

Zinc finger structure from cytoplasmic polyadenylation element binding protein

Biochemistry/Biophysics

Activities for participating students:

The summer research student will have the opportunity to work in a structural biology laboratory using techniques in molecular biology, biochemistry, protein chemistry, analytical chemistry and physical chemistry. The summer research student will participate in the expression and purification of the zinc finger domain of CPEB. The zinc finger domain will be characterized by biochemical techniques including liquid chromatography and mass spectrometry. Nuclear magnetic resonance (NMR) spectroscopy will be used to determine the three dimensional structure of the zinc finger domain. The summer research student will participate in collecting and analyzing data, describing the results to the laboratory group and presenting a poster at a regional conference.

Project Description:

Cytoplasmic polyadenylation element binding protein (CPEB) plays a central role in the translational regulation of synaptic plasticity, the activity dependent remodeling of nerve cell interfaces, which is required for the consolidation of long-term memory and learning. Translational regulation allows for a rapid response to stimulus and localized synthesis of proteins required for modification of the targeted synapse. CPEB controls polyadenylation of mRNA transcripts and binding of initiation factors through interactions with accessory proteins. Three structural domains have been identified by sequence analysis including two RNA recognition motif domains and a zinc finger domain. Biomolecular nuclear magnetic resonance spectroscopy (NMR) is used to study the structures of the zinc finger domain of CPEB and interactions with the uracil rich mRNA transcripts targeted for regulation.

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