Membrane Biochemistry in Health and Disease
Course # 2226-FS2018-0
Matthias Hediger, Dimitrios Fotiadis, Christiane Albrecht, Daniel Fuster, Andrea Chicca,
Roch-Philippe Charles, Martin Lochner, Christine Peinelt and guest speakers
Philosophisch-naturwissenschaftliche Fakultät – Biologie - Bachelor in Biology, Specialisation in Cell Biology and Master in Molecular Life Sciences - Wahleranstaltungen Bachelor in Cell Biology (B) and Master in Molecular Life Sciences (M)

Wednesday, February 28, 2018 – May 30, 2018, 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 16, 2018
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. 28.02.2018 (Matthias Hediger)
   • Introduction to lecture series
   • Membrane structure and organization
     Membrane lipids, organization (bilayers, liposomes), asymmetry, mobility, glycolipids, membrane proteins.
   • Types of membrane transport proteins
     Ion-coupled transporters, facilitated transporters, SLC families, channels, ABC transporters, pumps and porins.

2. 07.03.2018 (Dimitrios Fotiadis, Sofia Verouti and Geneviève Escher)
   • Methods for the characterization of membrane protein structure
     Purification, overexpression, structural biology methods
   • Transgenic tools to study membrane transport proteins

3. 14.03.2018 (Matthias Hediger and Post-Docs)
   • Transporters and channels in health and diseases: From basic science to therapeutic applications
     Nutrient transporters, TRP ion channels and store-operated calcium channels

4. 21.03.2018 (Dimitrios Fotiadis)
   • Structure and function of G-protein-coupled receptors

5. 28.03.2018 (Christoph von Ballmoos and Benjamin Clémençon)
   • Mitochondrial membrane proteins involved in oxidative phosphorylation
     a. Redox driven proton transport and ATP synthesis
     b. Mitochondrial carrier family SLC25
Part 2 – Research

04.04.2018 Easter Break

6. 11.04.2018 (Christiane Albrecht)
   • Clinical implications of ATP-binding cassette (ABC) transporters

7. 16.04.2018 (Daniel Fuster)
   • Sodium/hydrogen exchangers and acid-base physiology

8. 25.04.2018 (Andrea Chicca and Jürg Gertsch)
   • Structure, function and pharmacology of endocannabinoid receptors

9. 02.05.2018 (Christine Peinelt and Jean-Sébastien Rougier)
   • Pathophysiology of ion channels
   • Pathophysiology of Nav1.5 in the heart – molecular mechanisms and future therapeutic directions

10. 09.05.2018 (Roch-Philippe Charles)
    • Membranes and cancers:
      a. Epithelial to mesenchymal transition
      b. Warburg effect

11. 16.05.2018 (Sonja Kleinlogel and Marcel Egger)
    • Glutamate receptors in the visual system
    • The role of InsP3 signalling in cardiac arrhythmogenicity

12. 23.05.2018 (Martin Lochner)
    • Development of chemical ligands for membrane proteins

Exam  Wednesday, 30.05.2018, 16h15 – 18h00