

Topical Collection

Function, Regulation, and Dysfunction of Intrinsically Disordered Proteins

Message from the Collection Editors

It has become acknowledged that a significant portion of proteins encoded in eukaryotic and prokaryotic genomes feature a partial or total degree of structural disorder. Disordered regions can regulate the biological activity of protein molecules, such as the propensity to generate molecular complexity, including the regulation of phase separations. The involvement of intrinsically disordered proteins in fundamental biological processes, including cellular signaling, protein translation, and transcriptional regulation, is increasingly reported to be crucial in functional and pathological mechanisms. The remarkable ability of these molecules to establish macromolecular interactions with multiple biomolecular partners is likely promoted by their inherent flexibility and ability to adapt their shape. While the functional role of IDPs is attracting an increasing research focus, understanding the underlying structural and mechanistic principles of their biological activity remains a crucial research challenge. The role of kinetic versus thermodynamic control is the key to understand the way by which these elusive systems are regulated to solve their intriguing biological functions.

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