

Stem Cell Engineering

Programme course

6 credits

Stamcellsteknik

TVCB13

Valid from: 2017 Spring semester

Determined by

Board of Studies for Chemistry, Biology and
Biotechnology

Date determined

2017-01-25

Main field of study

Engineering Biology

Course level

Second cycle

Advancement level

A1X

Course offered for

- Protein Science, Master's programme
- Chemical Biology
- Engineering Biology, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Three years of previous studies in the area of biotechnology.

Intended learning outcomes

The aim of this course is to provide deeper knowledge in some specific areas of eukaryotic cell biology related to stem cells. By the end of this course the student will be able to:

- Summarize knowledge on models for the regulation of cell growth and cell differentiation.
- Describe different experimental methods used for modifying differentiation and function of cells.
- Discuss relevant ethical issues related to the use of stem cell engineering.

- Independently identify a scientific question of relevance for the topic of the course, search and critically evaluate scientific literature in this field and write a review of the results.

Course content

Growth and differentiation factors. Processes of cell differentiation, apoptosis, regulation and control of the function of stem cells. Epigenetic regulation of gene expression and its role in cell growth and cell function. Principles of aberrant growth control, cancer, stem cell niches, cell editing technologies as well as advantages and disadvantages of these technologies. Reproductive and therapeutic cloning, regenerative medicine and induced pluripotent stem cell technology. Ethical aspects on stem cell technology.

Teaching and working methods

The course applies problem based learning and includes lectures, tutorials, laboratory work and seminars. Tutorials, laboratory work and seminars are compulsory.

Examination

LAB1	Laboratory Work and Report	U, G	1 credits
UPG2	Seminar on Ethical Issues of Stem Cell Technology	U, G	1 credits
PRA1	Individually written report	U, G	2 credits
BAS1	Study group participation	U, G	2 credits

Clarification BAS1: Active participation in the study group and the following seminars is a prerequisite for the grade 'Pass'.

Grades are given as Pass or Fail.

Grades

Two-grade scale, U, G

Department

Institutionen för klinisk och experimentell medicin

Director of Studies or equivalent

Kajsa Holmgren Peterson

Examiner

Stefan Koch

Education components

Preliminary scheduled hours: 32 h

Recommended self-study hours: 128 h

Course literature

Additional literature

Books

Alberts B. et al., (2014) *Molecular Biology of the Cell* 6th ed Garland Publishing Inc, New York

Please note that the book is not mandatory, but a recommendation.

Articles

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.