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Ice Binding Proteins and Their Interaction With Ice Crystals

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We investigate the interactions of ice-binding proteins, IBPs, with ice surfaces. In particular, we investigate the dynamic nature of the protein&ice interaction using fluorescence microscopy techniques combined with temperature-controlled microfluidic devices. The results show that binding of IBP to ice is irreversible and that the freezing temperature depression is sensitive to the time allowed for the proteins to accumulate on ice surfaces. This time sensitivity changes dramatically between different types of IBPs. Our results relate the dynamics and level of activity of various types of IBPs to their ability to bind to specific ice orientations, in particular to the basal plane of the ice. These results contribute to the understanding of the mechanisms by which IBPs act that will be critical for the successful use of IBP in cryobiological applications.

References:

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Significance statement

Our results show that binding of IBPs to ice is irreversible and that the freezing temperature depression is sensitive to the time. These results contribute to the understanding of the mechanisms by which IBPs act that will be critical for the successful use of IBP in cryobiological applications.

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