Abstract Submitted
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Antifreeze Protein Binds Irreversibly to Ice[1] I. BRASLAVSKY, N. PERTAYA, C.L. DI PRINZIO, L. WILEN , Ohio University, Athens, OH, E. THOMSON, J.S. WETTLAUFER, Yale University, CT, C.B. MARSHALL, P.L. DAVIES, Queen's University, ON, Canada — Many organisms are protected from freezing by antifreeze proteins (AFPs), which bind to ice and prevent its growth by a mechanism not completely understood. Although it has been postulated that AFPs would have to bind irreversibly to arrest the growth of an ice crystal bathed in excess liquid water, the binding forces seem insufficient to support such a tight interaction. By putting a fluorescent tag on a fish AFP, we were able to visualize AFP binding to ice and demonstrate, by lack of recovery after photo-bleaching, that it is indeed irreversible. Because even the most avid protein/ligand interactions exhibit reversibility, this finding is key to understanding the mechanism of antifreeze proteins, which are becoming increasingly valuable in cryopreservation and improving the frost tolerance of crops.

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