Level: master

Course title: Preparative biochemistry

Status: elective

ECTS: 7

Requirements: none

Learning objectives

To provide students with the fundamental knowledge of contemporary methods used in biochemical laboratories for isolation, purification and characterization of biomolecules from natural sources. Furthermore, the goal of the course is to develop students' ability to choose the appropriate experimental procedure and to gain certain practical (experimental) skills related to biochemical techniques.

Learning outcomes

Students will be able to: (1) understand the fundamental principles of isolation, purification and characterization of biomolecules from natural sources, (2) understand the dependence between the selection and sequence of biochemical techniques used for the isolation, purification and characterization of biomolecules and their physicochemical characteristics, (3) properly handle basic equipment in biochemistry laboratory, handle chemicals safely and recognize potential hazards and risk assessment during practical work, (4) apply appropriate experimental procedures for isolation, purification and characterization, (5) interpret experimental results and write reports.

Syllabus

Theoretical instruction:

Homogenization. Extraction. Lyophilization. Precipitation: isoelectric, salting in/out, with organic solvents. Preparative centrifugation of biomolecules and cell organelles. Size-based separation of biomolecules: dialysis and electrodialysis, ultrafiltration and reverse osmosis. Chromatographic methods: size exclusion, adsorption, hydrophobic, ion-exchange, affinity and partition chromatography. High performance liquid chromatography. Gas chromatography. Chosen spectroscopic methods (UV-VIS spectrometry, spectrofluorimetry, circular dichroism) in experimental biochemistry. Immunochemical and radioisotope methods. Electrophoresis (SDS, PAGE, disc). *Practical instruction:* Isolation and purification of amino acids, proteins, lipids, enzymes, vitamins, polysaccharides, cellular components, DNA, and RNA from natural sources.

Weekly teaching load				Other:
Lectures: 2	Exercises: 3	Other forms of teaching: 1	Student research:	