Cardiovaskular Biology, 5.0 credits

Kardiovaskulär biologi, 5.0 hp

Third-cycle education course

8FO0080

Department of Biomedical and Clinical Sciences

Valid from: First half-year 2025

Approved by
The Research and PhD studies Committee

Approved
2014-01-20

Registration number
LiU-2014-00213

Entry requirements

Entry requirement for studies on third-cycle education courses

- second-cycle degree,
- 240 credits in required courses, including at least 60 second-cycle credits, or
- acquisition of equivalent knowledge in some other manner

Specific information

Prior to the course, the student must have knowledge of cardiovascular physiology as described in textbooks such as “An introduction to vascular biology” by Hunt, Poston, Schachter & Halliday and “An introduction to cardiovascular physiology” by Levick. The student must be familiar with basic concepts in cardiovascular biology such as cardiac cycle, action potential in heart cells, regulation of cardiac output, reflex regulation of blood pressure, blood vessel and peripheral resistance, endothelial cells and blood vessel tone.

Learning outcomes

Knowledge and understanding
After completing the course, the student should have acquired knowledge of
- The mechanisms of various cardiovascular diseases such as hypertension, atherosclerosis, aneurysm, arrhythmia, sudden death, and heart failure
- Standard clinical methods used for evaluation of cardiovascular function
- Treatment that helps to cure or alleviate the effect of the different diseases

Competence and skills
After completing the course, the student should be able to
- Apply knowledge and integrate findings from current cardiovascular research to discuss new hypotheses
- Develop own practical and laboratory skills to handle and process tissue samples from the heart and vessels
- Present in writing and orally how a selected concept in cardiovascular biology can be applied to the student’s own research project

Judgement and approach
After completing the course, the student should be able to
- Critically evaluate literature in basic and clinical cardiovascular biology by reading and discussing current research articles
- Critically evaluate the possibility for a selected concept in cardiovascular biology to be successfully applied and implemented in an own research project

Contents

Vascular tone and vascular biology linked to hypertension
Endothelial cell dysfunction and nitric oxide
Varicose veins
Atherosclerosis – underlying biology, development and challenges
Plaque rupture, heart attack and stroke
Pharmacological treatment of myocardial infarction
Regeneration of heart
Angiogenesis - molecular mechanisms and clinical implications
Pathophysiology of cardiac arrhythmias
Sudden death, long QT syndrome, and HERG channels
Description and critical examination of how new concepts can be applied in research projects

Educational methods

The pedagogical approach applied at the Faculty of Medical and Health Sciences is student centered, problem-based learning (PBL). The student takes responsibility for his/her own learning and seeks and evaluates information and knowledge based on own queries and formulated problems. The role of the teacher is to guide and support the students.
Educational methods applied in this course are lectures, laboratory work, experimental demonstrations, seminars, individual written reports, and oral presentations.

Examination

1. Answer theoretical questions (within the scope of the learning objectives) from the examiner at the seminars
2. Written report similar to a literature review on how a selected concept in cardiovascular biology can be applied to the student's own research project
3. Oral presentation of the report at a seminar, together with critical appraisal of other students' reports and presentations (opposition).

If a PhD student has previously completed the course at Master's level, the course can be credited at PhD level by students presenting a written report and giving an oral presentation (examination steps 2-3 above).
Students who fail are offered one re-examination occasion in close connection to the course. After that participation in a coming course examination is offered. The re-examination should be equally comprehensive as the ordinary examination.
Change of examiner
Students who have failed the course or part of the course twice are entitled to request another examiner for the following examination occasion.
Grading
Pass or Fail

Grading

One-grade scale

Course literature

list of recommended literature will be provided by the course coordinator before the start of the course.

General information

The course is given in part in parallel with the Cardiovascular Biology course at Master's level, with joint lectures. The PhD students have separate seminars at PhD level and separate assignments.

The course is planned and carried out according to what is stated in this syllabus. Course evaluation, analysis and suggestions for improvement should be fed back to the Research and PhD studies Committee (FUN) by the course coordinator.
If the course is withdrawn or is subject to major changes, examination according to this syllabus is normally offered at three occasions within/in close connection to the two following semesters.