Abstract Submitted
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The effects of melittin on water diffusion and membrane structure in DMPC bilayers[1] ZACHARY BUCK, JAMES TORRES, MENGJUN BAI, HELMUT KAISER, HASKELL TAUB, U. of Missouri, Columbia, EUGENE MAMONTOV, LIAM COLLINS, ANDREW MISKOWIEC, Oak Ridge National Lab, FLEMMING HANSEN, Technical University of Denmark — Transmembrane proteins are known to affect the structure of their host membrane; however, it is not fully understood how these proteins could alter the diffusion of water in their vicinity. To elucidate such behavior, we have performed quasielastic neutron scattering (QENS) and atomic force microscopy (AFM) measurements on supported lipid bilayers of DMPC exposed to various concentrations of the well-studied antimicrobial peptide, melittin. On monitoring the incoherent elastic 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 in proportion to melittin concentration, suggesting that water could be freezing onto membrane-bound melittin. Analysis of the quasielastic spectra collected on BASIS at Oak Ridge National Lab provides evidence that near this transition there is a water component which diffuses more slowly than bulk water. Furthermore, *in situ* AFM studies reveal the formation of dimple-like features on the surfaces of such membranes, which are tentatively interpreted as aggregates of melittin responsible for the perturbations observed in the hydration water dynamics.

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