

SCS3170- Fate of Drugs in the Body: Fundamentals of Pharmacokinetics

Course Directors

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Textbooks

Required:

1. **Basic and Clinical Pharmacology** (12th Edition) by Katzung, Masters, Trevor.
ISBN 978-0-07-176401-8
2. For students without a background in Physiology:
Principles of Human Physiology (5th Edition) by Cindy Stanfield.
ISBN 13: 978-0-321-81934-5

Evaluation

Discussion Board Participation	ongoing	10%
Assignments	twice	20%
Online quizzes	ongoing	20%
Final (cumulative)	TBA	<u>50%</u>
Total		100%

Blackboard Access: go to <https://portal.utoronto.ca/> or click on the Portal button at the top right of the UofT homepage: <http://www.utoronto.ca/>

Pharmacokinetics is a core competency in pharmacology and an essential component of clinical research. This course is designed to give you the fundamentals, with ample opportunity to practise your skills. Whether this is your first time learning pharmacokinetics, or you want to refresh your knowledge, the clarity of the lectures and the interactions with the internationally renowned U of T faculty will help you advance your skills. New employees in contract research organizations, pharmaceutical companies and consulting agencies will especially benefit. This course clearly explains the guiding principles of pharmacokinetics – the absorption, distribution, metabolism and elimination of drugs in the body.

Course material will be evaluated through interactive participation on discussion boards, on-line quizzes, problem based case studies including introductory pharmacokinetic calculations and a final exam. Although there are no formal pre-requisites for this course, good standing in a human biology course at the senior secondary or introductory university level is highly recommended. You can take this course as a stand-alone option, or as the first part of our three-part series "Pharmacology: Principles and Clinical Applications".

Lecture Objectives and Course Goals

Students who successfully complete this course will have gained:

- Gain the fundamentals of pharmacokinetics at a comfortable pace through over twenty lectures, vignettes and interviews.
- The ability to apply and integrate this information to better understand clinical use and limitations of drugs

More specifically students will be able to:

- Understand what is considered a drug and how drugs may be found in nature or created by man
- Understand how the physiochemical structure of a compound can alter how it is absorbed, distributed and cleared by the body
- Appreciate how the route of administration is designed to take into account both the drug's physiochemical properties and the body's physiology to ensure that therapeutic concentrations reach targeted sites of action
- Describe how physiological processes (protein binding, ionization) can change a drug's kinetic profile in the body (i.e. absorption and distribution)
- Recognize how properties of a compound can alter its bioavailability (plasma concentration) and how this relates to a drug's measure of clinical effectiveness
- Understand and explain how drugs are biotransformed and eliminated by the body, focusing on both renal and hepatic clearance.
- Understand and explain the different enzymatic processes that are involved in drug metabolism, especially in the liver, and how drug metabolism may alter route of administration, dosing and clinical effectiveness
- Apply pharmacokinetic principles (absorption, distribution, clearance) to better understand drug dosing through pharmacokinetic calculations
- Through examples appreciate the use of drugs in the clinical setting
- Communicate a better understanding of how drugs interact with the body
- Appreciate how genetics, disease and multiple drug therapy play a role in an individual's drug response

Summary Lecture Schedule

Lectures	Instructor
L1: Introduction to the course	Drs Arnot & Laposa
L2: Introduction to Pharmacology	Dr Ross
L3: What is a drug	Dr Ross
L4: Drugs as molecules	Dr Ross
L5: Overview: Pharmacokinetic Principles and Physiological Concepts	Dr Burnham
L6: Route of Administration	Dr Burnham
V1: Formulations	Dr Shear
L7: Mechanisms of Drug Absorption	Dr Burnham
L8: Drug Distribution I	Dr Burnham
L9: Drug Distribution II	Dr Burnham
L10: Intro to Clearance and Biotransformation	Dr Burnham
L11: Biotransformation I	Dr Burnham
L12: Biotransformation II	Dr Burnham
L13: Total Body Clearance	Dr Burnham
L14: Organ Clearance	Dr Burnham
L15: Clinical PK	Dr Burnham
V2: What is Clinical Pharmacology	Dr Shear
L16: Drug Variability	Dr Grant
L17: Pharmacogenetics	Dr Grant
Interview: Application of PGx,	
L18: Drug-Drug Interactions	Dr Grant
V3: Geriatric Pharmacology	Dr Shear
L19: Adverse Drug Reactions	Dr Grant
L20: Review	Dr Ross
FINAL EXAM: Organized by the School of Continuing Studies	

DISCLAIMER: This course is intended for non-University of Toronto students only. The course exclusions are: PCL201, PCL302, and from UTM BIO200/JBC201. Currently, this course cannot be applied towards any undergraduate degree offered by the University of Toronto.