

BIMA43, Biomedicine: Pathobiology and Pharmacology, 13.5 credits

Biomedicin: Patobiologi och farmakologi, 13,5 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by The Master's Programmes Board on 2016-06-07 to be valid from 2016-07-01, autumn semester 2016.

General Information

The course is a compulsory component of the Bachelor of Medical Science programme in Biomedicine and is included in semester 4. The course can also be taken as a freestanding course.

Language of instruction: Swedish and English

The course is mainly taught in Swedish. Some components may be taught in English. The reading list includes titles in English.

Main field of studies

Biomedicine

Depth of study relative to the degree requirements

G2F, First cycle, has at least 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 the basic terms, principles and mechanisms within general pathology
- explain the basic principles of pharmacodynamics, pharmacokinetics and pharmacotoxicology, and perform simple pharmacokinetic calculations
- account for cellular and physiological responses to adrenergic and cholinergic transmission in the peripheral nervous system, and how these can be affected by pharmaceuticals

- explain the known and conceivable underlying cellular and molecular pathophysiological mechanisms for selected diseases
- account for existing and possible paths for pharmacological intervention at the molecular, cellular and systemic levels of studied diseases
- explain the complexity of diseases related to organ systems and the pharmacological or non-pharmacological treatment of them
- account for the different parts of the drug development process, from discovery to finished product

Competence and skills

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

- work in groups and constructively evaluate their own role in the group so the group achieves results
- formulate hypotheses on the pathological causes of diseases, and principles of pharmacological treatment of them
- assess information from different sources and present it orally to fellow students, using appropriate terminology at the level of the required reading.
- study standard and pathological samples in a microscope and identify the differences between them
- find and synthesise relevant scientific information in subject-specific original and survey articles, and apply and compile the information in a written paper equivalent to a survey article in the area, paying special attention to the scientific content, structure, language and reference management
- provide and receive constructive feedback from a fellow student (peer review), and reflect on how the process affects the contents and quality of the written paper
- discuss advantages and disadvantages of pharmacological intervention

Judgement and approach

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

- reflect on pharmacogenetic issues
- reflect on how research and development in pathobiology and pharmacology contributes to disease prevention and treatment
- discuss ethical considerations on the basis of increased knowledge of diseases and their underlying causes

Course content

The course integrates knowledge acquired earlier in, for example, physiology, cell biology and cell chemistry with pathobiology and pharmacology by studying selected diseases. The aim is to provide students with a holistic perspective on the diseases and highlight the need of broad knowledge to be able to explain the diseases on the molecular, cellular and organ levels. The ethical issues of the subject are addressed. The course also provides students with training in group work and in providing and receiving feedback.

The course starts with an introduction to pathobiology, pharmacodynamics, pharmacokinetics, pharmacotoxicology and pharmacogenetics with overviews of basic pathological and pharmacological concepts as well as the principles of administration,

distribution, metabolism and elimination (ADME) of drugs. This will serve as a foundation for the pharmacological components of the following weeks. The course will then continue with, primarily, thematic weeks focusing on a selection of disorders, including autoimmunity and inflammatory states, infection medicine and internal medicine such as diabetes mellitus and cardiovascular diseases. This approach will be as broad as possible, allowing aspects such as underlying causes (aetiology), pathogenesis, symptoms, diagnosis, pharmacological and non-pharmacological treatment, the mechanisms behind the effect of drugs and ethical considerations to be discussed.

A further component of the course is that students are to individually execute a literature project within a delimited field in pathobiology and pharmacology. The literature project will enable the student to practise several of the generic skills required of biomedical professionals. Among the skills practised are seeking, reviewing, assessing and compiling scientific original and survey articles. The project is to be reported as a survey article in English.

The course also provides students with an introduction to aspects related to the different stages of drug development, from the early phases of clinical assessment and approval to the continued follow up of finished drugs (drug discovery and development). These components will include lectures and seminars by industry representatives, highlighting the role of biomedicine experts in the pharmaceutical industry.

Course design

The course is mainly based on problem-based learning (PBL) and mostly consists of thematic weeks. A typical week includes one or more supporting lectures. During the week, the students work in PBL groups (two meetings/week) and individually. At the first meeting, students analyse a case associated with the thematic week, checking the current knowledge of the group members and formulating the study goals for the week. At the final meeting, the group examines and discusses the knowledge acquired individually and reconnects to and explains the case. The group work is supported by a tutor. The PBL sessions provide the students with training in taking responsibility for their knowledge development and working constructively in groups.

Some components are addressed through supervised group study. These components are based on independent study supplemented with lectures and a final group meeting, during which the group participants discuss and account for the knowledge acquired on the weekly subject. The group members are to support each other, partly based on their own ideas with regard to the current subject, partly based on available group study questions. If a group fails to reach an understanding of all aspects, a group supervisor will step in at a later stage of the meeting and provide explanations.

Some components will be addressed during seminars and exercises based on activity by both lecturers and students. Demonstration labs will be employed to show the complexity of pharmacological interventions with regard to organ diseases or diagnostic possibilities. Microscopy exercises will be used as support for increased understanding of morphology. These components may include written assignments.

In parallel with the thematic weeks, students will execute a literature project within a delimited field in pathobiology and pharmacology. The areas to be covered are decided by the student in consultation with the supervisor. The aim of the literature project is to enable students to practise seeking, assessing and compiling information from research literature, and presenting the information in a report equivalent to a literature survey.

Assessment

The course is assessed on the basis of two examination components: a written exam and a course portfolio.

The learning outcomes with regard to knowledge and understanding are mainly assessed on the basis of the written exam. The learning outcomes with regard to competence and skills and judgement and approach are mainly assessed on the basis of the portfolio. The portfolio is to include active participation in group exercises, seminars, laboratory sessions, exercises and written assignments with associated components. Students who fail a component are to the greatest extent possible to be offered re-examination opportunities during the course. If this is not possible, students will be referred to the next time the course is offered.

Other forms of examination can be used, if there are special reasons.

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

Grades

Marking scale: Fail, Pass.

Entry requirements

To be admitted to the course, students must have completed three semesters of the Bachelor of Medical Science programme and a course in physiology of 15 credits, or passed at least 15 credits of basic cell biology, 30 credits of chemistry, of which at least 15 credits of cell chemistry or biochemistry, 7.5 credits of microbiology, 7.5 credits of immunology, 7.5 credits of human physiology, and another 15 credits of cell biology, microbiology, genetics or immunology.

Further information

The corresponds to the previous course BIMA35.

Subcourses in BIMA43, Biomedicine: Pathobiology and Pharmacology

Applies from V17

- 1601 Written Exam, 8,0 hp
Grading scale: Fail, Pass
- 1602 Course Portfolio, 5,5 hp
Grading scale: Fail, Pass