Linnæus University

Dnr: 2016/6165-3.1.2.2

Course syllabus

Faculty of Health and Life Sciences

Department of Chemistry and Biomedical Sciences

1BK024 Grundläggande farmakoterapi, 9 högskolepoäng
1BK024 Basic Pharmacotherapy, 9 credits

Main field of study
Biomedical Science, Pharmacy

Subject Group
Medicine

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved 2010-08-25
Revised 2016-11-15 by Faculty of Health and Life Sciences.
The course syllabus is valid from spring semester 2017

Prerequisites
General entry requirements and 7.5 credits in general chemistry, 7.5 credits in organic chemistry, 7.5 credits in cell biology, 15 credits in pharmaceutical biochemistry, or the equivalent, or a degree of bachelor of science in pharmacy, or the equivalent.

Objectives

Module 1. Pharmacokinetics, pharmacodynamics, and medicinal chemistry, 5 credits
After completing the module, the student should be able to:

- define and describe different pharmacokinetic parameters
- calculate pharmacokinetic parameters in a one-compartment model based on plasma concentration data
- provide examples of how different drugs can interact with each other
- define and explain various pharmacodynamic concepts
- explain general qualitative and quantitative structure-activity relationships for drugs
- describe the interaction between drug molecules and receptors
- present different metabolism pathways for drugs
- describe the principles of developing new drugs

- conduct simple modeling experiments
- search for information in medical databases.

Module 2. Statistics, clinical trials, and epidemiology, 4 credits
After completing the module, the student should be able to:

- perform basic statistical calculations and understand the application of statistics in biomedical studies
- describe measures of disease occurrence, along with different types of study designs and methodological issues in epidemiological research
- explain the methodology of clinical trials in the development of new drugs, including planning, design, quality requirements, and study implementation
- define evidence-based medicine and understand how drug evaluation forms the basis for therapeutic choices.

Content

Module 1. Pharmacokinetics, pharmacodynamics, and medicinal chemistry, 5 credits
The module includes the following elements:

- basic pharmacological concepts
- pharmacokinetics: absorption, distribution, metabolism, elimination of drugs, elimination constant, half-life, volume of distribution, clearance, renal clearance, exposure, and bioavailability
- pharmacodynamics: agonists, competitive and non-competitive antagonists, partial agonists and antagonists, inverse agonists, dose-response, receptor affinity, EC50 and ED50, as well as receptor reserve
- pharmacogenetics
- interactions
- drug chemistry concepts
- interaction between drug molecules and receptors, including stereochemical aspects
- lead generation: pharmacognosy/natural products, endogenous ligands, combinatorial chemistry, and bioisosterism
- lead optimisation: analogue/rational design, QSAR, and pharmacophore identification
- drug metabolism

Module 2. Statistics, clinical trials, and epidemiology, 4 credits
The module includes the following elements:

- basic statistics: mean, median, measures of dispersion, and confidence intervals
- significance tests: t-test, F-test, ANOVA, Chi2-test, and non-parametric methods
- power calculations
- NNT (number needed to treat)
- epidemiological concepts and studies
- clinical trial methodology
- evaluation of clinical trials
- evidence-based medicine
- regulations and documentation in pharmaceutical development.

Type of Instruction

The instruction is delivered in the form of lectures, seminars, laboratory work, and group exercises. Seminars, laboratory sessions, and specified lectures and group

exercises are mandatory.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

Module 1
Module 1 is examined through a written examination. The examination is assessed using one of the grades Fail, Pass, and Pass with Distinction. Other elements are assessed using one of the grades Fail and Pass.

Module 2
Module 2 is examined through a written examination. The examination is assessed using one of the grades Fail, Pass, and Pass with Distinction. Other elements are assessed using one of the grades Fail and Pass.

The grading criteria for a passing grade are based on the course objectives (see above). For each module the student is awarded one of the grades Fail, Pass, and Pass with Distinction, which are weighted based on their number of credits to form the final grade for the course as a whole.

Resit examination is offered within six academic weeks.

Course Evaluation

During or shortly after the course, a written course evaluation should be conducted. The result and analysis of the course evaluation should be promptly communicated to the students who have taken the course. Students who are taking the course when it is offered the next time should be informed of the result at the course introduction. The course evaluation is anonymous.

Required Reading and Additional Study Material

Module 1. Pharmacokinetics, pharmacodynamics, and medicinal chemistry, 5 credits

Rang, H.P., Dale, M.M., Ritter, J.M. & Flower, R.J. *Rang and Dale's Pharmacology*. Churchill Livingstone, the latest edition.

Tozer, T.N. & Rowland, M. *Essentials of Pharmacokinetics and Pharmacodynamics*. Lippincott Williams & Wilkins, the latest edition.

Williams, David A. *Foye's Principles of Medicinal Chemistry.* Lippincott Williams and Wilkins. The latest edition.

Module 2. Statistics, clinical trials, and epidemiology, 4 credits

Ahlbom, A., Alfredsson, L., Alfvén, T., Bennet, A. & Norells, S. *Grunderna i epidemiologi*. Studentlitteratur, the latest edition.

Ejlertsson, G. *Statistik för hälsovetenskaperna*. Studentlitteratur, the latest edition.

Alldredge B. K., Corelli, R. L., & Ernst M.E. *Koda-Kimble and Young's Applied Therapeutics.* Lippincott Williams and Wilkins, the latest edition.

Aulton, M.E. & Taylor K. M. *Aulton's Pharmaceutics: The Design and Manufacture of Medicines*. Churchill Livingstone, the latest edition.

FASS, *Läkemedelsindustrins branschförening (LIF)*, the latest edition.

Greenhalgh, T. *How to Read a Paper. The Basics of Evidence-Based Medicine*. Wiley-Blackwell, the latest edition.

Läkemedelsboken, Läkemedelsverket, the latest edition.

Wikman, S. *Organisk-kemisk nomenklatur*. Studentlitteratur, the latest edition.