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**Blebs in Model Lipid Membranes**[1] M. LARADJI, C.W. HARVEY, E.J. SPANGLER, University of Memphis, P.B. SUNIL KUMAR, IIT-Madras — It is now widely recognized that biomembranes exhibit complex lateral heterogeneities. Among these are blebs, which are localized balloon-like membrane protrusions observed during cell apoptosis, necrosis, and cytokinesis. Despite the poorly understood mechanism of bleb formation and their physiological role, they recently received a renewed attention. In order to investigate the physical mechanism leading to bleb formation, we developed a model based on an implicit-solvent lipid membrane model with soft interactions recently proposed by us [J. Chem. Phys. **128**, 035102 (2008)]. The model also incorporates an explicit fluctuating polymer meshwork simulating a cytoskeleton, which is anchored to the membrane. Using systematic large-scale simulations of membranes with varying values of the lipid density, cytoskeleton grafting-sites density and cytoskeleton tension, we found that localized blebs are formed on the membrane exoplasmic side in the presence of mismatch between tensions of the bare membrane and cytoskeleton. The blebs are pinned by the cytoskeleton anchors, reminiscent to those observed in apoptotic cells. The distance between neighboring anchors determines the neck of a bleb. The remaining membrane surrounding the blebs stiffens to accommodate the tensed cytoskeleton.

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