

Hydrodynamic Properties and Mg²⁺ Dependence of L30 RNA

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Ribonucleic Acid (RNA) is a biologically important macromolecule that provides various functions in protein synthesis. This research will focus on *Saccharomyces cerevisiae* (yeast) L30 ribosomal RNA that has a kink-turn motif, which is distinguished by Watson-Crick base pairs and unpaired nucleotides that create a sharp bend in RNA. Previous research has shown that the presence of Mg²⁺ and Na⁺ play an essential role in stabilizing the kink-turn structure. This summer in the White Lab, hydrodynamic properties of L30 RNA in the presence and absence of Mg²⁺ will be analyzed using sedimentation.

First, RNA will be transcribed from linearized plasmid DNA and purified using polyacrylamide gel electrophoresis. A typical yield for the process is 70 µg of RNA per 2 µg of DNA. Two types of L30 RNA will be analyzed – RNA with kink-turn (KT) and control RNA with base paired nucleotides (BP). The RNAs will undergo velocity sedimentation using Analytical Ultracentrifugation. The sedimentation coefficient can then be determined, and the value will be used to evaluate the frictional coefficient that indicates the size and shape of the RNA. In addition, the results will be compared to previous sedimentation data that used an affinity column to purify RNA.