PACIFICHEM 2015 Conference **INVITED LECTURE**
Honolulu, HI
December 15-20, 2015

New Perspectives of Synthetic and Biological Soft Matter
Abstracts

Self-assembly and interactions in biopolymer systems

Ferenc Horkay and Peter J. Basser

[1]Section on Tissue Biophysics and Biomimetics, Program in Pediatric Imaging and Tissue Sciences, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, 13 South Drive, Bethesda, MD 20892, USA

In biology the osmotic pressure is a particularly important physical quantity because it regulates various physiological processes. For example, in cartilage the osmotic pressure of proteoglycan (PG) assemblies enmeshed in the collagen network determines the compressive resistance of the tissue. A decrease in either the PG content or in the tensile strength of the collagen matrix significantly affects the biological function of cartilage. In general, physiological processes are accompanied by changes in the balance of water and ions among the fluid compartments within the body. The driving force of the swelling process is the osmotic pressure that contains contributions from different interactions, such as electrostatic interactions, hydration forces, hydrophobic interactions. We investigate the structure and dynamics of biopolymer assemblies over a broad range of length and times scales. We determine the characteristic length scales that define the thermodynamic properties by combining small angle neutron scattering and macroscopic osmotic pressure measurements. Our objective is to better understand the molecular mechanism that controls the structure and interactions in complex biopolymer systems.