

PHRM-525S
Drug Discovery and Development I
3.0 Credits

Course Directors:

Paul McGonigle, Ph.D., Professor, Dept. of Pharmacology and Physiology

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Course Description

This course, the first of a two part series, will provide in-depth exposure to the concepts, processes and disciplines involved in the preclinical stage of drug discovery and development as practiced in the biopharmaceutical industry. It covers all facets of the process ranging from target identification through to the submission of the Investigational New Drug (IND) application. Discussion of unmet medical needs and case histories will also be included.

Course Purpose and Goals

This course provides a detailed introduction to the field of drug discovery and a comprehensive overview of the multidisciplinary nature of the preclinical drug discovery process. Topics range from initial Target Identification to High Throughput Screening, Medicinal Chemistry, Metabolism and Toxicology. In addition to faculty from the College of Medicine with extensive drug discovery experience, there are currently 15 external scientists and executives from various organizations including Bristol-Myers Squibb, Autism Speaks, NIH, Agene Bio, Merck, AstraZeneca, and Janssen who lecture in this course. Needless to say, in addition to receiving training from leaders in their respective fields, students also have an excellent opportunity to network with industry professionals. The course also focuses on professional skills development, with an emphasis on written communications, oral presentations and team projects designed to simulate an industrial environment. Students have the opportunity to work in project teams and visit imaging and high throughput screening facilities at local pharmaceutical companies. This course introduces the students to several career opportunities that are unique to the field including: High Throughput Screening, Medicinal Chemistry, Cheminformatics, Computer Aided Drug Design, Pharmaceutical Profiling, Pharmacokinetics, Drug Metabolism, Program Management, Biomarker Development, and Pharmacogenomics.

Recommended Textbooks

Drug Discovery and Development,
Technology in Transition, 2nd Edition
R.G Hill and H.P. Rang ed., 2013
ISBN: 978-0-7020-4299-7
Paperback, Kindle

Drug Discovery and Development,
1st Edition
B. Blass, 2015
ISBN: 978-0124115088
Format: Paperback, Kindle

Lecture Schedule

Lecture #	Topic
1	Course Overview & Objectives
2	Historical Perspectives: The Evolution of Drug Discovery
3	Current Perspective: Pharmaceutical Research & Development
4	The Discovery, Development and Approval Process
5	Target-Based Drug Discovery: Identification, Validation & Selection
6	High Throughput Screening: Sample Libraries & Hit Identification
7	Medicinal Chemistry and Structure-Activity Relationships
8	Case Studies in Medicinal Chemistry
9	Computer-Aided Drug Design
10	Lead Identification and Optimization
11	Student Presentations
12	Pharmaceutical Profiling
13	Quantitative Systems Pharmacology
14	In Vivo Model Systems
15	Predictive Utility of Animal Models
16	Safety and Toxicology
17	Project Team Formation
18	Pharmacogenetics and Pharmacogenomics
19	The Investigational New Drug Application
20	Case Study in Drug Discovery: Modafinil
21	Vaccines and Vaccine Development
22	Biologic Therapeutics
23	Peptide Therapeutics
24	Academic Drug Discovery
25	Project Team Presentations
26	Round Table Discussion

Participating Faculty

James Barrett, Ph.D.

Professor, Pharmacology and Physiology
Drexel University College of Medicine

Adeboye Adajare, Ph.D.

Professor, Pharmaceutical Sciences
University of the Sciences in Philadelphia

Robert Ring, Ph.D.

Chief Scientific Officer
Autism Speaks

Rodney Bednar, Ph.D.

Director, Drug Discovery and Automation
Pennsylvania Drug Discovery Institute

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Professor, Pharmacology and Physiology
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Sandhya Kortagere, Ph.D.

Assoc. Professor, Microbiology and Immunology
Drexel University College of Medicine

Brian Murphy, Ph.D.

Senior Principal Scientist
Bristol-Myers Squibb

Lisa Aimone, Ph.D.

Senior Research Scientist
Teva Pharmaceuticals

Debbie Cooper, Ph.D.

Consultant
Formerly: Wyeth, Pfizer Cephalon

Michele Kutzler, Ph.D.

Associate Professor of Medicine
Drexel University College of Medicine

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Janssen Pharmaceuticals

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Cephalon, Inc.

David Stone, Ph.D.

Senior Principal Scientist
Merck Research

Michael Derelanko, Ph.D.

Senior Toxicology Manager
Critical Path Services, Inc.

Sharon Rosenzweig-Lipson, Ph.D.

Vice President, Research & Development
AgeneBio