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Impact of Salt and Water on Protein Structural Dynamics ANU THUBAGERE, LORAND KELEMEN, BEINING NIE, SANDIP KALED-HONKAR, AIHUA XIE, Oklahoma State University — Water is known as the lubricant of life. Without water, most proteins would lose their biological functions. Extensive studies have been carried out on how high concentration salts (dissolved in water) alter the stability and solubility of proteins. Such effects are thought to be mediated via salt-water interactions and water-protein interactions. This classic research field is known as the Hofmeister Series. We report the effects of Hofmeister Salts on the structural dynamics of proteins. Photoactive yellow protein (PYP), a bacterial blue light photoreceptor protein, is employed as a model system in this study. Time-resolved FTIR spectroscopic techniques allow us to probe the structural changes in proteins. Our data reveal that high concentration salt solutions alter the proton transfer pathway and suppress conformational changes in PYP upon photoexcitation. This study opens up a new dimension in the field of Hofmeister series. Further theoretical and experimental studies are needed in order to understand the dynamic properties of salt-water interactions and water-protein interactions.

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