



Monday, February 21

9:30 AM – 11:00 AM

Esplanade, Room 157

Bruker

Recent Advancements in Magnetic Resonance Solutions for Biology

Magnetic Resonance offers many insights into how biological systems function. Nuclear Magnetic Resonance (NMR) and Electron Paramagnetic Resonance (EPR) are two techniques used to identify species, dynamics, and structures of proteins, peptides, nucleotides, and lipids. The speakers in this session will present recent advancements in magnetic resonance in biophysics.

Clemens Anklin will present “Optimizing the NMR workflow for protein dynamics experiments.” NMR is ideally suited to study proteins in motion. A suite of NMR experiments allows the ability to look at protein dynamics from picosecond to very long timescales. One of the difficulties in performing these experiments was the need to assemble and master a variety of tools. We are currently working on creating an integrated workflow that can facilitate this task for the researcher. From experiment selection, to import of assignments, to analysis of the experimental data to visualization on a structure the user can find all these tools in a single workflow.

Ralph Weber will present “New EPR tools for studying biological structures and dynamics.” Motional dynamics in biological molecules such as proteins, peptides, and nucleotides, offers great insights into the functioning of these biological systems. Owing to the broad range of time scales accessible to EPR experiments, coupled with its high sensitivity compared to other techniques, EPR has been invaluable in advancing knowledge of many biological processes. Analysis of line shapes yields the desired information. Bruker now offers the SpinFit Liquids software module to easily extract information regarding the motional dynamics. Fitting of spectra is fully implemented and multiple species can be analyzed simultaneously. The module is compatible with all current Bruker spectrometers.

DEER (Double Electron Electron Resonance) has proven to be very successful in structural biology studies. Each sample is pre-screened to evaluate the labelling efficiency. With the introduction of the Bruker Magnetech ESR5000, we now offer a reasonably priced benchtop option (about the size of a UV/Vis spectrometer) that has the sensitivity to acquire the spectra and also is available with the optional SpinFit Liquids and SpinCount modules to ascertain the labelling efficiency. Screening is performed off-line, thus not interfering with the on-going DEER experiments to increase lab productivity. In addition, the spectrometer helps in pre-screening DNP samples.

EPR accessibility measurements are a valuable molecular ruler for peptides and proteins in membranes for structural studies. The Bruker Magnetech ESR5000 enables this important experimental technique.

Rapid Scan EPR offers improvements in sensitivity. We invite you to see the latest results applying the technique to biophysical studies.

Speakers

Clemens Anklin, Vice President of NMR Applications, Bruker Biospin

Ralph Weber, Senior Applications Scientist, Bruker Biospin