



Conformational Dynamics of Molecular Chaperones

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Seminar Room

Chaperones are molecular machines which convert metabolic energy to domain movements that aid vital cellular processes starting from de-novo folding, refolding of stress-denatured proteins, oligomeric assembly and membrane translocation. The activity of these molecular machines is largely modulated by nucleotides and associated co-chaperones which impart conformational allostery essential for chaperone activities. Hsp70 chaperones are one of the most abundant and vital chaperone systems of almost all cell types. Hsp70s remain either in ATP- or ADP-bound forms which differ significantly in their structural properties. Exact nature of these structures and the dynamics of conformational changes that constitute a functional chaperone cycle were poorly defined. Recent findings pertaining to the conformational heterogeneity and dynamics of Hsp70 systems of yeast mitochondria and its bacterial homologue during its functional folding cycle as probed by ensemble and single molecule fluorescence spectroscopy will be presented. The real-time interaction of the same chaperone during protein translocation will also be discussed.