

CH-411

**Cellular signalling**

Hovius Ruud

Cursus	Sem.	Type
Chimiste	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	Written
Workload	60h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Lecture	2 weekly
<b>Number of positions</b>	

**Summary**

Presentation of selected signalling pathways with emphasis on both the mechanism of action of the molecules involved, molecular interactions and the role of their spatio-temporal organization within the cell, considering cellular dimensions and conditions.

**Content**

Ligand binding and receptor activation. Receptor systems in plasma membrane, cytosol and nucleus. Lipids, proteins and molecular interactions. Regulation of activity and covalent modification. Spatial and temporal organisation of molecules and signalling efficacy.

**Keywords**

Cellular signalling, molecular interactions, space and time, cellular conditions, receptor, ligand, membranes, protein modifications

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

Biochimie I (CH-210)  
Macromolecular structure and interactions (CH-311)  
Dynamics of biomolecular processes (CH-312)  
Chemical Biology (CH-313)

**Recommended courses**

Biochemistry II (CH 313)  
Reaction kinetics

**Important concepts to start the course**

Biochemistry, cell and organelles, membranes, proteins, biophysical methods. physical chemistry

**Learning Outcomes**

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

- Integrate molecular and cellular events
- Discuss cellular signalling pathways
- Analyze scientific literature
- Assess / Evaluate mechanisms of regulation

- Contextualise receptor-ligand interactions
- Elaborate Spatio-temporal organisation and regulation
- Estimate using logical deduction and common sense

### Teaching methods

Lectures & discussion

### Expected student activities

Active participation to lectures; read and interpret scientific reviews and papers

### Assessment methods

Oral exam, without preparation

### Supervision

Others                      during course or on rendez-vous

### Resources

#### Bibliography

course hand-outs  
review and research articles

#### Notes/Handbook

standard text books

#### Websites

- <http://Moodle>

#### Moodle Link

- <https://go.epfl.ch/CH-411>