Cubic Phase Formation in Peptide/Lipid Systems\(^1\) BRANDON SCUFFINS, BETH CUNNINGHAM, Bucknell University, DAVID WOLFE, Lycoming College — Previous studies have shown that the phenomena of spontaneous membrane self-assembly can be used to incorporate membrane peptides into lipid bilayers. Once a peptide is incorporated in these peptide/lipid systems they may then be crystallized through the process of in meso crystallization. In this study, we used x-ray diffraction and \(^{31}\)P NMR to show that a system of dioleoylphosphatidylethanolamine (DOPE), monoolein (MO), and DOPE with polyethylene glycol covalently attached to the headgroup (PEG-lipid) can create a system with a higher concentration of peptide incorporated into the cubic phase than previously reported. We have observed that DOPE:MO:PEG-lipid at a molar ratio of 97.5:100:2.5 naturally forms the \(\text{Im}3\text{m}\) cubic phase at room temperature. Furthermore, we found that the DOPE:MO:PEG-lipid system can incorporate a concentration of up to 25 mole \% peptide at room temperature. Preliminary results indicate that the lipid/peptide system requires a stable cubic phase for peptide crystallization to occur.

\(^1\)We acknowledge support from NSF grant PHY-0097424

David Wolfe
Lycoming College

Date submitted: 11 Jan 2006