BIMA37 Microbiology and immunology

13.5 credits  First  cycle  G1F

General information

Main field
Biomedicine

Subject
Microbiology and immunology

Type of course
The course is a compulsory component of semester 3 in the Bachelor of Medical Science programmes in Biomedicine.

Language of instruction
Swedish

Learning outcomes

Knowledge and understanding
On completion of the course, students shall be able to
- provide an account of different protective barriers and describe how blood cells are formed, communicate and function as protection against microbial infections
- provide an account of how cellular as well as loose components of the immune system act to create acute-phase response, inflammation and high temperature
- provide an account of how immunological memory is created, how specificity is achieved in the immune system and how and why tolerance is developed
- provide an account of basic bacterial structures and examples of processes causing bacterial infections in humans
- provide an account of basic viral structures and examples of processes causing viral infections in humans
- provide an account of how hypersensitivity and sensitivity to infection vary in relation to genetic and environmental factors

Competence and skills
On completion of the course, students shall be able to
- present and discuss immunological and microbiological issues in speech and writing
- carry out and summarise in writing simple immunological and microbiological laboratory techniques and assess parameters such as sensitivity, specificity and coefficients of variation.

Judgement and approach

On completion of the course, students shall be able to
- assess and critically review immunological and microbiological information communicated via mass media such as radio, television, newspapers, podcasts, blogs and web pages.

Course content

The course provides basic knowledge of microbiology and immunology, focusing on the cellular and molecular levels. The first week introduces basic blood cell biology and the communication of immune cells, followed by weekly themes on innate immune defence and inflammation, acquired immune defence tolerance development, basic virology, basic bacteriology and, finally, hypersensitivity and sensitivity to infection.

Subjects examined

Laboratory exercises, 2 credits
Quizzes (readiness assurance process), 2.5 credits
Individual project, 9 credits

Course design

Teaching is in the form of compulsory group work (PBL and/or TBL), lectures, seminars/workshops and compulsory laboratory exercises. Case methodology may be used for reflection in the laboratory exercises or for exercises in assessment and critical review of media reporting linked to microbiology and/or immunology. In order to ensure that the learning outcomes are achieved, quizzes will be used on a weekly basis. The quizzes take place both individually and in groups and will be used for both formative and summative assessment.

The laboratory exercises will be based on immunological and microbiological issues. Microscope studies of blood cells and bacteria will be used to reveal cells and organisms. Through in vitro production of antigens and analysis of antibodies, followed by work with statistics software, students will practise relevant techniques and method evaluation. Cultivation and identification of bacteria provide students with insights into basic microbiological practices and the integral part played by risk assessment. The results of the evaluations and laboratory exercises are to be summarised in written papers designed in accordance with scholarly practice. The students assist each other in raising the quality of the papers through peer reviewing.

Throughout the course, students will work on a major individual project within microbiology and immunology. Students assist each other through peer reviewing and the examiner provides formative feedback. In order to ensure that the learning outcomes are achieved, the assessment will take into
account the students’ ability to respect deadlines and produce work in accordance with the guidelines provided. The individual project is to be presented in small groups, including the examiner and a critical reviewer.

Assessment

For a pass on the course, students must have been awarded this grade on all subjects examined. For a pass on the laboratory exercises, the students’ reports must have been approved by the course director and peer reviewed. For a pass on the quizzes, the students must have passed at least 4 out of 6 individual tests and all tests in groups. For a pass on the individual project, the student must have passed the written report, the peer review and the oral presentation.

Grades

The grades awarded are Pass or Fail.

Admission requirements

Chemistry 15 credits, Cell Chemistry/Biochemistry 15 credits and Cell Biology 15 credits.

Required reading

One of the following books on immunology is recommended.
Kuby Immunology (latest edition) by Kindt, Goldsby and Osborne.
Cellular and Molecular Immunology (latest edition) by Abbas and Lichtman.
Janeway’s Immunobiology (latest edition) by Murphy.
Other up-to-date titles on immunology may be accepted, subject to consultation with the course management.

One of the following books on microbiology is recommended.
Microbiology – An Introduction (latest edition) by Tortora, Funke and Case.
Medical Microbiology (latest edition) by Murray.
Other up-to-date titles on microbiology may be accepted, subject to consultation with the course management.

The required reading also includes published research articles.

Further information

The course replaces BIMA31.