



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Läkemedelskemi Medicinal Chemistry

KOKN01, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED B/K

Date of Decision: 2023-04-18

General Information

Main field: Pharmaceutical Technology.

Compulsory for: B4-1, K4-1, MLAK1

Elective for: N4-nbm

Language of instruction: The course will be given in English on demand

Aim

The aim of the course is to give basic knowledge in and broad understanding of medicinal chemistry and pharmacological principles from a molecular perspective.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to describe the most common strategies for drug discovery and development
- be able to describe common target molecules for drug development
- be able to describe basic pharmacodynamic and pharmacokinetic concepts from a molecular perspective
- be able to explain relationships between chemical structure and biological activity
- be able to describe chemical principles for design and development of drug molecules
- be able to name some of the most common drug compounds and their areas of use

Competences and skills

For a passing grade the student must

- be able to discuss chemical, physical, and pharmacokinetic properties of given drug molecules

- be able to describe and discuss drug action mechanisms from a molecular perspective based on conformational analysis, stereochemistry, acid-base chemistry and ligand-macromolecule interactions
- be able to analyse the potential of a given molecule structure as a drug candidate

Judgement and approach

For a passing grade the student must

- be able to analyse and judge a given molecular structure as potential drug candidate
- be able to analyse his/hers views and arguments for the judgement of a molecular structure as a potential drug candidate

Contents

The course discusses target biomolecules for drug discovery and development, general pharmacological principles, drug development and presents various classes of drugs, their effects, their use, and chemical structures. It integrates organic, physical, theoretical and biochemistry, cell biology and physiology to describe how a given drug molecule interacts with disease-relevant target biomolecules, as well as how such molecules can be optimized with respect to pharmacokinetic and pharmacodynamic properties. Relationships between chemical structure and biological activities is a central theme in the course. Important parts of medicinal chemistry, such as drugs of the nerve system, hormone drugs, drugs affecting the heart, respiratory drugs, anesthetics, sedative drugs, antivirals, antibiotics, and cancer drugs. Biological drugs are discussed and compared with small organic molecules as drug. Methods for searching novel drug candidates (drug discovery), for computational studies and prediction of various pharmacological properties, and structure-activity relationships are discussed.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Written assessment.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: KOOA15 General Chemistry, KOKA30 General, Inorganic and Organic Chemistry or KOKA05 Organic chemistry. KFKA05 Molecular Driving Forces 1: Thermodynamics or FAFA05 Physics - Waves, Thermodynamics and Atomic Physics. KBKA10 Biokemi, KBKA05 Technical Biology or EXTA70 Biology of the Cell.

The number of participants is limited to: No

The course overlaps following course/s: KOK085

Reading list

- Graham L P: An introduction to Medicinal Chemistry. Oxford University Press, 2017, ISBN: 9780198749691. 6th edition.

Contact and other information

Course coordinator: Professor Ulf Nilsson, ulf.nilsson@chem.lu.se

Course homepage: <http://canvas.education.lu.se>