Course syllabus for

Cell biology and genetics, 20 credits

Cellbiologi och genetik, 20 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Please note that the course syllabus is available in the following versions:
Spring2008 , Spring2010 , Spring2013 , Spring2014

Course code	1BI003
Course name	Cell biology and genetics
Credits	20 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedicine
Level	G2 - First cycle 2
Grading scale	Excellent, Very good, Good, Satisfactory, Sufficient, Fail, Fail
Department	Department of Biosciences and Nutrition
Participating institutions	• Department of Cell and Molecular Biology • Department of Molecular Medicine and Surgery
Decided by	Programnämnden för biomedicinprogrammet
Decision date	2007-10-09
Revised by	Programnämnden för biomedicinprogrammen
Last revision	2008-04-30
Course syllabus valid from	Spring 2008

Specific entry requirements

At least the grade E in the course Introduction to Biomedicine (1BI001).

Objectives

The student should Be able to account for the most important functions of the cell, its microscopical structure and the structure and function of the different cell organelles. Be able to account for basic genetic terminology at a general level, account for the organisation and development of the genome at cellular, chromosomal and gene levels, and be able to explain the basic molecular genetic mechanisms in relation to the structure and function of the cells. Be able to account for the molecular mechanisms of developmental biology, for development and turnover of the cells in the main tissue types and the individual's development from the formation of germ cells to embryo in relation to heredity and environment. Be able to account for cell growth, cell death, cell specialisation, cell motility and

interactions between cells and explain how these facilitate development of a multicellular organism together. Be familiar with genetic diseases and ways to identify pathogens Be able to report on and use basic cell biological methods: sterilisation technique, cultivation of cells, transfection of cells, microscopy technique Be able to account for various types of gene regulation and the molecular biological methods that can be used to study gene regulation. Be familiar with basic use of mouse models in the study of the importance of genes. Be familiar with model systems such as C. Elegance, Zebra fish. Be able to account for methods to discover and study gene changes leading to diseases. Be familiar with the three-dimensional structure of biomolecules, with an emphasis on proteins and how they are studied. Be able to account for the use of bioinformatics in the study of complex relationships with regard to gene regulation. Be able to account for which common method that can be used to study a specific problem within cell and molecular biology. Practical performance of simple cloning of DNA, and understand and apply PCR. Be able to use in vitro cell culture to examine the function of proteins. Be able to account for methods to measure gene expressions Be able to account for methods to study protein interactions and DNA:protein interactions. Be able to account for basic cellular and molecular biological mechanisms and relate these to man in health and un-health.

Content

Part 1: Cell Biology (Cell Biology), 6 credits This part comprises the molecular and cellular basic functions of life with a special focus on mechanisms enabling the development of a multicellular organism (growth and heredity, interactions between cells, cell motion and transport, and cell specialisation). This part is built around human development from germ cells to embryo, and gives an introduction to the most important functions and structures of the cell, embryology and molecular mechanisms of developmental biology. Part 2 - Molecular Biology and Genetics (Molecular Biology and Genetics) 9 credits The part covers elementary gene regulation with an emphasis on eukaryotes and molecular biological methods for the study of gene regulation. Using bioinformatics to study complex regulatory connections. Genetics with an emphasis on human diseases. The part gives an overview of the latest methods that are used in medical research. The part treats, in an integrated way, molecular biology, model systems, structural biology, genetics, bioinformatics Part 3 - Integration of Cell and Molecular Biology (Integration of Cell and Molecular Biology) 5 credits The course is completed with an integrating part where the contents of parts 1 and 2 are examined summatively.

Cell Biology, 6.0 hp

Grading scale: GU

The part includes the molecular and cellular basic functions of life with specific foci on mechanisms that facilitate development of a multicellular organism (growth and heredity, interactions between cells, cell motility and transport and cell specialisation). The part is built around human development from germ cells to an embryo and gives an introduction to the most important functions of the cell and its structures, embryology and the molecular mechanisms of the developmental biology.

Molecular Biology and Genetics, 9.0 hp

Grading scale: GU

The part includes elementary gene regulation with an emphasis on eukaryotes and molecular biological methods to study gene regulation. Usage of bioinformatics to study complex regulatory relationships. Clinical Genetics with an emphasis on human hereditary diseases. The part gives an overview of the latest methods that are used in medical research.

The part treats on an integrated way

- molecular biology
- model systems
- structural biology

• genetics

• bioinformatics

Integration of Cell and Molecular Biology, 5.0 hp

Grading scale: AF

The course is completed with an integrating part where the contents from the parts Cell biology and Molecular biology and genetics are examined summationally.

Teaching methods

The teaching includes lectures, discussions, demonstrations, concept maps and models, self-study and question sessions, and an integrating project work. The project work is an advanced study in a group with an emphasis on own work and literature studies. The course is completed with a written final examination.

Examination

Part 1 is graded with Fail/Pass and is examined through concept maps, participation in compulsory discussions, laboratory reports and a written, oral or IT-based test. Part 2 is graded Fail/Pass and is examined through participation in compulsory discussions, observation of the student's laboratory skills and written individual laboratory reports, and a written test. Part 3 is graded with F/Fx/E/D/C/B/A and is examined through an oral project presentation and a written final examination. For participation in the written final examination, both tests should be approved. For the tests, two make-up opportunities are provided before the written final examination. The course grade is based on results from part 3. Attendance is compulsory at laboratory sessions, safety lectures and safety sessions. The students are given the possibility to compensate for absence in sessions to be announced successively during the course. Students who have not passed the regular examination are entitled to participate in five more examinations. If the student is not approved after four examinations, he/she is recommended to apply for a new admission in the next regular course, and may, on completion of the course, be examined a second time in two more examinations. If the student has failed six examinations/tests, no additional examination or new admission in the course is given. The number of times that a student participated in one and the same test, count as examinations. Submission of a blank exam is counted as examination attempt. An examination for which the student registered but not participated is not counted as an examination.

Transitional provisions

Regardless of changes in the contents of the course and how it is examined, after each course a total of at least eight opportunities for tests and a written final examination, should be provided during a period of at least two years from the end of the course.

Other directives

The teaching is given in Swedish and English. Course evaluation will be carried out in accordance with the guidelines established by the Board of Education. Course council meeting is held with the course coordinator and student representatives.

Literature and other teaching aids

Alberts, Bruce

Molecular biology of the cell

5. ed. : New York : Taylor & Francis, cop. 2008 - xxxiii, 1268 s.
ISBN:9780815341062 (paperback) LIBRIS-ID:10645719
URL: http://www.loc.gov/catdir/toc/ecip0710/2007005475.html
Library search

Molecular biology of the cell

Alberts, Bruce

4. ed. : New York : Garland Science, cop. 2002 - xxxiv, 1463 s.
ISBN:0-8153-3218-1 (inb.) LIBRIS-ID:8311873
URL:
http://www.ncbi.nlm.nih.gov/books/bv.fcgi?call=bv.View..ShowTOC&rid=mboc4.TOC&depth=2
Library search

Strachan, Tom; Read, Andrew P.

Human molecular genetics 3

3. ed. : London : Garland Science, cop. 2004 - xxv, 674 s.
ISBN:1-85996-315-3 LIBRIS-ID:9061628
Library search