Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Secondary structure formation in peptide amphiphile micelles MATTHEW TIRRELL, Institute for Molecular Engineering, University of Chicago — Peptide amphiphiles (PAs) are capable of self-assembly into micelles for use in the targeted delivery of peptide therapeutics and diagnostics. PA micelles exhibit a structural resemblance to proteins by having folded bioactive peptides displayed on the exterior of a hydrophobic core. We have studied two factors that influence PA secondary structure in micellar assemblies: the length of the peptide headgroup and amino acids closest to the micelle core. Peptide length was systematically varied using a heptad repeat PA. For all PAs the addition of a C12 tail induced micellization and secondary structure. PAs with 9 amino acids formed beta-sheet interactions upon aggregation, whereas the 23 and 30 residue peptides were displayed in an apha-helical conformation. The 16 amino acid PA experienced a structural transition from helix to sheet, indicating that kinetics play a role in secondary structure formation. A p53 peptide was conjugated to a C16 tail via various linkers to study the effect of linker chemistry on PA headgroup conformation. With no linker the p53 headgroup was predominantly alpha helix and a four alanine linker drastically changed the structure of the peptide headgroup to beta-sheet, highlighting the importance of hydrogen boding potential near the micelle core.

Matthew Tirrell
Institute for Molecular Engineering, University of Chicago

Date submitted: 07 Nov 2011 Electronic form version 1.4