BIOPHYSICAL STUDIES OF PROTEIN-PROTEIN INTERACTIONS IN CELL REGULATION

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Regulation of cytoskeleton during a cell's life cycle requires a network of complex protein-protein interactions that affect the assembly of the actin filaments and microtubules, and control the transport of organelles and other cargo along microtubules using molecular motors. The regulation of the retrograde motor dynein is particularly critical for proper cell division and migration, and mutations in the proteins involved in these phenomena are linked to genetic developmental disorders of the brain cortex.

The focus of our research is on the structure-function relationships on several proteins involved in denein regulation, i.e. Lis1, NudeL, NudE and NudC. Using an array of biophysical techniques, involving X-ray crystallography, heteronuclear NMR, circular dichroism, and site directed spin labeling, we probe the structures of individual proteins, their dynamics and interactions. Biological functions are also investigated using a sophisticated system relying on the extracts of *Xenopus* eggs, which can assemble the mitotic spindle under virtual *in vivo* conditions, thus permitting for the investigation of the roles of individual proteins. The talk will present both published and unpublished recent data, with the emphasis on the synergistic use of cutting edge biophysical techniques.