香港中文大學(深圳)
The Chinese University of Hong Kong, Shenzhen

Course code	PHM3002
Course title (English)	Pharmacokinetics
Course title (Chinese)	药物代谢动力学
Units	2
Language of Instruction	English
Description (English)	This course provides students with an understanding of the absorption, distribution, metabolism, and excretion (ADME) of drugs within the body. The general principles of pharmacokinetic modeling will be introduced pertaining primarily to the processes of absorption and elimination of drugs. Importantly, students will learn about the application of pharmacokinetics in drug discovery, development, and application, such as therapeutic drug monitoring, dosage adjustment in special populations, and optimal drug therapy. Together with the course Principles of Pharmacology and Therapeutics (PHM2004) and a foundation of information assimilated in this course, students are able to specifically address the clinical choice and use of essential drugs in patients and the monitoring of their effects.
Description (Chinese)	本科探讨药物在体内的吸收、分布、代谢和排泄过程及机制，介绍药物代谢动力学模型在药物吸收和消除过程中的应用。学生将重点学习代谢动力学在药物发现、开发和应用方面的应用，包括治疗性药物监测、特殊人群的剂量调整和最佳药物治疗。协同本课程的基础知识以及《药理学和治疗学原理 PHM2004》所学，学生可以针对一般临床问题提出主要用药方案，并对药物的体内效应形成基本认知和判断。

Learning Outcomes

After completing the course, students should be able to:

- describe the fundamental processes of drug absorption, distribution, metabolism, and excretion (ADME);
- explain the general concepts and theories of pharmacokinetics regarding drug ADME;
- apply basic mathematical models to describe and predict drug pharmacokinetics;
- apply the knowledge of the factors affecting drug absorption, distribution, metabolism, and excretion;
- evaluate pharmacokinetic profile of drugs in special populations and clinical settings.

Indicative Teaching Plan

Week	Topic
	INTRODUCTION TO PHARMACOKINETICS
1	General principle of pharmacokinetics
1	Fundamental processes of drugs in the body
	DRUG ABSORPTION
2	Drug absorption I: routes of drug administration
2	Drug absorption II: drug transport mechanisms
3	Factors affecting drug absorption
	DRUG DISTRIBUTION
3	Drug distribution I: protein binding
4	Drug absorption II: drug transport mechanisms
4	Factors affecting drug absorption
	DRUG METABOLISM
5	Drug metabolism I: biotransformation pathways
5	Drug metabolism II: drug metabolizing enzymes
6	Factors affecting drug metabolism
	DRUG EXCRETION
6	Drug excretion I: renal drug excretion
7	Drug excretion II: non-renal drug excretion
7	Factors affecting drug excretion
7	Drug ADME
	PHARMACOKINETIC MODELS AND PARAMETERS
8	Compartmental & noncompartmental models I
8	Compartmental & noncompartmental models II
9	PK dosing models I
9	PK dosing models II
	BIOAVAILABILITY AND BIOEQUIVALENCE
10	Bioavailability and its clinical significance
10	Evaluation of bioequivalence
	THERAPEUTIC DRUG MONITORING AND DOSAGE ADJUSTMENT
11	Pharmacokinetic-pharmacodynamic models
11	Significance and principles of therapeutic drug monitoring
12	Drug interactions and their impact on pharmacokinetics
12	Dosage adjustment in special populations
	POPULATION PHARMACOKINETICS AND PHARMACOGENOMICS
13	Introduction to population pharmacokinetics
13	Pharmacogenomics and personalized medicine
14	Pharmacokinetic modeling and parameters