Department of Pharmacology and Toxicology

School of Medicine
Medical Sciences Campus
University of Puerto Rico
What is Pharmacology?

- Pharmacology is the science that studies how drugs, toxic substances and endogenous substances exert their effects on living systems.
A synthesis of several biomedical sciences....

Pharmacology

Physiology  Biochemistry

Chemistry  Medicine

...but unique in its own right
What is Toxicology?

- The study of the adverse or toxic effects of drugs and other chemical agents.
- It is concerned not only with drugs used in the treatment of disease, but also with chemicals that may present household, environmental, or industrial hazards.
What Pharmacologists do?

- Determine the effects of chemical agents upon subcellular mechanisms
- Deal with the potential hazards of pesticides and herbicides
- Focus on the treatment and prevention of major diseases by drug therapy
- Molecular modeling of drugs
- The use of drugs as tools to dissect aspects of cell function
Graduate Program Information

**M.S. Degree**
- 24 course credits
  - Biochemistry
  - Physiology
  - Pharmacology
  - Biostatistics
  - Seminars
  - Lab Rotations
  - Electives
- 6 credits of thesis

**Ph.D. Degree**
- 45 course credits
- 15 credits of thesis
- Comprehensive qualifying examination
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<th>Year 1</th>
<th>Year 2</th>
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<tr>
<td><strong>Fall</strong></td>
<td>Biochemistry, Physiology, Biostatistics, Seminar</td>
<td>Systemic Pharmacology, Electives, Seminar</td>
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<tr>
<td><strong>Spring</strong></td>
<td>Physiology, Introductory Pharmacology, Research rotations, Seminar</td>
<td>Systemic Pharmacology, Electives, Seminar</td>
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<td><strong>Year 3</strong></td>
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<td><strong>Fall</strong></td>
<td>Thesis Proposals (MS, PhD)</td>
<td>Research, Seminar</td>
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<td>Comprehensive Exam (Ph.D), Seminar</td>
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<td><strong>Spring</strong></td>
<td>Thesis research, Seminar</td>
<td>Research, Seminar, Dissertation</td>
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Graduate Faculty and Research Interests
Walmor C. De Mello, M.D., Ph.D.
Chairperson and Professor
Ph.D. 1964, Federal University, Rio de Janeiro
and University College, London

- Cardiovascular Pharmacology
  - Renin-angiotensin system
- Cellular and molecular mechanisms related to cardiac disease
- How different drugs alter these mechanisms
Adriana Báez, Ph.D.  
Professor  
Universidad Autónoma de Madrid

- Research interest address the molecular, epidemiological, and clinical characteristics of head and neck cancer in Puerto Ricans
- Research Director in the Otolaryngology – Head and Neck Surgery Department
Emma Fernández-Repollet, Ph.D.
Professor
Ph.D. 1979, University of Puerto Rico

• Expression of the insulin receptor in diabetes
• Methodologies and Techniques
  – Two, three and four color immunophenotyping
  – Cell culture methodologies
  – Quantitative flow cytometry
  – Microinjection techniques
  – Microscopy and Molecular Biology
Sylvette Ayala-Torres, Ph.D.
Assistant Professor
Ph.D. 1998, University of Texas Medical Branch

• Mitochondrial DNA repair and degenerative diseases
  • Aging
  • Huntington’s disease
  • Cancer
  • Autoimmune diseases
  • Therapeutic interventions
Philip Specht, Ph.D.
Professor
Ph.D. 1972, SUNY

• Computer simulations of pharmacokinetic mechanisms of drug interactions

• Computer simulations of infectious disease propagation, including Dengue in Puerto Rico
José G. Ortiz, Ph.D.
Professor
Ph.D. 1982, University of Connecticut

- Mechanisms of action of the pharmacological effects of Valeriana root extracts
- Interactions between Valeriana root extracts and the glutamate receptors
Diógenes Herreño, Ph.D.  
Professor  
Ph.D. 1986, Universidad de Puerto Rico

- Chemical carcinogenesis of aromatic polycyclic hydrocarbons, aromatic amines
- Identification and characterization of biomarkers
- Genetic toxicology of natural products
Susan Corey, Ph.D.
Associate Professor
Ph.D. 1973, SUNY

- Modulation of Na Pump activity
  - Molecular biology
  - Electrophysiology of pumps expressed in Xenopus oocytes
- CYP2D6 polymorphisms in Puerto Ricans
  - Microarray technology
Some techniques used by researchers in the Pharmacology and Toxicology Department

Cell Culture

Electrophysiology
Behavioral and Motor Performance Studies
Career Opportunities

- Research and Academia
- Governmental positions
  - FDA, EPA, CDC
- Administrative positions in government
- Industry
For further information:

• Department of Pharmacology and Toxicology
  (787) 766-4441

• Graduate Coordinator
  (787) 758-2525
  Ext. 1374