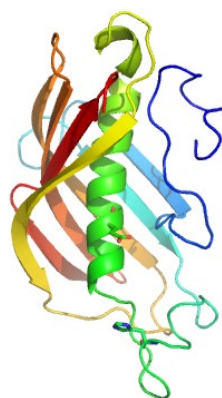


"Where Biotechnology Begins"

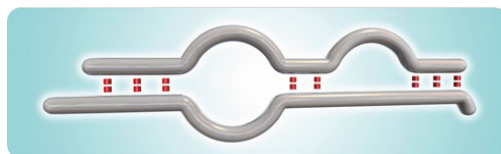


Proteins & Enzymes



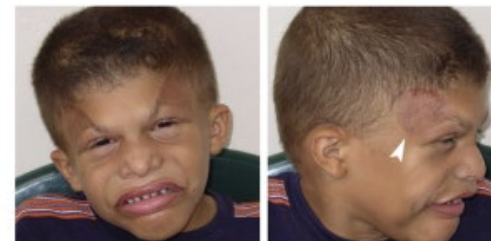
Cancer

miRNA

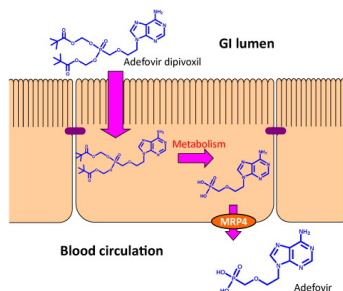


Human Genetics & Genomics

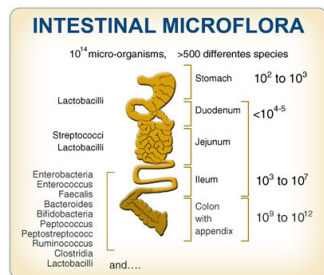
A



# Dept. of Biochemistry



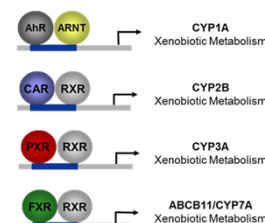
Biochemical  
Pharmacology



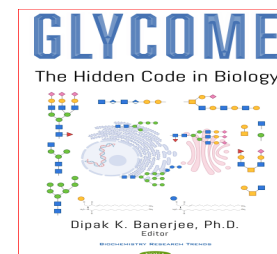
Microbiome



Proteomics



Molecular  
Toxicology



Glycobiology

# Biochemistry 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 5<sup>th</sup> semester
- Thesis Dissertation Research begins in the 6<sup>th</sup> semester.
- Productive work environment
- Thesis research projects in productive laboratories
- Access to internships in local Biopharma industries.

# Laboratory of Enzymology and Chemical Biology

Dr. Abel Baerga

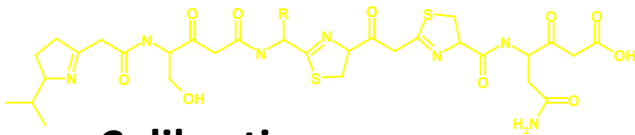
abel.baerga@upr.edu



## Biosynthesis of Omega-3 Fatty Acids

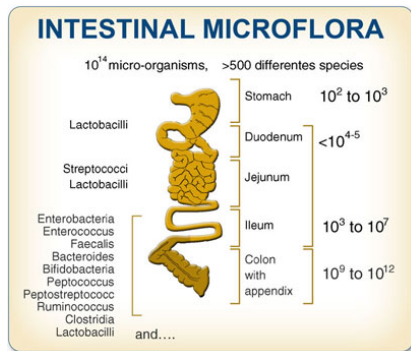


Eicosapentaenoic Acid, 20:5

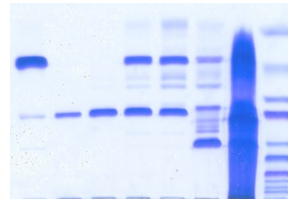


Colibactin

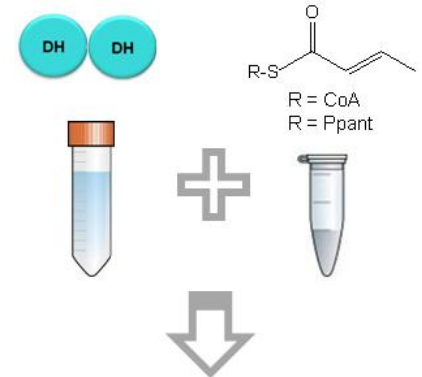
## Biosynthesis of toxins by gut bacteria



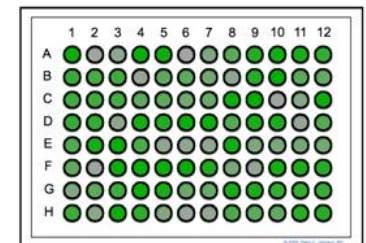
## Protein expression and purification



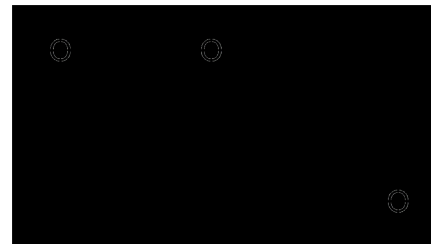
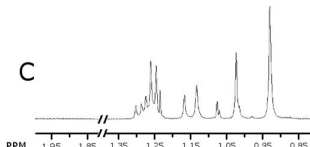
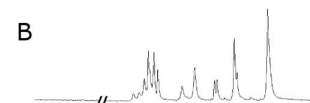
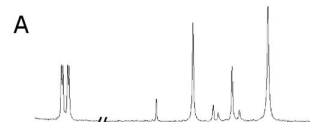
## Enzyme assay development



Small Scale Reaction o/n



## Natural products chemistry



# Experimental Therapeutics for Molecular Targets in Breast Cancer

Dr. Suranganie Dharmawardhane

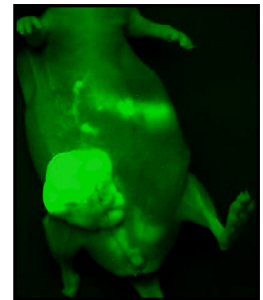
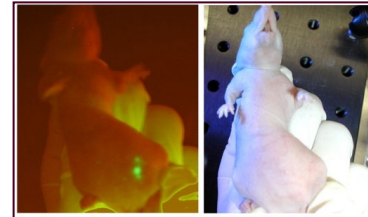
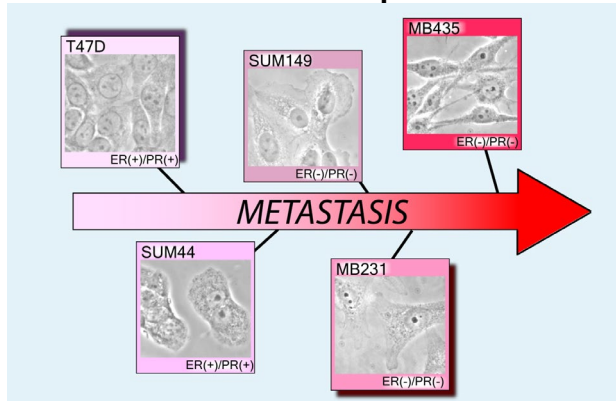
su.d@upr.edu



## Human Breast Cancer Cell

**Lines:** To study cancer regulatory signaling pathways and molecular mechanisms of experimental therapeutics.

To investigate effects of experimental therapeutics.



**We develop anticancer drugs!**





# VIVAS LABORATORY

**DR. PABLO VIVAS**

pablo.vivas@upr.edu

**Mechanisms of drug resistance in ovarian cancer**

**Role of microRNAs in brain tumors**

**Nanoparticle formulations for drug delivery**

## LABORATORY MEMBERS



**Fatima Valiyeva**  
Lab Technician



**Robert Rabelo**  
Ph.D. Student



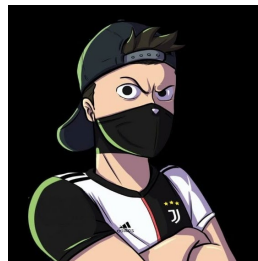
**Ricardo Noriega**  
Ph.D. Student



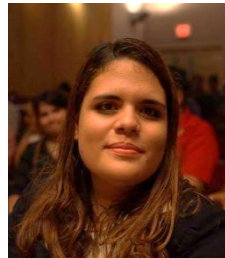
**Marienid Flores**  
Ph.D. Student



**Mariela Rivera**  
Ph.D. Student



**Victor Reyes**  
Ph.D. Student



**Yasmarie Santana**  
Dental student



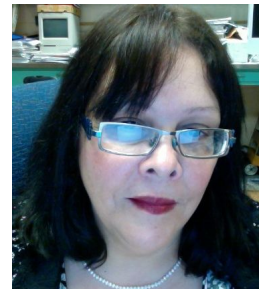
**Jose Tous**  
Undergraduate



**Nathalia Gomez**  
Undergraduate

**<http://vivas-lab.rcm.upr.edu/>**

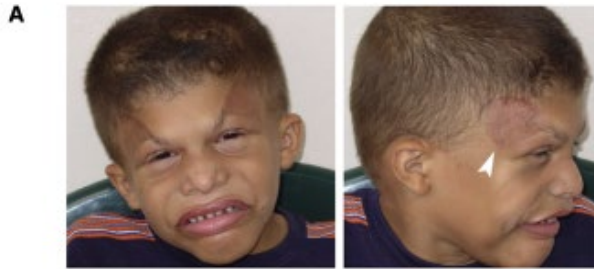
# Human Molecular Genetics



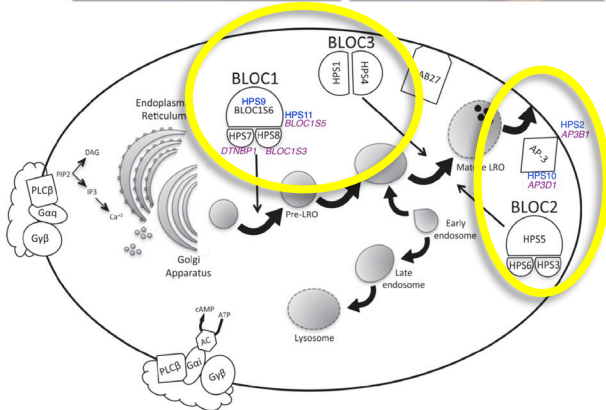
## Puerto Rican Setleis Syndrome Patient

## Dr. Carmen L. Cadilla

carmen.cadilla@upr.edu



- Rare diseases affecting the Puerto Rican population, particularly the Setleis Syndrome and related disorders
- Understand mechanisms of target gene regulation of TWIST bHLH proteins affected in Setleis syndrome.
- Understand the cellular pathways involved in the developmental processes affected in these disorders.
- We use 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**



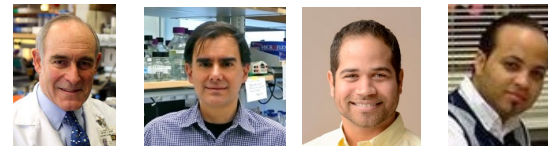
Protein complexes involved in the biogenesis of lysosome-related organelles

## Current Ph.D. students



Alexandra Torres Noe Crespo Jorge Martinez Joseline Serrano

## Collaborators in US



### Drs. Desnick, Calero, Franco and Carmona-Rivera

Homozygous Nonsense Mutations in *TWIST2* Cause Setleis Syndrome

Turgut Tukul,<sup>1,5,7</sup> Dražen Sošić,<sup>2,5</sup> Lihadh I. Al-Gazali,<sup>3</sup> Mónica Erazo,<sup>1</sup> Jose Casasnovas,<sup>4</sup> Hector L. Franco,<sup>4</sup> James A. Richardson,<sup>2</sup> Eric N. Olson,<sup>2</sup> Carmen L. Cadilla,<sup>4,6</sup> and Robert J. Desnick<sup>1,6,\*</sup>

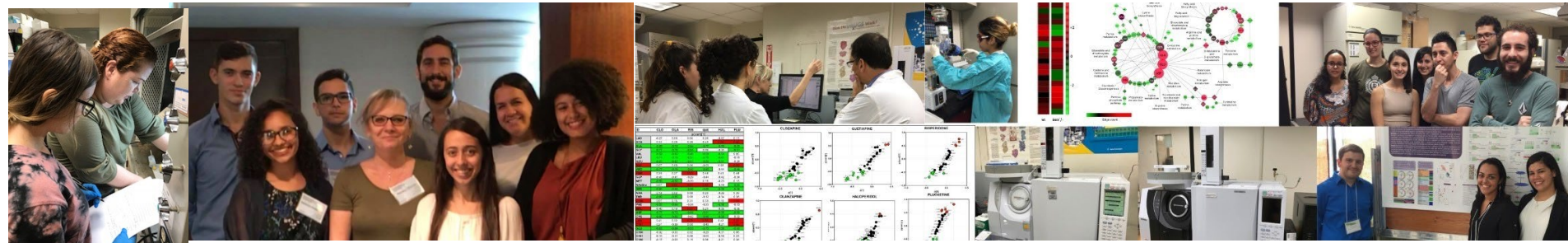
The American Journal of Human Genetics 87, 1–8, August 13, 2010



# PRINBRE Metabolomics Research Core

Dr. Nataliya Chorna

nataliya.chorna@upr.edu



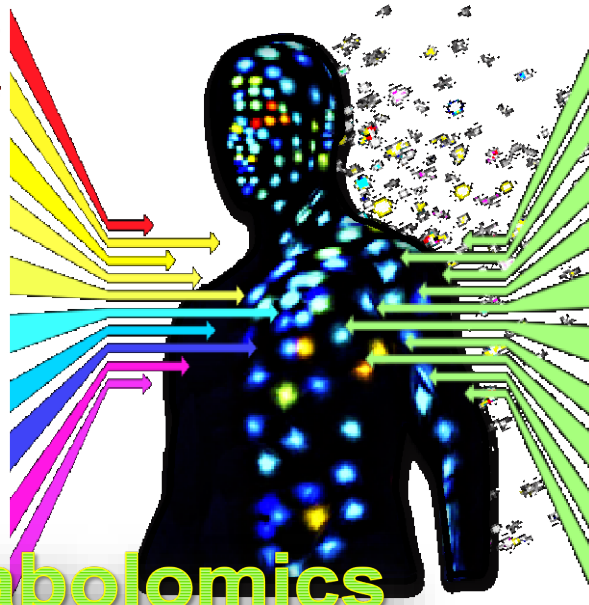
## Metabolic risk factors

Age  
Disease  
Environment  
Drugs  
Nutrition  
Lifestyle  
Epigenetics  
Trauma  
Inflammation

## Research and Collaboration

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

**Metabolomics**



# Biochemical Pharmacology in HIV, HCV, Steatosis and Cancer

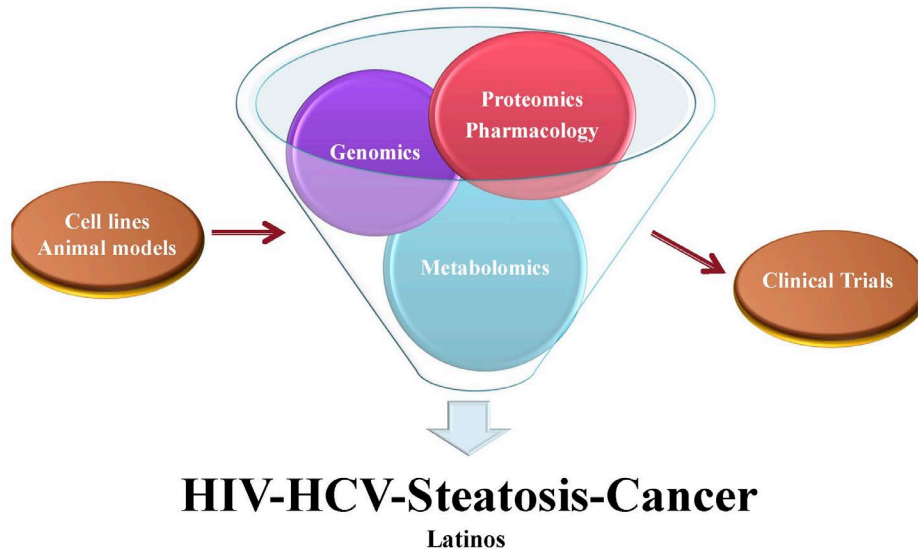
Dr. Jose F. Rodriguez Orengo

jose.rodriguez139@upr.edu



- 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

## Long term goal





# Molecular & Biochemical Toxicology

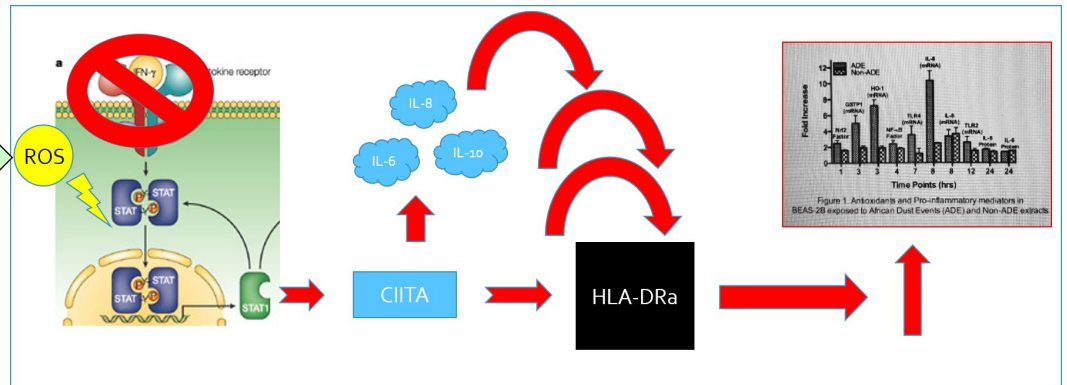
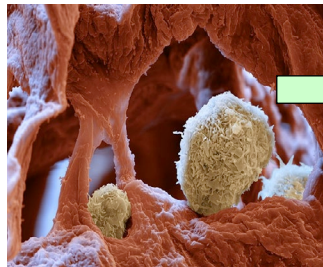
**Dr. Braulio D. Jiménez**

braulio.jimenez@upr.edu

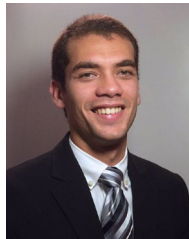


**Research Interest:**

- 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, Ph.D.**



**Leonardo Gonzalez, BSc  
Medical Student IV**



**Christian Gonzalez, BSc  
Medical Student IV**

# Glycobiology and Cell Function Laboratory

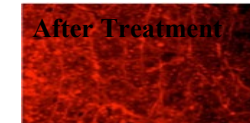
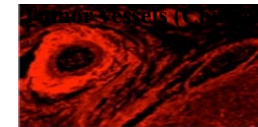
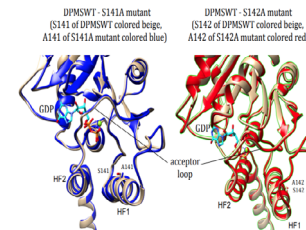
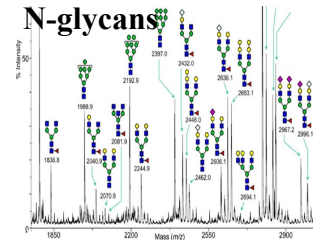
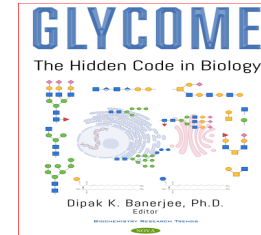
Dr. Dipak K. Banerjee

dipak.banerjee@upr.edu

**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 Phosphoprotein
  - 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



**GLYCOTHERAPY**  
FUTURE OF THE  
NEXT GENERATION  
BREAST CANCER  
TREATMENT

By Dr. Dipak Banerjee

**SM**  
Scientific Media

**DUAL ACTION GLYCOTHERAPY**

**ABSTRACT**  
The breast cancer cases in the United States show 516,000 cases annually and is rising. It is a globally most lethal in a global scale. Breast cancer is a multifactorial disease. Therefore, to conquer the disease many swarming challenges need to overcome. The problem with the current treatment strategies they are narrowly focused and not measuring using multidisciplinary approaches. In many cases the therapeutics are targeted over and over again to the same site of treatment while knowing lay when one pathway is blocked the

**OUR COMPANY ON**

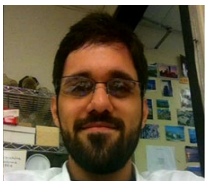
**www.scientificmedia.org**

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University of Pennsylvania and  
The Institute of Functional Genomics  
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- Dr. Suranganie (Su) Dharmawardhane

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