Abstract Submitted
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Mechanical response of solutions of phospholipids to anisotropic compression[1] YVES DUBIEF, School of Engineering, University of Vermont, Burlington, VT, LEONIE COWLEY — Solvated phospholipids in concentration higher than the critical micellar concentration self-assemble in micelles, vesicles and/or bilayer membranes. These structures are the building blocks of many biological systems, such as cell membranes and lining of lungs, and are well known for their ability to provide a biophysical barrier between two mediums. Another property that has not received as much attention is their macroscopic mechanical role based on nanoscale interactions, which is hypothesized to play a major role in the functions of articular joints. Using atomistic and coarse- grained molecular dynamics (MD), the existence of two universal linear elastic regimes of multilamellar bilayer membranes under anisotropic compression is identified for different level of hydration. Leveraging this property, the repulsive dynamics between self-assembled structures and the reduction of diffusion in supported membranes, a fluid nano ball bearing is constructed as an illustration for our hypothesis of synovial lubrication.

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