CB2120 Bioprocessing for the production of advanced biologics using mammalian cells 7.5 credits

Bioprocessteknik för produktion av avancerade biologiska läkemedel i mammalieceller

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

Establishment

The official course syllabus is valid from the autumn semester 2026 as decided by the Faculty Board decision PA-2025-0010. Date of decision: 2025-10-01.

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

A bachelor's degree comprising at least 180 credits and courses equivalent to at least 20 credits in life science subjects, 20 credits in chemistry, 15 credits in mathematics and 5 credits in programming.

Intended learning outcomes

After completing the course, the student should be able to

- explain central theoretical concepts in mammalian-based cell systems and cell culture techniques for the production of advanced biological drugs
- explain principles and applications of cell culture in bioreactors
- perform basic techniques for sterile cultivation of suspension and adherent cells
- reflect on opportunities and limitations with different mammalian-based cell systems and product classes
- reflect on sustainability aspects and ethical issues linked to the production and use of mammalian/human cells in pharmaceutical production
- apply knowledge to design and motivate strategies for cell culture processes suitable for industrial production of biological drugs
- analyze results from cell culture strategies and report and communicate these in a manner adapted for industrial purposes

Course contents

Theoretical elements include:

- cell metabolism relevant to culture processes
- cell culture operations in bioreactors
- process development and manufacturing of advanced biologics, including glycoproteins such as monoclonal antibodies, cells for cell therapy and viral vectors for gene therapy
- process scale-up for industrial production
- expression systems, cell lines and vectors/plasmids
- patient safety and regulatory requirements
- analytical methods for characterizing biologics
- process flow charts for manufacturing

Practical elements include:

- design of culture process for production of monoclonal antibodies with simulation software
- culture of suspension cells in shake flasks, including monitoring of metabolic parameters
- culture of adherent stem cells in culture flasks
- small-scale culture in stirred bioreactors
- case studies on, for example, the production of viral vectors or cell products, including project management

Examination

- TEN1 - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory assignments, 3.5 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. If the course is discontinued, students may request to be examined during the following two academic years.

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.