Samuel H. Gellman

University of Wisconsin-Madison
Monday, October 23, 2017; 9:40 AM

Sam Gellman is the Ralph F. Hirschmann Professor of Chemistry at the University of Wisconsin - Madison. He earned his A.B. from Harvard University in 1981 and his Ph.D. from Columbia University, under Ronald Breslow, in 1986. After an NIH post-doctoral fellowship at the California Institute of Technology, with Peter Dervan, Gellman joined the faculty at the University of Wisconsin - Madison in 1987. He is currently the Ralph F. Hirschmann Professor of Chemistry. Major interests in Gellman's research program involve chemical biology, organic chemistry and biophysics. Specific topics include fundamental studies of non-covalent interactions, elucidation of the origins of peptide and protein folding preferences, development and application of unnatural oligomers that display protein-like conformational behavior ("foldamers"), creation of new amphiphiles for membrane protein manipulation, and development of new biologically active polymers.

Abstract: Impact of Backbone Modifications on Informational Properties of Polypeptides

Folded biopolymers perform diverse functions in biological systems. Most of these operations require the biopolymer chain to adopt a specific conformation. Over the past two decades there has been growing interest in the prospect that biopolymer functions might be recapitulated and perhaps even improved upon with unnatural oligomers that manifest discrete folding preferences. Such systems are referred to generically as "foldamers".

This lecture will focus on recent progess in the use of use of α/β-peptide foldamers (i.e., peptides containing both α- and β-amino acid residues) to mimic information-rich surfaces displayed by natural polypeptides. The resulting foldamers can inhibit specific protein-protein interactions, or they can augment signaling through polypeptide-activated receptors. Advantages of the α/β-peptides include resistance to proteolysis and the ability to transmit signals that differ in subtle ways from those of a prototype α-peptide.