GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2017-2018

Pharmacokinetics (J000278)

Course size (nominal values; actual values may depend on programme)

Credits 4.0	Study time 120 h	Contact hrs	30.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	lecture	22.5 h
		seminar: coached exercises	7.5 h

Lecturers in academic year 2018-2019

Vermeulen, An	FW03	lecturer-in-charge

Offered in the following programmes in 2018-2019	crdts	offering
Bachelor of Science in Pharmaceutical Sciences	4	A

Teaching languages

Dutch

Keywords

Drug disposition: absorption, distribution, metabolism and excretion (elimination) of drugs (ADME), compartmental pharmacokinetic models, clearance, volume of distribution, non-linear kinetics, pharmacodynamics, PKPD modelling

Position of the course

Pharmacokinetics is the study of the time course of the concentration of a drug in the different parts of the organism. This time course can be described using mathematical models. The concentration is determined by time dependent processes, i.e. “ADME” processes or absorption, distribution, metabolism and excretion (elimination) of the drug. It is the aim that the student knows the mechanisms involved in these processes and the factors affecting them. In addition, the combination of pharmacokinetic (PK) and pharmacodynamic (PD) data will also be covered, i.e. the PKPD modelling, which enables to predict the time course of effects.

Contents

Part 1: Drug disposition
• Transport of drugs through cell membranes
• Absorption
• Distribution and plasma-protein binding
• Biotransformation and pharmacogenetics
• Renal and biliary excretion
Part 2: Pharmacokinetics
• Concentration-time relationships following different routes of administration
• Concentration-time relationships following single and multiple dosing
• Pharmacokinetic models: first order kinetics, one- and two-compartmental models
• Pharmacokinetic parameters such as half-life, volume of distribution, clearance, bioavailability, etc.

• Bio-equivalence of drugs
• Non-linear kinetics
• PKPD modelling
• Therapeutic drug monitoring (TDM)

Initial competences

Having successfully completed the course "human anatomy and general physiology", or having acquired the corresponding competencies in another way.

Final competences

1 To know the disposition of drugs in the body: absorption, distribution, metabolism and excretion (ADME processes)

2 To understand the pharmacokinetics of a drug, i.e. what the body does to the drug
3 To interpret drug concentration-time profiles
4 To know basic pharmacokinetic parameters: half-life, volume of distribution, clearance, bioavailability, etc.
5 To know pharmacokinetic models: first order kinetics, one- and two-compartmental models
6 To calculate the pharmacokinetic parameters of a drug
7 To calculate the dosage regimen of a drug using pharmacokinetic parameters
8 To understand dosage regimens and to adapt the dose in the individual patient as a function of age, disease, genetic variation (pharmacogenetics), drug interactions, etc.
9 To understand rational drug use, i.c. dosage and drug interactions
10 To interpret information leaflets/package inserts of drugs, i.c. pharmacokinetic properties, dosage and drug interactions

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, seminar: coached exercises

Extra information on the teaching methods

Lectures and seminars.
The seminars are coached exercises during which pharmacokinetic problems are solved. The students must initially try to solve the problem themselves or in close cooperation with other students, and during each seminar the solution is also given.

Learning materials and price

Syllabus, incl. exercises.
The answers of the exercises are offered via the electronic learning platform Minerva.

References

The exercises included in the syllabus originate from following books:
Rowland M., Tozer T.N. (ed.) Clinical Pharmacokinetics. Concepts and Applications. Williams & Wilkins, third edition, 1995.
Shargel L., Yu A. (ed.) Applied Biopharmaceutics and Pharmacokinetics. Stamford: Appleton & Lange, 1999.

Course content-related study coaching

Just before and after the lectures there is the possibility to ask questions. During the exercises, one has ample opportunity to ask questions. A small number of questions can also be asked via e-mail. For a larger number of questions, the student has to make an appointment.

Evaluation methods

end-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Theory and seminars: written examination, i.e. open questions and pharmacokinetic exercises

Calculation of the examination mark

Theory and seminars (exercises): period related evaluation. Calculation of the total score: 50% theory and 50% pharmacokinetic problems.