B23

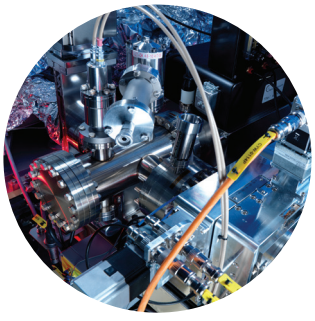
Circular Dichroism

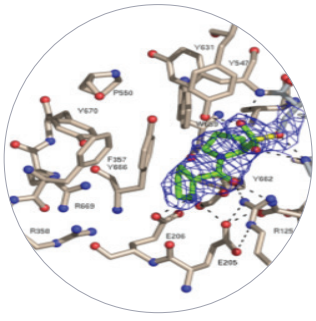
In depth knowledge of structure-function relationships is crucial to elucidate the mechanisms governing biological processes. Of critical importance for proteins in particular is an understanding of mode of action and the ability to identify new targets for novel drug therapeutics. Circular Dichroism (CD) is the spectroscopic technique of choice to study solutions of a wide variety of chiral materials such as small molecules (drugs), polymers and biopolymers (nucleic acids, proteins, carbohydrates and lipids).

Between a third and a half of all mammalian proteins have natively disordered states, making them difficult or impossible to analyse using traditional methods, such as NMR or X-ray crystallography, which are more suited to rigid, well structured systems. A low-resolution technique, CD is ideally suited to investigate protein-ligand binding interactions of these biologically important systems.

Benefits of using synchrotron Circular Dichroism:

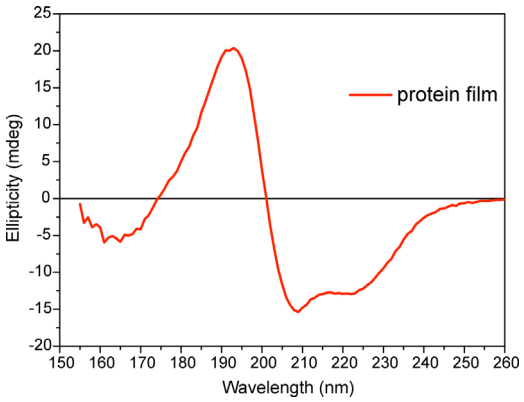
- Very small volumes of sample required as small beam size is used in conjunction with very dilute samples.;
- Greatly improved signal-to-noise compared with lab sources in the vacuum and far-UV region thanks to high photon flux;
- Vacuum-UV region measurements accessible.





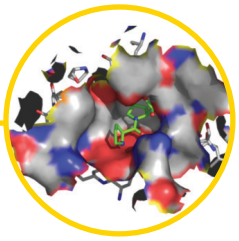
Beamline Specification

Wavelength range	155-500 nm (Module Station A) 170-650 nm (Module Station B)
Photon flux	10^{12} (ph/s/0.1% bw at 200 nm)
Photon beam size at the sample	0.5 mm^2 to 3 mm^2
Temperature	5 to 90°C
Sample volume	~5 µL to 0.8 mL
Other available techniques	Fluorescence spectroscopy



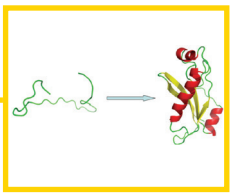
B23 APPLICATIONS

Interaction Studies



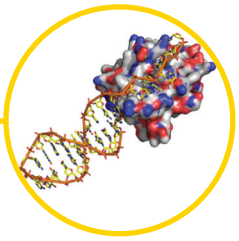
- Drug and ligand binding to a macromolecular receptor (e.g. a protein);
- Binding affinity measurements of biopharmaceuticals (e.g. peptides, proteins);
- Metal binding studies.

Protein Folding



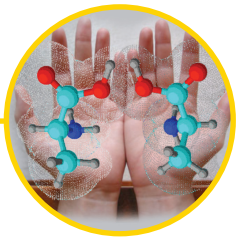
- Understand protein folding dynamics;
- Native protein folding studies;
- Protein misfolding;
- Monitor integrity of antibody during changes in processing.

Nucleic Acids



- Anti-cancer studies of nucleic acids;
- Anti-viral applications.

Small Molecules



- Perform correlative studies with cryofluorescence microscopy;
- Reveal localisation of fluorescent proteins within complex organelles;
- Capture processes of dynamic membrane trafficking.

For further information

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