

The Bio-Deuteration Lab at ORNL

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Neutrons and Structural Biology

- **Structure: H/D-Labeled molecules** in complex systems
- **Function: H/D** in enzyme mechanisms
- **Dynamics: Specific H-Labeling in deuterated** systems

Infrastructure & Support

- Laboratory for bio-sample preparation
- Computational tools for structural biology
- Bio-Deuteration Lab** - H/D-labeling, isolation & characterization
- SAXS and Light Scattering

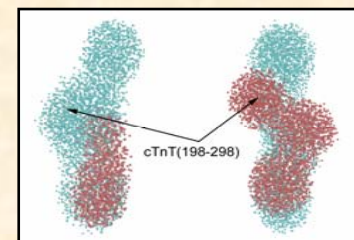
CSMB Mission

Provide the infrastructure and support that enable biologists to FULLY exploit these capabilities.

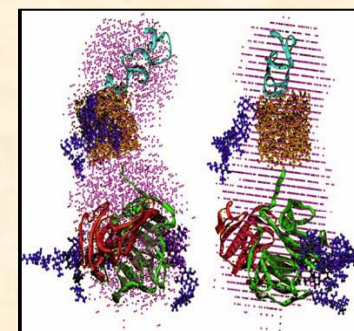
The Bio-Deuteration Laboratory

(Laboratory Directed Research and Development)

- **Develop a Central Deuteration Laboratory** dedicated to specific H/D labeling of cells, proteins, nucleic acids and other biomolecules.
- **Develop better and faster systems and methods** to produce deuterium-labeled biological macromolecules
- **Improving downstream technologies** to exploit these reagents (including data collection and interpretation for neutron scattering)
- **Train research students and staff** in application of these techniques



W.T. Heller et al., *J. Biol. Chem.* 2004



G.W. Lynn et al., *Biochemistry* 2005

Fermentor: BDL workhorse

- **Allows control of variables**
- **Data logging**
- **Software control**
- **Affords high cell-density growths**
- **Economy of scales**



Current Model of Operation

- **Collaboration!**
- **Users provide genes coding for their protein**
- ***Escherichia coli* expression systems**
- **Fermentation tests**
- **Deuteration**
- **Purification and characterization**
- **Exploring future directions**

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Oak Ridge Associated Universities

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Abstract			

http://www.ornl.gov/sci/csd/Research_areas/MS_group.html