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Interaction of water with melittin inserted in a single-supported lipid bilayer[1] ZACHARY BUCK, MENGJUN BAI, JAMES TORRES, HELMUT KAISER, HASKELL TAUB, Univ. of Missouri - Columbia, FLEMMING Y. HANSEN, Technical University of Denmark, ANDREW MISKOWIEC , Oak Ridge National Lab, MADHUSUDAN TYAGI, NIST Center for Neutron Research — The insertion mechanism, conformation, and the function of transmembrane proteins are strongly influenced by both the lipid molecules and the hydration water of a cell membrane. Previously, we have fabricated samples of single-supported lipid bilayers of zwitterionic DMPC and studied extensively their influence on the freezing behavior and diffusion of water in their vicinity [2]. We have recently extended these studies to a more biologically relevant system by depositing melittin proteins onto single-supported DMPC bilayers. By monitoring the elastically-scattered neutron intensity as a function of temperature from such samples, we observe an abrupt freezing transition of the associated water not seen in the bare membrane case. Moreover, the change in elastic intensity of this freezing step increases proportionally with melittin concentration. For a particular peptide concentration, a small increase of the elastically-scattered neutron intensity is measured while annealing the sample at 328 K. We tentatively interpret this increase of the elastic intensity to anchoring and/or insertion of the melittin peptides within the membrane. [2]M. Bai *et al.*, Europhys. Lett. **98**, 48006 (2012).

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Zachary Buck
Univ of Missouri - Columbia

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