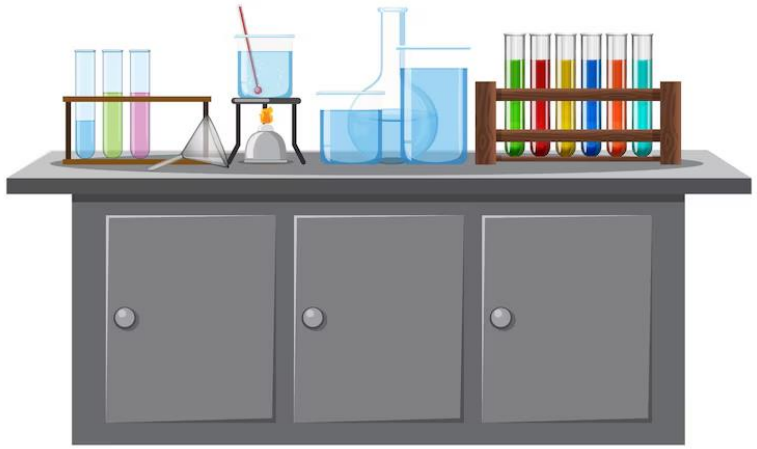
Purification of a membrane protein with the help of Instruct-ERIC

Giedrė Tamulaitienė

2025-05-22

New ideas, but…

No experience



No equipment

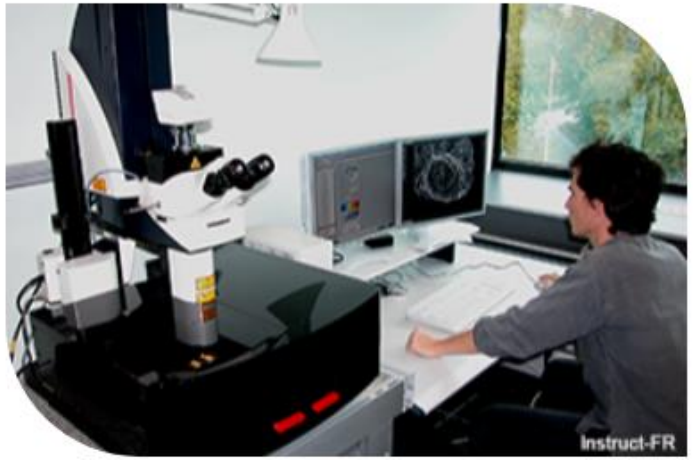
Instruct-ERIC Service / Technology Catalogue

Sample Preparation

Crystallisation

Nanobody Discovery

Protein Production



Biomolecular Analysis

Imaging

Mass Spectrometry

Molecular Biophysics

3D Structural Analysis

Electron Microscopy

Magnetic Resonance Techniques

X-Ray Techniques

https://instruct-eric.org/platform-catalogue

Instruct-ERIC Funding for Access

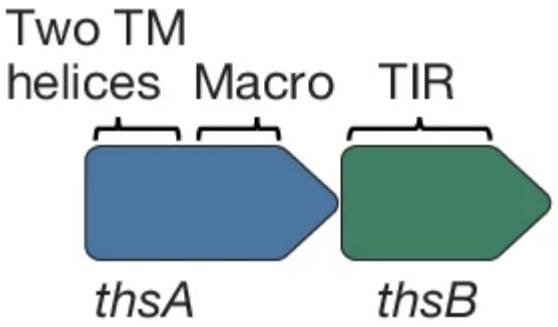
Instruct funding contribution:

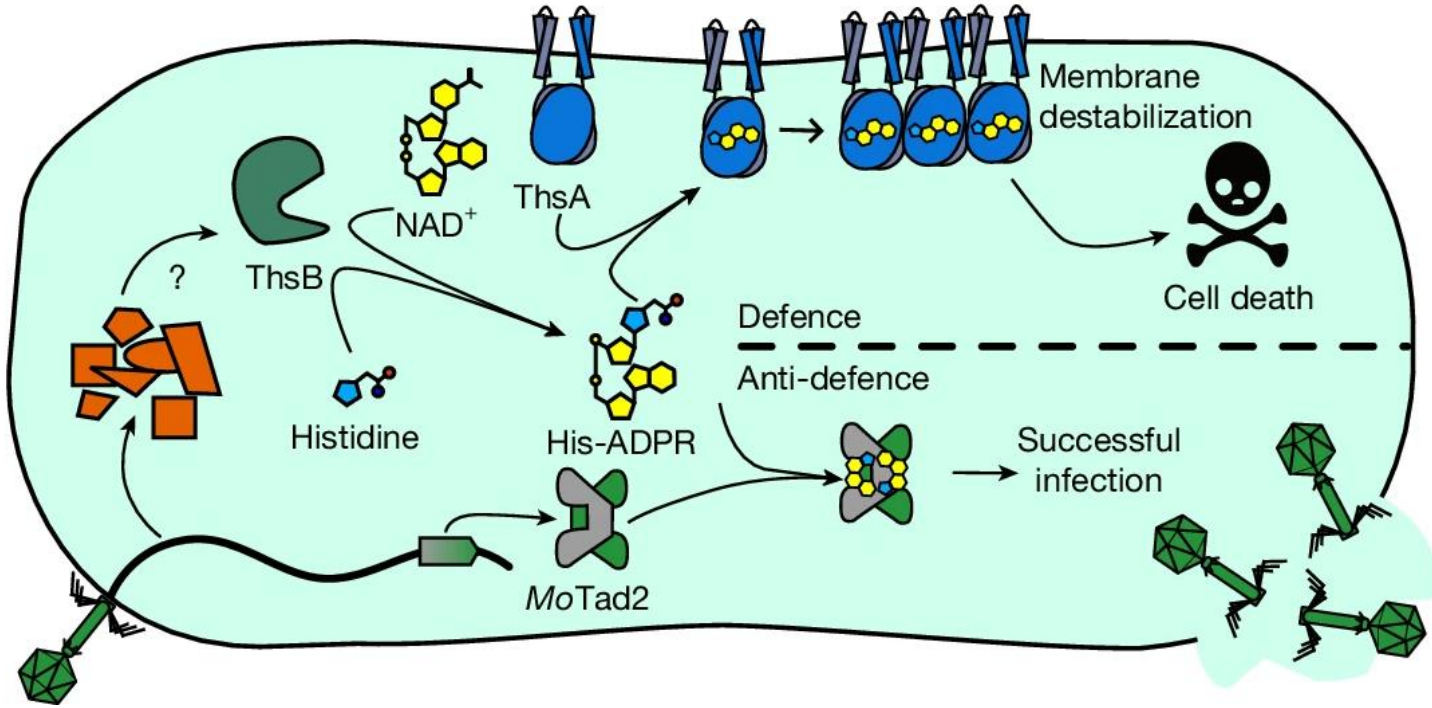
1) Access (facility)

2) Travel, Accommodation (T&A) and Shipping (up to € 400) (users)

Maximum access free of charge per Technology	
Technology	**Maximum days of free access per Visit**
Crystallisation	4
Electron Microscopy	2
EM Analysis	10
ESPRIT	8.4
Imaging	3
Magnetic Resonance Techniques	5.4
Mass Spectrometry	3
Molecular Biophysics	3
Nanobody Discovery	8.4
Protein Production (includes sample preparation for EM/NMR)	10
X-ray Techniques	2.9

Thoeris Antiviral Defense System





Sabonis et al., Nature, 2025

Poster:
Džiugas Sabonis

To characterize full-lenght transmembrane effector protein ThsA

Proposal Application Steps

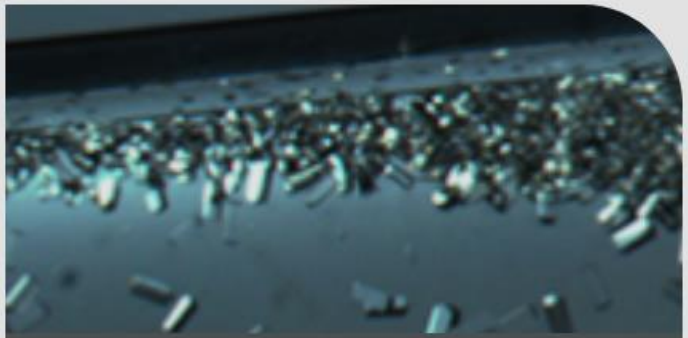
1. Select Service / Technology

2. Prepare Proposal

3. Proposal Evaluation

4. Arrange visit/experiments

Sample Preparation



Crystallisation:

Crystallisation allows the 3D structure of macromolecules to be revealed through X-ray diffraction. Instruct offer a fully automated crystallisation pipeline to achieve high-throughput with short crystallisation plate processing times, high reproducibility, and increased efficiency of the screening process.

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Nanobody Discovery:

Nanobodies are single chain antibodies which have revolutionary applications in structural biology. Our Nanobody Discovery service is accessible to all Instruct researchers.

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Protein Production:

Instruct's services include protein expression, cloning and high throughput expression, and protein purification. Our techniques allow for expression of challenging proteins along with expert protein purification systems.

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Protein Production

Expression systems:

a) *E. coli*

b) *Baculovirus* / insect cells (BEVS)

c) Mammalian cells

d) Cell-free expression

Cloning and High Throughput Expression screening:

a) High throughput cloning and expression screening

b) Library methods for identification of soluble domains in poorly understood proteins (ESPRIT)

Purification of proteins and complexes

Biomolecular Complex Purification (Biocomplex), Helsinki, Finland

ESPRIT: Library-Based Screening for Soluble Expression, Grenoble, France

Gene Tagging, Strasbourg, France

Membrane Protein Production, MPL, Harwell, UK

Protein and RNA Production in vitro, Grenoble, France

Protein Production in E. coli with Isotope Labelling for NMR, CERM/CIRMMP, Florence, Italy

Protein Production in Insect and Mammalian Cells, Amsterdam, Netherlands

Protein Production in Mammalian Cells for in-cell NMR, Florence, Italy

Protein Production, Strasbourg, France

Protein Production, Vestec near Prague, Czech Republic

Protein Production, Weizmann Institute, Israel

Robotein Automated Protein Production, Belgium

Service / Technology Instance

About Membrane Protein Production, MPL, Harwell, UK

View All Protein Production at Instruct →

The Membrane Protein Laboratory (MPL) at the Research Complex Harwell is a research and training user facility open to scientists from laboratories anywhere in the world that are interested in the Structural Biology of Membrane Proteins. The laboratory combines recently developed high throughput technologies for membrane protein production with sample preparation for crystallisation and cryo-electron microscopy. As a Wellcome funded support facility within Diamond Light Source we are uniquely placed to utilise the latest state-of-the-art developments in X-ray diffraction data collection and cryo-electron microscopy.

Service Availability:

Remote Physical

Instruments Available:

+ Membrane protein expression/ purification screening

+ Membrane protein purification and formulation

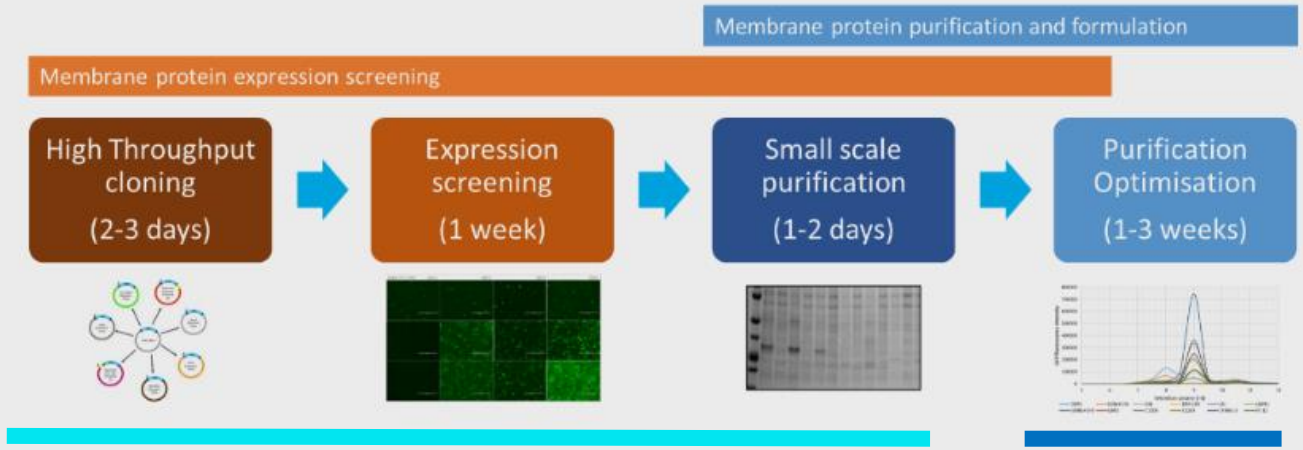
MPL
Membrane Protein Laboratory

User Guide

Protein Production

High quality membrane protein samples are essential for structural biology. Our protein production platform can support visiting scientists to clone, express and purify 48-96 membrane protein constructs on a small scale. We provide the facilities to utilise protein expression in *E.coli*, yeast, insect and mammalian cells. This is coupled to a high-throughput screening platform to rapidly identify the most suitable conditions for membrane protein purification. Our expression platform has recently been enhanced through the work of an Instruct-ULTRA post-doctoral research associate who developed new protocols and enhanced workflows for membrane protein production in mammalian cells.

Protein Production Workflow



Contacts:

Andrew Quigley
Diamond Light Source Ltd
Contact

Ray Owens
University of Oxford
Contact

REQUEST ACCESS

Contacted throught the website

Online meeting to discuss proposal details

Draft proposal

Proposal submition

3 homologs
4 expression vectors

remotely + in person

Proposal Content

Research Project Title:

Scientific background, significance and objectives : 2500 characters

Research programme and methodology : 4800 characters (discussed with facility)

Ethical concerns: Yes/No

Safety concerns: Yes/No

Background in your lab & current results : 3000 characters

Relevant publications :

Files & figures (images & PDFs accepted) **:**

Proposal Evaluation: 3 reviewers

Other Services / Technologies

Sample Preparation

Crystallisation

Crystallisation of protein molecules
Membrane protein crystallisation

Nanobody Discovery

Nanobodies are the small (15 kDa) and stable single-domain fragments harboring the full antigen-binding capacity of camelid heavy chain–only antibodies. Nanobodies are exquisite chaperones for crystallising membrane proteins, multiprotein assemblies, transient conformational states and intrinsically disordered proteins.

Biomolecular Analysis

Imaging:

Imaging techniques including fluorescence microscopy provide an efficient and unique approach to study fixed and living cells because of their versatility, specificity, and high sensitivity.

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Mass Spectrometry:

Mass spectrometry is the dominant technology in the field of proteomics, enabling the identification and quantification of cellular proteins and their modified forms.

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Molecular Biophysics:

Instruct offer a wide range of techniques to study macromolecular interactions, including circular dichroism, surface plasmon resonance (SPR), thermal shift assay and calorimetry.

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Biomolecular Analysis

Imaging

Light microscopy and fluorescence techniques
In vivo cell imaging
FRAP and FRET

Mass Spectrometry

Mass spectrometry
Ion Mobility Mass Spectrometry
Native Mass Spectrometry
Proteomic Mass Spectrometry

Molecular Biophysics

Surface Plasmon Resonance (SPR)
Analytical Ultracentrifugation (AUC)
Circular dichroism (CD)
Multi Angle / Dynamic Light Scattering (MALS)
Thermal shift assay
Calorimetry
Microscale Thermophoresis (MST)

3D Structural Analysis

Electron Microscopy:

The high-resolution electron microscope has evolved into a sophisticated instrument that is capable of routinely providing quantitative structural information on the atomic scale.

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Magnetic Resonance Techniques:

NMR allows three-dimensional structural and dynamic information to be obtained in conditions as close as possible to physiological ones. Functional processes can be followed in living cells, and transient protein-protein interactions can be investigated.

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X-Ray Techniques:

Instruct-ERIC offer a wide range of X ray approaches to determine the three dimensional shape of proteins at the atomic level.

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3D Structural Analysis

Electron Microscopy

Scanning electron microscopy
Cryogenic electron microscopy
Transmission electron microscopy
Electron tomography

Magnetic Resonance Techniques

Solution NMR
Fast field cycling relaxometry
Solid State NMR
Electron Paramagnetic Resonance (EPR)

X-Ray Techniques

X-Ray Diffraction
Bio-SAXS

Instruct-ERIC can help you too!

https://instruct-eric.org/platform-catalogue

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