PCEUT 502
DRUG DISPOSITION SCIENCE

Autumn Quarter, 2019 (2 credits)
Lectures: M, W (8:30-9:20), H-074

Course Organizer
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543-0819
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### Schedule

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<th>Course Topic</th>
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<td>Drug Metabolism Processes – Phase 1</td>
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<td>Drug Metabolism Processes – Phase 2</td>
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<td>Transport Kinetics – Experimental Design</td>
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<td>EK</td>
<td>Isolation of Nucleic Acids, Quantitation and QC</td>
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<td>DMET Genotyping Methods</td>
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<td>DMET Variation – mRNA Quantitation <em>(take home-3)</em></td>
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<td>Rigor &amp; Reproducibility – Hypothesis Testing and p-Values</td>
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<td>Rigor &amp; Reproducibility – Research Integrity <em>(take home-4)</em></td>
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6/9-12 NI/KT **Exam-2** *(finals week; 10/25 – 12/6 material)*

### Instructors

**KT**, Ken Thummel, Pharmaceutics, H272M, Thummel@uw.edu

**EK**, Ed Kelly, Pharmaceutics, H272K, edkelly@uw.edu

**NI**, Nina Isoherranen, Pharmaceutics, H272N, ni2@uw.edu

**LC**, Lindsay Czuba, Pharmaceutics, H-253/251, lczuba@uw.edu

**LS**, Laura Shireman, Pharmaceutics, 4225 Roosevelt, Rm 305B, shireman@uw.edu

### Teaching Assistant

None
Course Goals:
The goals of the course are to provide the student with:
- Basic understanding of drug metabolism and transport (DMET) processes
- Detailed understanding of subcellular fractionation methods for isolation of in vitro kinetic systems
- Detailed understanding of in vitro experimental design for generating kinetic data
- Concepts relating Michaelis-Menten kinetics describing in vitro enzyme-catalyzed biotransformation and transport processes to pharmacokinetic principles, including in vivo drug clearance
- Mechanisms of DMET inhibition and induction and associated kinetic theories
- An understanding of methods for isolating and characterizing nucleic acids and proteins
- An understanding of common DMET genotype – activity phenotype relationships
- Principles underlying experimental rigor and reproducibility

Learning Objectives:
1. To describe metabolic and transport processes governing drug disposition
2. To understand basic models of drug biotransformation and transport
3. To understand how enzymatic and transport processes affect drug intrinsic clearance
4. To describe various perturbations of enzyme function or expression (DDIs, genetics) and how this translates into changes in intrinsic clearance
5. To understand the scientific method, hypothesis testing and the difference between objective vs subjective science
6. To understand and embrace research integrity

Performance Objectives:
Upon completing the course, the student should be able to:
1. Develop in vitro experimental designs to determine kinetic parameters that define metabolic and transport drug disposition
2. Use GraphPad to calculate in vitro kinetic parameters, including inhibition constants
3. Read and understand the literature pertaining to mechanisms of inter-individual variability in drug disposition kinetics, including drug-drug interactions and pharmacogenetics
4. Conduct research in a rigorous, reproducible and responsible manner

Text References: (Not required)

Performance Evaluation:
Grades for the course will be assigned based on your take-home lab exercise performances and two written, in-class exams.

- Take-home assignments (4 labs; 10% each) 40%
- Written exams (2 exams; 30% each) 60%
Office Hours:
Arranged by each faculty member.

Accommodations:
If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz, 543-8924 (V/TTD). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to the instructors so we can discuss the accommodations you might need for the class.

Religious Accommodations:
Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW’s policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy. Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form."