IBS Center for Molecular Spectroscopy and Dynamics

COLLOQUIUM

- SPEAKER

  Dr. David Gregson (Vice Chairman, Applied Photophysics Limited)

- TITLE

  Quantitative circular dichroism (qCD) and its role in comparing the higher-order structures of proteins

- ABSTRACT

The seminar will be sub-divided into three parts with applications illustrating what can be achieved with a modern CD spectrometer in its basic, intermediate and advanced configurations. I shall assume that the audience has some knowledge of circular dichroism spectroscopy and will hold a question and answer session after each of the three sections.

1) Basic configuration. Chirascan spectrometer with a single-cuvette, temperature-controlled sample environment in transmission mode (CD, Abs) only. Traditionally, the study of the thermal stability of protein higher-order structure using CD spectroscopy has been carried out using a single wavelength and a relatively rapid continuous temperature ramp or over a range of wavelengths using a slow, stepped temperature ramp. The superior performance of the Chirascan CD spectrometer enables multi-wavelength measurements to be combined with rapid, continuous temperature ramps. Examples and demonstrations of software will be given.

2) Intermediate configuration. Chirascan-plus spectrometer with a multi-cuvette, temperature-controlled sample environment and pseudo-simultaneous measurement of transmission (CD, Abs) and emission (F) modes. Orthogonal spectroscopic probes report on different aspects of higher order structure. Secondary and tertiary structure stability can be monitored in a single, multi-sample experiment using CD and fluorescence probes to establish optimum buffer conditions to promote the stability of higher-order structures.

3) Advanced configuration. Chirascan auto-qCD – fully automated, quantitative circular dichroism spectroscopy. Automation and standardized operating procedures (SOPs) eliminate operator intervention and enshrine good practice, minimizing systematic error in CD data. The productivity conferred by automation also enables replicate measurements of multiple samples to be made without imposing an unacceptable overhead on the operator, permitting quantitative, statistical analysis of the data. Automation, standardized operating procedures and statistical analysis combine to create quantitative circular dichroism (qCD). The role of qCD in generating objective, reproducible and auditable comparisons of the higher-order structure of proteins will be discussed. Examples and demonstrations of software will be given.

■ DATE AND VENUE

January 16, 2017 (Monday, 10:00 -12:00)
Seminar room 116, KU R&D Center

■ Language

English