



BB2170 Drug Development 6.0 credits

Läkemedelsutveckling

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

Establishment

Course syllabus for BB2170 valid from Autumn 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

Introduction to Biotechnology (≥ 2 hp, e.g. BB1010), Cell Biology including Immunology (≥ 3 hp, e.g. BB1160), Organic Chemistry I (≥ 2 hp, e.g. KD1230), Biochemistry (≥ 2 hp, e.g. BB1150)

Language of instruction

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

Intended learning outcomes

After the course, the students should be able to

- describe the different types of therapeutic drugs (proteins and other large molecules, small organic molecules, peptides, viral vectors, cells) with respect to their properties, production, safety and therapeutic areas
- describe and discuss the different steps and important concepts in the process of drug discovery and development from target validation to commercial launching of a therapeutic drug
- describe the studies and methods used in the process of drug discovery and development
- explain what administration, absorption, distribution and elimination of a drug are, as well as pharmacodynamics and pharmacokinetics, and their implication in the development of a new drug medicine product
- state how the market landscape is for the different types of drugs and their therapeutic areas, and describe how this market has evolved with time from last century to nowadays
- describe the studies and methods used to test the drugs before they are applied in human and in clinical trials
- describe how the different types of drugs are commercially produced and delivered to the patients
- describe how the safety issues, the authority regulation and intellectual property aspects impact the process of drug discovery and development
- describe the use of computational approaches and bioinformatics/genomics in drug discovery and development

Course contents

The lectures will cover a range of aspects of drug development and discovery and give recent examples from the pharmaceutical industry by external lecturers. Topics that will be discussed include:

- pharmacology about administration, absorption, distribution and elimination of a drug as well as pharmacodynamics and pharmacokinetics
- the methods for target identification and validation, including bioinformatics/genomics
- the different types of therapeutic drugs and their properties: proteins including antibodies and derivate, polymer molecules, small molecules, peptides, viral vectors and cells
- the methods for the development of the therapeutic drugs such as screening approaches, computational approaches, in silico drug design and ADMET prediction
- the safety and efficacy requirements in pre-clinical studies and clinical trials
- the methods for the assessments of the drug properties and safety
- market landscape for the different types of drugs and their therapeutic areas
- entrepreneurship and development of young research companies in medical drug domain
- intellectual property protection in the context of biotechnology and drug development

- methods for commercial production of active substances
- methods for drug delivery including nanoparticles

Each student will perform an assignment covering a majority of the taught material in form of a report, peer reviewing, oral presentation and opposition (group work with individual reporting).

Examination

- LIT1 - Literature Task, 2.0 credits, grading scale: P, F
- TEN1 - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, 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.

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

Other requirements for final grade

Besides LIT1 Pass and $\text{TEN1} \geq \text{E}$, compulsory presence at seminarium where the students present their literature assignment report.

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.