

Ice-active compounds that do not bind to ice

Stephen Clarke^a, David A. Wharton^b, Craig J. Marshall^{ac*}

^a Department of Biochemistry, University of Otago, New Zealand, ^b Department of Zoology, University of Otago, New Zealand, ^c Genetics Otago, University of Otago, New Zealand

We describe here protein-based recrystallization inhibition activities from the Antarctic nematode, *Panagrolaimus davidi* and from lawn grass that affect ice crystal formation, but are not incorporated into ice crystals grown in their presence. In contrast, thermal hysteresis proteins from the mealworm *Tenebrio* both affect ice crystal formation and are incorporated into ice. These findings suggest that incorporation into an ice lattice is not essential for recrystallization inhibition, and imply instead, that the proteins from *P. davidi* and grass function in the liquid phase between ice crystals. These observations may have implications for explanations of antifreeze protein function.