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Abstract

Osmolytes are naturally occurring small molecules accumulated intracellularly to protect organisms from various denaturing stresses. Similar to the two faces of a coin, several of these osmolytes are stabilizing and destabilizing proteins depending on the concentrations and/or solvent conditions. For example, the well known stabilizing osmolyte, trehalose destabilizes some proteins at high concentration and/or high pH. In spite of the fact that destabilizing aspects of osmolytes can modulate many cellular processes including regulation of protein homeostasis (proteostasis), protein–protein interaction, and protein–DNA interaction, researchers have mostly focused on the stabilizing aspects of osmolytes. Thus, it is important to look into both aspects of osmolytes to determine their precise role under physiological conditions. In this article, we have discussed both stabilizing and destabilizing/denaturant aspects of osmolytes to uncover both sides of the coin.

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