

Clinical Proteomics Discovery Core Facility provides new resources for Clinical and Biomedical Research

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Clinical Proteomics Discovery Core Facility

University of Puerto Rico, Medical Sciences Campus

<http://rcmi.rcm.upr.edu/docs/proteomics.pdf>

Clinical Proteomics Discovery Core Facility (CPDCF)

- Only Proteomic Core Facility in Puerto Rico completely equipped to provide overall expertise and resources



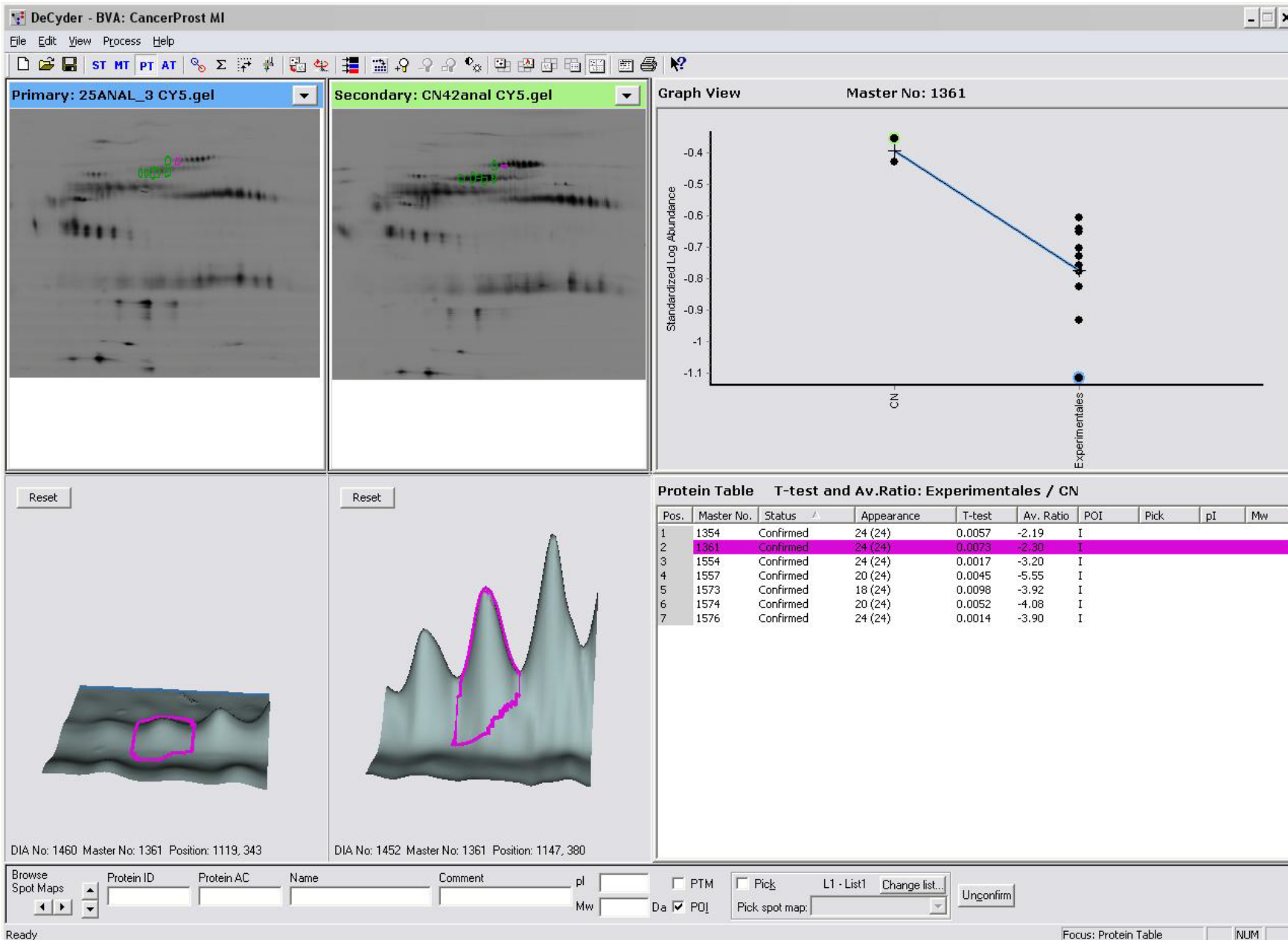
CPDCF Personnel

- **Dr Loyda Meléndez**, PhD, PI
 - Director and project coordinator
- **Dr Juliana Pérez-Laspiur**, PhD
 - Research Associate, experiment coordinator, LTQ analysis, instrumentation and data management, quantitative LTQ analysis, faculty and student training
- **Elaine Rodríguez**, MT
 - SELDI-TOF analysis, LTQ maintenance, administrative, student training
- **Bonnibel Delgado**, MSc
 - Technical and scientific expertise in 2D-DIGE, DeCyder analysis, spot picking; trained in quantitative proteomics (iTRAQ: isobaric tag for relative and absolute quantitation), student training



Aims of CPDCF

- To provide the infrastructure necessary to characterize, and isolate differentially expressed proteins in populations with health disparities.
- To increase the capabilities of performing research projects in proteomics among faculty and graduate students.
- To prepare the institution for protein identification and analysis by fostering collaborations with Biostatisticians-Bioinformatics in the mainland.
- To establish a state of the art proteomic core laboratory available for faculty and students and provide advices, trainings, and services of proteomics analyses using diverse approaches in accordance to each biological system.



Analysis in experimental design and analysis is also provided

Ingenuity Pathways Analysis



> Build Pathways

Create your pathways for your targets, biomarkers, diseases and biological functions



> Design Pathways

Communicate pathways and network results through visually enhanced representations



> Compare

Identify the union, unique, and common molecules across lists, pathways, biomarkers, and analyses

Analyze



Core

Interpret your data in the context of biological processes, pathways and networks

> Analyze dataset

> Compare analyses



IPA-Tox

Assess toxicity and safety of test compound in the context of toxicological processes, pathways, and networks

> Analyze dataset

> Compare analyses



IPA-Biomarker

Filter your datasets and identify and prioritize potential biomarker candidates

> Analyze dataset

> Compare analyses



IPA-Metabolomics

Explore genotype-phenotype relationships and environmental influences via metabolite data

> Analyze dataset

> Compare analyses

Genes or Chemicals Functions and Disease Genes targeted by Drugs

brca1 SEARCH

Advanced Search Options

Identifier Type: All Identifiers

Molecule Types: [Click here to select molecule types](#)

Subcellular Locations: [Click here to select subcellular locations](#)

Function and Diseases: [?](#)

Drugs: [?](#)

Display results as: ☒ List ☐ Functions and Diseases Tree

RESET SEARCH CANCEL

Search

ADD TO PATHWAY ADD TO LIST CUSTOMIZE TABLE ?

The search for brca1 matched 1 items.

<input type="checkbox"/>	#	Symbol	Matched Term	Synonym(s)	Entrez Gene Name	Location	Type
<input type="checkbox"/>	1	BRCA1	BRCA1, BRCA1 (LACKING EXON 11), BRCA1	BRCA1 (LACKING EXON 11), BRCA1, BRCC1, BROVCA1, IRIS, PSCP, RNF53	breast cancer 1, early onset	Nucleus	transcription r

System Downtime Training Schedule Tutorials and Help FAQs Guidelines for citing IPA Customer Support

Summary Networks Functions Canonical Pathways My Pathways Gene Summary Network Explorer Overlapping Networks Lists

Here is a summary of analysis Waring_tox_dataset - 2007-01-30 08:20 PM

Top Networks

ID	Associated Network Functions	Score
1 View	Cell Death, Cell Cycle, Cancer	94
2 View	Cell Death, Gene Expression, Cellular Development	30
3 View	Cell Death, Cancer, Cellular Growth and Proliferation	27
4 View	Lipid Metabolism, Molecular Transport, Small Molecule Biochemistry	23
5 View	DNA Replication, Recombination, and Repair, Cellular Growth and Proliferation, Cancer	11

Top Tox Functions

Hepatotoxicity

Name	Significance
Liver Necrosis/Cell Death	3.81E-7 - 4.60E-6
Liver Hyperplasia/Hyperproliferation	8.38E-6 - 8.38E-6

Top Toxicity Lists

Name	Ratio
Aryl Hydrocarbon Receptor Signaling	3/9 (0.33333)
Cytochrome P450 Panel - Substrate is an Ecosanoid (Rat)	1/3 (0.33333)
Cytochrome P450 Panel - Substrate is a Xenobiotic (Human)	5/19 (0.26316)
Cytochrome P450 Panel - Substrate is a Xenobiotic (Rat)	6/23 (0.26087)
Cytochrome P450 Panel - Substrate is a Xenobiotic (Mouse)	6/28 (0.21429)

Top Canonical Pathways

Top Genes

Normalized Ratio up-regulated

Gene	Exp. Value
CYP1A1	↑123.700
ABCB1B	↑100.100
COX6C (includes EG54322)	↑29.100
ABCC3	↑26.900
GAPD	↑26.600
JUNB	↑21.600
GGT1	↑17.000

Ephrin Receptor Signaling

10 molecules and 10 relationships were added

Filter Summary

Consider only molecules and/or relationships where (rel. types = activation OR expression OR inhibition) AND (mol. types = biologic drug OR chemical - kinase...)

— and limit molecules to

☒ Use Ingenuity Knowledge Base

☐ Use Molecules from Analysis/Dataset...

Current Analysis/Dataset: None selected

Change Analysis/Dataset

Species All

Tissues & Cell Lines All

Biofluids All

Diseases All

Relationship Types activation, expression...

☐ Select all

☒ activation

☐ chemical-chemical interactions

☐ chemical-protein interactions

☒ expression

☐ inhibition

☐ leads to

☐ localization

☐ membership

Molecule Types biologic drug...

☐ Select all

☒ biologic drug

☐ chemical - endogenous mammalian

☐ chemical - endogenous non-mammalian

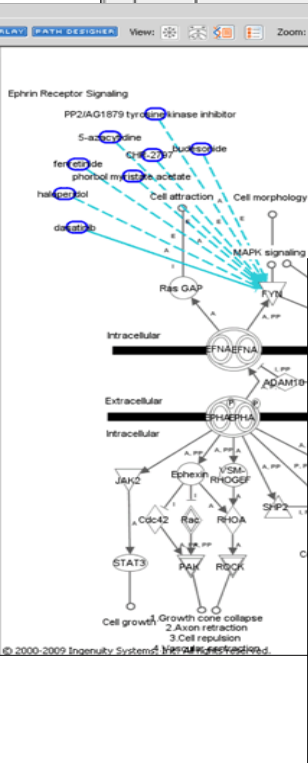
☒ chemical - kinase inhibitor

☐ chemical - other

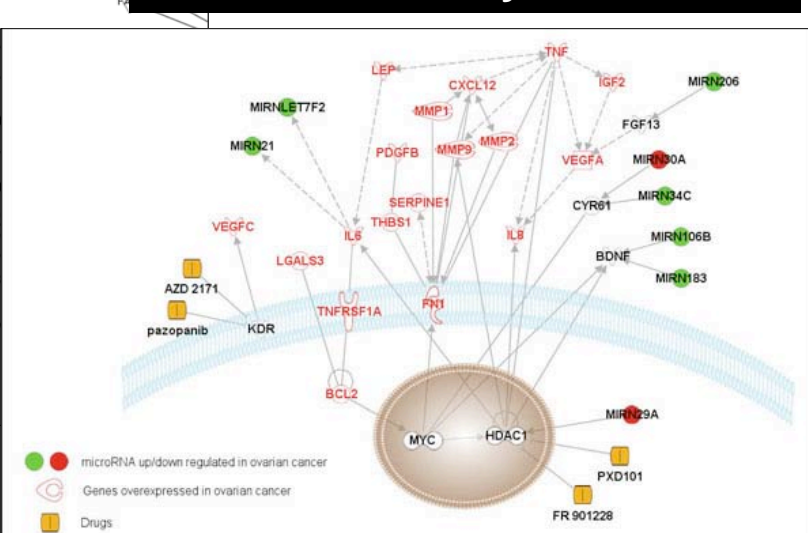
☐ chemical - protease inhibitor

☒ chemical drug

☐ chemical reagent



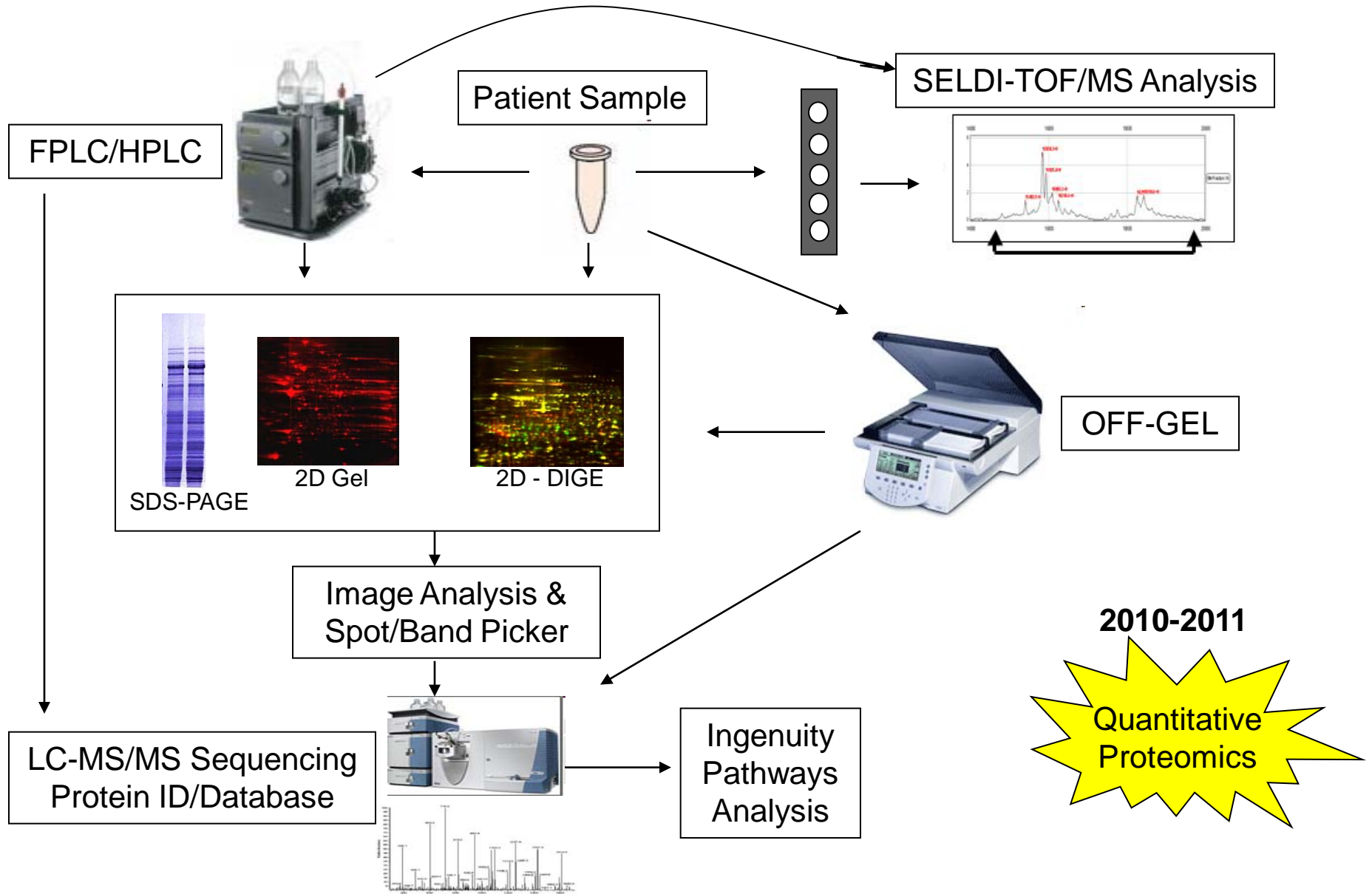
Model, analyze and understand complex biological and chemical systems



How does it works?

- Services provided by fee and/or collaboration:
 - Publications
 - Trainings
 - Dr Howard Gendelman / Dr Pawel Ciborowski, Univ. of Nebraska Medical Center: iTRAQ
 - Dr Philip Andrews, Univ. of Michigan: REDOX, phosphoproteomics
 - R01 MPI Grant writing, co-investigation with Dr Pérez-Laspiur
 - PILOTS Projects
 - Young scientists with proteomics background

Proteomics Workflow



Users of 2010

Investigator	Personnel	Research area	Funds	Percent of proteomics In each project
Baerga, A BCH SoM	Grad student & Core	Enzymology	R03	10% SELDI-TOF, MS
Barreto, J Anatomy SoM	Core	Neuroscience Alcohol abuse	RCMI Pilot	New pilot (50%) 2D-DIGE, MS
Espino, A Micro SoM	Grad student & Core	Parasitology	RCMI Pilot	New pilot (50%) 2D-DIGE, MS
Segarra, A Physiology SoM	Post-doc & Core	Neuroscience Cocaine abuse	U54	R01 writing x 2011 (75%) 2D-DIGE, MS
Meléndez, L	Post-doc & Core	NeuroAIDS	R01	10% 2D-DIGE, SILAC, MS

Investigator	Personnel	Research area	Funds	Percent of proteomics In each project
Sosa, M Anatomy SoM	Grad student & Core	Neuroscience Behavior	RCMI Pilot	75% + New pilot (50%) SELDI-TOF, 2D-DIGE, MS
Irizarry, M Med Tec Health Allied	Core	Prostate Cancer	S06	100% SELDI-TOF, 2D-DIGE, MS
Vivas, P Cancer Center and BHC SoM	Core	Blood Cancer	RCMI Pilot	10% + New pilot MS

Workshops and Trainings Offered in the past year

Personnel	Training
All Core personnel	<i>Proteomics Workshop</i> in collaboration with Dr. Carlos Torres to 20 Faculty members of undergraduate institutions. June 20-25, 2009.
Dr Carmela Jaravata	<i>IPA Workshop</i> to 15 Faculty from undergraduate institutions in collaboration with INBRE (IDeA Networks of Biomedical Research Excellence). March 9-10, 2010
All Core personnel & Dr Roberto Diez	<i>2D-DIGE and IPA Workshop</i> to 18 Faculty from UPR-RCM and other undergraduate institutions in collaboration with INBRE. May17-20 2010
Dr. Juliana Pérez-Laspiur	<i>Mass Spectrometry Analysis</i> training to Dr. Linda Rodríguez resulted JNIP published abstract presentation and F32 proposal in preparation.

Workshops and Trainings Received in 2010

Personnel	Training
Bonnibel Delgado	<i>Introduction to 2D-DIGE</i> (December – January, 2010)
All core	<i>Ingenuity Pathway Analysis</i> software with Dr Carmela Jaravata (March 9-10, 2010)
Dr. Pérez Laspiur	<i>Phosphoproteomics and REDOX</i> proteomics with Dr Philip Andrews in May, 2010
Bonnibel Delgado	<i>iTRAQ</i> at UNMC (June 8-18, 2010)
Bonnibel Delgado Elaine Rodríguez	<i>Clinical Proteomics and Biomarker Discovery</i> (BioTRAC course at NIH, June 20-26, 2010)

Presentations

Presenter	Title	Meeting	Date	Location
Nietzell Vázquez	Differential Expression of Proteins in the Brain of the Freshwater Prawn in the Context of Dominance Hierarchies.	Society for Neuroscience	Oct 2009	Chicago
Linda Rodríguez, PhD	Cystatin B associates with proteins related with HIV replication.	SNIP (Published Abstract JNIP)	April, 2010	Los Angeles
Stephanie Kraft-Terry	Monocytes from HIV-1 infected Hispanic women with cognitive impairment show a unique proteomic signature.	Midwest Student Biomedical Research Forum (oral presentation)	Feb 2010	Omaha
Eillen Rodríguez	Late HIV Infection Modulates the Expression and Activity of Cathepsin B, and its Inhibitors in Macrophages: Implications Neuropathogenesis.	HIV and Emerging Diseases	March 2010	France
Loyda Meléndez, PhD	Clinical Proteomics Discovery Core Facility at University of Puerto Rico Medical Sciences Campus provides new resources for the Advancement of Biomedical Research Excellence.	INBRE	June 2010	Washington DC
Margarita Irizarry, PhD	Biomarkers of Prostate Cancer in a Hispanic Population	Prostate Cancer	June 2010	Germany

Publications

Manuscripts	Citations
Kraft-Terry S, Gerena Y, Wojna V, Plaud-Valentin M, Rodríguez Y, Ciborowski P, Mayo R, Skolasky R, Gendelman HE, Melendez LM . 2010. Proteomics analysis of monocytes from Hispanic women with HIV-associated dementia show depressed antioxidants. <i>J. Proteomics and Clinical Applications</i> .	In press
Peters J, Dieppa-Perea L, Meléndez LM , Quirk GJ. 2010. Induction of fear extinction with hippocampus infralimbic BDNF. <i>Science</i> 328:1288-1290.	PMID: 20522777
García, K, Cadilla C, and Meléndez L . 2010. Restricted HIV-1 replication in placental macrophages is caused by inefficient viral transcription. <i>J Leukocyte Biol.</i> 87(4):633-6.	PMID: 20042472
Luciano-Montalvo C and Meléndez, LM . 2009. Cystatin B Associates with signal transducer and activator of transcription-1 in monocyte-derived and placental macrophages. <i>Placenta</i> . 30(5):464-7	PMID: 19342095
García, K, García, V, Duan, F, Perez Laspiur J, Meléndez, L.M. 2009. Characterization of the placental macrophage secretome: Implications for antiviral activity. <i>Placenta</i> 30: 149-155.	PMID: 19070362
Velázquez I, Plaud M, Pérez-Laspiur J , Skolasky R, Wojna V and Meléndez LM . 2009. Antioxidant enzyme dysfunction in monocytes and CSF of Hispanic women with HIV-associated cognitive impairment. <i>J Neuroimmunol</i> 209:206-211.	PMID: 19101040
Toro Nieves D (mentee), Ciborowski P, Duan F, Pérez Laspiur J , Wojna V, Gendelman, HE, and Meléndez LM . 2008. Proteomic analyses of monocyte-derived macrophages infected with human immunodeficiency virus type 1 primary isolates from Hispanic women with and without cognitive impairment. <i>J. Neurovirology</i> 15:36-50.	PMID: 19115125

Publications

Manuscripts	Citations
Luciano-Montalvo C, Ciborowski P, Duan F, Gendelman HE, Meléndez LM . 2008. Proteomic analyses associate cystatin B with restricted HIV-1 replication in placental macrophages. <i>Placenta</i> 29(12):1016-23.	PMID: 18951626
Rozek, W, Ricardo-Dukelow M, Holloway S, Wojna V, Melendez LM , and Ciborowski P. 2007. Cerebrospinal fluid proteomic profiling of HIV-1-infected patients with cognitive impairment. <i>J Proteome Research</i> 6(11):4189-99.	PMID: 17929958
Toro Nieves D, Plaud, M, Wojna V, Skolasky R, Meléndez LM . 2007. Characterization of peripheral blood human immunodeficiency virus isolates from Hispanic women with cognitive impairment <i>J NeuroVirology</i> 13(4):315-327.	PMID: 17849315
Pérez Laspiur J , Anderson E, Ciborowski, P, Wojna V, Plaud-Valentin, M., Rodriguez, E., Duan F., Wojna V, Mayo R, Rodríguez-Orengo J, Gendelman HE, and Meléndez LM . 2007. CSF proteomic fingerprints for HIV-associated cognitive impairment. <i>J. Neuroimmunol.</i> 92(1-2):157-70.	PMID: 17950469
Toro Nieves D, Plaud, M, Wojna V, Skolasky R, Meléndez LM . 2007. Characterization of peripheral blood human immunodeficiency virus isolates from Hispanic women with cognitive impairment <i>J NeuroVirology</i> 13(4):315-327.	PMID: 17849315
Wojna V, Skolasky RL, Hechavarría R, Mayo R, Selnes O, McArthur JC, Meléndez LM , Maldonado E, Zorrilla CD, García H, Kraiselburd E, Nath A. 2006. Prevalence of human immunodeficiency virus-associated cognitive impairment in a group of Hispanic women at risk for neurological impairment. <i>J NeuroVirol</i> 2(5): 356-364	PMID: 17065128

Plans for Next Year

- Move to new Molecular Sciences Building.
- Add quantitative high throughput proteomics to the core (SILAC, iCAT, iTRAQ).
- Collaborate with UNMC for SILAC and MALDI-TOF on HIV macrophage lysates.
- Collaborate with Univ. Michigan for Orbitrap and analysis for drug abuse.
- Provide a workshop for Pharmaceuticals Industry (Merck, Amgen).



The word "PROTEOMICS" is rendered in a bold, sans-serif font. Each letter is filled with a different color from a rainbow spectrum, starting with purple for 'P', followed by pink, red, orange, yellow, green, teal, blue, and ending with purple for 'S'. A soft, grey shadow is cast to the left of the letters, giving the text a three-dimensional appearance.

**IS THE NEW "TREND"
FOR CLINICAL AND
BIOMEDICAL RESEARCH**



Culebra, Puerto Rico