University of Texas at San Antonio

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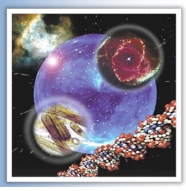
What can the Poisson-Boltzmann equation teach us about non-specific and ion–mediated electrostatic interactions in RNA systems?

RNA is a highly charged biopolyelectrolyte with each residue having a formal negative charge due to the presence of the phosphate groups in its backbone. An ionic atmosphere that reduces the repulsion between RNA phosphate groups surrounds RNA. Given the polyelectrolyte nature of RNA, it is not surprising that folding, melting and binding events –all of which involve changes in RNA charge density- are accompanied by ion re-distribution and exhibit large salt sensitivities. The theoretical modeling of non-specific and ion mediated electrostatic interactions is a challenging endeavor. Different levels of theoretical models have been developed to account for non-specific electrostatic interactions in RNA systems. In this talk, we discuss the present status of implicit solvent-based Poisson-Boltzmann models in interpreting and predicting important experimentally accessible observables for RNA systems.



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