Stem Cells and Applied Regenerative Medicine

Stamceller och tillämpad regenerativ medicin
7.5 credits

Single subject course

8FA228

Valid from: 2024 Autumn semester

Determined by	**Main field of study**	
The Board for First and Second Cycle Programmes at the Faculty of Health Sciences	Medical Biology	
Date determined	**Course level**	**Progressive specialisation**
2013-10-30	Second cycle	A1X
Revised by	**Disciplinary domain**	
Chairman of The Board for First and Second Cycle Programmes	Medicine	
Revision date	**Subject group**	
2021-08-16; 2023-11-10	Medical Biology	
Offered first time	**Offered for the last time**	
Autumn semester 2014		
Department	**Replaced by**	
Institutionen för biomedicinska och kliniska vetenskaper		

Specific information

The course is given in English.

Entry requirements

Bachelor's degree in a major subject area with relevance for biomedical sciences, equivalent to a Swedish Kandidatexamen with at least 90ECTS credits in the following subjects:

- biochemistry
- cell biology
- molecular biology
- genetics
- gene technology
- microbiology
- immunology
- physiology
- histology
- anatomy
- pathology

or similar.

- English corresponding to the level of English in Swedish upper secondary education (Engelska 6)
  Exemption from Swedish

Intended learning outcomes

By the end of this course the student will be able to:

Knowledge and understanding:

- Describe various types of stem cells in the human body and their potential in regenerative medicine
- Explain the stem cell technologies used in the field of medicine
- Describe how biomaterials are used in regenerative medicine and explain their interaction with host tissue
- Identify immunological interactions between host and graft in organ- and stem cell transplantation

Competence and skills:

- Explain and discuss regulatory aspects related to transferring stem cell-based treatment from the laboratory to the clinic
- Apply technologies used to track transplanted stem cells and their derivates
- Identify accurate stem cell markers and separation strategies for translational applications

Judgement and approach:

- Critically address and present a scientific question in regenerative medicine
- Discuss the ethical aspects of stem cell research

Course content

Stem cell research and regenerative medicine are new interdisciplinary fields in biomedical sciences that aim to replace defective parts or cells in the human body. The aim of this course is to introduce students into selected topics of regenerative medicine, and to provide deeper knowledge about stem cells. More specifically, the course contains:

- Classification, biological properties, and differentiation of stem cells
- Epigenetic regulation of stem cell fate
- Stem cell-biomaterial interactions for regenerative medicine
- Methods and mechanisms for genetic manipulation of stem cells
- The activation of host's immune system during organ- and stem cell transplantation
- Cell reprogramming and cell tracking
- Techniques for *in vivo* visualization of cells and tissue
- Transfer of experimental therapies from the laboratory to the clinic
- Ethical issues in stem cell research

Teaching and working methods

The Faculty of Medicine and Health Sciences at Linköping University applies student-centered learning among which Problem Based Learning (PBL) is one pedagogical philosophy and method. Students work together in groups based on real-life situations to develop their own learning, contribute to fellow students' learning and to practice cooperation. The teacher's role is to support students in this way of working.

This course includes lectures, seminars, tutorial groups and laboratory work.

Examination

The course is examined by:

- An individual written exam
- A written laboratory report carried out in groups, with individual assessment
- Individual written summary of literature study
- Oral presentation at a seminar carried out in a group with individual assessment

Active participation in the compulsory parts is necessary to pass the course, and assessment of them is carried out continuously.

Compulsory parts in this course are: tutorial groups, seminars and laboratory work .

The course is examined in English.

Grades

The final course grade is based on the grade from the written exam.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

Application for examination

Instructions on how to apply for examinations are given prior to the beginning of each course.

Re-examination

The date for re-examination should normally be announced by the date of the

regular examination at latest; in which case the scope must be the same as at the regular examination.

Examination for students with disabilities

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Nomination of another examiner

A student who has taken two examinations in a course or a part of a course without obtaining a pass grade is entitled to the nomination of another examiner, unless there are special reasons to the contrary.

Grades

Three-grade scale, U, G, VG

Course literature

List of relevant literature is available at least 2 months prior to the start of the course as decided by the Department of Biomedical and Clinical Sciences (BKV). There is no mandatory literature in the course.

Other information

Planning and implementation of the course is to be based on the wordings in the course syllabus. A course evaluation is compulsory for each course and should include how the course is in agreement with the course syllabus. The course coordinator will analyse the course evaluation and propose appropriate development of the course. The analysis and proposal will be returned to the students, the Director of Studies, and as needed to the Education Board, if related to general development and improvement.

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If the course is cancelled or undergoes major changes, examination is normally offered under this course syllabus, at a total of three occasions, within/in connection to the two following semesters, of which one in close proximity to the first examination.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.