BIO-477

# Infection biology

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

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| Language of teaching | English |
| Credits | 5 |
| Session | Summer |
| Semester | Spring |
| Exam | Written |
| Workload | 150h |
| Weeks | 14 |
| **Hours** | **5 weekly** |
| Courses | 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 (pandemics, epidemics)
- Evolution of pathogens and horizontal gene transfer
- Bacterial infections (intra vs. extracellular bacteria)
- Virulence factors inclduing toxins and secretion systems
- Identification of virulence factors using molecular approaches
- Diarrheal diseases
- Respiratory diseases
- Viral infections
- Symbiosis
- Human microbiota
- Vaccines
- Antimicrobials
- Eukaryotic pathogens & 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

Basic microbiology (prerequisite), immunology, basic cell biology, and genetics and genomics.

### Important concepts to start the course

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

## 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

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|---|---|
| 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