BIO-477

Infection biology

Blokesch Melanie

Cursus	Sem.	Type
Life Sciences Engineering	MA2	Opt.
Sciences du vivant	MA2, MA4	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
Hours	**5 weekly**
Lecture	3 weekly
Exercises	2 weekly
Number of positions	

Summary

Infectious diseases (ID) are still a major problem to human health. But how do pathogens make us sick? How do they evolve and spread? The discovery and use of antibiotics and vaccination has changed the outcome of some IDs. But resistance mechanisms have evolved and are of major concern.

Content

- Impact of infectious diseases (pandmics, epidemics)
- Evolution of pathogens and horizontal gene transfer
- Bacterial infections (intra vs. extracellular bacteria)
- Identification of virulence factors using molecular approaches
- Diarrheal diseases
- Respiratory diseases
- Symbiosis
- The human microbiota
- Antimicrobials
- Viral infections
- Eukaryotic pathogens (Plasmodium, Trypanosome, Worms)
- Pathogenic fungi
- Bioethics

Keywords

Infection Biology; bacterial pathogens; viruses; eukaryotic pathogens; antibiotics and resistance mechanisms; virulence factors; global impact of infectious diseases.

Learning Prerequisites

Required courses

An *Introductory Microbiology* course is a prerequisite.
Exchange students will only be accepted after presentation of a certificate indicating that they have followed a basic microbiology course.

Recommended courses

Immunology and basic cell biology.

Important concepts to start the course

Basic microbiology; knowledge of prokaryotic specialities (ribosomes, cell wall etc).

Learning Outcomes

By the end of the course, the student must be able to:

- Judge the impact of infectious diseases on human health
- Assess / Evaluate the need for new therapeutics to fight infectious diseases
- List and explain current vaccination regimes
- Describe molecular mechanisms that underly pathogenicity
- Analyze and present publications on Infection Biology

Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Use a work methodology appropriate to the task.
- Set objectives and design an action plan to reach those objectives.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Access and evaluate appropriate sources of information.
- Summarize an article or a technical report.
- Write a scientific or technical report.

Teaching methods

Ex cathedra + discussion of relevant publications + exercises

Expected student activities

Participating students are expected to engage in this course by attending lectures, reading additional material, understanding and presenting recent state-of-the-art publications, and completing exercises.

Assessment methods

Written exam

Supervision

Office hours	Yes
Assistants	Yes
Forum	No
Others	Moodle webpage (EPFL-SV-Master Infection Biology; BIO-477)

Resources

Bibliography

- "Bacterial pathogenesis: a molecular approach / Brenda A. Wilson ... [et al.]. Year:2011. ISBN:978-1-55581-418-2
- "Microbiology: an evolving science / Joan L. Slonczewski, John W. Foster. Year:2011. ISBN:978-0-393-11824-7

- "Principles of virology" / S.J. Flint ... [et al.]. Year:2009. ISBN:978-1-55581-443-4

Ressources en bibliothèque

- Bacterial Pathogenesis: A Molecular Approach / Wilson
- Principles of Virology / Flint
- Microbiology: An Evolving Science / Slonczewski

Moodle Link

- http://moodle.epfl.ch