Biophysical characterization of biomolecules at MOSBRI MoB-IBT

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The BIOCEV core facilities grouped in the Center of Molecular Structure (CMS) operated by the Institute of Biotechnology, represent shared resource of the state-of-the-art instruments and technologies for biophysical and structural characterization of macromolecules and their complexes

CMS

Biophysical core facility at CMS offers a services for the characterization of
- Biomolecular interactions
- Structure, stability and conformation of biomolecules

We invite you to apply for an access

https://www.mosbri.eu/apply-for-tna/

https://instruct-eric.eu/submit-proposal?t=instruct

https://stigmator.ceitec.muni.cz/project_form/

Analysis of biomolecular interactions

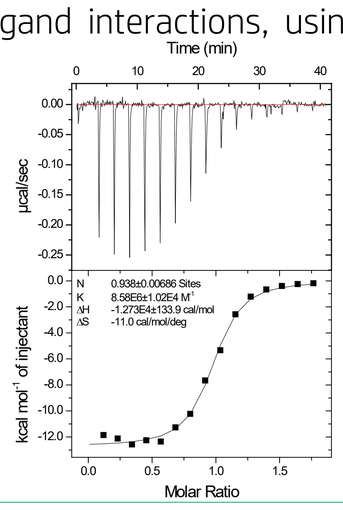
MicroScale Thermophoresis (MST)

Monolith NT.115 machine monitors binding of molecules from metal ions to proteins, liposomes and ribosomes on the base of detection of fluorescent dyes or fluorescent fusion proteins.

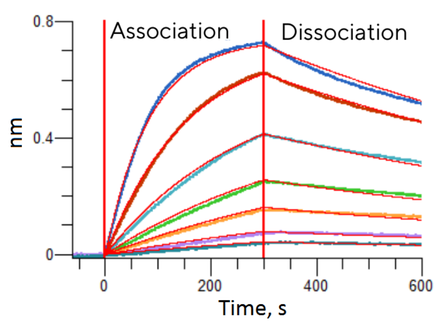
Monolith NT.LabelFree allows characterization of protein-ligand interactions, using the intrinsic tryptophan fluorescence.

Isothermal Titration Calorimetry (ITC)

for the characterizing biomolecular interactions, without labeling or immobilization by means of highly sensitive, low volume device **iTC200** microcalorimeter.
Provides a complete thermodynamic profile of binding: dissociation constant, reaction, stoichiometry, enthalpy, entropy.



BioLayer Interferometry (BLI)

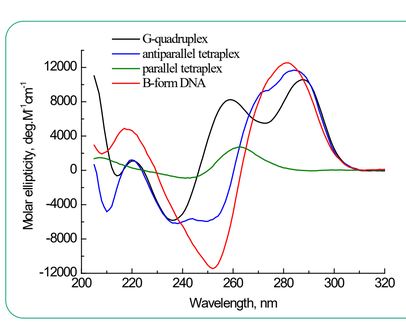


OCTET R8 instrument enables label-free measurement of kinetics and affinity of biomolecular binding. Octet R8 is a fluidics-free, low maintenance detection system. Eight parallel, independent channels provide maximum speed, sensitivity and flexibility.

Surface plasmon resonance (SPR)

technology is used in the ProteOn™ XPR36 protein interaction array system to detect binding between ligand immobilized on a sensor chip and analyte flowing over it in a microfluidic channel. Enables the simultaneous injection of six ligands and six analytes.

Determination of structure, stability and conformation



Circular Dichroism (CD) spectroscopy

Chirascan™-plus for the determination of secondary structure of proteins, folding and refolding, conformation of DNA, ligand induced changes in structure and stability.

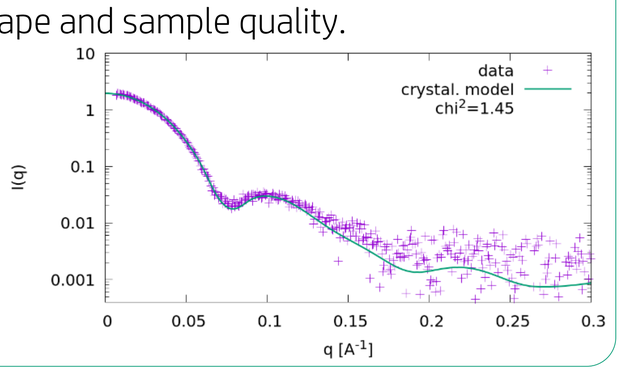
UV/Vis spectrometry

Specord 50 Plus spectrometer allows to study the stability of biomolecules and enzymatic reactions.

Small-angle X-ray scattering (SAXS)

SAXSpoint 2.0 is designed to measure SAXS on biological macro-molecules. The method provides information particle size, shape and sample quality.

The measurement can be complemented with in-situ UV-Vis spectroscopy and size-exclusion chromatography. The instrument is equipped with high brilliance Excillum MetalJet C2+ X-ray source and Dectris Eiger 1M detector.

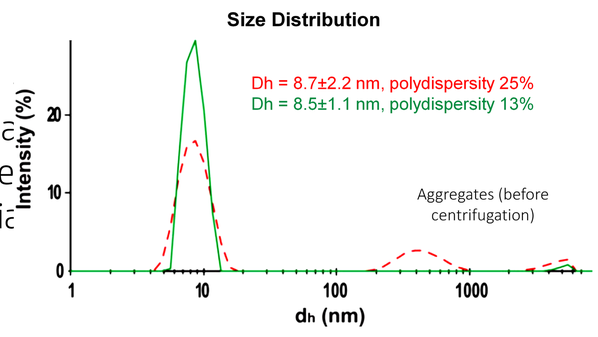


Optical tweezers and confocal microscope

C-trap correlative optical tweezers and confocal microscope for single molecule experiments, which offers the study of interaction dynamics, providing a unique way of observing and measuring molecule interactions and mechanical properties of biomolecules.

Dynamic light scattering (DLS)

Zetasizer Nano ZS90 and Zetasizer Ultra systems for the characterization of molecula size and measurement of particle concentration, determination of zeta potentia and molecular weight.



Differential Scanning Calorimetry (DSC)

for the measurement of the stability of proteins, nucleic acids, micellar complexes and other macromolecular systems.
Microcal VP-DSC device allows to determine temperature of thermally-induced structural transitions, enthalpy of unfolding, heat capacity change.

Differential Scanning Fluorescence (DSF) assay

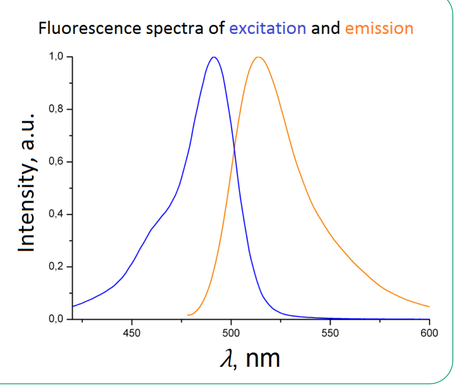
Prometheus NT.48 device to study the protein stability using tyrosine and tryptophan fluorescence.

Plate reader (absorbance, fluorescence, FRET)

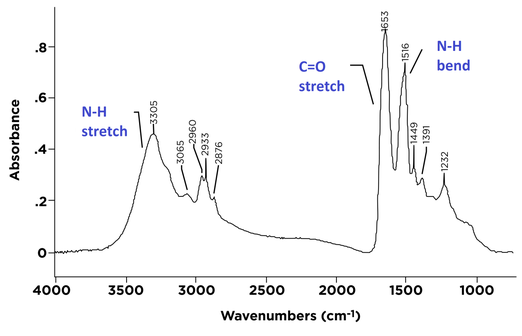
The **SPARK** microplate reader offers measurement of absorbance (from 200 to 1000 nm), fluorescence, including FRET and fluorescence polarization, and luminescence measurement with a high sensitivity.

Spectrofluorimetry

Spectrofluorimeter FLS1000 enables steady-state fluorescence spectra measurements in ultraviolet to the mid-infrared spectral range and fluorescence lifetimes spanning from picoseconds to seconds.



Fourier-transformed Infrared Spectrometry (FTIR)



Spectrometer Vertex 70v is suitable for structural characterization of proteins and polypeptides, analysis of the impact of ligand-binding on the protein structure, studies of influence of pH, temperature and mutation on the protein stability, analyzing of physical states and sample amounts of DNA.

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