Investigating Structure-Function Dynamics of Protein Homeostasis Regulators: ***Applications to Health and Disease***

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All cellular functions require a finely orchestrated balance between protein synthesis, folding and degradation. Highly specialized components in the protein quality control network modulate protein folding and degradation pathways in order to avoid accumulation of misfolded proteins. Any perturbation in one or more of these components can result in diseases including neurodegenerative disorders and cancer making them attractive therapeutic targets. However, the size, complexity and dynamic nature of the network presents a formidable barrier to its investigation using traditional methods. My presentation will focus on our efforts to investigate the structure-function relationship of two critical components in this network: Heat shock protein 90 (Hsp90) and Ubiquitin. I will discuss how integration of various tools and methodologies developed in our laboratory has allowed me to answer longstanding questions pertaining to the biology of these proteins.