

"Towards dynamics-driven allosteric regulation in modular sensor-effector systems"

Andreas Winkler

(Institute of Biochemistry, TU Graz)

Abstract:

Addressing sensor-effector modularity in light-regulated diguanylate cyclases

During evolution, nature has developed an astonishingly modular architecture of covalently linked protein domains. Using an array of building blocks with diverse functionalities enabled organisms to develop complex cellular networks that are critical for cell survival. A direct coupling of sensory modules with enzymatic effectors, for example, enables direct allosteric regulation of second messenger levels in response to diverse stimuli.

Even though progress in understanding concepts of light activation in different photoreceptor families has been made, mechanistic descriptions of light-signaling differ even within families. Recently, specific molecular integrator modules have been described that enable signal integration from diverse sensors and processing of this information by their cognate effectors. I will present molecular details of such an integrator module for diguanylate cyclases and how regulation by blue- and red-light photoreceptors is achieved.