

Spring 2015

The George Washington University

Department of Pharmacology and Physiology

Course: PHAR 6116 – Pharmacogenomics and Personalized Medicine (3 Credits)
Tuesdays 2:30-5:30 PM in Ross Hall 643

Description

Relationships between human genetic variability and drug responsiveness, susceptibility to disease, and disease severity. Scientific, clinical, legal, and ethical challenges in applying pharmacogenomics to drug discovery and clinical development. Professionals from such disciplines as human genetics, pharmacology, pharmaceutical sciences, genomic medicine, clinical and translational sciences, law, and regulatory affairs provide an integrative view of the application of pharmacogenomics to personalized medicine. Restricted to Graduate students enrolled in the Biomedical Sciences Program or Year 2 of the Anatomical and Translational Sciences Program; Instructor permission required.

Prerequisites: PHAR 6205. Students who have not completed PHAR 6205 or its equivalent are required to complete a pharmacology preparatory primer prior to the start of PHAR 6116; Equivalency will be determined by the instructor; The primer provides foundational concepts of drug biodisposition, dose response, and pharmacodynamics.

Course Learning Objectives:

At the end of the course the student will be able to:

1. Describe the basic principles of genetic inheritance and variability in humans.
2. Explain the major techniques for investigating human genetic variability
3. Describe how human genetic variability can impact drug action
4. Define genetic biomarkers and explain how they are incorporated into drug development and monitoring
5. Explain the ethical, social and legal implications surrounding the clinical application of pharmacogenomic biomarkers
6. Critically analyze data from a genetic study.

Teaching/Learning Strategies

Readings from handouts, internet resources, and articles from relevant professional journals. Class discussions revolving around case studies and didactic material. Oral presentation and written assignment.

Calculation of the final grade

Task	Worth
Examinations	90%
Genotype Paper	10%
Total	100%

Session (Tues, 2-5P)	Topic**	Lecturer
1/12	Introduction to Pharmacogenomics (PGx) Personalized Medicine Human Genetic Variability	Dr. O'Brien
1/19	Analysis of Human Genetic Variability	Drs. O'Brien and Manzini
1/26	Human Genetic Variability: P450 Enzymes & Drug Transporters	Drs. Harralson and O'Brien
2/2	Clinical Applications of Genetics	Drs. Harralson and O'Brien
2/9	Exam 1 (1/12-2/2) *	
2/16	Population Genomics and Pharmacology (1.5h) Biomarker Development and Validation(1.5h)	Dr. Goodsaid (webinar) Dr. Goodsaid (webinar)
2/23	Toxicogenomics	Dr. Harrouk - FDA
3/1	PGx Application: Cancer Chemotherapy	Dr. Lee
3/8	Exam 2 (2/16-3/1)	
3/15	Spring Break!!!	
3/22	Genetic Counseling and Ethics	Dr. Schwartz and Prof. Callier
3/29	Genetics of Rare Disease and Targeted Drug Development	Dr. Manzini
4/5	Class discussion of genotype study data with cases	Drs. O'Brien/Harralson/Tuck
4/12	Personalized Medicine I	Dr. Pritchard - PMC
4/19	Personalized Medicine II	Dr. Clark - HHS
5/3	Exam 3 (3/22-4/19)	

* Genotype sample collection

**Session learning objectives will be provided with each session's materials.

Spring 2015

Genotyping Project

As a part of the course, we will be offering students and faculty the opportunity to be genotyped for SNPs in the *CYP2D6* gene (GWUMC IRB# 120626). Samples (buccal swipes) are scheduled to be collected sometime in February, analyzed and the data discussed on April 5th. STUDENTS WILL NOT BE REQUIRED TO SUBMIT SAMPLES AS PART OF THEIR GRADE AND INFORMED CONSENT WILL BE OBTAINED FROM ALL PARTICIPANTS. Dr. O'Brien will not have any knowledge as to the identity of the individuals who did/did not participate in the study. All samples will be labeled with an anonymous identification number.

Textbooks and other materials (Supplemental Reading)

There is no required textbook for this course. The major content of the course will be presented in lecture and/or handouts. Each handout will provide a list of learning objectives as well as a drug list of the specific pharmacologic agents that students are expected to know. There are many textbooks of pharmacology available. We recommend either "Basic and Clinical Pharmacology" by Katzung (13th edition, 2014) and/or Goodman and Gilman's the "Pharmacological Basis of Therapeutics" (11th edition, 2011) as suitable texts for the pharmacological concepts covered in this course. The books are available on the GWUMC library website (<http://libguides.gwumc.edu/content.php?pid=60105&sid=441899>).

Blackboard

Pharmacology 6116 materials are also available through the Blackboard portal. Lecture notes and slides for each week's material will be posted as soon as possible. To log onto Blackboard, you must have registered for the course and have a gwu email address.

Examinations

Students must seek approval for any planned missed examinations within the first week of class. A student who misses an exam and provides an excuse acceptable to the course coordinator will be allowed to take a make-up exam at a time designated by the course coordinator. Missing an exam without an accepted excuse will result in a grade of zero for that exam.

Honor Policy Academic Misconduct

Academic Dishonesty will not be tolerated. Faculty is obligated to report suspicions of violations to the Student honor code to the appropriate Academic Committees. Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and fabrication of information. Academic dishonesty includes giving, receiving, or using unauthorized aid on academic work. Again any student suspected of cheating or plagiarism will be reported. For a review of the University's code of misconduct please go to <http://www.gwu.edu/~ntegrity/code.html>.

Course Director:

Travis J. O'Brien, Ph.D., M.Ed.

Ross Hall, Room 660A

202-994-3373

phmtjo@gwu.edu