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Expression, purification and basic characterization of target protein samples for drug binding studies

Monday 8 September – Wednesday 10 September 2025

Latvian Institute of Organic Synthesis, Riga, Latvia

Training School of the COST Action CA21111 One Health drugs against parasitic vector borne diseases in Europe and beyond OneHealthdrugs

The event is open to PhD, young innovators and senior scientists from both academia and pharma

Description. The successful large-scale production and purification of a target protein allows to initiate all the biochemical and biophysical studies that can lead to the characterization of the potency and binding mode of potential inhibitors, substrates or ligands. This training school aims to provide basic knowledge and hands-on experience on protein expression protocols using bacterial cells, protein purification methods, and biophysical techniques for the rapid assessment of protein stability and purity. The course will feature a combination of lectures and practical laboratory activities.

The participants will familiarize themselves with the most common procedures for large scale protein expression in bacteria, standard protein purification protocols using liquid chromatography techniques (Affinity, Size-Exclusion, and Ion-Exchange Chromatography) as well as some basic biophysical techniques for the immediate, rapid assessment of the quality of the protein thus produced. These include: Polyacrylamide Gel Electrophoresis (SDS PAGE, both under native and denaturing conditions), Circular Dichroism (CD), Differential Scanning Fluorimetry (DSF), and Mass Spectrometry (MS).

Programme

Day 1 (Monday 8 September 2025)	
8:30-9:15	Registration
9:15-9:30	Welcome and school introduction
9:30-10:30	Lecture 1: Introduction to protein expression in bacteria
10:30-11:00	Break
11:00-13:00	Laboratory activities: Transformation of bacterial cells with plasmid, cell plating, clone selection, small-scale culture.
13:00-14:30	Lunch
14:30-15:30	Lecture: Invited Speaker from COST Action
15:30-18:30	Laboratory activities: Large-scale expression, cell harvesting, cell lysis
Day 2 (Tuesday 9 September 2025)	
9:30-10:30	Lecture 2: SDS Page and Protein Purification
10:30-11:00	Break
11:30-13:00	Laboratory activities: SDS page, protein purification (affinity chromatography)
13:00-14:30	Lunch
14:30-15:30	Lecture: Invited Speaker from COST Action
15:30-17:30	Laboratory activities: Protein purification (size exclusion, ion-exchange chromatography)
17:30-18:30	Break & Flash-presentations from Training School attendees
Day 3 (Wednesday 10 September 2025)	
9:30-10:30	Lecture 3: Biophysical assessment of protein quality
10:30-11:30	Break
11:30-13:00	Laboratory activities: MALDI
13:00-14:30	Lunch
14:30-15:30	Lecture: Invited Speaker from COST Action
15:30-17:30	Laboratory activities: Circular Dichroism, Differential Scanning Fluorimetry
17:30-18:30	Short group presentation on the school activities by the training school attendees
18:30	Closing remarks

You are invited to **submit your filled Application Form** ([download it here](#)) together with your short CV (no longer than one page) and an endorsement letter from the supervisor on institutional head paper by the **10/07/2025** at the following address: Atis Jekabsons (atis@osi.lv) **and** Sheraz Gul (Sheraz.Gul@itmp.fraunhofer.de). Successful applicants will need to create an e-COST account (<https://e-services.cost.eu>) and will receive an official invitation.