Translational Proteomics Center

Loyda M Melendez, PhD
Professor
Department of Microbiology
School of Medicine
Core Director
University of Puerto Rico Medical Sciences

Center for Collaborative Research in Health Disparities

Puerto Rico IDeA Network Biomedical Research Excellence
PRINBRE

January 29-30, 2020
Little Rock, AR, (USA)

UPR•SCHOOL OF MEDICINE
CLINICAL PROTEOMICS LABORATORY
TRANSLATIONAL RESEARCH

Clinical Proteomics Laboratory

San Juan, Puerto Rico

Horacio Serrano Rivera, PhD
Professor
School of Medicine
Internal Medicine Department
University of Puerto Rico

January 29-30, 2020
Little Rock, AR, (USA)

Coat of Arms

Commonwealth of Puerto Rico

Outline

- RCMI Research Infrastructure Core
  - Translational Proteomics Center
  - Genomics Translational Research Unit
  - Tropical and Emerging Infectious Diseases
  - Molecular Neurogenetics and Bioimaging
  - Integrated Informatics
- INBRE Centralized Instrumentation Core
- Clinical Proteomics Laboratory
  - Dr. Horacio Serrano

Center for Collaborative Research in Health Disparities

Research Infrastructure Core

Genomic Service
Main suite: 1,400 sq ft

Tropical and Emerging Infectious Diseases Research Service
1,445 sq ft

Integrated Informatic Service
599 sq ft

Neurogenetics and Bioimaging Service
926.96 sq ft

Proteomics Service
1,168.25 sq ft

Genomics Service
Satellite suite: 1,560 sq ft

Mission

- Center for collaborative research in health disparities (CCRHD)
  - To contribute to the national infrastructure and the capacity for research in the health sciences by supporting basic, behavioral and clinical studies in health disparities that affect the Puerto Rican population.

The Research Infrastructre Core (RIC) functions synergistically to maximize the quality and productivity of the Research Projects and the pilot projects funded by the CCRHD.

Vision

- Vision of the CCRHD
  - To create a collaborative center recognized as a model of excellence in promoting research in minority health and health disparities, contributing to a diverse biomedical research workforce and interacting with the community to improve health of Puerto Rian population.

RIC Aims	Direction
To combine Bioinformatics, Health Informatics and Operational Informatics resources into one Integrated Informatics Service	Abiel Roche-Lima, PhD Associate Professor 
To deliver high-end services to support Genomics and Proteomics research	Carmen L. Cadilla, PhD / Loyda M. Melendez, PhD Professor Department of Biochemistry / Department of Microbiology  
To provide state-of-the-art Neurogenetics and Bio-imaging services	Mark Miller, PhD Professor Department of Anatomy 
To provide access to key resources for Tropical and Emerging Infectious Diseases research.	Adelfa Serrano, PhD Professor Department of Microbiology 

Translational Proteomics Center (TPC) Mission

- Provide an integrated platform for biomarker discovery and protein identification and quantitation to interface between basic and clinical research conducted in Puerto Rico for the diagnosis and therapeutic monitoring of human diseases.

- Integrate Genomics, Bioinformatics (Ingenuity Pathways), Metabolomics (INBRE), and Emergent Infectious Disease Cores with Proteomics Platform.

- Provide TPC services with new methodologies on quantitative proteomics such as: TMT labelling.

- Promote validation strategies including: Imaging (Core in Neurobiology), ELISAs (TPC,TEID), Kinetic assays (TPC, TEID) and Flow cytometry (CCC).

- Provide workshops and trainings through the INBRE program and Increase users and visits to the TPC, as well as supported projects.

Research Resources

UPR School of Medicine
Interdepartamental Seminar Series

"State of the Art Resources Available to UPR MSC Investigators through RCMI and INBRE Supported Facilities"

Loyda Meléndez, PhD
Professor
Microbiology Department
Translational Proteomic Center Director

Carmen L Cadilla PhD
Professor
Biochemistry Department
Genomics Translational Research Unit Director

Nataliya Chorna, PhD
Adjunt Professor
Biochemistry Department
INBRE Metabolomics Core Director

Adelfa Serrano, PhD
Professor
Microbiology Department
Tropical and Emerging Infectious Diseases Core

Mark Miller, PhD
Professor
Institute of Neurobiology
Neurogenetics and Bioimaging Director

Abiel Roche-Lima, PhD
Assistant Professor
Bioinformatics Core Director

Tuesday, December 5, 2017 at 12:00pm
Amphitheater 6th Floor, Guillermo Arbona Building UPR- Medical Sciences Campus

SPONSORED BY THE RCMI AND INBRE PROGRAMS, Departments of Biochemistry and Physiology

1st day: 29 participants

PROTEOMIC WORKSHOP

Evaluation Report

March 12-13, 2018

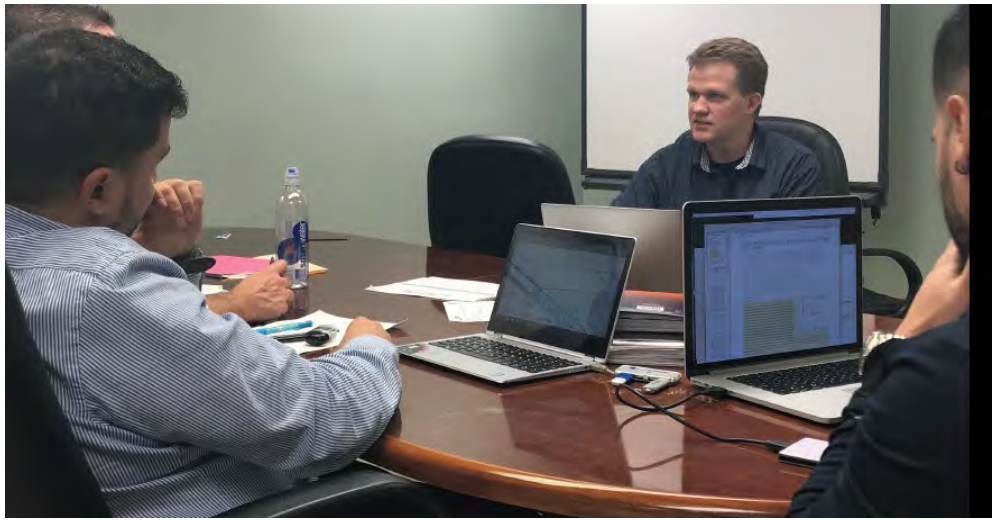
University of Puerto Rico, Medical Sciences Campus

Coordinator: Loyda Melendez

CRI Core

PRINBRE

IDeA Network of Biomedical Research Excellence



2nd day: 11 participants, individual meetings with students and faculty working in proteomics related projects

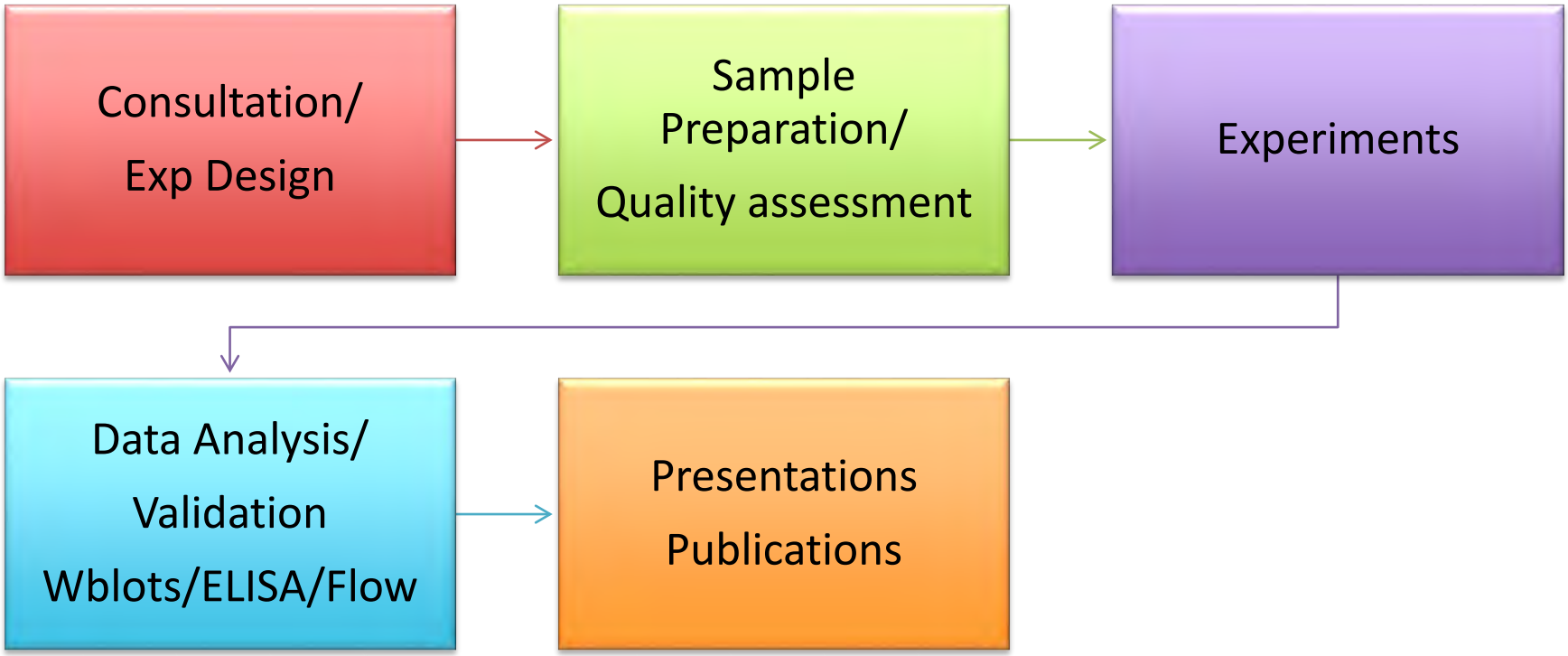
Evaluation & Tracking Team

Prepared by

Nicole M. Ortiz Vega, MS

Sharon M. Alvalle Vélez, MS

Method of Operation



Translational Proteomics Center

Loyda M Melendez, MT, MS, PhD

Service Leader

Loyda M Melendez, PhD

Ana Rodriguez, MS

Research Associate

Ana Rodriguez, MS

Supported by RCMI

Yadira Cantres, BS

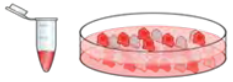
Research Assistant

Yadira Cantres, BS

Supported by CCC

Services Provided

Protein Identification



Cell Culture or Tissue Sample

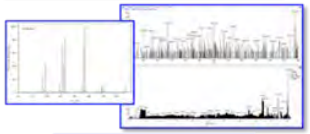
Protein Extraction

Sample Cleaning by Acetone Precipitation

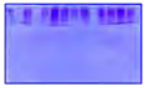
Proteome Profiling

Immunoprecipitation

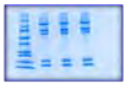
Protein ID
Proteome Discoverer 1.4



SDS-PAGE



Coomassie or Silver Stain



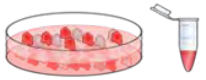
LC-MS/MS Analysis
Easy nLC 1000 /LTQ XL

In-gel Trypsin Digestion

Protein Quantitation

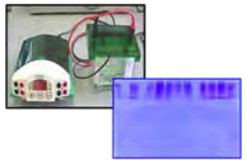
Sample Cleaning by Acetone Precipitation

Protein Extraction

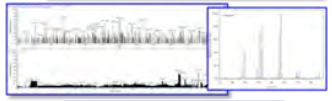


Cell Culture or Tissue Sample

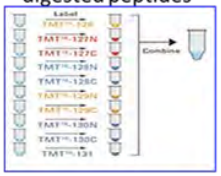
SDS-PAGE



Protein Quantitation
Proteome Discoverer 2.1



TMT labeling of digested peptides



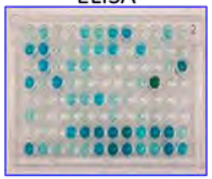
Reduction, Alkylation and In-gel trypsin digestion

Sample Cleaning C18 spin tips

LC-MS/MS Analysis
Easy nLC 1200 /Q-Exactive Plus

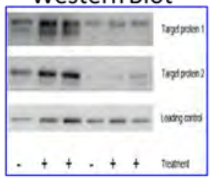
Validation

ELISA



Varioskan Microplate Reader

Western Blot



Chemi Doc XRS+

To be incorporated:
SRM Method
(Targeted Quantitative Proteomics)

#	Service Provided	Fee for Services
1	Initial Consultation	**Free**
2	Experimental design and power analyses	**$30/hr**
3	Processing of complex clinical samples (BCA, Calibration curve)	**$35/sample**
4	Depletion of most abundant proteins from clinical samples*	**$35/sample**
5	Protein fractionation	**$35/sample**
6	Protein Separation: ✓ One-dimensional SDS PAGE ✓ Gel staining (Coomasie or Silver)	**$ 50/Gel**
7	Immunoprecipitation** **Investigators must provide antibodies of their preferences and the lysis buffer.	**$ 150**
8	Sample Processing for Mass Spectrometry: ✓ Enzymatic digestion (in-gel) ✓ Peptide Extractions	**$ 15/Sample**
9	Protein Identification: ✓ Analysis by LC-MS/MS (Easy-nLC-LTQ XL) ✓ Sequest HT Data Search	**$ 20/Sample**
10	Quantitative Proteomics: ✓ Peptide tagging (iTRAQ/TMT labeling) ✓ Analysis by LC-MS/MS (Q-Exactive Plus) ✓ Sequest HT and Mascot Data Search ✓ SILAC	**$ 100/Sample**
11	Protein Validation by Fluorometry/ELISA * Investigators provide ELISA Kits costs.	**$ 50**
12	Protein Validation by Western Blot (WB) ✓ Investigators provide Antibodies of their preference.	**$ 75** **$ 15 (Re-Blot)**
13	Ingenuity Pathway Analysis for Validated Proteins ✓ The software is also available for users Free independent analysis.	**$ 50**
14	**Consulting and Final Report**	**Free**
15	**Proteomics Abstract and Manuscripts Revision**	**Free**

List of Services

http://rcmi.rcm.upr.edu/resreso/corefacnetwork/tpc/guides_prot

SALE!!!
25% discount x
INBRE users

INBRE CENTRALIZED RESEARCH INSTRUMENTATION CORE (CRI)

1. **Translational Proteomics Center– Dr. Loyda M. Melendez, RCMI - UPR Medical Sciences Campus**
2. Genomics Translational Research Unit – Dr. Carmen L.Cadilla, RCMI, PRCTRC - UPR Medical Sciences Campus
3. Metabolomics Research Core – Dr. Nataliya Chorna, INBRE - UPR Medical Sciences Campus
4. Sequencing Genomic Facility (SGf)– Dr. Riccardo Papa, INBRE and UPR Rio Piedras, NSF.
5. Protein Structure and Dynamics –Dr. Juan Lopez Garriga, NSF, INBRE. UPR Mayaguez Campus
6. In-Vitro Biotesting Facility (ChemTox)– Dr. Beatriz Zayas, INBRE and Universidad Metropolitana.

CRI Core Goals & Aims

- The overall goal of the PR-INBRE Centralized Research Instrumentation (CRI) Cores is to integrate and empower investigators and students from Tier 1, Tier 2 Primarily Undergraduate Institutions (PUIs) and Outreach Institutions by providing mentorship and scientific support.

- Specific Aim 1: Reinforce and enhance access to state-of-the-art core research instrumentation for nurturing new and expanding established research collaborations between the CRI investigators, students, and faculty from Puerto Rico, the Caribbean, and other IDeA states.

CRI Core Goals & Aims (cont.)

- Specific Aim 2: Ensure the effective dissemination of CRI Cores technologies via theoretical and practical workshops, mentoring researchers in experimental design and best practices in the use of the resources that are available to them.

- Specific Aim 3: Create an alliance of CRI Core users.

PROTEOMICS facilities
Comprehensive Cancer Center, Lab #5

- Lab 1,200 sq. ft.
- Instrumentation Room
- Chemical Room
- Cell culture Room
- Cold Room
- Emergency outlets

Tissue Culture Room

Cold Rooms

Storage of reagents clinical samples and reagents that need low temperatures.

Chemical Room

Mass Spectrometry Room

New Technology Quantitative LC/MS/MS Analysis

Protein Quantitation System

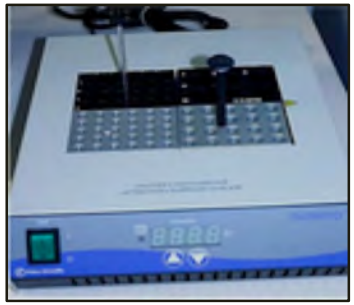
Thermo Easy n-LC 1200 coupled to the Thermo Q-Exactive Plus Mass Spectrometer

Puerto Rico IDeA Network Biomedical Research Excellence

PRINBRE

Instrumentation Protein ID

Enzyme Digestion – Peptide Extraction – LC/MS/MS Analysis

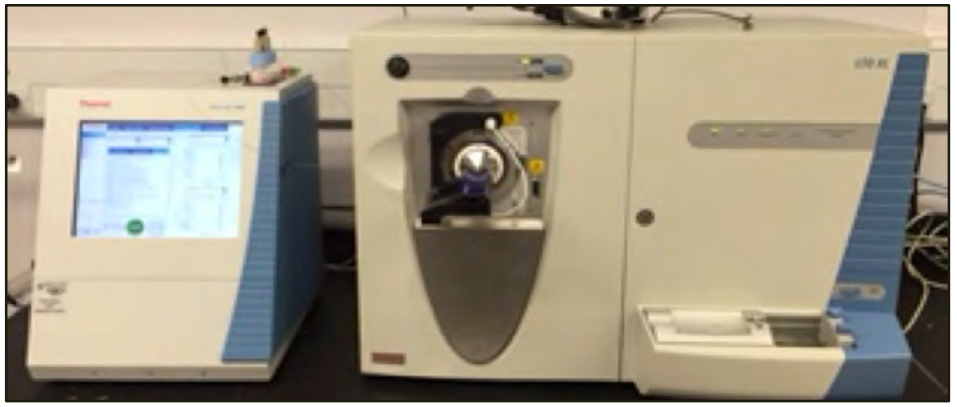


Digital Dry Bath

Sorvall Legend Micro 21R & 17 Centrifuges

miVac DNA Concentrator Integrated system & Savant Speed Vac Plus

Protein Identification System



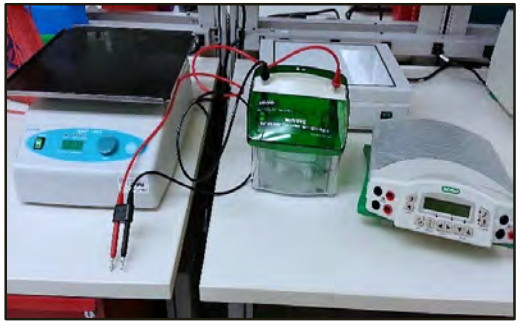
Thermo Easy n-LC 1000 coupled to the Thermo LTQ XL Mass Spectrometer

Puerto Rico IDeA Network Biomedical Research Excellence

PRINBRE

Instrumentation Protein Validation

Electrophoresis – Western Blot – ELISA



Electrophoresis Station

Turbo Trans Blot Transfer System

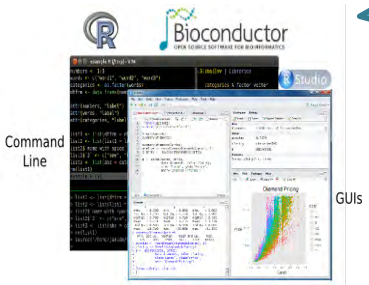
Varioskan Flash Spectral Reader

Bio Rad Gel Doc XR+

The Translational Proteomics Center provides training, resources, and tools for new and established investigators seeking to use innovative approaches of proteomics to their research, as well as to undergraduate and graduate students in the biomedical field

Data Analysis

Raw Data Analysis (1,080 proteins/ sample pool)

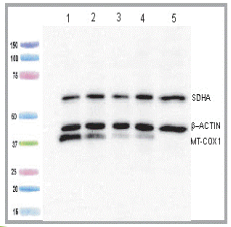


Limma R Statistics

Bio-Informatics Collaboration

INGENUITY PATHWAY ANALYSIS

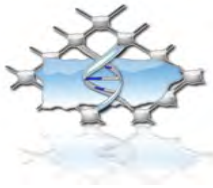
Ingenuity Pathway Analyses



Western Blot Analyses for Validation

Proteomics analysis programs

Program	Application
Image Lab™ Version 5.1	Software for acquisition and analysis of gel (Electrophoresis) and blot images (Western Blots).
SKanIt RE for Varioskan Flash Version 2.4.3	Software provides method setup, data acquisition, data processing, and reporting for Varioskan Flash instrument. Recommended for ELISA and other biological assays.
Xcalibur Version 2.2	Software provides method setup, data acquisition, data processing, and reporting for LC/MS/MS analysis.
Proteome Discoverer Version 1.4 and 2.1	Software for protein identification and quantitation in complex biological samples. Used with the analysis of raw data files of the LC/MS/MS analysis.
Ingenuity Pathway Analysis	Software helps in the research process of the data obtained. Answer biological questions as: What biological pathways do the identified proteins participate in? or What is the effect of known protein modifications?



Puerto Rico IDeA Network Biomedical Research Excellence

PRINBRE

Translational Proteomics

Users / Visits 2018-2019

RCMI Facility	Month	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2018	Jun 2019	Total
Translational Proteomics Center (TPC)	Service Tickets- Requested	0	4	1	2	3	1	1	4	4	0	2	2	**22**
	Service Tickets- Resolved	0	1	4	1	3	0	3	2	0	0	4	2	**18**
	Instrument Use- Bar coding data	17	40	25	26	17	10	15	23	37	19	24	19	**253**
	Unique Users (per Month)	8	10	10	8	8	5	6	10	11	7	10	7	**24***

July to June 2019

296 visits in total by 24* users between July to June 2019.

Impacted Projects- UPR-MSC

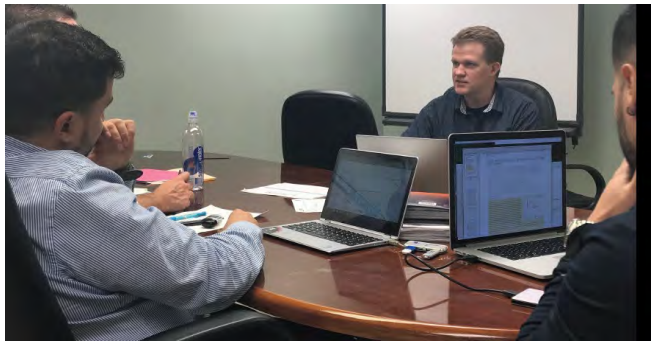
Project	Area	Investigator	Students / Postdocs
Adopting a Precision Medicine Paradigm in Caribbean Hispanics of Puerto Rico	Heart	Jorge Duconge,PhD	1
Upstream regulation and Downstream Effectors of c-MYC in Ovarian Cancer	Cancer	Pablo Vivas, PhD	1
Vaccine Development against Infectious Diseases	Infectious	Miguel Otero, PhD	2
Targeting Breast Cancer Progression	Cancer	Suranganie F. Dharmawardhane, PhD	2
Targeting Monocyte/Macrophage Cathepsin B in HIV-1 Neurocognitive Disorders	Infectious	Loyda M Melendez, PhD	4

Impacted Projects- Other UPR projects

Project	Area	Investigator
Novel Rac inhibitors as potential therapeutics for metastatic breast cancer: Phosphoproteomics analyses	Cancer	Surangami Dharmawardhane
Exosome-mediated soluble insulin receptor secretion correlates with HAND.	Infectious	Yamil Gerena and Valerie Wojna
mTOR related genes in cisplatin-resistant ovarian cancer PRCCC	Cancer	Pablo Vivas
Biomolecular Analyses of Hypospadias According to Severity.	Physio	Horacio Serrano/ Juan Carlos Jorge
Study of Proteins associated to stress in yeast for the discovery of antifungal treatment in humans.	Infectious	Jose Rodriguez-Medina
Combining High-Throughput Omics methods to Understand Cervical Microbiome Dynamics for Cancer Prevention among High-Risk Hispanics	Infectious	Filipa Godoy
HIV vaccine development	Infectious	Abel Baerga
Nicotine receptors and addiction	Drug abuse	José Lasalde

Special Activities 2019-20

Activities	Topics	Resources
Seminars and Webinar	Proteomics and Viral infections. Jan, 2019	Dr. Melendez
Trainings	Proteomics training to graduate and undergraduate students March, 2019	Core staff
Workshops	Quantitative Proteomics and Protein Bioinformatics. May, 2019	Dr. Bryan Ballif Dr. Emilio Camafeita Dr. Inmaculada Jorge
Course	Special Topics in Proteomics Feb-March, 2020	Drs. Melendez, Serrano, Ballif, Weintraub, Camafeita, Jorge



Outcomes: Presentations

Meetings	Place	Format
Human Proteome Organization (HUPO). September 30, 2018.	Orlando, Florida,	Poster
ABRCMS. Oct 2018.	Washington DC	Poster
PR Neuroscience. Nov 2018.	Puerto Rico	Poster
Society for Neuroscience. Nov 1-7, 2018.	San Diego, CA.	Poster
HIVDART and Emerging viruses. 27-29 November, 2018.	Miami , Florida,	Oral
Society on Neuroimmune Pharmacology 25th Scientific Conference. April 9-13, 2019.	Portland, OR	Oral and Poster
American Society for Mass Spectrometry. June 4, 2019 (ASMS)	Atlanta, GA	2 Posters
Cerebral Vascular Biology Conference, June 25-28, 2019	Miami, FL	Oral

Manuscripts

1. Rosario-Rodríguez LJ, Colón K, Borges-Vélez G, Negrón K, Meléndez LM. 2018. Dimethyl fumarate prevents lysosomal disruption and cathepsin B secretion from HIV infected macrophages. J Neuroimmune Pharmacol. 2018 Jul 9. doi: 10.1007/s11481-018-9794-5. PMID:29987592.

2. Rosas-Vidal L, Lozada V, Cantres-Rosario Y, Vega-Medina A, Melendez L, and Quirk G. 2018. Alteration of BDNF in the medial prefrontal cortex and the ventral hippocampus impairs extinction of avoidance. Neuropsychopharmacology. 2018 Dec;43(13):2636-2644. doi: 10.1038/s41386-018-0176-8. Epub 2018 Aug 11. PMID: 30127343.

3. Cantres-Rosario YM, Ortiz-Rodríguez SC, Santos-Figueroa AG, Plaud M, Negron K, Cotto B, Langford D, Melendez LM. *HIV infection induces extracellular cathepsin B uptake and damage to neurons.* Sci Rep. 2019 May 29;9(1):8006. doi: 10.1038/s41598-019-44463-1. PMID: 3114275

4. Vélez- López O., Gorantla S., Segarra Marrero A., Andino Norat MC, Álvarez M, Skolasky RL, Meléndez LM. 2019. Sigma-1r antagonist bd1047 prior to cocaine reduces cathepsin B secretion in HIV-1 infected macrophages. J Neuroimmune Pharmacology Jun;14(2):226-240. doi: 10.1007/s11481-018-9807-4. Epub 2018 Oct 10. PMID: 30306495

5. Vélez-López O, Carrasquillo-Carrión K, Salgado-Ramírez CA, Cantres-Rosario Y, Machín-Martínez E, Álvarez-Ríos MA, Roche-Lima A & Meléndez LM. Quantitative Proteomics of HIV-1 Infected Macrophages exposed to Cocaine following Sigma-1 Receptor Modulation. To be submitted to J of Proteome Research.

6. Zenon-Melendez CN, Roche-Lima A, Carrasquillo-Carrión K, Cantres Rosario Y, Roman E & Meléndez LM. Cathepsin B/SAPC secreted by HIV-infected macrophages share common and distinct pathways of neuronal apoptosis. To be submitted to J of Proteome Research.

Contact

Loyda M Melendez, PhD
Service Lead
Translational Proteomics Center

Comprehensive Cancer Center
Lab #5

loyda.melendez@upr.edu
Cell 787-467-2328

Websites:

1. http://rcmi.rcm.upr.edu/?q=proteomic-page
2. https://md.rcm.upr.edu/micro/dt_team/dr-loyda-m-melendez/

UPR•SCHOOL OF MEDICINE
CLINICAL PROTEOMICS LABORATORY
TRANSLATIONAL RESEARCH

Clinical Proteomics Laboratory

San Juan, Puerto Rico

Horacio Serrano Rivera, PhD
Professor
Internal Medicine Department
University of Puerto Rico

January 29-30, 2020
Litter Rock, AR (USA)

The creation of this laboratory was an initiative developed through the Department of Internal Medicine of the School of Medicine, Medical Sciences Campus, University of Puerto Rio

Clinical Proteomics LAboratory

- Mission
  - To provide support in proteomics to clinical research faculty and students by supporting clinical studies in health disparities that affect the Puerto Rican population.
  - To promote translational research by applying proteomics approach.

We rely on existing platforms in the RCMI Translational Proteomic CORE directed by Dr. Loyda Meléndez

Proteome Discoverer
Mass Informatics Platform for Protein Scientists

IPA®

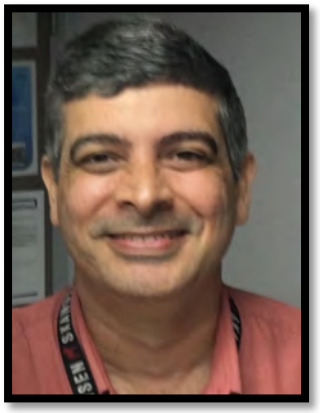
Clinical Proteomics Facility

UPR•SCHOOL OF MEDICINE
CLINICAL PROTEOMICS LABORATORY
TRANSLATIONAL RESEARCH

Bridging the sciences

BIOSTATISTICS

On a technical level we have a chemist and statistician as part of the staff.



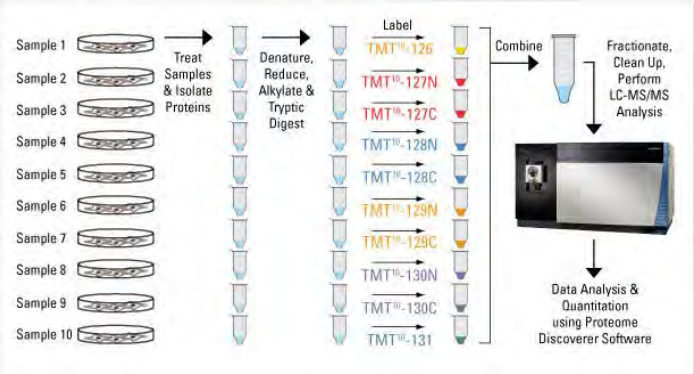
Eric Miranda, MPH,
Research Assistant
eric.miranda@upr.edu

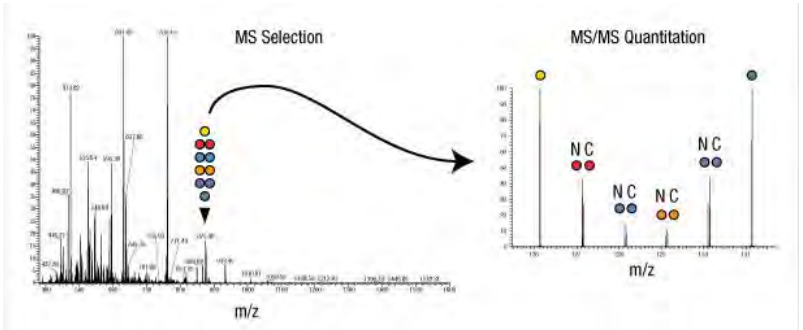
Two components

- Academic Component
  - Undergraduate level
    - Students interested in clinical research.
  - Graduate
    - Working on specific objectives of doctoral thesis
    - We offer conferences and courses
- Research Component
  - Facilitators and collaborate with **Clinical Faculty** in:
    - » Experimental design
    - » Biostatistics
    - » Repository of clinical samples
    - » Sample conditioning for MS / MS
    - » Protein labeling
    - » Proteomic data analysis

Methodologies applied:

- ELISA test
- Protein Identification by MS / MS
  - Protein Chemistry
  - Mass Spectrometry and
  - Bioinformatics
- Quantification of Proteins by MS / MS
  - TMT





Some of the most relevant research conducted with our collaboration include:

Research	PI and Co-PI
Biomarkers of Kidney Damage / Diabetes T2	Ileana Ocasio, MD Horacio Serrano, PhD
Biomarkers of Lung Cancer	Carlos Cortijio, PhD Horacio Serrano, PhD
Pharmacoproteomics (Rheumatoid arthritis)	Luis Vilá, MD Horacio Serrano, PhD

Other collaborations in progress include proteomics studies of the following diseases:

Research	PI and Co-PI
Hypospadias	Juan C. Jorge, PhD
Biomarkers of Alzheimer's (No traditional Sample)	Ivonne Z. Jiménez, MD
Parkinson	Sherly Pardo, MD
HIV	Loyda Meléndez, MD
Thyroid Cancer	William Mendez, MD
Pancreatic Cancer	Texel Longoria, MD
Preeclampsia and premature delivery	Jossie Romaguera, MD

HIV and Drug abuse

Proteomics Clin. Appl. 2015, *00*, 1–11 DOI 10.1002/prca.201400204

RESEARCH ARTICLE

^{18}O proteomics reveal increased human apolipoprotein CIII in Hispanic HIV-1+ women with HAART that use cocaine

Frances Zenón[1], Inmaculada Jorge[2], Ailed Cruz[3], Erick Suárez[4], Annabell C. Segarra[5], Jesús Vázquez[2], Loyda M. Meléndez[1] and Horacio Serrano[6]*

[1] Department of Microbiology, University of Puerto Rico Medical Sciences Campus, San Juan, Puerto Rico
[2] Laboratorio de Proteómica Cardiovascular, Centro Nacional de Investigaciones Cardiovasculares (CNIC), Madrid, Spain
[3] Department of Biochemistry, University of Puerto Rico Medical Sciences Campus, San Juan, Puerto Rico
[4] Department of Biostatistics and Epidemiology, Graduate School of Public Health, University of Puerto Rico Medical Sciences Campus, San Juan, Puerto Rico
[5] Department of Physiology, University of Puerto Rico Medical Sciences Campus, San Juan, Puerto Rico
[6] Department of Internal Medicine, University of Puerto Rico Medical Sciences Campus, San Juan, Puerto Rico

Purpose: Drug abuse is a major risk factor in the development and progression of HIV-1. This study defines the alterations in the plasma proteome of HIV-1-infected women that use cocaine.

Experimental design: Plasma samples from 12 HIV-seropositive Hispanic women under antiretroviral therapy were selected for this study. Six sample pairs were matched between nondrug users and cocaine users. After IgG and albumin depletion, SDS-PAGE, and in-gel digestion, peptides from nondrug users and cocaine users were labeled with ^{16}O and ^{18}O, respectively, and subjected to LC-MS/MS and quantitation using Proteome Discover and QuiXoT softwares and validated by ELISA.

Received: December 17, 2014
Revised: May 26, 2015
Accepted: July 27, 2015

And we work on this panoramic article regarding the possibilities of making clinical proteomics with non-traditional samples

proteomes

MDPI

Article

A Quantitative Proteomics Approach to Clinical Research with Non-Traditional Samples

Rígel Licier [1,2,*], Eric Miranda [2,3] and Horacio Serrano [2,3,*]

1 Department of Medicine, San Juan Bautista School of Medicine, Caguas 00727, Puerto Rico
2 Quantitative Proteomics Laboratory, Comprehensive Cancer Center of Puerto Rico, San Juan 00936, Puerto Rico; eric.miranda@upr.edu
3 Department of Internal Medicine, University of Puerto Rico, Medical Sciences Campus, San Juan 00936, Puerto Rico
* Correspondence: rigello@sanjuanbautista.edu (R.L.); horacio.serrano@upr.edu (H.S.); Tel.: +787-454-3192 (R.L.); +787-643-8071 (H.S.)

Academic Editors: Edwin Lasonder and Jacek R. Wisniewski
Received: 28 June 2016; Accepted: 21 September 2016; Published: 17 October 2016

Abstract: The proper handling of samples to be analyzed by mass spectrometry (MS) can guarantee excellent results and a greater depth of analysis when working in quantitative proteomics. This is critical when trying to assess non-traditional sources such as ear wax, saliva, vitreous humor, aqueous humor, tears, nipple aspirate fluid, breast milk/colostrum, cervical-vaginal fluid, nasal secretions, bronco-alveolar lavage fluid, and stools. We intend to provide the investigator with relevant aspects of quantitative proteomics and to recognize the most recent clinical research work conducted with atypical samples and analyzed by quantitative proteomics. Having as reference the most recent and different approaches used with non-traditional sources allows us to compare new strategies in the development of novel experimental models. On the other hand, these references help us to contribute significantly to the understanding of the proportions of proteins in different proteomes of clinical interest and may lead to potential advances in the emerging field of precision medicine.

Keywords: quantitative proteomics; MS/MS; clinical samples; precision medicine; screening

Graduate Students

Frances Zenón, Ph.D.
(2016), MSC- UPR

Ana Ortíz, Ph.D.
(2017), MSC- UPR

Amanda Flores, Ph.D.
(2019), MSC- UPR

Mayte Ramírez, Ph.D.
(2019), MSC- UPR

Sartiza Santos, Ph.D.
(2019), MSC-UPR

Rigel Licier, MD,
(2020), USB – PR

Génesis Ayala, M.D.
(2020), USB - PR

UPR•SCHOOL OF MEDICINE
CLINICAL PROTEOMICS LABORATORY
TRANSLATIONAL RESEARCH

Coriness Pineyro, Ph.D.
(2020), MSC-UPR

Kelvin Navarro, MS,
(2019), Univ. Inter-Metro

Kagsianais Alicea, M.S.
(2018), Univ. Inter-Metro

Kamil Suliveres, M.S.
(2019), Univ. Inter-Metro

Luis Pagán, M.S.
(2019), Univ. Inter-Metro

Ivelisse Pérez Resto, M.S.,
(2018), Univ. Inter-Metro

International partners

Centro Nacional de Investigaciones Cardiovasculares (CNIC) Madrid, España

Dr. Jesús Vázquez,
CNIC, España

Dra. Inmaculada Jorge,
CNIC, España

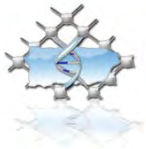
Dr. Emilio Camafeita
CNIC, España

PILL
Proteomics International
LABORATORIES LTD

Dr. Richard Lipscombe
Proteomics International,
West Australia

Dr. Scott Bringans
Proteomics International,
West Australia

Thanks!



Puerto Rico IDeA Network Biomedical Research Excellence
PRINBRE

Puerto Rico OMICS Core