Faculty of Medicine

BIMB23, Biomedicine: The Cell and its Environment, 15 credits

Biomedicin: Cellen och dess omgivning, 15 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Master's Programmes Board on 2022-12-06 to be valid from 2022-12-13, spring semester 2023.

General Information

The course is a compulsory component of the Biomedicine Programme and is included in semester 2.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Biomedicine	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:

- explain and compare different principles for how extracellular signals enter the cell and are amplified, transmitted and concluded, and give examples of how signaling pathways are integrated
- give an account of how gene expression is regulated epigenetically, transcriptionally and post-transcriptionally, and explain how gene expression can be manipulated and studied experimentally
- describe structure in relation to function for the specialised cells that constitute the four basic types of tissue (epithelial, connective, muscle and neuronal tissues)
- explain molecular mechanisms by which cell division, apoptosis and DNA repair are regulated in response to the internal and external signals of the cell and how defects in these mechanisms can lead to cancer
- describe the molecular structure and the dynamics of the extracellular matrix and

explain how this is connected to function,
- explain how cells interact with the extracellular matrix and with one another, and give examples of how these interactions are regulated
- explain principles and molecular mechanisms for how and why cells move and give examples of biological situations in which this is important
- describe the meaning of good laboratory practice (GLP) and what is required in order to adapt a laboratory method to this, and
- describe how parametric and non-parametric tests can be used to compare statistical outcomes in two or several groups and the difference between these tests.

Competence and skills

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

- identify and present relevant information from research publications on cell and molecular biology issues and relate the information to the context of cell biology
- plan experiments in order to solve a problem in cell biology and interpret descriptions of method and apply these when carrying out the experiment,
- carry out and interpret statistical analyses of laboratory result and in writing summarise the laboratory session in a format that compares to a scientific article,
- apply knowledge of cell biology and statistics to interpret and critically evaluate results from research publications,
- participate constructively and assess their own role in a group assignment within the scope of the course, and
- behave with a professional approach, respect others' opinions in discussions of cell biology and meet set deadlines.

Judgement and approach

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

- reflect on the reasons why the public sector requires quality assurance of the development and production of drugs and analyses of patient materials
- reflect on how constructive feedback affects the quality of their own scientific work, and
- assess their level of cell biology knowledge and take responsibility for their own development of knowledge based on this assessment.

Course content

The course involves specialisation but also a broadening of earlier courses in biochemistry and basic cell biology in the Biomedicine programme.

Different themes in cell biology are covered each week, such as intracellular signal transduction, gene regulation and non-coding RNA, specialised cells and basic tissue types, cell cycle and cancer, cell interactions, the extracellular matrix and the movement of cells. The course focuses on the molecular and cellular mechanisms that control cells and the basic functions of their surroundings. The course acts as a bridge to future courses in e.g. neurobiology and immunology as well as human organ systems and homeostasis by discussing specialised cells and their role in different physiological and pathophysiological situations.

In addition to knowledge of cell biology, the course provides experience in extracting, interpreting and presenting information from research articles and training in solving problems in cell biology experimentally through the application of cellular and molecular biology methods. The course contains training components for GLP and quality assurance in the development and production of drugs. The course also

provides training regarding working in groups and giving and receiving constructive feedback.

Course design

Learning activities to achieve the learning outcomes for the course consist mainly of active learning methods that require the students to prepare before each teaching component. During group work, students practice taking responsibility for their knowledge development and working constructively in groups. As a complement, there are also lectures providing support, summaries and/or specialisation. Certain learning outcomes are also connected to laboratory components in which students practice planning and carrying out experiments in order to solve problems in cell biology and describing scientific results and laboratory and statistical methods according to the format used in the scientific literature.

The competency-based learning outcomes that apply to scientific literature are practised and graded in a series of presentations in which the students read, present and interpret research articles connected to themes on cell biology in the course. The students practice giving and receiving feedback through peer review of their individual contributions to group work and of a scientific laboratory report.

Assessment

The learning outcomes are assessed through:

Course portfolio: 7.5 credits (Fail/Pass/Pass with Distinction)
Multiple-choice test: 7.5 credits (Fail/Pass)

The learning outcomes with respect to knowledge and understanding are mainly assessed through the multiple-choice test. The learning outcomes with regard to competence and skills as well as judgement and approach are mainly assessed on the basis of the portfolio. The course portfolio includes submission of a scientific laboratory report and active participation in presentations, group work, laboratory sessions and the figure interpretation seminar.

Under special circumstances, other forms of assessment 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.
For the grade of Pass, students must have passed all of the components. For the grade of Pass with Distinction, students must also have been awarded the grade of Pass with Distinction on the course portfolio.

Entry requirements

Biology and Chemistry of the Cell 30 credits and completed courses in Biochemistry

and Cellular Metabolism 7.5 credits and Genetics and Genomics 7.5 credits, or at least 37.5 credits from completed first-cycle courses of which at least 15 credits in Eukaryotic Cell Biology, 15 credits in Chemistry/Biochemistry and 7.5 credits in Human Genetics.

Subcourses in BIMB23, Biomedicine: The Cell and its Environment

Applies from V23

2301 Course portfolio, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction
2302 Multiple-choice questions, 7,5 hp
Grading scale: Fail, Pass