CB2090 Drug Development 7.5 credits

Läkemedelsutveckling

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for CB2090 valid from Autumn 2024

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

Completed degree project 15 credits, 20 credits courses in biotechnology and 20 credits courses in chemistry. English B/6.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After successful completion of the course, the student should be able to:

- Describe the different classes of pharmaceutical substances: proteins and other large molecules, small organic molecules, peptides, viral vectors and cells, with regards to their properties, production, safety and therapeutic areas
- Describe and discuss the steps and important concepts in drug discovery and development, from target validation to commercial introduction of new therapeutic drugs, including the methods used in this field
- Explain what is meant by administration, absorption, distribution and elimination, as well as pharmacodynamic and pharmacokinetic, and their implication in the development of new therapeutic drugs
- Describe how the market landscape is for the different types of drugs and their therapeutic areas, and describe how this market has evolved this last century
- Describe the studies and methods used to test the drugs before they are applied to human and in clinical trials
- Give an account of- and explain how the therapeutic drugs are commercially produced, including the administration routes and delivery systems
- Describe how the safety issues, the authority regulation and intellectual property aspects impact the process of drug discovery and development
- Give an account of the use of computer based methods, including bioinformatics and genomics in drug discovery and development

Course contents

The lectures will cover a broad range of aspects of drug development. It will give current examples from the pharmaceutical industry and will mainly be given by invited guest lecturers. Topics to be covered are:

- Classification of active substances and their pharmaceutical properties: proteins including antibodies and derived products, polymer molecules, small molecules, peptides, viral vectors and cells.
- Basic pharmacology about administration, absorption, distribution and elimination, as well as pharmacokinetics and pharmacodynamics
- Methods for target identification and validation for drug development, including bioinformatics/genomics
- Methods for drug development such as screening, computer based calculations, in silico drug design and ADMET prediction
- Safety and efficacy requirements as well as the methods used in pre-clinical studies and clinical trials of new pharmaceutical drugs
- Market landscape for the different types of drugs and their therapeutic areas
- Entrepreneurship and development of newly established research companies

- Intellectual property protection in the context of drug development and commercialisation
- Methods for commercial production of active substances
- Methods for pharmaceutical drug delivery including nano particles

The students will be required to perform a literature task covering many aspects of the course, present a report, perform peer reviewing, hold an oral presentation and perform opposition. (This is a group assignment with individual reports).

Examination

- LIT2 - Literature assignment, 5.5 credits, grading scale: A, B, C, D, E, FX, F
- TENB - Written assignments, 2.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Grade E on LIT1 and E on TENA is required. Final grade is based on LIT1.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.