The interest in the incorporation of proteins/peptides into synthetic polymers has grown exponentially in recent years. In such hybrid macromolecules, the interactions between biological parts create the driving force for self-assembly. Coiled-coils and β-sheets, the basic folding domains of native proteins have been frequently used as building blocks. Their self-assembly creates physical cross links, and mediates hydrogel formation. Several designs of hydrogels responsive to external stimuli will be presented including: a) A novel in-situ forming hybrid hydrogel system consisting of poly[N-(2-hydroxypropyl) methacrylamide] (polyHPMA) backbone and a pair of oppositely charged peptide grafts. Two distinct pentapeptad peptides (CCE and CCK) were devised to favor the formation of antiparallel coiled-coil heterodimers. The peptides were anticipated to create a dimerization motif and serve as physical cross linkers. b) PolyHPMA-based hybrid hydrogels containing enzyme units. A triple mutant of adenylate kinase (AKε), which undergoes a large conformational change when binding its substrate, was chosen as crosslinker of the hydrogel system. The design permitted the translation of substrate recognition into macroscopic motion of three-dimensional materials.

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Smart Biomaterials and Drug Delivery Systems

Wednesday, March 4, 2009
4:00 PM
1000 Micro and Nanotechnology Laboratory
Reception to follow Seminar