Abstract No. Szep24

Crystal Structure of Loop E Sequences from 5S rRNAs

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Beamline(s): X4A, X25

Introduction: The helix 4/5 arm of 5S rRNAs includes an internal bulge called loop E. Crystal structures have been obtained for a prototypical eubacterial loop E [1] and a prototypical archaeal/eukaryotic loop E [2]. However, the sequence variation in the loop E region of the 5S rRNAs of both eubacteria and archaebacteria is so large as to raise questions about the degree to which conformation of this region is conserved within these groups. Consequently, crystal structures are being sought for the loop E regions from a number of organisms whose loop E sequences suggest that they might be outliers.

Methods and Materials: The RNA sequences required for these studies are being synthesized chemically and crystallized using standard techniques. The diffraction patterns produced by crystals of small RNAs are often challenging to phase. The approach being used here involves crystals of RNAs that have been brominated at specific locations at the time of synthesis. Phase information is being obtained from these crystals and their unbrominated isomorphs using MIR, MIRAS, SAD, and MAD methods, the latter two being approaches that require access to synchrotron radiation.

Results: From the data now in hand, it appears that the first structure in this series will be solved in the next several weeks, and depending on how crystallization experiments now underway proceed, others may follow.

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References:

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