Level: master

Course title: Lipids and cell membranes (B-501)

Status: obligatory

ECTS: 7

Requirements: none

Learning objectives

The goal of the course is to provide students with advanced and extended knowledge of structure and function of lipids and other structural elements of cell membrane, as well as structure and function of the cell membrane itself. Furthermore, the goal of the course is to develop students' ability to establish relationship between the gained knowledge of membrane lipids and proteins and their role in properties and functions of the cell membrane, which will enable better understanding of processes within the cell and the organism as a whole.

Learning outcomes

By the end of this course, students will be able to (1) differentiate lipid classes and their functions in the organism, (2) independently choose methods for isolation, purification and analysis of lipids from different natural sources, (3) understand biochemical processes in organism which involve lipids, (4) understand structure of cell membrane and transport mechanisms of ions, biomolecules and signals through cell membrane, (5) understand the correlation between properties and various functions of the cell membrane and structure and properties of membrane lipids.

Syllabus

Theoretical instruction: Amphiphilic lipids (phospholipids, sphingolipids, glycolipids, eicosanoids): structure, properties, conformation of amphiphilic membrane lipids. Occurrence of lipids. Isolation from natural sources, analysis. Transport and reaction of lipids in the blood. Lipids in cellular signalling. Lipids in the diet. Lipid metabolism disorders and diseases. Phospholipase. The composition and structure of the membrane: membrane lipids, proteins and carbohydrates. Transport processes: simple and facilitated diffusion, osmosis, active and passive transport. Membrane potential. Ion channels. Signal transduction across the membrane. Membranes and energy conservation. Lipid peroxidation. The mechanism of lipid peroxidation. Peroxidation impact on living organisms.

Practical instruction: -

Weekly teaching load				Other:
Lectures: 4	Exercises:	Other forms of teaching: 2	Student research:	