vesiculation in the RBC membrane. We investigate vesiculation induced by the spontaneous curvature of the membrane domain and vesiculation induced by a stiffened cytoskeleton causing compression on the lipid bilayer. In addition, we model vesiculation in RBCs from patients suffering from the blood disorders of hereditary spherocytosis (HS) and elliptocytosis (HE). Our simulation results show that the spontaneous curvature of a membrane domain induces vesicles with a diameter less than 50 nm. We also found that compression on the membrane can cause the formation of vesicles having heterogeneous composition with a size similar to the size of the cytoskeleton corral. When both effects are taken into consideration, the compression on the membrane can facilitate the formation of vesicles originated from the membrane domain with the same spontaneous curvature. While the size of the vesicles induced by the compression in the normal RBC membrane is similar to the cytoskeleton corral size, the vesicle sizes become more diverse in HS RBCs because the constrain from the cytoskeleton on the lipid bilayer is reduced. When the vertical connectivity between the lipid bilayer and the cytoskeleton is elevated, multiple vesicles, with sizes similar to the cytoskeleton corral dimension, are generated from the compressed membrane. However, membrane with low vertical connectivity tends to produce larger vesicles under the same compression ratio as above. In HE RBCs, the reduced cytoskeleton connectivity facilitates the membrane vesiculation. It is noted that vesicles released from the HE RBCs could contain spectrin filaments while vesicles released from the HS RBCs are depleted of cytoskeleton components.

1227-Pos Board B178
Modeling and Simulations of Glycosphingolipids Determining A, B, and O Blood Groups
Thais S. Boyd, Wonpli Im.
Molecular Biosciences, University of Kansas, Lawrence, KS, USA.
Glycosphingolipids are the biological recognition sites in determining human A, B, and O blood groups. They are composed of the long-chain amino alcohol sphingosine, a long-chain fatty acid, and an oligosaccharide polar head group that is joined by a glycosidic linkage. These oligosaccharide sequences that determine human A, B, and O blood groups are almost identical.