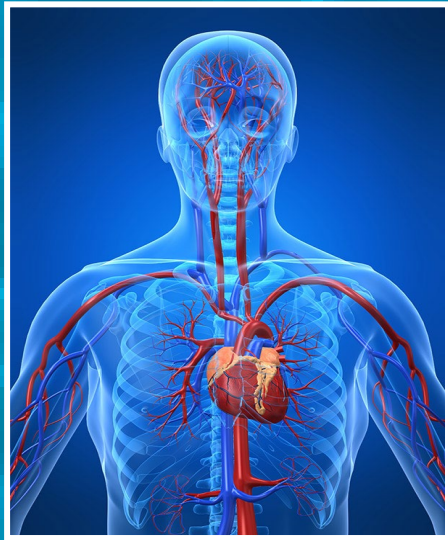


Departamento de Fisiología

UPR-Recinto de Ciencias Médicas



Coordinador: Jorge D. Miranda, Ph.D.

Lab. A-682

email: jorge.miranda3@upr.edu

Tel: (787)758-2525 ext. 1631

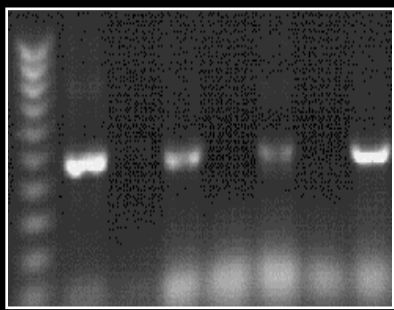
Para mas información visita:

<https://md.rcm.upr.edu/physiology/>

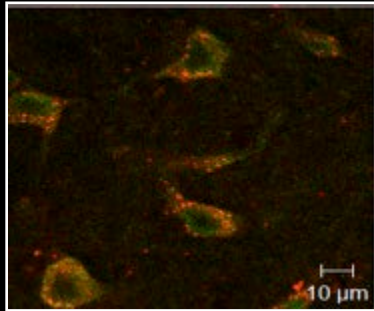
Physiology

The branch of Biology that studies the function of living organisms.

You could study a living organism at different levels:



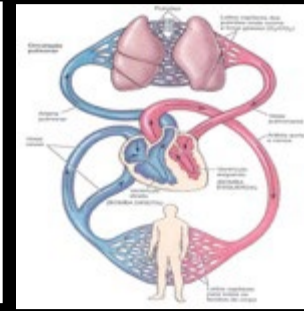
molecular



cellular



tissue



system



organisms

Physiology is integrative:

Among different systems or at different levels within a system!!!

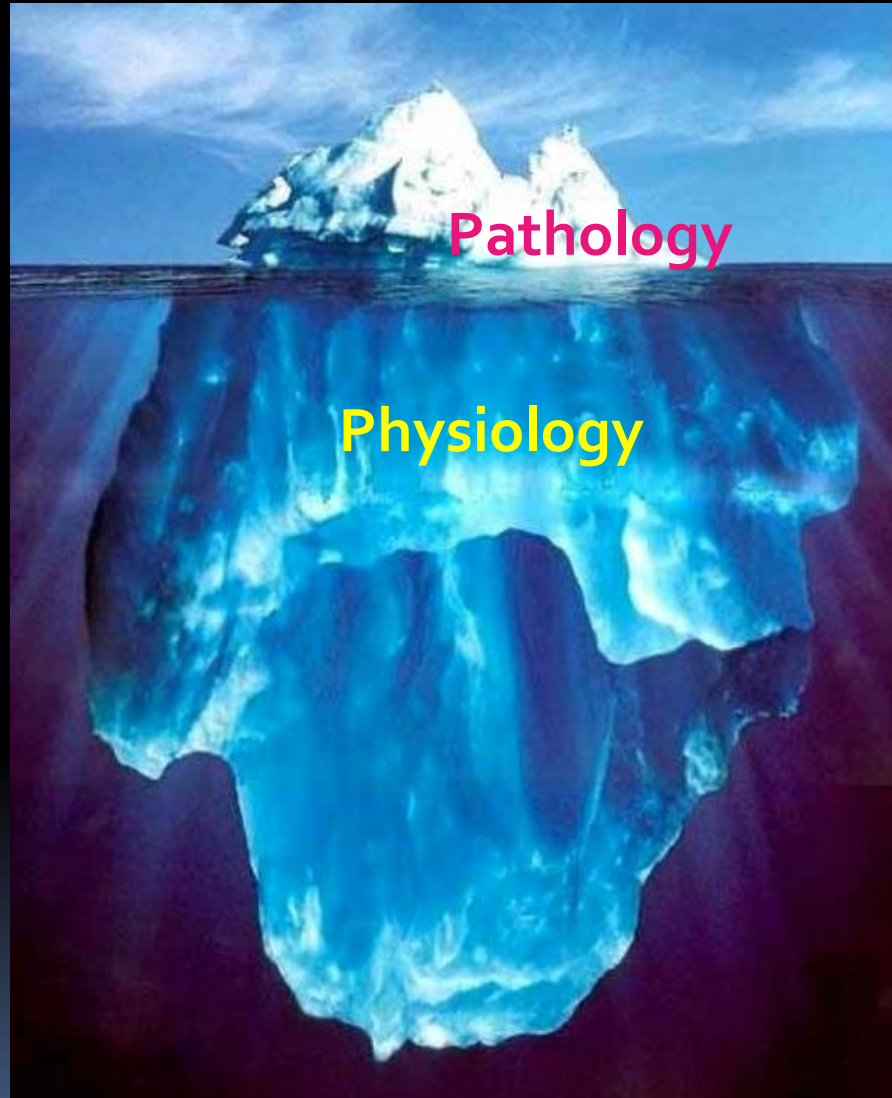


More interesting: How the body respond to different stimuli



You will learn how your body works and how it...**adapts to changes in the environment (trauma, temp, drug, exercise).**

How a healthy human body works



That is why the nobel
Prize in Medicine is:

Noble Prize in Physiology
and Medicine

Will help to determine the nature of diseases and how to treat them.

Reporteros de la Ciencia!!!

1)¿Que?

2)¿ Porque?

3)¿Como?

4)¿Cuando?

5)¿Donde?

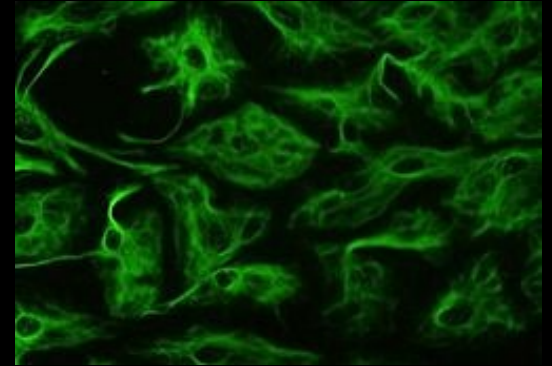
Experimental models used in the department:



Yeast



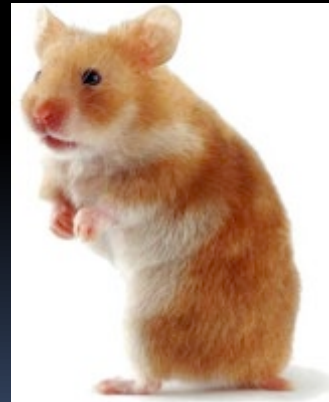
Cells in culture



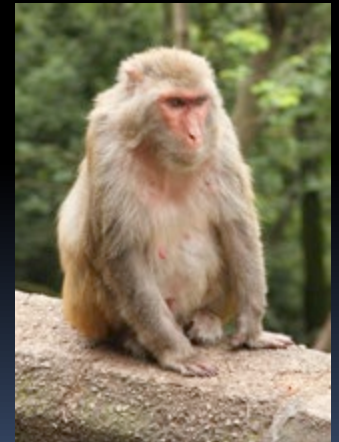
Mice



Rats

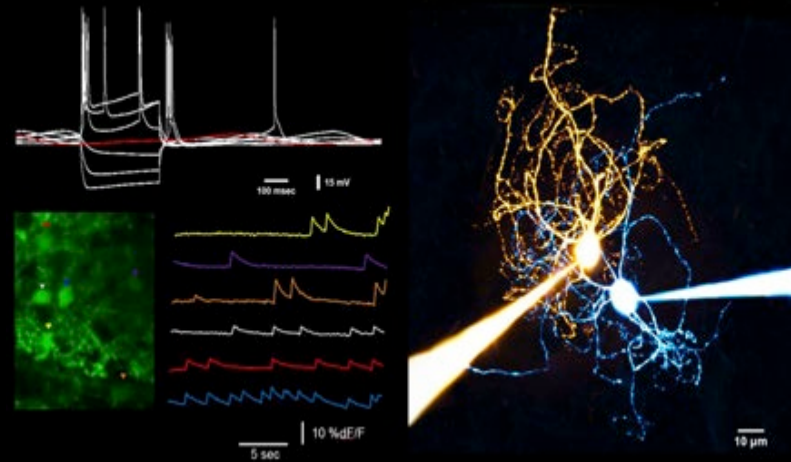


Hamsters



Macaques

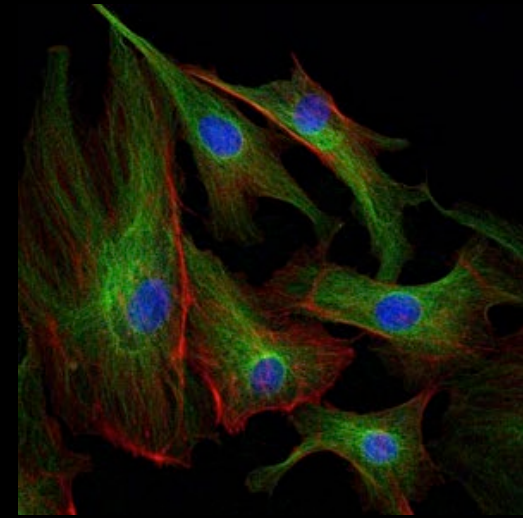
Experimental techniques:



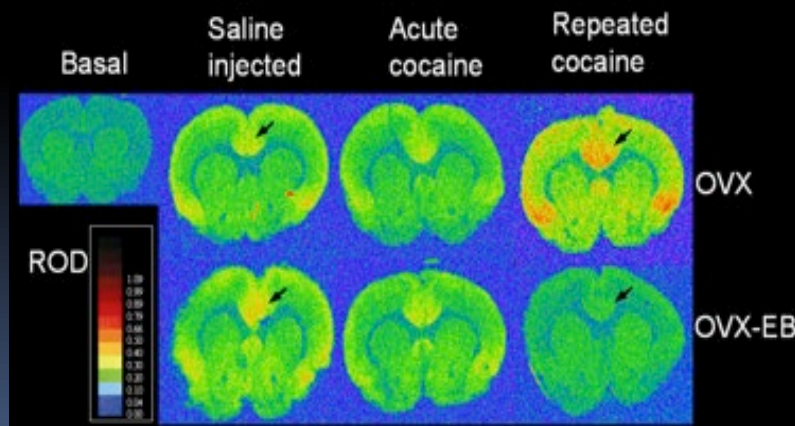
Electrophysiology



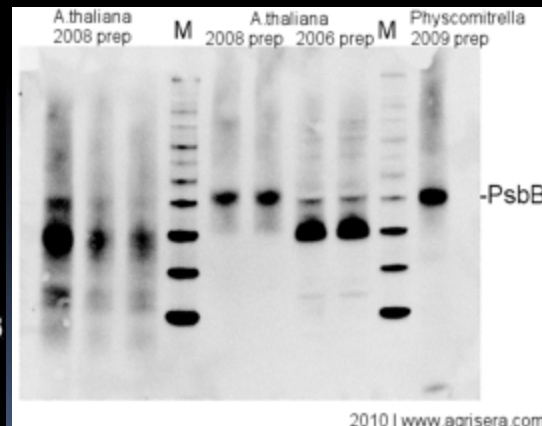
PCR



Confocal microscopy



Autoradiography



Western blots



Behaviors

Areas of Study

- **Cardiovascular**
 - Drs. Escobales, Crespo, Javadov
- **Neuroscience**
 - Neuroprotection & Regeneration – Dr. Miranda
 - Drug Addiction – Drs. Segarra & Jimenez
 - Cell Differentiation & Alzheimer disease – Dr. Silva
- **Aging and Cancer Biology**
 - Dr. Carlos Torres
- **Muscular Physiology**
 - Dr. Walter Frontera



Laboratory of Neuroendocrinology

Annabell C Segarra, Professor & Chair

PhD 1988, New York University

Post doc 1991: Rockefeller University

annabell.segarra@upr.edu

787-758-2525 Ext 1965



Research Interest:

- The mechanisms by which sex steroids modulate the response to drugs of abuse.
- The role of estradiol in protection against neural damage in SIV infected monkeys.

Sex differences



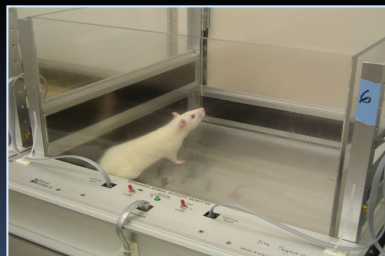
Addiction

Morphine

Cocaine



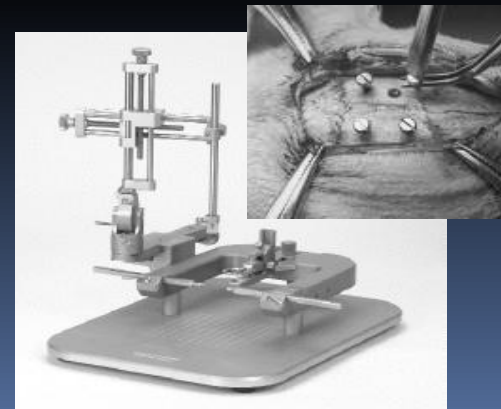
Behavioral sensitization



Surgery

❖ Gonadectomy

❖ Stereotaxic



Laboratory: Neuroprotection after SCI

Jorge D Miranda, Professor

PhD 1996, Baylor College of Medicine

Post doc 1998: Univ of Miami Sch of Med

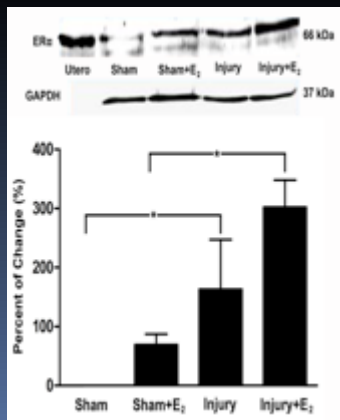
jorge.miranda3@upr.edu
(787) 758-2525 Ext. 1631



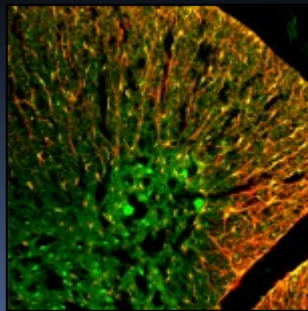
Research Interest:

- Neuroprotective effects of Tamoxifen after spinal cord injury (SCI).
- Sex differences in the metabolic profile after SCI and the effect of Tamoxifen.

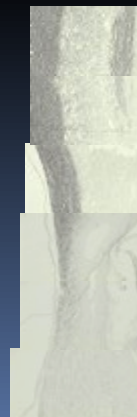
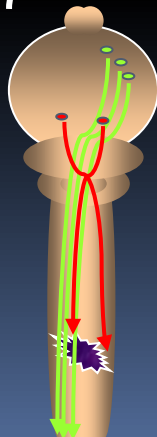
Molecular



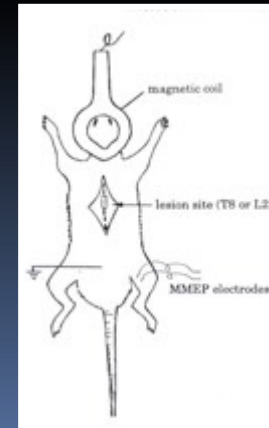
Cellular



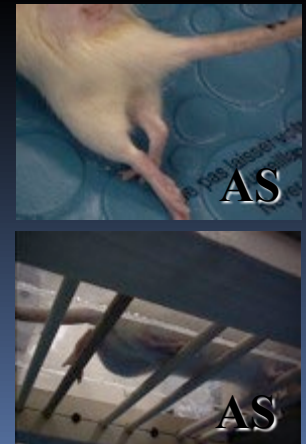
Anatomic



Physiologic



Behavioral



Laboratory: Neurophysiology of Addiction

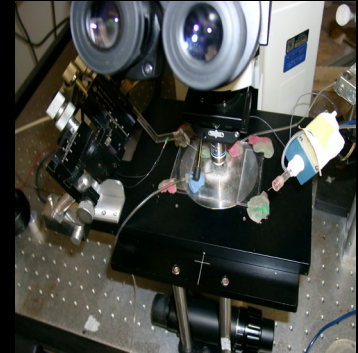
Carlos Jimenez Rivera, Professor

Ph.D. 1986, Univ of New Mexico School of Medicine

Post-doc 1986-87, University of Texas, HSC, Dallas, TX

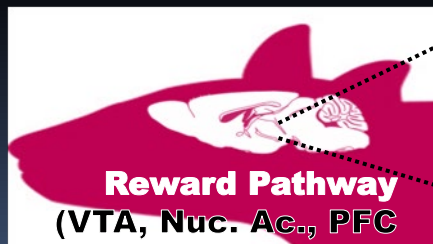
Post-doc 1987-89- Hahnemann University, Philadelphia, PA

Carlos.jimenez8@upr.edu
(787)758-2525 x1676

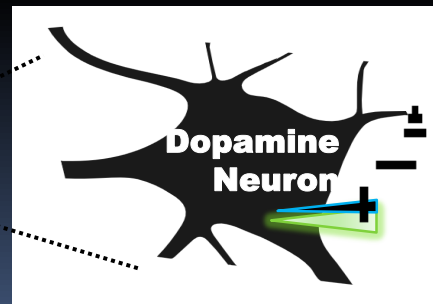


Research Interest:

•Our laboratory investigates the role of the Hyperpolarization-activated cation current (I_h) as a key element that contribute to cocaine addiction in dopaminergic neurons of the VTA. Our hypothesis is that alteration of HCN channel function after chronic drug exposure is a critical element of drug action on the VTA. We believes that changes in I_h activity may affect excitability, which can alter information processing and can be one common change in the central reward/reinforcement pathway.



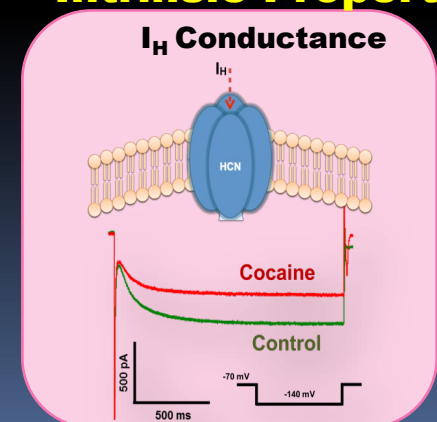
Cocaine Sensitization Model



Patch Clamp Electrophysiology



Intrinsic Properties



Techniques: animal models, western blots, in vivo behavioral/electrophysiological recordings.

Laboratory of Neurocellular Physiology

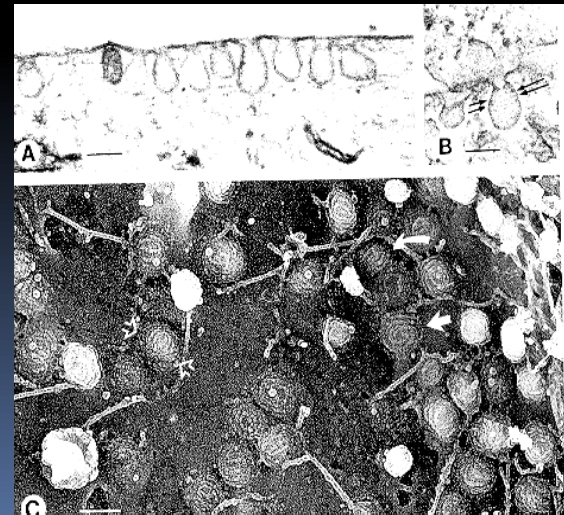
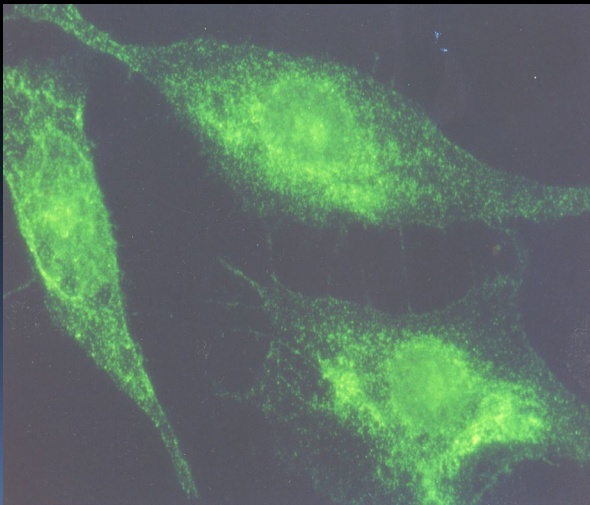
Walter I Silva, Professor
PhD 1990, Mount Sinai Sch of Med

Walter.silva@upr.edu
(787)758-2525 x1608



Research Interest:

- The role of the caveolae and their proteins caveolins in the differentiation of cultured C6 glial cells.
- The effect of injury in C6 glial or primary cultured cells in caveolin expression.



Laboratory of Cardiac Mitochondriology

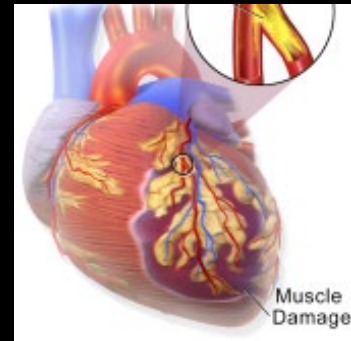
Sabzali Javadov, Professor

MD 1983, Russian Medical University

PhD 1986, Cardiology Research Center, Russia

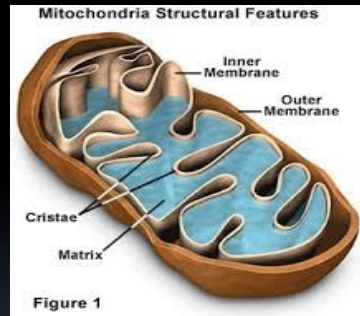
Sabzali.javadov@upr.edu

(787) 758-2525 Ext. 2909



Research Interests:

- Elucidates molecular mechanisms of mitochondria-mediated cardiac dysfunction during coronary heart diseases such as myocardial infarction and heart failure.
 - investigates the role of the mitochondrial membrane integrity in the stimulation of apoptosis (death signaling) in response to oxidative stress.



- Develop new pharmacological/conditional strategies for treatment cardiac diseases.
 - Examines cardioprotective effects of mitochondria-targeted compounds during myocardial infarction (ischemia-reperfusion) and heart failure.
 - a) mitoROS scavengers
 - b) Permeability transition pore inhibitors



Laboratory of Membrane Transport and Cardiovascular Physiology

Nelson Escobales, Professor

MS 1976, University of Puerto Rico Mayaguez

PhD 1982, Univ of Puerto Rico, MSC

Post doc 1984: Harvard Medical School

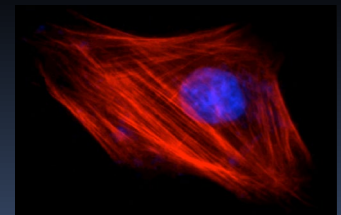
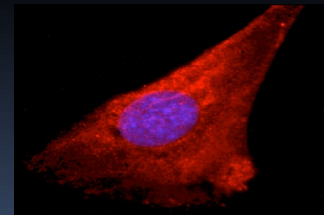
nelson.escobales@upr.edu

(787) 758-2525 Ext. 1612

(787)753-0120

Recent interest:

- The understanding of cardioprotection in the heart following ischemia & reperfusion.
- The intracellular renin-angiotensin system in the heart.



Publications at: <https://www.ncbi.nlm.nih.gov/pubmed/?term=Escobales+N>

Laboratory of Cardiovascular Physiology

María J Crespo, Professor

PhD 1993, Univ of Puerto Rico, MSC

Post doc 1995, Univ of Puerto Rico, MSC

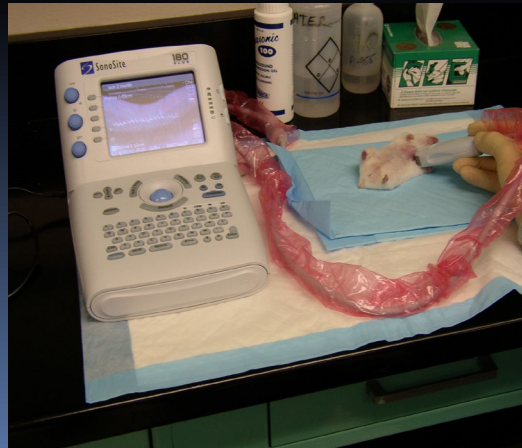
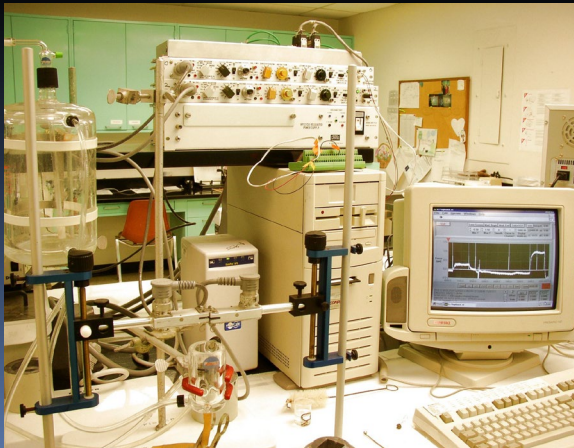
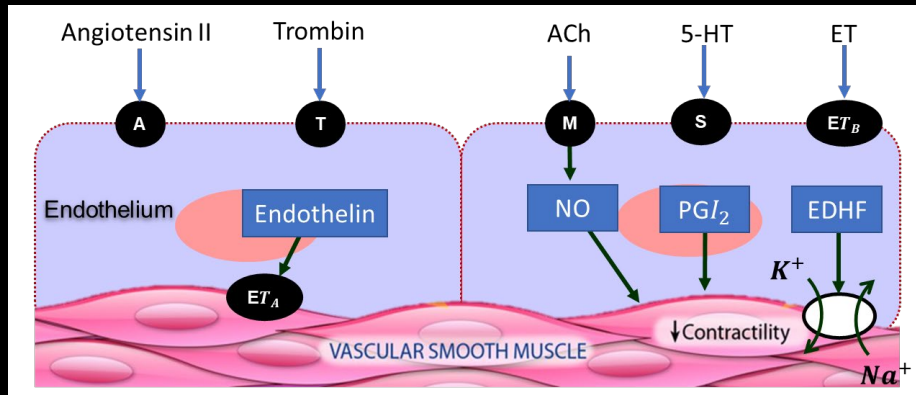
maria.crespo3@upr.edu

(787) 758-2525 Ext. 5078



Research Interest:

- Vascular alterations in cardiovascular disease.
- Evaluation of new therapies for the treatment of cerebral vasospasms in diabetes



Laboratory of Molecular Genetics & Physiology



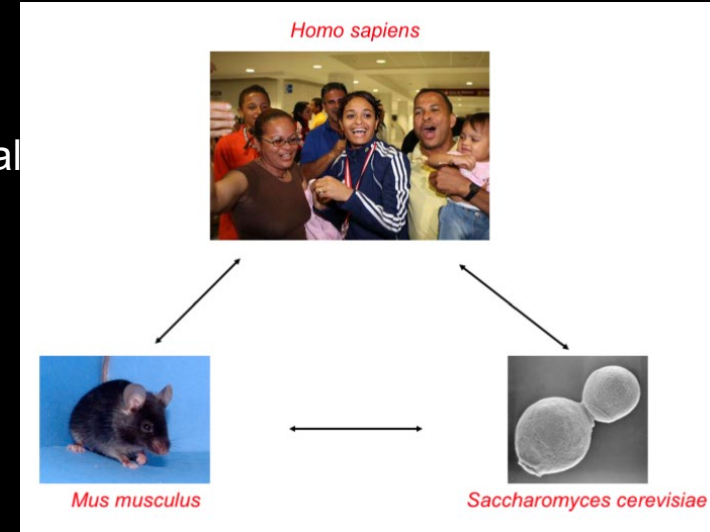
Carlos A Torres-Ramos

Associate Professor

PhD 1995, University of Texas Medical
Branch (UTMB)

Post doc 1999, UTMB

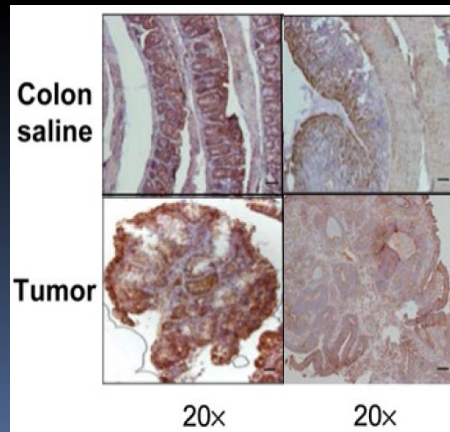
carlos.torres27@upr.edu
(787) 758-2525 Ext. 1393



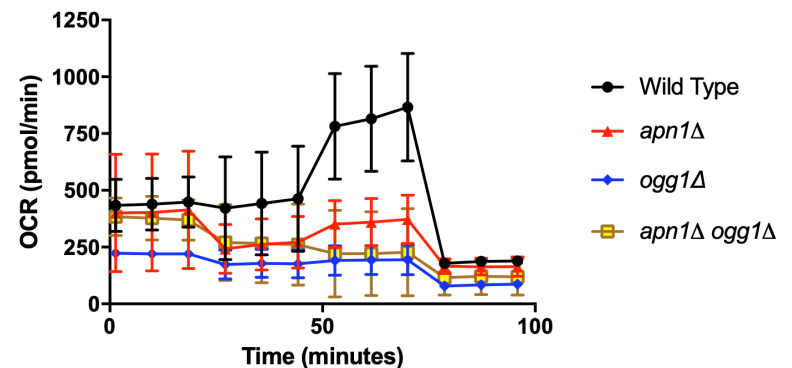
Research Interests:

- Role of mitochondrial DNA repair in the maintenance of mitochondrial physiology.
- Understand the relationship between mitochondrial DNA damage and cancer and aging.

Colorectal cancer



Mitochondrial Bioenergetics





Exercise & Muscle Cell Physiology Laboratory

Walter R. Frontera, Professor

MD 1979, University of Puerto Rico

PhD 1986, Boston University

Sabatical training: Karolinska

Hospital Stockholm, Sweden

Depart. of Physical Med. & Rehabilitation

walter.frontera@upr.edu



Research Interest:

- Investigate the basic mechanisms that underlie skeletal muscle dysfunction in elderly men and women and in patients with chronic disease.
- Study the contractile properties of skeletal muscles after spinal cord injury.

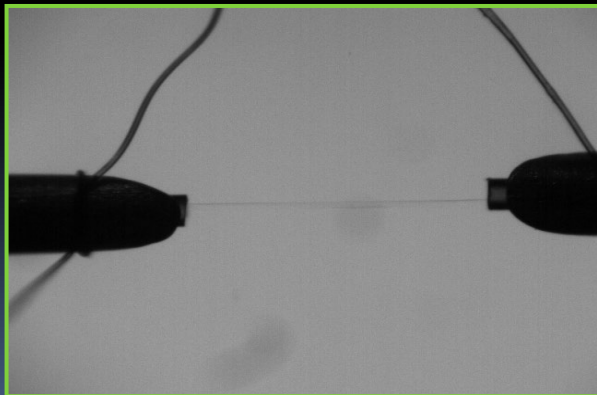


Fig. 1: Single fiber attachment technique.

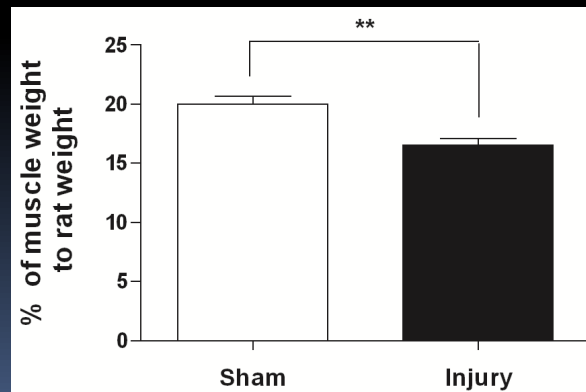


Fig. 2: SCI reduces the muscle mass of the Tibialis anterior at 7 DPI.

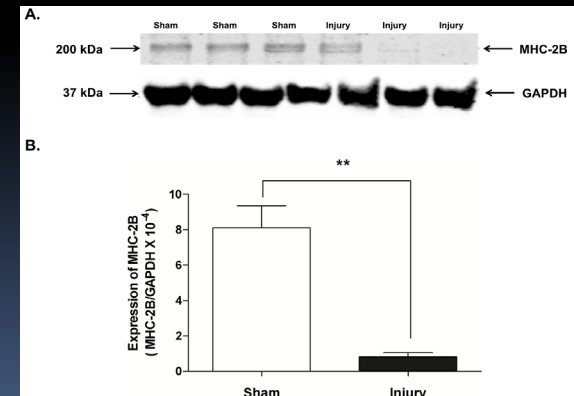


Fig. 3: SCI decreases MHC-2B at 7 DPI in female rats.

The long term objective of our projects will be to improve the life of patients with:



Spinal cord injury



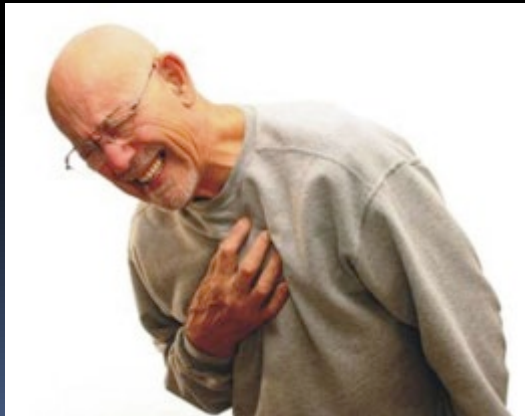
Cancer



HIV



Aging ailments



Cardiovascular disease



Diabetes



Drug addictions



Welcome to Physiology!!!



Lo que vayan a estudiar, lo tienen que hacer por pasión y no por una imposición...y lo que hagan, deben tratar de ser lo mejores!!!

Physiology Dept Webpage

<http://www.md.rcm.upr.edu/physiology/>

Dr. Jorge D. Miranda

Office A-682

jorge.miranda3@upr.edu

Ext. 1631