Biomolecular Interaction Technologies Center (BITC)

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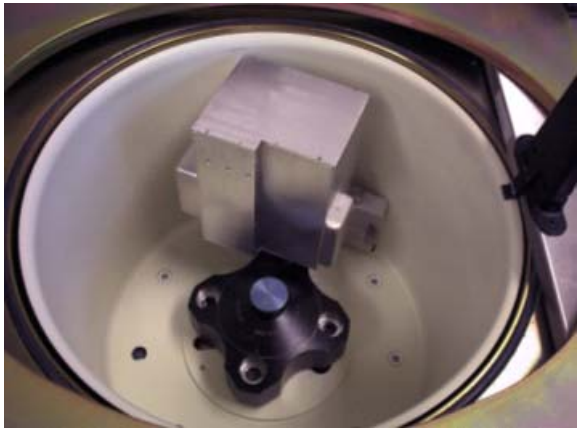
Fluorescence-Based Detector for the Analytical Ultracentrifuge



The Center for Biomolecular Interaction Technologies has partially funded the research that led to the commercial production of a fluorescence-based detector for the analytical ultracentrifuge. The analytical ultracentrifuge is the principal method for measuring the molecular weights of biomolecules in solution. The new instrument will allow one to analyze biomolecules (e.g., DNA, proteins) and their assemblies at much lower concentrations than ever before and to perform these analyses in very complex media, like cell lysates. This advance may permit the characterization of complex assemblies of biomolecules under conditions that much more closely resemble those in a living organism, and will aid drug discovery and development programs in pharmaceutical companies as well as quality control/quality assurance procedures. The first commercial instruments are being developed by Aviv Biomedical.

For more information, contact Dr. Thomas M. Laue, 603-862-2459; e-mail: tom.laue@unh.edu.

Method to Measure High-Affinity Interactions of Macromolecules

Until now, there have been few experimental methodologies to measure very high-affinity interactions of macromolecules--interactions that are important in biological systems and in developing new therapeutic drugs. Center research has led to a method of making such measurements using a fluorescence optical system for the analytical ultracentrifuge in combination with fluorescent tagging of a macromolecule in the complex. The method allows chemical parameters to be determined for the formation of the complex, such as stoichiometry, equilibrium association constant, and thermodynamics of the interaction. When the project is completed in 2004, the technology will allow a researcher to study high-affinity binding as well as investigate any complex linked association/dissociation phenomena occurring with the binding event. For more information, contact Dr. Thomas M. Laue, 603-862-2459; e-mail: tom.laue@unh.edu.

Absorbance Optical System and Data Acquisition Software for the Analytical Ultracentrifuge

A new high-precision absorbance optical system and data acquisition software for the analytical ultracentrifuge developed by BITC will improve the throughput of analytical ultra-centrifugation. Without Dr. Laue's effort, this advance would not be possible: Beckman, the company that developed the analytical ultracentrifuge, had not designed further upgrades since launching the instrument in early 1990s. Currently, the Beckman absorbance optical system uses a flash lamp and moving slit over a photomultiplier tube and operates too slowly to acquire data for sedimentation velocity experiments suitable for rapid analysis. The new system will aid drug discovery research in pharmaceutical companies. For more information, contact Dr. Thomas M. Laue, 603-862-2459; e-mail: tom.laue@unh.edu.