UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Molecular Immunology

2021-3-E0201Q056

Aims

Aim of the course is to give modern concepts on how the immune system interacts with an environment containing different species of microorganisms potentially dangerous. The course will be focused on how the immune system evolved to protect the individual self from invading microorganism. Different topics will be treated by discussing original experiments and the most up-to-date themes will be deeply discussed.

Knowledge and understanding:
Aim of the course is to give modern concepts on how the immune system interacts with an environement containing different species of microorganisms potentially dangerous, how the immune system protects us from tumor development and how it participates to the aetiogenesis of inflammatory disorders. The course will be focused on how the immune system evolved to protect the individual self from invading microorganism. different topics will be treated by discussing original experiments and the most up-to-date findings will be thoroughly discussed.

Ability to apply knowledge and understanding:
Orignal article discussion led by the Lecturer will allow to open a discussion with the students and to evaluate the comprehension of the arguments discussed during the course

Making judgements
Question and answers as well as a final evaluation of the paper discussed will allow each student to judge the data exposed.

Communication skills
The questions made during the lessons will allow the evaluation of the comunicative skills of the students.

Learning skills
Learning skills will be evaluated during the lessons based on students' questions/discussion as well as via the final written exam.

Contents

1) Inflammation and innate immunity
2) Transcription factors and the immune regulation
3) The immunometabolism
4) The epigenetic control of the immune response
5) The interferons
6) Immune defense against the infections
7) Commensal microorganism and the immune system
8) Immunopathologies
9) Tumors and phagocytes
10) Tumors and natural killer cells

Detailed program

1. Inflammation and innate immunity.
The barriers of the immune system. The cells of the innate immunity. The receptors of the innate immunity. Signal transduction of the TLRS. The inflammasome.
2. The transcription factors that regulate the immune response.
The activation of an immune response requires the activity of specific transcription factors (TF). Some of the major TF involved in an immune response will be analyzed
3. The immunometabolism.
Relationship between cellular metabolism and immunity. The immunometabolism of phagocytes, lymphocytes and tumors.
4. Epigenetic control of an immune response.
The importance of the epigenetic regulation of an immune response to determine the memory of the innate immune system.
5. The interferons.
Importance of the three types of interferons during an immune response
6. Immunity against infections.
Innate and adaptive responses elicited against fungal, viral and bacterial infections.
7. The microbiota and the immune system.
Mucosal immunology and the interaction between the microbiota and the immune system.
8. Immunopathologies.
Sepsis and IBDS
9. Phagocytes and tumors.
Role of neutrophils and macrophages in the development of tumor growth and spread.
10. NK cells and tumors.
Origin and phenotype of NK cells, mechanisms of recognition of targets. Activatory and inhibitory receptors. Anti-tumoral activities.

Prerequisites

Background: basics of immunology
Specific prerequisites: Immunology.
General prerequisites: Students can take the exams of the third year after having passed all the exams of the first year of the course.

Teaching form

Classroom lessons supported by PowerPoint presentations. The lecturer will present and discuss scientifically relevant, old and newly published papers related to the topics of the course.
Teaching language: italian.

Textbook and teaching resource

Learning material (slides of the lessons, scientific papers) is available at the e-learning web page of the course.

Recommended textbook:
- Paul Travers, Mark Walport, Mark Shlomchik, Mark Schlomchik Charles Janeway (Authors); “Immunobiology, the immune system in health and disease”,Taylor & Francis, Inc. (Editors) (most recent edition)

Semester

Second semester

Assessment method

Written examination with open questions. Students will be asked on methods, results and theories related to scientific articles presented during the lessons.

Office hours

Contact: on demand, upon request by mail to lecturer.