



LUND
UNIVERSITY

Faculty of Medicine

BIMM18, Biomedicine: Advanced molecular medicine, 30 credits

Biomedicin: Avancerad molekylär medicin, 30 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus is an old version, approved by Committee for Biomedical, Medical and Public Health Education on 2015-03-31 and was valid from 2015-03-31, spring semester 2015.

General Information

The course is compulsory within Master Programme in Biomedicine and constitutes its semester 1

Main field of studies

Biomedicine

Depth of study relative to the degree requirements

A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

Knowledge and understanding

The student should on completion of the course, with correct terminology and a language that is adapted to well versed colleagues be able to:

- argue for the possibilities and limitations within biomedical research and application of the cell culture and account for preconditions for cell culture in vitro
- argue for animal models possibilities and limitations within biomedical research and account for relevant technologies, laws, statutes and ethical rules for handling of laboratory animal
- account for reproduction and embryonic development for mouse and rat, methods for production and genotype and phenotypic analysis of gene-modified mice and analyse disease models where gene-modified animals are used

- account for the development, selection, regulation and toleransmekanismer and effektorfunktion at the cellular and molecular level, its interaction with the innate immune defence at infection and tissue damage and at hypersensitivity reactions of lymphocytes
- account for primary and secondary immune responses and explain the principles of vaccination and describe symptoms and relate these to immunological mechanisms at some common autoimmune diseases
- account for various types of variables from scale level, and describe how they can be presented numerical and graphical,
- account for the concepts random samples, parameter and parameter estimation and how the uncertainty of estimations relates oneself to sample size, and reason about the concepts generalizability and causality
- put up nollhypotes and mothypotes and account for the concepts significance level, statistical strength, confidence intervals and p-value
- choose and explain an appropriate test at tvågruppsjämförelser.

Competence and skills

The student should, on completion of the course, be able to:

- independently plan and carry out laboratory sessions and summarise results in writing self-critical/critically in relation to the scientific literature with a for the subject area relevant language,
- identify and present relevant information from scholarly journals with biomedical issues and evaluate and relate the information to the subject area
- carry out adequate statistical analyses with a statistical program package and interpret the results
- handle the most common smaller laboratory animals (mainly mouse) and carry out anaesthesia and simple operational encroachments,
- suggest appropriate method for production of gene-modified animals from a given issue, establish time plan, calculate consumption of laboratory animal and write an ethical application concerning vivisections.

Judgement and approach

The student should, on completion of the course, be able to:

- with constructive and critical attitude analyse and argue for practical and theoretical preconditions in different biomedical research methods including ethical and environmental aspects and reflect on alternatives
- evaluate and review media information critically (radio, TV, daily press, bloggar and web pages) concerning biomedical issues,
- evaluate the own goal attainment in relation to learning objectives.

Course content

The course intends to prepare the student for further studies within experimental medical research by giving advanced knowledge within three main fields of study: cell culture, animal experimentation models and immunology and basic knowledge within biostatistics and scientific communication.

The course starts with theoretical and practical knowledge of and skills in cultivation of cells in vitro. The students are trained in to plan, carry out and analyse trials that

include cell culture and to assess under which relation as cell culture can be used to solve issues within basic and applied research.

The main field of study experimental animal models are initiated with general laboratory animal science that includes both practical and theoretical knowledge and aim to give the student conditions to work with smågnagare/hardjur in djuravdelningar. Further, training in ethical positions and in to write is given an ethical djurförsöksansökan. After that, focus on the reproduction and embryogenesis of the mouse and the rat are put with special emphasis on how one goes practically tillväga at collection of the preimplantationsembryon. The most common methods at generation of gene-modified mice are gone through in detail and the students are given occasion to practise these. The main field of study is completed with genotype and fenotypanalys.

The course is completed with studies in advanced immunology at the cellular and molecular level. Different immunological ämnesavsnitt are treated under theme weeks and the students are trained, so that they can account for and compare immunological mechanisms at e.g. infection, tissue damage, vaccination, hypersensitiveness or autoimmunity.

Within the frame of the course, biostatistics that corresponds to the course is also taught? Applied Statistics I- general specialisation 1.5 credits? and may be included in third-cycle courses and study programmes at The Faculty of Medicine, Lund University.

Course design

The teaching is student-centered with varied tuition forms so as problem-based learning in tutorial groups (PBL), teams based learning (TBL) and case methodology. Lectures of active researchers are given both as introduction to subject areas and as specialisation to give clear examples from modern experimental research and to integrate recent research results in the teaching. In addition to the reading list read the students supplementary scientific articles that are discussed under group work. A web-based course that treats research with smågnagare and hardjur are also included.

The practical teaching is given in the form of a number of laboratory sessions that the students carry out in groups. Written individual reports in the form of miniartiklar? be submitted after each laboratory session.

Literature assignment that is carried out within the main field of study animal experimentation models should be presented both orally and in writing. Further, the students should write an ethical application concerning vivisections which be discussed in a set-up that reminds about the hearing with djurförsöksetiska the board.

All group tuition, laboratory parts and lectures that are associated with laboratory sessions have compulsory attendance.

Assessment

The course is examined through six test parts, a practical examination, the four written and a kursportfolio.

In the practical examination, expected learning outcomes respect knowledge and understanding and skills and abilities regarding cellodlingsrelaterade learning objectives are examined.

At the written examinations, expected learning outcomes concerning knowledge and understanding are examined.

In kursportfolion, the expected learning outcomes respect skills and abilities and judgement and approach through active participation in group work and laboratory sessions, oral presentations and written assignments are examined.

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

Grades

Marking scale: Fail, Pass.

For the grade Pass in the course, the grade Pass on all test parts is required.

Entry requirements

The same as to Master's programme in biomedicine: 180 högskolepoäng within biomedicine, biotechnology, cell and molekylärbiologi or medicine including at least 15 credits självständigt work (degree project) within biomedicinskt-naturvetenskapligt område. För to give behörighet should the education innehålla at least 30 credits grundläggande chemistry of which at least 15 credits include the ämnesområdena biochemistry cellkemi or the equivalent; at least 45 credits grundläggande cell biology (cell biology, molekylärbiologi, microbiology, immunology, genetics and/or developmental biology) of which at least 5 credits immunology and 5 credits microbiology; at least 10 credits human physiology and at least 30 credits molekylär medicine, pathobiology and/or toxicology. English B/English 6.

Subcourses in BIMM18, Biomedicine: Advanced molecular medicine

Applies from H15

- 1501 Practical examination - cell culture, 2,0 hp
Grading scale: Fail, Pass
- 1502 Written exam - cell culture, 3,5 hp
Grading scale: Fail, Pass
- 1503 Written exam - biostatistics, 1,5 hp
Grading scale: Fail, Pass
- 1504 Written exam - animal models, 5,5 hp
Grading scale: Fail, Pass
- 1505 Written exam - immunology, 6,0 hp
Grading scale: Fail, Pass
- 1506 Portfolio, 11,5 hp
Grading scale: Fail, Pass