

BIO-479

**Immunology - advances and therapeutic implications**

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Cursus	Sem.	Type
Life Sciences Engineering	MA1, MA3	Opt.
Minor in life sciences engineering	H	Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
<b>Hours</b>	<b>5 weekly</b>
Lecture	3 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

The students acquire advanced level knowledge regarding the functioning of the (vertebrate) immune system. A strong focus is placed on the molecular mechanisms underlying innate and adaptive immune responses and their implications for medicine.

**Content**

The basic subject will be introduced by online lectures and/or self-directed exercises. It will be followed up by (higher-level) discussions on seminal primary research or on summaries of emerging themes related to functioning or therapeutic implications of the immune system. These discussions will be prepared by the students and presented in small groups during seminars.

Basic Topics include:

- Innate Immunity
- Antibodies and Antigens
- Activation and differentiation of T lymphocytes
- B cell immunology and humoral immunity
- Immunity to microbes
- Transplantation Immunology
- Vaccination
- Tumor Immunity

**Specialized topics** discussed can include innate immune memory function, emerging anti-inflammatory medicines, novel T cell checkpoints, novel approaches to cancer immunotherapy, autoinflammatory syndromes.

**Keywords**

- Immune cell subsets
- Pattern recognition receptors
- Signal transduction
- T cell differentiation
- Antigen processing and presentation
- B cell regulation

**Learning Prerequisites****Required courses**

Biology I, II  
Basic knowledge in immunology is helpful.

### Recommended courses

Biologie Moleculaire et Cellulaire II & III.

### Important concepts to start the course

- cellular biology
- pathogens

### Learning Outcomes

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

- Recall knowledge of the immune response
- Assess / Evaluate the value and accuracy of primary scientific research
- Use available resources to generate an oral report on a immunological topic
- Propose strategies of translational immunity

### Transversal skills

- Give feedback (critique) in an appropriate fashion.
- Make an oral presentation.
- Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.

### Teaching methods

- Online lectures
- Preparation and oral presentations of review articles and of primary research articles

### Expected student activities

- Revision of course content
- Presentation of scientific topic

### Assessment methods

- Written assessment of acquired knowledge in an exam format
- Oral presentation

### Supervision

Assistants                      Yes

### Resources

#### Moodle Link

- <https://go.epfl.ch/BIO-479>