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Structural Complexity and Environmental Adaptation: Hsp90–Hsp70 Chaperone Systems in Cyanobacteria

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Abstract: Heat shock proteins (HSPs) are essential, highly conserved molecular chaperones that facilitate the correct folding and maturation of diverse client proteins across prokaryotic and eukaryotic organisms. In bacteria, the HSP70 (DnaK) and HSP90 (HtpG) chaperones are particularly critical for protein homeostasis and cellular stress responses under elevated temperatures and other environmental stresses.

While these chaperone systems have been extensively characterized in Escherichia coli, their molecular structures and biochemical functions in cyanobacteria remain relatively unexplored.

In this talk, I will discuss our interdisciplinary efforts aimed at elucidating the structural and functional characteristics of cyanobacterial DnaK and HtpG chaperone systems using an integrated approach that combines biochemistry, biophysics, cryo-electron microscopy, and molecular dynamics simulations.

Collectively, our results position DnaK and HtpG as pivotal model systems for probing cyanobacterial chaperone functions linked to protein homeostasis and photosynthetic performance, establishing a framework for further investigations into chaperone-mediated environmental stress adaptation and potential biotechnological applications.

Wednesday, November 5th | 2:00pm-3:15pm | Science Hall 126 & Zoom

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