

PHCL 461 - BASIC PHARMACOKINETIC (2+0)

Prereq: PHT-252

Course Description

This course is designed to introduce the student to the changes in the drug's absorption, distribution and elimination with time. One and two compartment models after different route of administration will be discussed with their applications.

Course Objectives

Upon the completion of the course students will be able to:

1. Understand the basic pharmacokinetic principles.
2. Utilize these principles to determine certain pharmacokinetic parameters after various route of administration.
3. Interpret the changes in drug level in the body with time which lead to the impairment in its effect.

Course Contents

	<u>Allocated hours</u>
1. <u>Introduction</u>	
Complexity of the biological system	2
The need for compartmental models	
The concept of compartments	
2. <u>One-Compartment Model</u>	
a) <u>Intravenous Injection</u>	
- Drug levels in plasma and biological half-life.	1
- Apparent volume of distribution. Determination and applications.	1
- Area under the curve. Determination and applications.	1
- Urinary excretion data.	1
- Drug clearance. Determination and applications.	1
- Metabolites in plasma and urine.	1

- b) Intravenous Infusion 4
- Drug levels in plasma during infusion, steady state, (at anytime after stopping infusion) applications.
 - Relationship of elimination rate constant, half-life, drug clearance plasma level before and after steady-state levels.
 - Simultaneous rapid intravenous injection and infusion.
- c) Extravascular Drug Administration 2
- Drug level post extravascular administration from plasma data.
 - Area under the curve
 - Using urinary excretion data.
3. Two-Compartment Model 2
- a) Intravenous injection
- Drug levels in plasma and biological half-life.
 - Apparent volume of distribution. Determination and applications.
 - Drug levels in tissue compartment
 - Area under the curve. Determination and applications.
 - Urinary excretion data
 - Drug clearance. Determination and applications
- b) Intravenous infusion 2
- Drug levels in plasma during infusion, steady state, (at anytime after stopping infusion) applications.
 - Relationship of elimination rate constant, half-life, drug clearance plasma level before and after steady-state levels.
 - Simultaneous rapid intravenous injection and infusion.

4.	<u>Application of Pharmacokinetic in Bioavailability</u>	1
	- Calculate the absorbed fraction	
	- Calculate relative and absolute bioavailability	
	- Bioequivalence	
	- Using urinary excreted data	
5.	<u>Multiple Dose Therapy</u>	2
	- Calculate C_{\max} , C_{\min} and C_{av} .	
	- How to design therapy regimen.	
6.	<u>Dosage Adjustment in Renal Disorder</u>	2
	- Calculate creatinine clearance	
	- Methods of dosage adjustment	
7.	<u>Nonlinear Pharmacokinetics</u>	3
	- Saturated enzymatic elimination process	
	- Michaelis Mentin equation	
	- Determination of K_m , V_{\max}	
	Exam	2

