Course name: Combinatorial Biotechnology (USOS Code: B-BTM.054E)

ECTS: 5

No. of hours: 60 (30 lectures + 30 classes)

Course coordinator: Prof. dr hab. Małgorzata Cytryńska

Prerequisites: general knowledge of genetics, biochemistry, microbiology and molecular biology

Course description: Lecture: Combinatorial biotechnology versus combinatorial chemistry. Microbial resistance to defense peptides. Strategies to obtain peptides with desired characteristics: endogenous peptides as patterns for the development of new molecules with antimicrobial and anticancer activity, combinatorial libraries of peptides and antibodies. Peptidomimetics. Combinatorial oligonucleotide libraries: aptamers' selection by SELEX techniques (Systematic Evolution of Ligands by Exponential Enrichment), application of aptamers. Directed evolution of molecules - technologies: cell surface display, phage display, ribosome display, mRNA display, SNAP-tag display.

Labs: Analysis of the interaction of proteins with other macromolecules on the example of the interaction of insect apolipophorin III (apoLp-III) with RNA and LPS (isolation of RNA, partial purification of apoLp-III, SDS-PAGE, Native-PAGE, immunodetection of apoLp-III). Determining the potential of proteins as a source of peptides with antimicrobial activity (bioautography).

Recommended literature: Recommended review and original articles from current scientific literature.