

Stem Cell Biology and Regenerative Medicine: The Past, the Present and the Future, MESR01F

Stamcellsbiologi och regenerativ medicin: Mot framtidens behandlingar

1.5 credits

Third cycle

General information

The course is a freestanding digital course in the subject area stem cell biology and regenerative medicine. The course is intended for doctoral students involved in life sciences, and the aim is that at least half of the participants are registered at Lund University's Faculty of Medicine. Doctoral students registered at other higher education institutions (both national and international) as well as postdocs can apply to take the course and are admitted if places are available. Course duration 40 hours (1.5 credits) over a 2-week period (part-time). The course aims to provide a specialisation in stem cell biology in order to stimulate and train tomorrow's leading stem cell researchers.

Language of instruction

English

Purpose

The aim of the course is for the students to attain broad knowledge in the subject of stem cell biology. A deepened understanding is to be attained about the present-day position of the stem cell research field and what issues must be resolved for it to reach full potential. The participants will also be exposed to how technical breakthroughs of the last few decades within stem cell biology – which are available at the Lund Stem Cell Centre – can be applied in the course participants' own research. The course aims to strengthen and improve translational research within the faculty and give third cycle students at Lund University the opportunity to interact with early career researchers at other national/international higher education institutions. For the international students, the course's digital format, which eliminates high travel and course costs, creates conditions for unique, inclusive education on equal terms and exposure to world-leading researchers in Stem Cell Biology.

Learning outcomes

The learning outcomes are based on the Biggs SOLO taxonomy and the aim is that on completion of the course the students shall be able to *define*, *account for* and *explain* key issues and concepts in the subject area:

- What are stem cell self-renewal and cell differentiation?
- What are totipotent, pluripotent and multipotent stem cells?
- What are induced pluripotent stem cells?
- What are cell therapy and regenerative medicine?
- What are cancer stem cells?
- Which stem cell-based therapies are applied clinically
- How stem cells can be used as a disease model
- Explain the current limitations of stem cell therapy
- What is direct reprogramming?
- What is gene therapy/gene technology and how can these techniques be used in research and clinically?
- Ethical issues relating to stem cell research/cell therapy

Using this knowledge, the participants shall finally, in groups, *develop/propose* a new stem cell-based therapy, which they will present individually, orally and in writing.

Course content

The course will be conducted in a team-based learning (TBL) format over a two-week period on a part-time basis and is divided into four segments (introduction, preparatory phase, readiness assurance phase and application phase). The preparatory phase consists of pre-recorded lectures given by area experts (research leaders/physicians) who work at the Lund Stem Cell Centre. The lectures will include the following topics: *definition of stem cells, pluripotent stem cells, development biology and stem cells, somatic stem cells, stem cell regulation, modulation of diseases, gene-editing, direct reprogramming and drug discovery, cancer stem cells, current and future stem cell treatments and stem cell tourism*. Thereafter, the participants' knowledge will be evaluated through an MCQ test (individually and in groups). This will be followed by the TBL component, in which the participants in their groups will use their new knowledge and previous experience to design/propose a new stem cell-based therapy or a stem cell-based technology that can benefit society. The groups' proposals are presented orally and each participant then writes an individual report (1-2 pages) about the group's idea. The report is to include a reflection on their work and the feedback they have received. As the course is based on TBL, all participants will receive direct feedback, both orally and in writing, during the course.

Course design

The course will be conducted in a team-based learning (TBL) format divided into four segments (introduction, preparatory phase, readiness assurance phase and application phase). The course will be in a digital format to ensure inclusive training on equal terms. The teaching will consist of pre-recorded lectures, panel discussions, readiness assurance test (in the form of MCQs, digitally), group work with associated presentation and an individual written assignment. Attendance is compulsory for all practical components and components that involve group exercises.

Assessment

Course assessment is through three assessed components: a written examination (MCQs), and project work that is presented orally and in writing.

Learning outcomes relating to knowledge and understanding are assessed in the written examination.

Learning outcomes relating to competence and skills are assessed in the oral presentation and the written report.

- The MCQs and written report/reflection on the TBL assignment (research programme) (0.5 credits)
- Oral presentation of the team's research programme (1.0 credit)

Grades

Pass or Fail.

Entry requirements

Those eligible for the course are doctoral students at medical faculties in Sweden, and preferably at Lund University. In addition, we welcome international doctoral students and students with a one-year Master's degree (240 credits) working in relevant life sciences (natural sciences, biomedicine, medicine or related area).

Required reading

Participants will be informed about required reading before and during the course.