SE&T Colloquium Series-Winter 2013

Speaker	Dr. Jennifer Chaytor Department of Chemistry
Title	***Biological Antifreezes: The Effect of Carbohydrate Hydration on Ice-Recrystallization Inhibition***
Abstract	Antifreeze glycoproteins (AFGPs) are a subclass of biological antifreezes that are found in many species of Antarctic and Atlantic teleost fish. These compounds restrict the growth of ice and therefore protect these organisms from cryo-injury and death. We have explored the rational design of chemically and biologically stable AFGPs that have biological activity and therefore have potential medical and industrial applications. To this end, we have prepared a series of C-linked AFGP analogues that possess ice-recrystallization inhibition (IRI) activity. This presentation examines the effect of stereochemical and structural modifications of carbohydrates on IRI activity. Furthermore, their IRI activity appears to be related to their solvation or hydration, which affects their ability to fit into the three-dimensional hydrogen-bonded network of ice. The IRI activity of these mono- and disaccharides will also be correlated to their ability to protect human embryonic kidney cells at sub-zero temperatures. It has been proposed that the majority of damage to cells and tissues is caused by the recrystallization of ice during freeze-thaw protocols. Our observations support the theory that ice-recrystallization is a major cause of damage to cells during the freeze-thaw cycle, and that we can design novel cryoprotectants based upon the results of our IRI activity assessment. The implications of this research will be discussed.
Date	Tuesday, February 12
Time	4:10-5:00pm
Place	Pioneer 240
	Refreshments will be served at 4:00pm.