CENTER FOR NANOSCALE SCIENCE AND TECHNOLOGY
University of Illinois, Urbana-Champaign

Center for Nanoscale
Chemical-Electrical-Mechanical
Manufacturing Systems

Self-Assembled Nanometer Scale Lipid Bilayers for Drug Discovery and Therapeutic Delivery

One of the most challenging problems in biochemical science are studies of integral membrane proteins. Using designed amphipathic helical peptides, termed membrane scaffold proteins (MSPs) we have developed a simple and robust system that self-assembles phospholipids into soluble discoidal phospholipid bilayers 8-10 nm in diameter termed Nanodiscs®. Importantly, the same self-assembly process can be used to directly incorporate a variety of integral membrane proteins into Nanodiscs. The result is a native-like environment that provides stability and full functionality for these integral membrane protein targets. Using MSPs of varying lengths, the size and composition of the Nanodiscs can also control the oligomerization state of incorporated targets. During my presentation I will relay our most recent results in the incorporation of integral membrane enzymes, channels, transporters and receptors into Nanodiscs as well as the biophysical and biochemical characterization of these nanostructures. I will also describe our in vivo work designed to develop the Nanodisc system for the delivery of macromolecular therapeutics.

Wednesday, October 5, 2005
4:00 pm
B02 Coordinated Science Lab

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Professor Stephen Sligar received his B.S. in physics from Drexel University and his M.S. and Ph.D. also in physics from the University of Illinois in 1975. He was an assistant professor in the Department of Molecular Biophysics and Biochemistry at Yale University and returned to the University of Illinois in 1982. He is currently a professor in the Departments of Chemistry, Biochemistry, and the College of Medicine and is a Beckman Institute faculty member in the Advanced Chemical Systems Group. Sligar is the I. C. Gunsalus Endowed Professor, University Scholar and recipient of the Bert Vallee Endowed Visiting Professorship at Oxford University, a Japan Society Senior Fellow, World Innovation Foundation Fellow, and an NIH MERIT Research Awardee. He was the Janet and William Lycan Professor of Biochemistry while Director of the School of Chemical Sciences, a Fulbright Research Scholar and is a Fellow of the American Association for the Advancement of Science.