Molecular Machinery for Protein Quality Control

Proteostatic quality control mechanisms are crucial for maintaining the crowded environment of the cell. The small glutamine-rich, tetratricopeptide repeat-containing protein alpha (SGTA) is a co-chaperone that facilitates the biogenesis and/or quality control of hydrophobic proteins aberrantly exposed to the aqueous cell cytoplasm. In collaboration with the Bag6 complex, SGTA decides the fate of these substrates; either refolding them via chaperones, targeting them to the requisite membrane, or disposing of them via the ubiquitin proteasome system. I will present our most recent findings on the properties of different regions of SGTA that are revealed using cell biology, NMR, SAXS, Native MS and EPR (and indicate that SGTA operates like a pair of tweezers to pick up hydrophobic substrates) and show our progress on a $^{19}$F-based approach to dissect SGTA/substrate interactions. I will also present our latest structural results on a quality control mechanism in *B. subtilis* in which metabolism is shut down during sporulation, the gene expression transition in which bacteria can become hardy, dormant, long-lived spores to escape stress conditions.