

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Temperature Dependent Rotational Correlation in Lipids

CHRISTINA OTHON, NEDA DADASHVAND, EDUARDO VEGA LOZADA,
Wesleyan Univeristy — The lateral heterogeneity of lipid dynamics is explored in free standing lipid monolayers. As the temperature is lowered the lipids exhibit increasingly broad and heterogeneous rotational correlation. This increase in heterogeneity appears to exhibit a critical onset, similar to those observed for glass forming fluids. We explore this heterogeneous relaxation by measuring the rotational diffusion of a fluorescent probe (NBD-PC) using wide-field time-resolved fluorescence anisotropy microscopy, in single constituent lipid monolayer of DMPC. The observed relaxation exhibits a narrow, liquid-like distribution at high temperatures ($\tau \sim 2.4$ ns), consistent with previous experimental measures by different methods. However, as the temperature is quenched, the distribution broadens, and we observe the appearance of a long relaxation population (16.5 ns). This demonstrates that the nanoscale diffusion and reorganization in lipid structures can be significantly complex, even in the simplest unstructured architectures. This result can have a significant impact on the organization, permeability and energetics of natural membrane structures.

Christina Othon
Wesleyan Univeristy

Date submitted: 06 Nov 2015

Electronic form version 1.4