

Molecular & Cellular Biology Faculty Search

“Drying Without Dying: Tardigrades Use Intrinsically Disordered Proteins to Survive Desiccation”

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ENR2 Room SI07 @ IIAM

Hosted By: Lisa Nagy



Tardigrades (AKA water bears) are a phylum of microscopic animals renowned for their ability to survive a number of different environmental extremes including: desiccation, freezing, temperatures above the boiling point of water, intense radiation, low oxygen conditions, and even prolonged exposure to the vacuum of outer space. How tardigrades protect themselves, their cells, and their cellular components from these extremes is largely unknown. Using a combination of computational, molecular, biophysical, and biochemical approaches demonstrates that members of a family of genes encoding intrinsically disordered proteins (IDPs) are heavily upregulated upon desiccation. These IDPs are unique to tardigrades, are required for the tardigrades to survive drying, improve the desiccation tolerance of heterologous systems, and protect enzymes from desiccation in vitro. These IDPs form gels that ultimately dry to form non-crystalline glass-like solids, which serve to protect the desiccation sensitive contents of tardigrade cells. Understanding how tardigrades survive desiccation not only expands our understanding of fundamental biological phenomena, but also opens avenues for pursuing a number of useful biomedical and agricultural applications.

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