Elettra Sincrotrone Trieste

International Centre for Genetic Engineering and Biotechnology

Protein Production and Purification Partnership in Europe

19th Annual Meeting

Trieste, 22-23 May 2023

AREA SCIENCE PARK

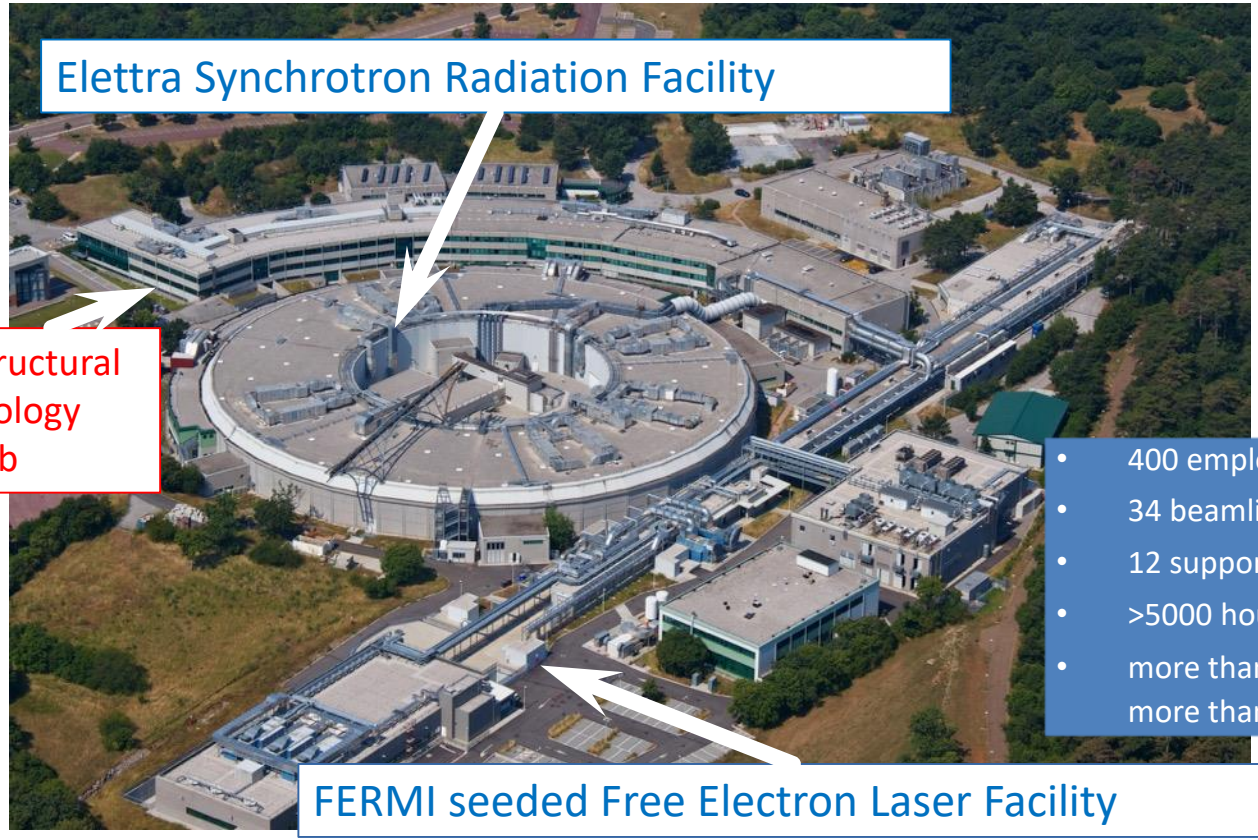
RE FEYN WEIGHING MOLECULES WITH LIGHT

ALFATEST strumentazione scientifica

BECKMAN COULTER Life Sciences

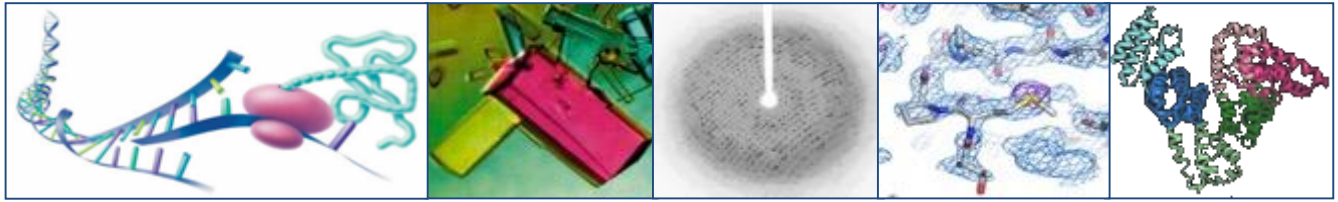
enterprise europe network

Elettra Sincrotrone Trieste



- 400 employees
- 34 beamlines
- 12 support lab
- >5000 hours /year
- more than 1000 scientists from more than 50 countries

The Structural Biology Laboratory



AIM: Apply molecular and structural biology tools to study key processes within the cell that are linked with major diseases such as **cancer, neurodegeneration and infection** and to characterize some of the proteins involved. We use **protein crystallography** to determine the atomic structure of these proteins, as well as **biochemical** and **biophysical** approaches to understand how they work.

- protein production facility
- crystallization suite

Silvia Onesti

Structural & functional aspects of DNA replication and repair, DNA/RNA helicases, protein crystallography, electron microscopy.

Paola Storici

Cancer cell signalling, drug discovery on kinases, deubiquitinases, and SARS-CoV-2 proteases, protein production, biochemistry, protein crystallography.

Protein Facility @ Elettra

Offer specialized expertise in protein expression and purification to **support academic and industrial R&D** for functional and structural characterization of proteins in **synergy with** Elettra **beamlines**.

- ***Collaborative research*** → *Fundamental Research Projects*; *Proprietary Research Projects*
- ***Tailor-sized, open-minded, versatile support***
- ***Tutoring inexperienced users***

Crystallization Suite @ Elettra (present set-up)

A robotized crystallization platform is available to screen hundreds of conditions to find crystal forms using small amount of pure proteins

Tecan FreedomEVO150

TTP Labtech Mosquito

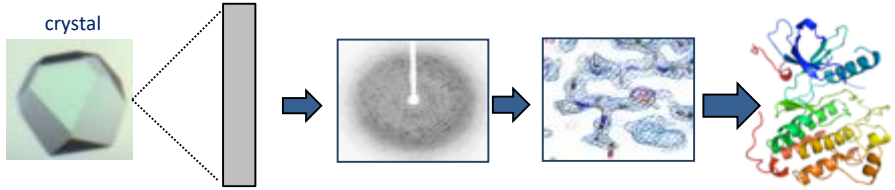
Explora Nova Xtal Focus

VUO based monitoring

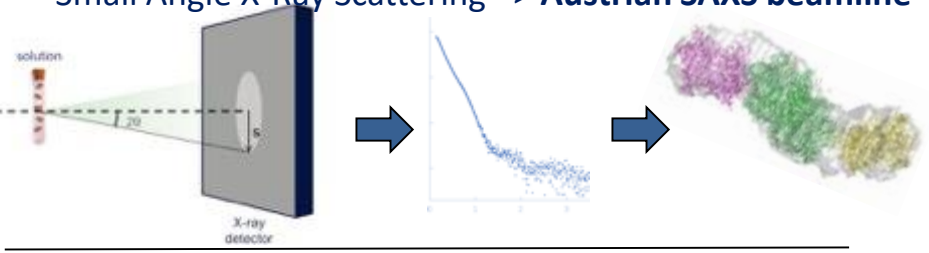
*The crystallization suite is undergoing a refurbishment and upgrade to offer support to **external users***

Integrative Structural Biology at Elettra

X-Ray crystallography => **XRD2 beamline**

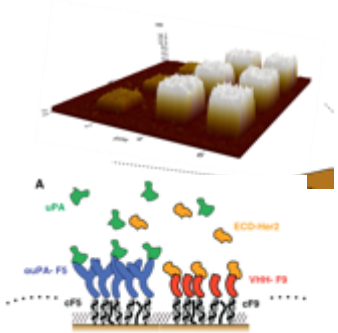


Small Angle X-Ray Scattering => **Austrian SAXS beamline**

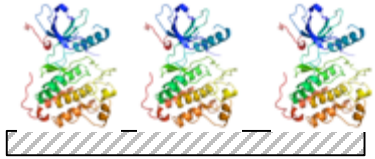


CERIC

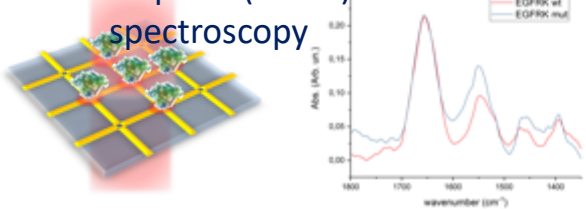
Central European
Research Infrastructure
Consortium



immobilized



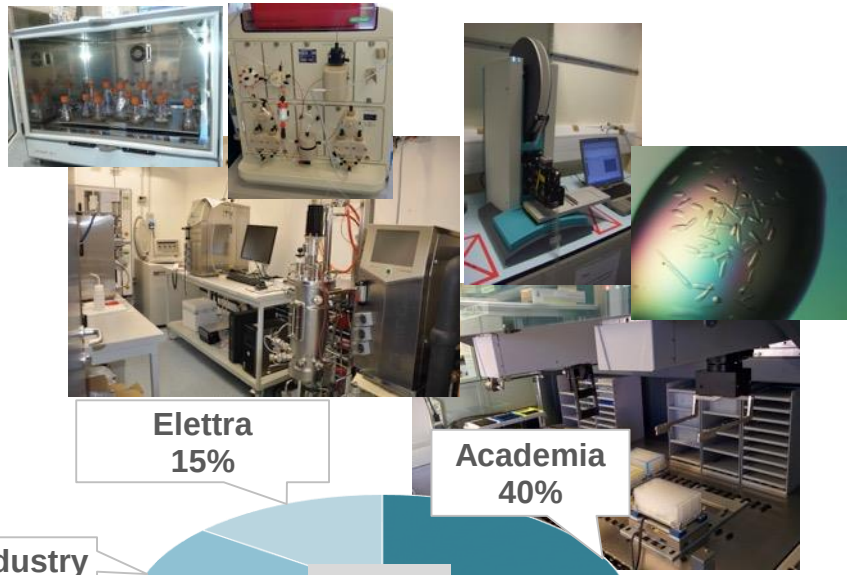
Surface Enhanced InfraRed Absorption (SEIRA) spectroscopy => **SISSI beamline**

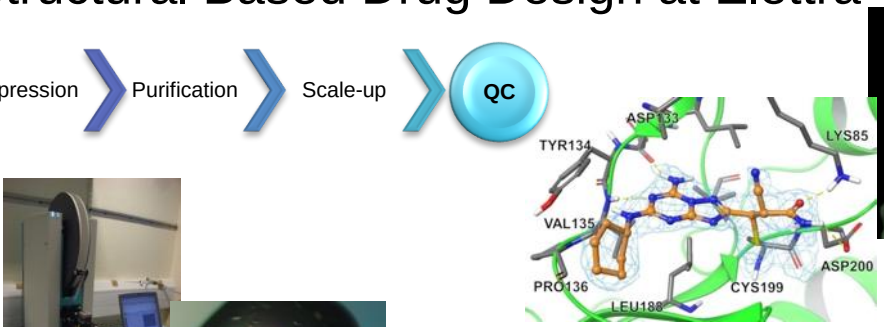


Atomic Force Microscopy => **NanoLab**

Structural Based Drug Design at Elettra

Construct Design → HT Cloning → Expression → Purification → Scale-up → QC



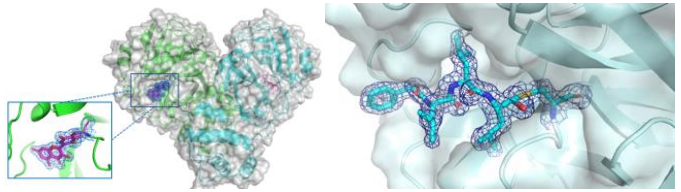


X-ray structure of kinase GSK-3β with inhibitor covalently bound in ATP pocket

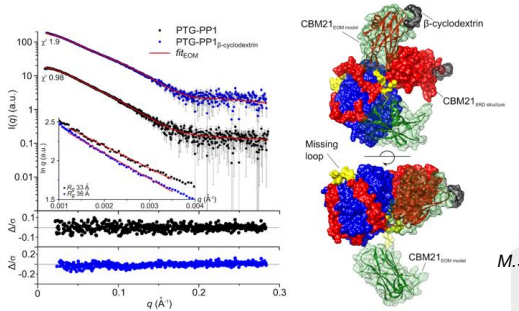
S. Redenti *et al., ChemMedChem.* (2018)

EXSCALATE 4COV

SBDD of SARS-CoV2 Mpro

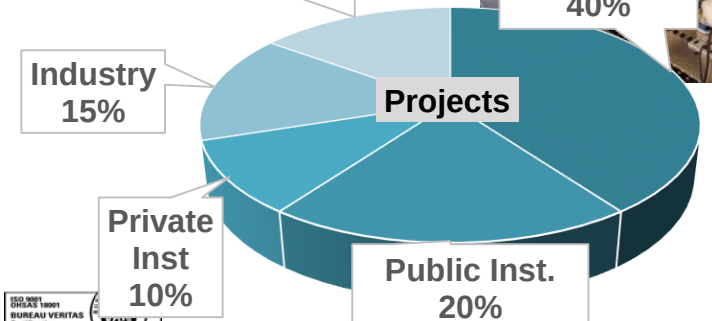


E. Costanzi et al. Int J Mol Sci 2021



Molecular architecture of glycogen committed PP1/PTG holoenzyme

M.S. Semrau et al., Nature Comm (2022)



Future upgrades planned

Pathogen Readiness Platform for CERIC ERIC Upgrade

Activity 3.1
Upgrade the Elettra Protein Facility

Potentiate expression and putification set-up

- floor centrifuge of preparative scale
- 2-3 incubators for insect and mammalian cells
- 2-3 FPLC systems

Potentiate Protein QC and binding analysis

- Mass Photometry System
- microscale thermophoresis system

Activity 3.2
Upgrade HT-crystallization Suite

- HT crystallization robot (Mosquito)
- Integrated system for crystal storage and imaging

Activity 4.1
Upgrades are proficient to establish a Cryo-EM facility for SB CNR-IOM in partnership with Elettra

- 200 keV microscope with direct electron detector
- facility for single particle and cellular analysis Cryo-ET

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Ministero dell'Università e della Ricerca
Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA
AREA SCIENCE PARK

Elettra Sincrotrone Trieste

The PF@Elettra team:

Marta S. Semrau – *scientist*
Theo Battista – *postdoc*
Andrei Gerisimov – *postdoc*
Federica Ruzzier – *technician*
Stefano Morasso – *PhD student*
Livia Palumbo – student
Rachele Ortolan – student
Eleonora Parolin – guest PhD student

Barbara Giabbai – past team member

EXSCALATE 4COV

Italia-Slovenia
Slovenija-Italija

AIRC

Commissione europea

PROTEO proteiNetwork

Interreg ITALIA-SLOVENIJA TRANS-GLIOMA

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