Wednesday, April 27, 2022
4:00 P.M.

Ackert Hall, Room 120

Biochemistry & Molecular Biophysics **Seminar**

Compaction and folding of RNAs in apolar chemical environments

Erik D. Holmstrom

Department of Molecular Biosciences
University of Kansas

Protein surfaces are often substantially less polar than water, which can greatly alter the physical and chemical properties of any closely associated molecules. However, the effect of these apolar environments on RNA molecules is often overlooked. As a result, the influence of polarity on the structural and energetic properties of RNAs is not well documented. Therefore, we studied the folding of two different RNA folding constructs dissolved in a series of aqueous-organic cosolvent mixtures, which allows us to systematically modulate solvent polarity. The structural and energetic properties of these freely-diffusing RNAs were monitored using single-molecule FRET spectroscopy. Our findings indicate that apolar environments gave rise to more compact unfolded conformations of both model RNAs. This compaction appears to make the formation of folded tertiary (but not secondary) structures more energetically favorable. We propose that the compaction and more-favorable folding arise from an enhanced accumulation of counterions in the low dielectric environment surrounding the unfolded RNA.