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Fall 9-1-2001

### PHAR 432.01: Biopharmaceutics and Pharmacokinetics

Todd G. Cochran

*University of Montana - Missoula*

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## Biopharmaceutics and Pharmacokinetics

Pharmacy 432  
Fall 2001  
3 credits

Todd Cochran  
SB242  
W: 243-4941; H: 728-2925  
tcochran@selway.umn.edu

Class	T,Th	10:10-11:00 am	SB 117
Conference	M,T, or Th	1:10-3:00	SB 113
Exams	Four Fridays	1:10-3:30 pm	SB 114
Format	28 classes, 11 conferences, 4 exams, final exam		

### Course Description: Biopharmaceutics and Pharmacokinetics

Biopharmaceutics: Drug absorption, bioavailability, and drug product selection  
Pharmacokinetics: The rates of drug absorption, distribution, metabolism, and excretion

### Course Goals: The goals of this course are to provide the student with:

1. An understanding of the fundamental concepts of pharmacokinetics in humans
2. Skills in the application of pharmacokinetics in dosage regimen design and therapeutic drug monitoring
3. Knowledge about the application of biopharmaceutics in drug product use and selection

**Course Objective:** At the end of this course you will be able to design and adjust a patient's drug dosage regimen to keep the plasma/serum concentration of the drug within a desired therapeutic range. Along the way, you will gain an understanding of the principles of the ADME of a drug, and how these apply to the optimum utilization of a drug in a patient. The course is designed for you to gain the knowledge and skills to apply biopharmaceutics and pharmacokinetics principles in pharmaceutical care.

### Required Materials:

1. Faculty Packs: Lecture Notes on Pharmacokinetics; Biopharmaceutics
2. A calculator with natural log (ln) and exponent (e) functions
3. Approximately 30 sheets of 2 or 3 cycle semilog graph paper (photocopy OK)
4. Approximately 10 sheets of linear graph paper
5. Straight edge

<b>Course Outline:</b>	<u>Class</u>	<u>Conf</u>	<u>FacPac Pages</u>	<u>Study Problems</u>
<b>Pharmacokinetics</b>				
Review of zero and first order kinetics	Sep 4	Sep 10,11,13	1-12	Kinetics 1-6
Introduction to Pharmacokinetics	Sep 6		13-15, 111	
Intravenous Bolus Injection	Sep 12#	Sep 17,18,20	16-18	
# Kinetics (432) will meet Wed 9/12 @ 9:10 in SB117. Therapeutics (451) will meet Tue Sept 11 @ 10:10 in SB117				
Intravenous Infusion	Sep 13	Sep 24,25,27	19-24, 112	
Loading Dose, Clearance	Sep 18		25-29, 113	
Dosage Regimen Adjustment	Sep 18		30-32, 108-110	
<b>Exam 1 Fri Sep 28</b> 1:10-3:30 pm				1-18
Cytochrome P450 enzymes	Sep 20			
Oral Administration	Sep 25,27	Oct 1,2,4	33-39, 114	
Multicompartment Models	Oct 2	Oct 8,9,11	40-45, 115-117	
Method of Residuals	Oct 4	Oct 15,16,18	46-51	
Repetitive Drug Administration	Oct 9		52-53	
<b>Exam 2 Fri Oct 19</b> 1:10-3:30 pm (Thurs Oct 18 6:30-9:00 pm for ASP trippers)				19-31B
Repetitive IV Dosing	Oct 11,16,18	Oct 22,23,25	54-64	
Repetitive Oral Dosing, Loading Dose	Oct 23		65-70	
Repetitive IV Infusion	Oct 25	Oct 29,30,1	71-82	
Dosage Regimen Design & Adjustment	Oct 30	Nov 5,6,8	83-87, 118	
<b>Exam 3 Fri Nov 9</b> 1:10-3:30 pm				31C-57
	<u>Class</u>	<u>Conf</u>	<u>FacPac</u>	<u>Probs</u>
Creatinine Clearance	Nov 1		88, 119	

Dosage Adjustment in Renal Disease	Nov 6,8	Nov 26,27,29	89-95	
Nonlinear Pharmacokinetics	Nov 13		96-100	
Salt Factor	Nov 13		101	
Clearance Concepts: Physiologic Models	Nov 15		102-106	
Bayesian Pharmacokinetics	Nov 15			
<b>Exam 4 Fri Nov 30</b>	1:10-3:30 pm		120-123	58-72

### **Biopharmaceutics**

Pharmacokinetics of Drug Interactions	Nov 27	Dec 3,4,6
p-Glycoprotein	Nov 29	
Factors Affecting Drug Absorption	Dec 4, 6	
Bioavailability and Bioequivalence	Dec 11	
Drug Product Selection; Course Eval	Dec 13	

**Final Exam Monday Dec 17, 8:00-10:00 am**

### **Grading:**

Four mid-semester exams @ 50 points	200 points	80%
Final exam (not cumulative)	50 points	20%
Total:	250 points	

Bonus points: The four mid-semester exams will have 5 bonus points on each exam.

Bonus point questions will be taken from literature articles distributed before each exam.

Approximate grading scale: A = 90%, B = 80%, C = 70%, D = 65%

### **Course Policies:**

Students are expected to take all exams at the scheduled time. If you cannot take an exam at the scheduled time, you must contact Todd Cochran or leave a message with a pharmacy secretary (Erika Claxton @ 4621 or Beverly Brooks @ 4765) no later than noon of the day of the exam. Exams normally must be made up within three class days.

If you have questions regarding the grading of your exam, please make an appointment with Todd Cochran to review your exam. Appointments must be scheduled **within 10 days** following the return of your exam. After that time, adjustment of grades will not be made. You are encouraged to review the posted exam key before your appointment.

**Online Materials:** Course handouts that are Word documents will be placed on the School's server at: Network Neighborhood, Skaggs-03, PharmSci, P2, 432  
These files can be accessed and printed in the School's Computer Lab.

**Help Sessions:** Wednesdays at 2:10 pm, SB114: Sept 26, Oct 17, Nov 7, Nov 28

**Days off:** The following classes will not be held in lieu of the four Friday exams.  
Class: Tues Nov 20  
Conference: Weeks of Sept 3, Nov 12, Nov 19, Dec 10

**Office Hours:** W 2-5 pm; Other hours by appointment.