UNIVERSIDAD DE PUERTO RICO
1950

DIVISIÓN DE CIENCIAS BIOMÉDICAS
1960
UPR - ESCUELA DE MEDICINA

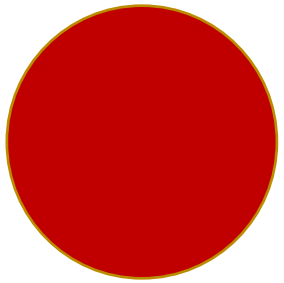
CENTRO COMPRENSIVO DE CÁNCER
universidad de puerto rico

msrc
MOLECULAR SCIENCES
RESEARCH CENTER

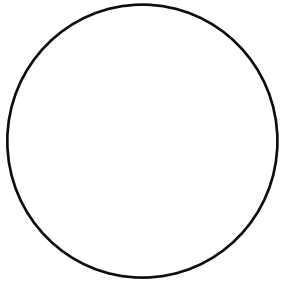
Graduate Program

- **63 credits** for PhD Degree
- **30 credits** for MS Degree
- Sequential **course curriculum** for MS and PhD degrees can be completed in **2 and 4 semesters respectively.**
- **Comprehensive Examination and Thesis Proposal in 5th semester**
- Thesis Dissertation Research begins in the 6th semester.

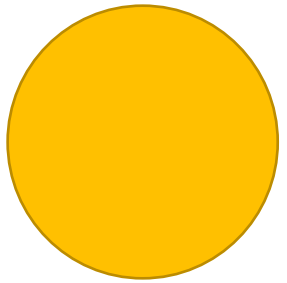
- Productive and collaborative work environment.
- Equipment & resources for research projects.
- Local & National meetings presentations.
- Access to internships in local Biopharma industries.



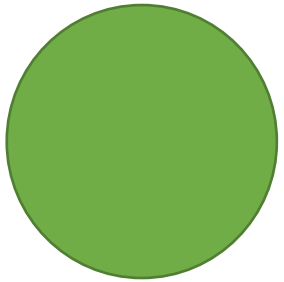
Chemical Biology &
Drug delivery



Bioinformatics

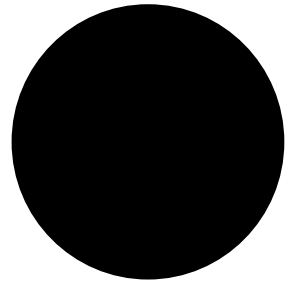


Toxicology & Metabolism

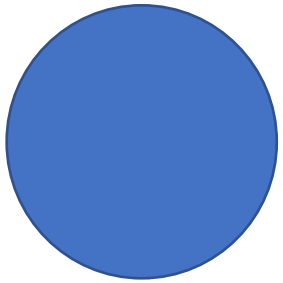


Molecular Biology

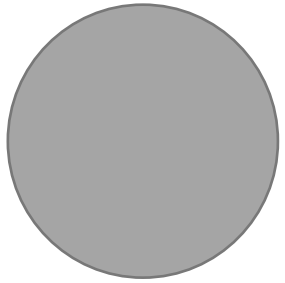
Basic Research & Therapies for Cancer and other diseases



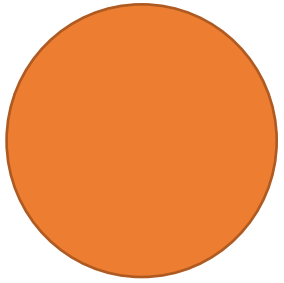
Glycobiology



Proteins & Enzymes



Genetics & Regulation



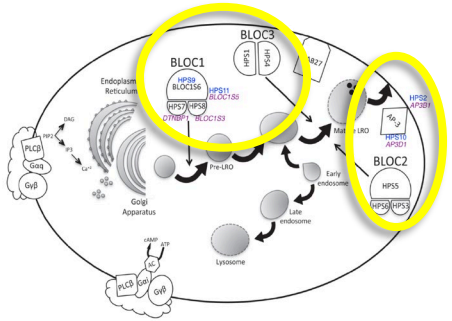
Omics

Human Molecular Genetics

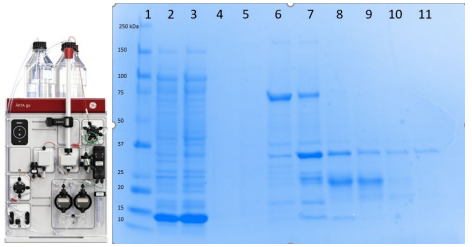
Dr. Carmen Cadilla

- We focus on **Rare diseases affecting the Puerto Rican population, particularly the Setleis Syndrome and related disorders**
- We aim to understand **mechanisms of target gene regulation of TWIST bHLH transcription factors** affected in Setleis syndrome and related craniofacial syndrome as well as the cellular pathways involved in processes affected in these disorders using cellular models for most functional studies.
- We also study the genetics and cell biology of Hermansky Pudlak Syndrome, a rare form of albinism.
- We collaborate in pharmacogenomic studies with **Dr. Jorge Duconge- UPR School of Pharmacy**

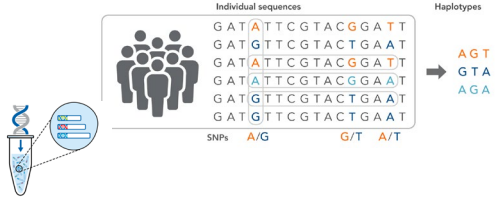
Puerto Rican Setleis Syndrome Patient



Protein complexes involved in the biogenesis of lysosome-related organelles

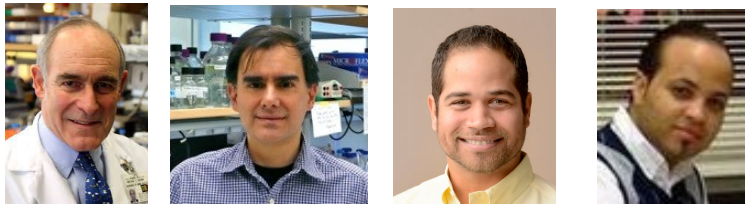


Protein purification



Genotyping sequencing

Collaborators in US



Drs. Desnick, Calero, Franco and Carmona-Rivera

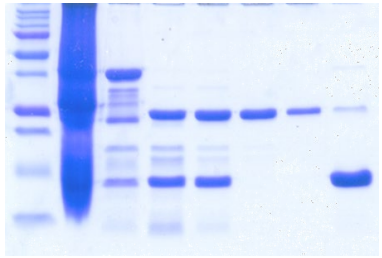
Current Ph.D. students

Alexandra Torres Jorge Martinez Joseline Serrano

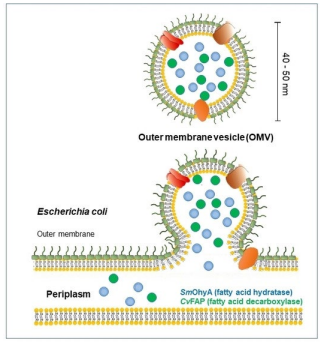
Laboratory of Enzymology and Chemical Biology

Dr. Abel Baerga

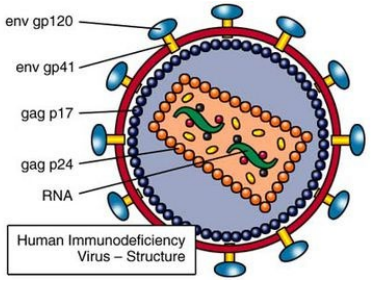
Recombinant protein expression and purification

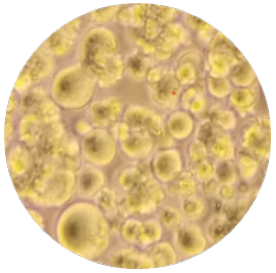


Outer membrane vesicles extraction and purification

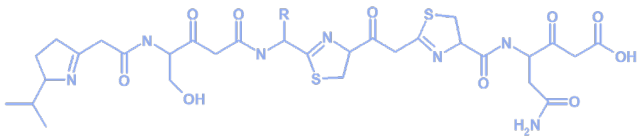


Genetically Engineered HIV Env Protein

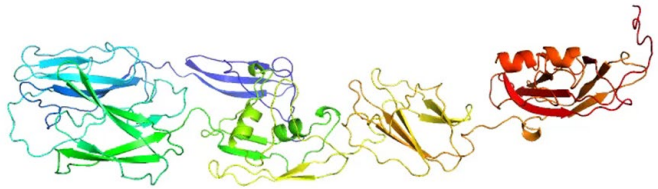




Virulent factors by gut bacteria and their correlation with CRC and inflammatory conditions.



Colibactin



Uropathogenic Specific Protein

Rachell Martinez, PhD Candidate

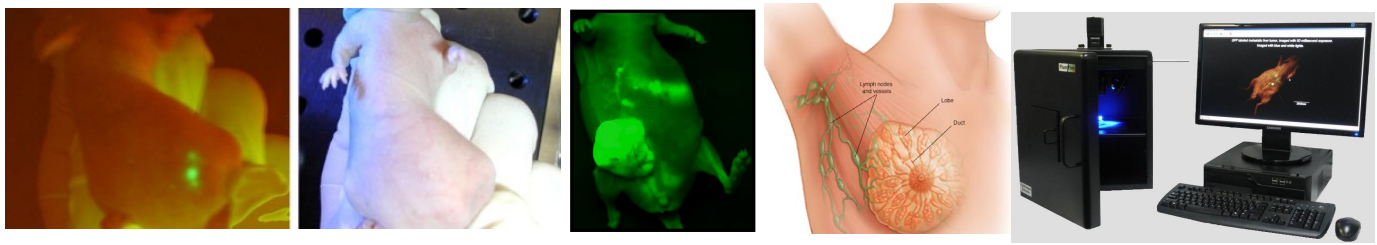
Jeremy Colón, PhD Candidate

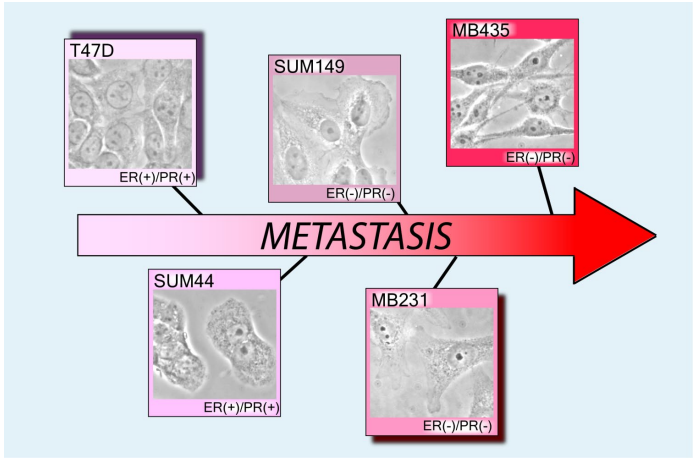
Yesenia Acevedo, PhD Candidate

Experimental Therapeutics for Molecular Targets in Breast Cancer

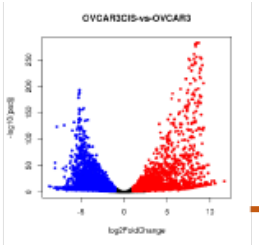
Dr. Su

- **Human Breast Cancer Cell Lines:** To study cancer regulatory signaling pathways and molecular mechanisms of experimental therapeutics.
- **Immunocompromised mouse models of cancer:** To investigate effects of experimental therapeutics.
- **Anticancer drugs**





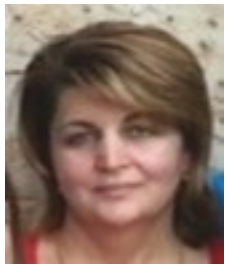
- Julia Medina, PhD candidate
- Luis Velazquez , PhD candidate
- Cynthia Esquerre, PhD student
- Anamaris Torres, PhD candidate
- Luis Borrero, PhD
- Ailed Cruz, PhD
- Jessica Colón, PhD student



Vivas Laboratory- Cancer Research

Dr. Pablo Vivas

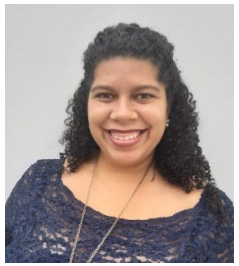
- Mechanisms of drug resistance in cancer.
  - Ovarian
  - Brain
- Design and test microRNA and small interferfering RNA (siRNA)-based therapies for advanced cancers.
- Nanomedicine: Nanoparticle formulations for drug delivery.



Fatima Valiyeva
Lab Technician

Robert Rabelo
Ph.D. Student

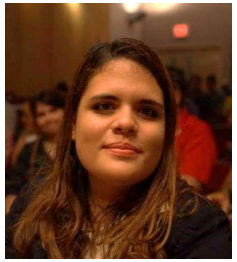
Ricardo Noriega
Ph.D. Student



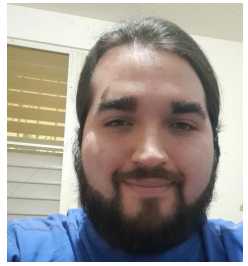
Marienid Flores
Ph.D. Student

Mariela Rivera
Ph.D. Student

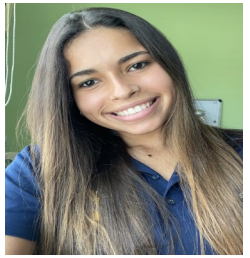
Victor Reyes
Ph.D. Student



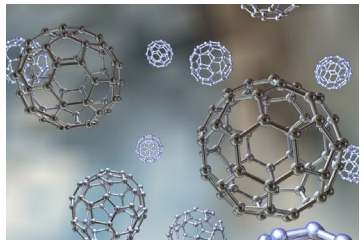
Yasmarie Santana
Dental student

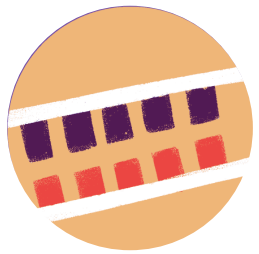


Jose Tous
Undergraduate

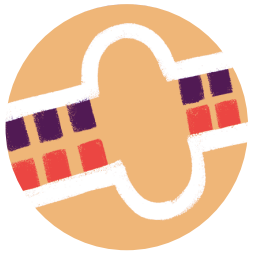


Nathalia Gomez
Undergraduate





siRNA



miRNA

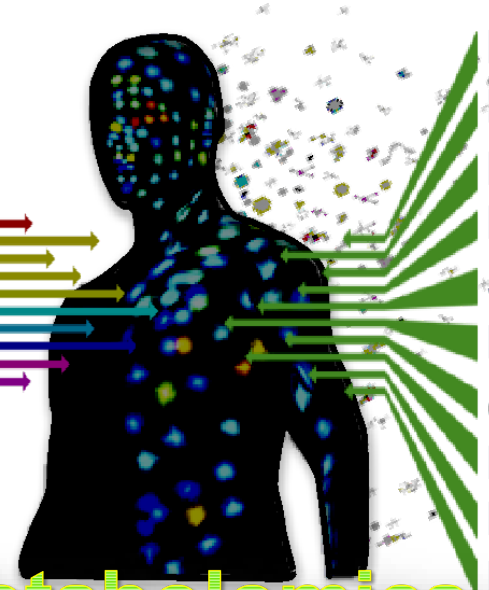
http://vivas-lab.rcm.upr.edu/

Metabolomics Research Core

Dr. Nataliya Chorna

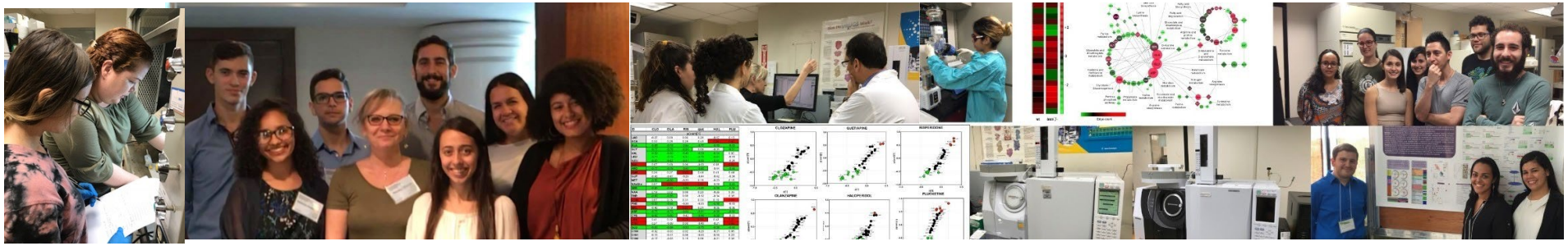
Metabolic risk factors

Age
Disease
Environment
Drugs
Nutrition
Lifestyle
Epigenetics
Trauma
Inflammation
Cancer

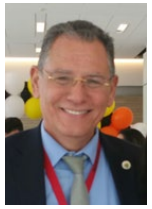


Research and Collaboration

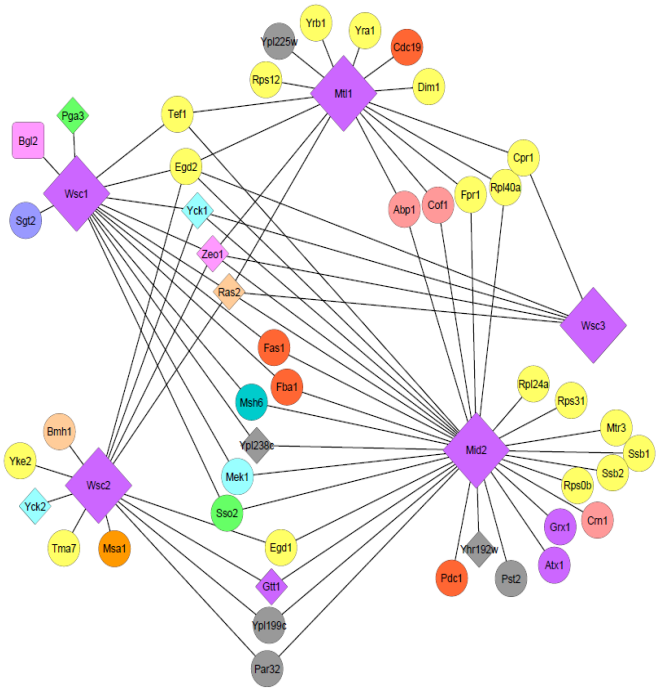
- Biomarkers of HPV infection
- Metabolism of exercise
- Memory metabolism
- Biomarkers of sleep disorders
- Stem cell metabolism
- Biomarkers of depressive disorders
- Glucose metabolism in fungi
- Metabolism of glioma
- Biomarkers of hypospadias
- Biomarkers of spinal cord injury



Deciphering the stress signaling mechanism in fungi



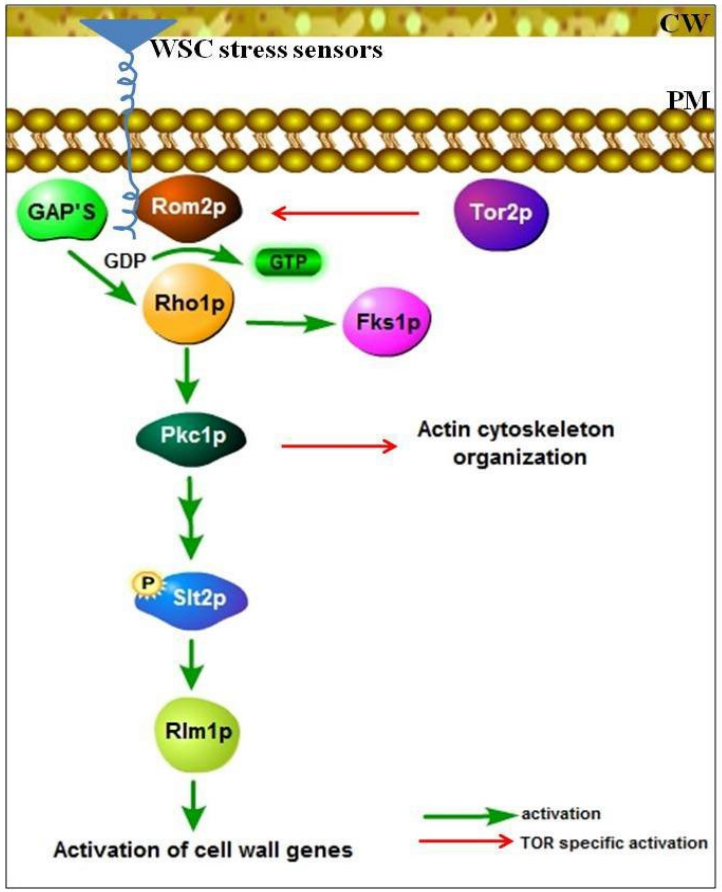
Dr. Jose Rodriguez Medina



Identify proteins that interact physically with stress mechano-sensors.

Mutate these genes to test for sensitization to drug and stress treatments.

Assess metabolic profile and protein function.



Thematic Areas of our Research: Proteomics/Genomics/Molecular and Cell Biology. See list of publications at: https://orcid.org/0000-0002-9860-7155

Sahily Gonzalez, M.S. and Lilliam Villanueva, M.S., Technicians
Natalie Morel Graduate Student, and
Jorge D. Garcia Undergraduate Student

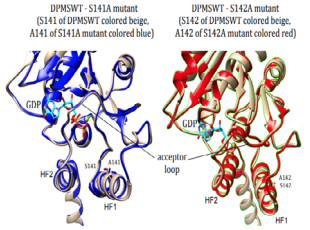
Glycobiology and Cell Function Laboratory

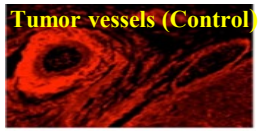
Dr. Dipak Banerjee

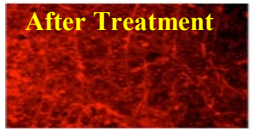
Vision: Deciphering the Glycome Code

Mission: Applying the Knowledge to understand that

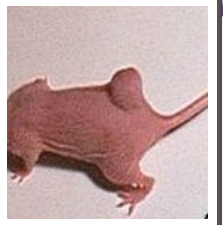
- **Glycoproteins are Essential for Angiogenesis and Breast Tumor Progression**
  - Regulation by Extracellular Signaling
  - "ER Stress" Initiates Unfolded Protein Response (*upr*) signaling and Induces Apoptosis
  - Discovering Glycan Biomarkers for Human Diseases
- **Glycosyltransferase Structure – Function**
  - DPMS is an Essential Gene and Codes for a Phosphopoprotein
  - Mutation Causes Congenital Disorder of Glycosylation (CDG)
  - Developing Therapy for CDG Cure
- **Glycotherapy Inhibits Angiogenesis and Treats Breast Tumor**
  - Targets GPT, induces ER stress, and Causes
  - Apoptosis in Tumor Tissue
  - A dual-action therapy



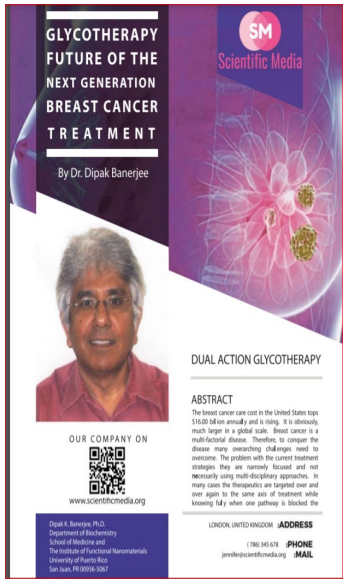


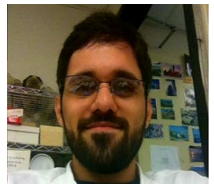


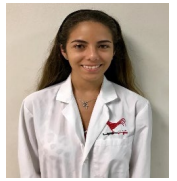
Untreated Tumor

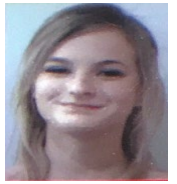


Treated









Molecular & Biochemical Toxicology

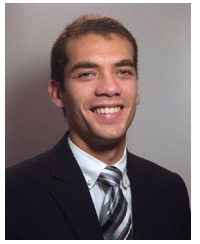
Dr. Braulio Jimenez

•Elucidating airborne particulate matter Health effects using Lung bronchial epithelial cells as an "*in vitro model*". We focus on specific and relevant gene expression such as the Major Histocompatibility Complex Class II and HIF.

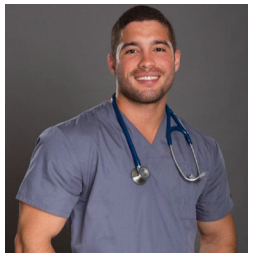
•Developing a biomarkers of oxidative stress for respiratory disorders.

•Extrapolate and expand our *in vitro* findings to *In Vivo investigating* genetic polymorphisms in Puerto Rican Asthmatic, Chronic Obstructive Pulmonary Disease and Cardiac vascular pathologies.

Hector Jirau, BSc
Ph.D

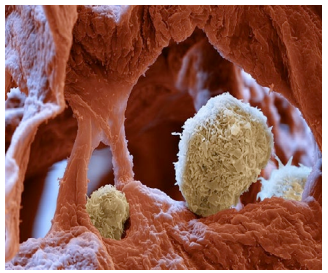


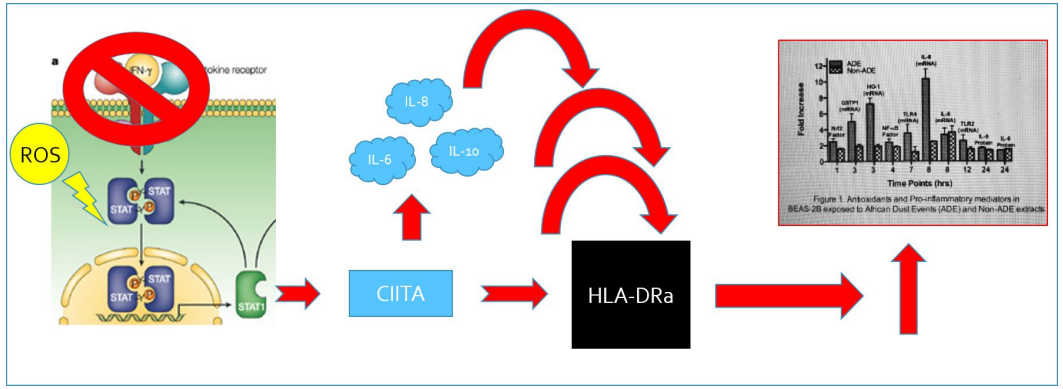
Leonardo Gonzalez, BSc
Medical Student IV



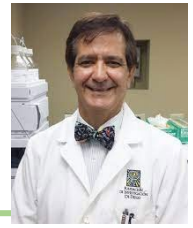
Christian Gonzalez, BSc
Medical Student IV

Lung alveoli



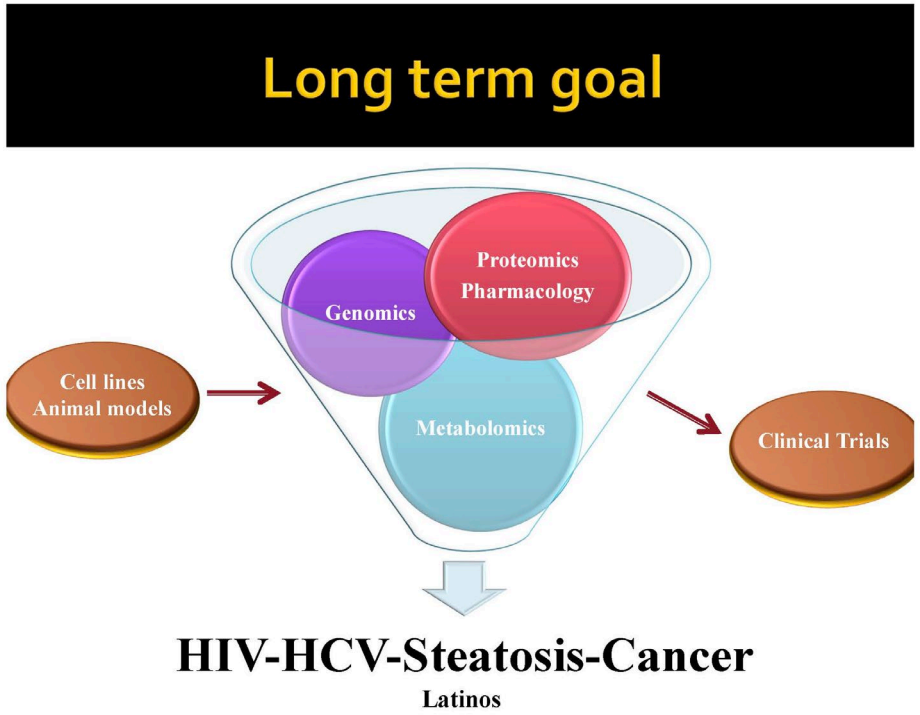


Biochemical Pharmacology in HIV, HCV, Steatosis and Cancer



Dr. Rodriguez Orengo

- Development of proteomic biomarkers for the progression of liver fibrosis and steatosis
- Development of MS assays for HIV and HCV medications
- Development of metabolomics assays
- Determination of Vit D in various PR populations
- Synthesis, chemical and biochemical characterization of nanoparticles in cancer cell lines (Mayaguez Campus Collaboration)
- Cannabis Research



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