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Study of the Interaction of the HIV-1 Fusion Peptide with Lipid Bilayer Membranes WILLIAM HELLER, DURGESH RAI[1], Oak Ridge National Laboratory — HIV-1 undergoes fusion with the cell membrane through interactions between its coat proteins and the target cell. Visualization of fusion with sufficient detail to determine the molecular mechanism remains elusive. Here, the interaction between a synthetic variant of the HIV-1 gp41 fusion peptide with vesicles composed of dimyristoyl phosphatidylcholine (DMPC) and dimyristoyl phosphatidylserine (DMPS) was studied. The peptide was observed to undergo a concentration-dependent conformational transition between an α-helix and an antiparallel β-sheet that is accompanied by a transition in the structure of the lipid bilayer vesicle. The peptide changes the distribution of lipids between the vesicle leaflets. Further, it creates two regions having different thicknesses. The results shed new light on how the peptide modifies the membrane structure to favor fusion. A portion of this research was sponsored by the Laboratory Directed Research and Development Program of Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U. S. Department of Energy. Research at Oak Ridge National Laboratory's Spallation Neutron Source was sponsored by the Scientific User Facilities Division, Office of Basic Energy Sciences, U. S. Department of Energy.

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