

Expression, Purification, Crystallization and Structure Determination of Membrane Proteins

Description	The objective of the course is to introduce participants into the intricacies of over-expressing membrane proteins using various expression hosts, solubilizing them using detergents, and purifying them using chromatographic techniques. The course will also provide an introduction to 3D-crystallization of membrane proteins and discuss the basics of X-ray data collection, phasing, and model building.
Eligibility	Participants must have a Master degree in biology/chemistry/physics with an interest in membrane protein structure determination.
Course Structure	Practical, lectures, demonstrations, experimental work
Assessment	Participation to all activities and a quiz test at the end of the course.
Dates	05. - 07. July 2011
Credits	1.5 ECTS
Facilitators	Prof. Kaspar Locher (ETH Zurich, Institute of Molecular Biology and Biophysics) Prof Raimund Dutzler (University of Zurich, Department of Biochemistry)
Location	University of Zurich, Irchel Campus and ETH Zurich, Hönggerberg campus (details to follow).
Registration	send an Email to Sina.Henrichs@mci.unibe.ch
No of Places	Maximum # of accepted students: 24. Priority will be given to researchers (PhD students and postdocs) from NCCR TransCure laboratories and with little experience in membrane protein expression, purification, or crystallization.

Preliminary program:

Day/ Time	Tuesday, July 5, 2011	Wednesday, July 6, 2011	Thursday, July 7, 2011
9:00 - 12:00	<p>Lectures:</p> <ol style="list-style-type: none"> 1. Membrane protein biochemistry, use of detergents / lipids. 2. Over-expression techniques in various hosts. 3. Crystallization 	<p>Lectures:</p> <ol style="list-style-type: none"> 1. Crystallography 1: Fundamentals, data collection. 2. Crystallography 2: Phasing, electron density maps. 3. Crystallography 3: Modeling, interpretation of model, analysis of pdb files. 	<p>Tutorial</p> <p>Students are split in two groups. Computational tutorial at ETH Hoenggerberg and Irchel in Locher and Dutzler groups.</p> <p>Topics: Data processing, electron density, resolution, model building, refinement, map interpretation, pitfalls.</p>
12:00- 13:00	Lunch at Irchel	Lunch at Irchel	Transfer to Irchel
13:00- 18:00	<p>Experiments/Demonstrations:</p> <p>Expression screening (SDS PAGE)</p> <p>Solubilization (SDS PAGE)</p> <p>Affinity and gel filtration chromatography</p> <p>FSEC</p>	<p>Experiments/Demonstrations:</p> <p>Crystallization setups</p> <p>Crystal mounting</p> <p>X-ray diffraction experiments and data collection</p>	<p>Quiz</p> <p>Course evaluation</p> <p>Concluding remarks.</p> <p>Reception.</p>
18:00		Pizza dinner	