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Directly probing the antifreeze glycoprotein kinetics at the ice/solution interface SALVADOR ZEPEDA, Hokkaido University, ETSURO YOKOYAMA, Gakushuin University, YOSHINOR FURUKAWA, Hokkaido University — Antifreeze proteins (AFP) and glycoproteins (AFGP) help fish, plants, insects and bacteria survive sub-freezing environments. It is well known that these proteins function via some surface interaction, but the exact mechanism has eluded scientists. Aside from mutagenesis experiments directed towards examining the functional importance of specific residues, conclusions about the mechanism have been drawn from indirect studies or more precisely from studies that describe the proteins effects on the ice interface. Our work is aimed at directly studying the protein kinetics at the ice/solution interface. Fluorescent microscopy is used to determine interaction planes, surface concentrations as well as adsorption characteristics and the segregation constants, while fourier transform infra-red attenuated total reectance (FTIR-ATR) is used to determine the protein structure vs. temperature in the liquid and solid states as well as the ice interface characteristics. All data show that AFGP do not function by the characteristic Gibbs-Thomson mechanism. While the surface coverage is similar for the AFPIII, segregation (amount in ice/amount in solution) is non-zero.

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