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Large Scale Computer Simulation of Erthocyte Membranes CAMERON HARVEY, University of Memphis, Physics Dept., SPS, JOEL REVALEE, MOHAMED LARADJI, University of Memphis, Physics Dept. — The cell membrane is crucial to the life of the cell. Apart from partitioning the inner and outer environment of the cell, they also act as a support of complex and specialized molecular machinery, important for both the mechanical integrity of the cell, and its multitude of physiological functions. Due to its relative simplicity, the red blood cell has been a favorite experimental prototype for investigations of the structural and functional properties of the cell membrane. The erythrocyte membrane is a composite quasi two-dimensional structure composed essentially of a self-assembled fluid lipid bilayer and a polymerized protein meshwork, referred to as the cytoskeleton or membrane skeleton. In the case of the erythrocyte, the polymer meshwork is mainly composed of spectrin, anchored to the bilayer through specialized proteins. Using a coarse-grained model, recently developed by us, of self-assembled lipid membranes with implicit solvent and using soft-core potentials, we simulated large scale red-blood-cells bilayers with dimensions $\sim 10^{-1}\mu\mathrm{m}^2$, with explicit cytoskeleton. Our aim is to investigate the renormalization of the elastic properties of the bilayer due to the underlying spectrin meshwork.

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