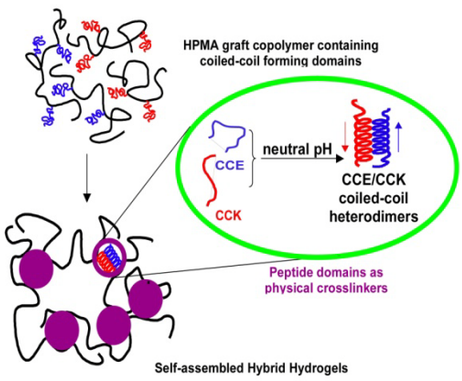
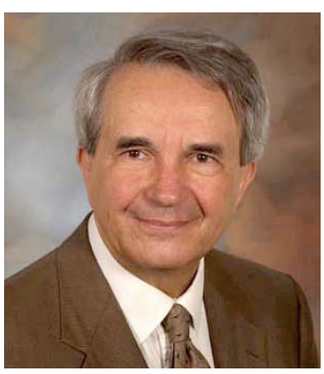
Smart Biomaterials and Drug Delivery Systems



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 pentaheptad 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 (AKe), 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.



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

Jindrich (Henry) Kopecek, Ph.D., D.Sc.
Distinguished Professor of Bioengineering,
Pharmaceutics and Pharmaceutical Chemistry
University of Utah

Jindrich (Henry) Kopeček, studied at the Czechoslovak Academy of Sciences and National Research Council of Canada. He is currently a Distinguished Professor of Pharmaceutical Chemistry and a Distinguished Professor of Bioengineering. He served as President of the Controlled Release Society in 1995-1996. His numerous awards include the Millennial Pharmaceutical Scientists Award and Paul Dawson Biotechnology Award. Kopeček's research interests are focused on biorecognition of macromolecules, bioconjugate chemistry, drug delivery systems, and biomaterials self-assembled from hybrid block or graft copolymers.
Laboratory homepage: www.pharmacy.utah.edu/pharmaceutics/groups/kopecek/