



LUND
UNIVERSITY

Faculty of Medicine

BIMB30, Biomedicine: Developmental and Stem Cell Biology, 7.5 credits

Biomedicin: Utvecklings- och stamcellsbiologi, 7,5 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Master's Programmes Board on 2021-03-16 to be valid from 2021-03-24, autumn semester 2021.

General Information

The course is compulsory in the Biomedicine programme and included in semester 3.

Language of instruction: English

Main field of studies

Biomedicine

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

Knowledge and understanding

On completion of the course, the students shall be able to

- account for significant milestones within developmental biology and stem cell research
- explain how the development process starts through fertilisation
- explain the basic mechanisms behind the establishment of the embryonic body plan, the formation of the first cell lines and differentiation of early tissues
- explain the basic molecular mechanisms that control the development of an early embryo and the role of cell-cell communication in the development process
- explain the processes that lead to extremity development and regeneration
- explain the principles of organ formation during early development
- define different stem cells and give an account of their origin and distribution in different organs

- describe disease development as a consequence of dysregulation of stem cells and the possibilities that are offered by regenerative therapies

Competence and skills

On completion of the course, the students shall be able to

- explain and critically review published research in developmental biology and stem cell biology and summarise the biological principles behind this research in brief presentations
- put issues relating to developmental biology and stem cell biology in their biological context and assess the relevance for regenerative medicine and development of therapies
- present and discuss scientific issues in developmental and stem cell biology and provide suggestions for solutions
- appear with a professional approach, respect others' opinions in discussions of developmental and stem cell biology and meet given deadlines.

Judgement and approach

On completion of the course, the students shall be able to

- reflect on societal opportunities and consequences arising from developmental biology research and knowledge, and discuss these with individuals in the same education cycle
- reflect on current scientific challenges and ethical issues in developmental and stem cell biology research and how this influences society in general.

Course content

The course covers basic principles in developmental biology and molecular genetics with a special emphasis on developmental biology model systems in vertebrates and invertebrates. Furthermore, the course covers the most important processes in early embryo development, such as fertilisation, cell division, establishment of position information, polarity and asymmetries, and formation of body axes and gastrulation as preconditions for extremity development, regeneration and formation of the body's most important organs. Finally, there is a discussion about the mechanisms behind the self-renewal and differentiation of stem cells and the role of stem cells in renewal of the body's tissues.

The course also includes how developmental biology knowledge can be utilised in the establishment of animal models for studies of human disease mechanisms. The course aims to prepare students for work in a field that includes regenerative medicine and stem cells.

Course design

The whole course is based on five week-long modules on selected subjects related to issues concerning developmental biology and stem cells. The course mainly involves student-active learning methods, which set requirements for the students to prepare before the teaching components. The students are expected to act professionally and, just as in a future work situation, participate constructively in the working group to achieve joint progress.

Each module contains lectures and preparatory material, followed by individual tests as well as group tests, analysis and discussion of material in compulsory application exercises, and concludes with an assessed assignment. Some components are illustrated with method introductions and demonstrations or short laboratory sessions and discussions. Students train in extracting relevant content from research articles, bringing together information from different sources and presenting in different formats.

Assessment

The course contains two assessed components:

1. Course portfolio 5 credits (Fail/Pass/Pass with distinction)
2. Multiple-choice questions 2.5 credits (Fail/Pass)

The course portfolio includes article discussions, oral and written presentations, and reflections.

The multiple-choice questions mainly test the learning outcomes related to knowledge and understanding.

If there are special reasons, other forms of examination may apply.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

To achieve the grade of Pass as final grade, all components must be passed. To achieve the grade of Pass with Distinction as final grade, the grade of Pass with Distinction is required on the course portfolio.

Entry requirements

Passed examinations and course components in semester 1 and 2 of the programme for at least 45 credits and completion of the course BIMB22 The Cell and its Environment (or equivalent).

Subcourses in BIMB30, Biomedicine: Developmental and Stem Cell Biology

Applies from H21

- 2101 Course portfolio, 5,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 2102 Multiple-choice questions, 2,5 hp
Grading scale: Fail, Pass