

Membrane Biochemistry in Health and Disease

Course # 2226-FS2017-0

Matthias Hediger, Christiane Albrecht, Peter Bütikofer, Roch-Philippe Charles, Dimitrios Fotiadis, Daniel Fuster, Jürg Gertsch, Martin Lochner, Christine Peinelt and guest speakers

Philosophisch-naturwissenschaftliche Fakultät – Biologie - Bachelor in Biology, Specialisation in Cell Biology and Master in Molecular Life Sciences - Wahlveranstaltungen Bachelor in Cell Biology (B) and Master in Molecular Life Sciences (M)

Wednesday, March 1, 2017 – May 31, 2017, 16:15 - 18:00

Institute of Biochemistry and Molecular Medicine (IBMM),
Gertrud-Woker-Strasse 5, lecture room, ground floor

ATTENTION: Lecture 7 is exceptionally held on MONDAY, April 10, 2017

A minimal attendance of 80% of the lectures will be required to attend to the exam.

Learning objectives: In this lecture series, the students will receive an overview of general membrane biochemistry as well as in-depth insight into basic and applied research pertaining to transporters, ion channels and membrane receptors. Transfer of knowledge is based on a mixture of lectures and interactive discussions.

Part 1 – Basic aspects of membrane biochemistry

1. 01.03.2017 (Peter Bütikofer)

- **Introduction to lecture series**
- **Membrane structure and organization**
Membrane lipids, synthesis of membranes, organization (bilayers, liposomes), asymmetry, mobility.

2. 08.03.2017 (Matthias Hediger and Dimitrios Fotiadis)

- **Types of membrane transport proteins (Matthias Hediger)**
Ion-coupled transporters, facilitated transporters, SLC families, channels, ABC transporters, pumps and porins.
- **Methods for the characterization of membrane protein structure (Dimitrios Fotiadis)** Purification, overexpression, structural biology methods

3. 15.03.2017 (Matthias Hediger and Post-Docs)

- **Transporters and channels in health and diseases: From basic science to therapeutic applications**
Nutrient transporters, TRP channels and store-operated calcium channels

4. 22.03.2017 (Dimitrios Fotiadis)

- **Structure and function of G-protein-coupled receptors**

5. 29.03.2017 (Christoph von Ballmoos and Benjamin Cl  men  on)

- **Mitochondrial membrane proteins involved in oxidative phosphorylation**
 - a. Redox driven proton transport and ATP synthesis
 - b. Mitochondrial carrier family SLC25

Part 2 – Research

6. 05.04.2017 (Christiane Albrecht)

- Clinical implications of ATP-binding cassette (ABC) transporters

7. MONDAY, 10.04.2017 (Daniel Fuster)

- Sodium/hydrogen exchangers and acid-base physiology

19.04.2017 Easter Break

8. 26.04.2017 (Andrea Chicca and Jürg Gertsch)

- Structure, function and pharmacology of endocannabinoid receptors

10. 03.05.2017 (Christine Peinelt and Jean-Sébastien Rougier)

- Pathophysiology of Ion channels
- Pathophysiology of Nav1.5 in the heart – molecular mechanisms and future therapeutic directions

12. 10.05.2017 (Roch-Philippe Charles)

- Membranes and cancers:
 - a. Epithelial to mesenchymal transition
 - b. Warburg effect

13. 17.05.2017 (Peter Bütikofer)

- Lipid modifications of proteins
- Membrane lipid synthesis in a model eukaryote

14. 24.05.2017 (Sonja Kleinlogel and Marcel Egger)

- Glutamate receptors in the visual system
- The role of InsP3 signalling in cardiac arrhythmogenicity

15. 31.05.2017 (Martin Lochner)

- Development of chemical ligands for membrane proteins

Exam Tuesday, 06.06.2017, 16h15 – 18h00