

## Stem Cells and Applied Regenerative Medicine

Stamceller och tillämpad regenerativ medicin

7.5 credits

Programme course

8MEA11

Valid from: 2022 Spring semester

<b>Determined by</b>	<b>Main field of study</b>	
Chairman of The Board for First and Second Cycle Programmes	Medical Biology	
<b>Date determined</b>	<b>Course level</b>	<b>Progressive specialisation</b>
2012-12-07	Second cycle	A1X
<b>Revised by</b>	<b>Disciplinary domain</b>	
	Medicine	
<b>Revision date</b>	<b>Subject group</b>	
2014-10-06; 2021-05-03	Medical Biology	
<b>Offered first time</b>	<b>Offered for the last time</b>	
Autumn semester 2014		
<b>Department</b>	<b>Replaced by</b>	
Institutionen för biomedicinska och kliniska vetenskaper		

## Specific information

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. The course is elective semester three in the Master's Programme in Experimental and Medical Biosciences.

## Course offered for

- Master's Programme in Experimental and Medical Biosciences

## Entry requirements

The special eligibility requirement is the possession of the Degree of Bachelor of Sciences in a major subject area with relevance for biomedical sciences. This could include previous studies at faculties of medicine, technology/natural sciences, odontology or veterinary medicine. A major part of courses included in the Bachelor degree should be in subjects such as biochemistry, cell biology, molecular biology, genetics, gene technology, microbiology, physiology, immunology, histology, anatomy, and pathology.

Applicants must also have documented skills in English corresponding to the level of English in Swedish upper secondary education (English B). For applicants who have not studied in Swedish upper secondary education, skills in English are normally attested to by means of an international language test.

## 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
- Describe the use of different basic biomaterials in regenerative medicine, and their interaction with host tissues
- Identify host – graft interactions with the focus on immune- and infectious issues related to regenerative medicine

Competence and skills

- Account for and discuss regulatory aspects of regenerative medicine, especially those related to transfer of experimental therapies from the laboratory to the clinic
- Apply technologies used for tracking of implanted stem cells and their derivatives
- Identify stem cells in order to separate and purify them

Judgement and approach

- Identify and critically address a scientific question in regenerative medicine

## Course content

- Classification, biological properties, and differentiation of stem cells
- Stem cells and cancer
- Stem cells and biomaterial interactions
- Evolution of bioengineered materials
- Host-graft interaction and the relation with immune and infection issues
- Reprogramming and tracking
- Techniques for in vivo visualization of cells and tissue
- Transfer of experimental therapies from the laboratory to the clinic

## Teaching and working methods

General: Linköping University Master's Programme in Experimental and Medical Biosciences applies student-centered learning among which Problem Based Learning (PBL) is one pedagogical philosophy and method. To prepare the students for future employment, practical and experimental work in laboratory settings are important parts of the programme in courses as well as in individual projects.

Specific: In this course, lectures, seminars, demonstrations and laboratory work are used.

## Examination

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## **Compulsory items**

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: laboratory work, demonstrations, and seminars.

## **Examination**

Individual written examination.

Written report and oral presentation of laboratory work (group assignment with individual assessment).

## **Grades**

The grades for the course are either fail (F), pass (G) or pass with distinction (VG). A weighting of the grades on the individual written exam and laboratory work form the basis for the final grade of the course.

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

## **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 carried out in such a way that knowledge of gender, gender identity/expression, ethnicity, religion or other belief system, disability, sexual orientation and age is addressed, highlighted and communicated as part of the programme.

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.