Student Talk

Inter-Disciplinary Explorations in Chemistry (I-DEC 2018)

How Structure Leads to Function –Lessons from a Protein Co-chaperone

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Abstract:

In living systems, protein homeostasis is an important event assisted by protein complexes called molecular chaperones. One of the important chaperone systems is the Hsp70 system essential in all organisms under stress. It associates with unfolded proteins, thereby preventing their aggregation and promoting refolding in an ATP dependent manner. Hsp70, called DnaK in bacteria, is a key chaperone, which operates via the concerted action of two other co-chaperones; DnaJ, and GrpE. We are interested in understanding how GrpE, and its interaction with DnaK, regulates the protein folding events. We are particularly interested in the mechanism by which GrpE senses thermal stress and activate the DnaK chaperone system. In a recent study, one point mutation in yeast mitochondrial GrpE has enhanced the ability of yeast cell to grow at 42°C. This suggests that the protein is programmed to help the organism to survive in extreme conditions. To understand GrpE function, we have generated several GrpE mutants. In this talk, I will discuss our current understanding of the biophysical, and functional aspects of the GrpE mutants, and what it teaches us about the structural and functional aspects of proteins.

References and Notes:

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Bio-Sketch of Speaker

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I, Tulsi Upadhyay, joined Dr. Ishu Saraogi's research group in January 2015. The Saraogi group works mostly in the field of Chemical Biology, which links two fascinating disciplines of chemistry and biology together to discover new aspects of science at the interface of the two subjects. I have pursued my B.Sc. (2009) and M.Sc. in Biotechnology (2011) from MohanLal Sukhadiya University, Udaipur and H.N.B. Garhwal University respectively. To fulfil my quest of understanding bioinformatics, I joined MANIT Bhopal for M.Tech. (2014).In the Saraogi group, I am working on understanding the essentiality of protein-protein interactions in living systems, with the ultimate goal of modulating these interactions with designed small molecules for therapeutic applications.