PS-14-15 Poster Session

Core Facility for Crystallographic and Biophysical Research to support the development of medicinal products

Jan Kutner*, Maria Górna, Maura Malińska, Monika Wanat, Daria Dawidziak, Katarzyna Polak, Mikołaj Kuska, Weronika Lidwin, Marlena Kisiała, Szymon Sutuła, Krzysztof Woźniak*

University of Warsaw, Biological and Chemical Research Centre, Core Facility for Crystallography and Biophysics, 101 Zwirki i Wigury, 02-089 Warsaw, Poland

* j.kutner@uw.edu.pl, kwozniak@chem.uw.edu.pl, cfcb@uw.edu.pl

As a result of the TEAM-TECH Core Facility Project from the Foundation for Polish Science, we have established the Core Facility for Crystallography and Biophysics (CFCB) at the Biological and Chemical Research Centre, University of Warsaw, under the supervision of Professor Krzysztof Woźniak (Head) and Jan Kutner, Ph.D. (Deputy Manager).

The Core Facility services (Figure 1) are focused on the analysis of proteins and small molecule compounds leading to crystallization trials for academic and commercial users. The project enables studies of challenging biochemical and pharmaceutical problems, with an emphasis on drug development. Research at CFCB is carried out in an interdisciplinary way, including both wet biology ("BIO") and chemical crystallography ("CHEM") techniques as well as theoretical approaches including structure modelling, bioinformatics and computational methods. Biology and chemistry team members work in synergy complementing their knowledge, skills and experience. Apart from services and collaborations, postdoctoral and Ph.D. researchers carry out their research projects dedicated either to small-molecule or protein crystallography.

Core Facility Services			
Small Molecule Compounds "Comp-CHEM" pipeline	Small Molecule Compounds "X-CHEM" pipeline	Biomacromolecules and Complexes "MX-BIO" pipeline	Biomacromolecules and Complexes "EM-BIO" pipeline
In silico analysis	Phase Transition	Protein Expression and Purification	Negative Staining
Ligand -Target Electron Density Analysis	Polymorphism Analysis	Ligand or Protein Binding Assays	Sample vitrification
Hydrogen Bond Propensity	Crystallization	Crystallization	Cryogenic Sample-Grid Screening
Crystal Structure Prediction	Diffraction Data Collection (in house)	Diffraction Data Collection (in house)	Microscope Setup
Crystal Energy Landscape	Synchrotron Data Collection (external)	Synchrotron Data Collection (external)	Cryo-EM Data Collection (Solaris)
Crystal Morphology Prediction	Model Building	Model Building	Model Building Training
In silico analysis of the lead compound	Structural analysis of the lead compound	Structural and Biochemical analysis of target molecule	Cryo-EM analysis of target molecule
"Expert Pool" for all pipelines			

Figure 1. The main pipelines of the CFCB

Work in the Facility includes collaboration with other research groups and biotech/pharmaceutical companies, such as the WPD Pharmaceuticals, Cellis, Leaderna Biostructures, OncoArendi Therapeutics, Pikralida, Bio-Rad and Innvigo.

Moreover, we cooperate with Dr. Sebastian Glatt and Dr. Przemysław Grudnik (Structural Biology Core Facility, Jagiellonian University, Cracow) under the TT CF extension concerning on the commercial aspects (The Integrative Platform for Accelerated Drug Discovery – IPADD).

We are open to different forms of collaborations with individual researchers, research groups or biotech/pharma companies.

Keywords: Core Facility, Structural biology, crystal chemistry, science services, Cryo-EM

The project is supported by Foundation for Polish Science/European Union under the European Regional Development Fund (TEAM TECH CORE FACILITY/2017-3/4, POIR.04.04.00-00-31DF/17-00)