

BIO-207

**Cellular and molecular biology II**

Karthaus Wouter Richard

Cursus	Sem.	Type
Life Sciences Engineering	BA4	Obl.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Lecture	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

This course is aimed to familiarize students with the 3D organization of a eukaryotic cell, its compartmentalization, how cellular compartments communicate together and how a cell communicates with its environment. The related molecular mechanisms will be discussed.

**Content**

Membranes (structure) (chapter 10)  
 Membrane transport (chapter 11)  
 Origin and transmission of mitochondria, and cell death  
 Organelles and transport (chapters 12 and 13)  
 Cellular communication (chapter 15)  
 Cytoskeleton (chapter 16)  
 Cellular junctions (chapter 19)

**Keywords**

biological membranes, lipids, transmembrane proteins, organelles, addressing, protein folding, quality control, cellular homeostasis, ionic composition, signaling, inter- and intracellular communication, apoptosis, cell junctions

**Learning Outcomes**

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

- Describe the structure of a biological membrane, the 3D organization of a eukaryotic cell, the mechanisms of communication between cells and between organelles, the mechanisms of protein addressing, the mechanisms of establishment and maintenance of the cellular ionic composition
- Analyze the results of experiments on the themes of the course.
- Design experiments on course topics to test a hypothesis
- Test hypotheses within the framework of the course themes.
- Describe the consequences of an experimental manipulation or treatment in the context of the course themes.
- Develop scenarios to explain experimental observations.
- Explain the structure of a biological membrane, the 3D organization of a eukaryotic cell, the mechanisms of communication between cells and between organelles, the mechanisms of protein addressing, the mechanisms of establishment and maintenance of the cellular ionic composition, the mechanisms involved in cellular junctions

**Expected student activities**

3 hours of classroom work at EPFL and 3 hours of personal work.

**Assessment methods**

written exam

### **Supervision**

Assistants                      Yes

### **Resources**

#### **Bibliography**

Molecular Biology of the Cell, 6th Ed. Alberts et al.; Garland Science

#### **Ressources en bibliothèque**

- [Molecular Biology of the Cell, 6th Ed. Alberts et al.; Garland Science](#)

#### **Moodle Link**

- <https://go.epfl.ch/BIO-207>