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Effect of biocompatible polymers on the structural integrity of lipid bilayers under external stimuli JIA-YU WANG, Chemistry Department, the University of Chicago, RAVINATH KAUSIK, CHI-YUAN CHEN, SONG-I. HAN, Chemistry-Biochemistry Department, University of California, Santa Barbara, JEREMY MARKS, Department of Pediatrics, the University of Chicago, KA YEE LEE, Chemistry Department, the University of Chicago — Cell membrane dysfunction due to loss of structural integrity is the pathology of tissue death in trauma and common diseases. It is now established that certain biocompatible polymers, such as Poloxamer 188, Poloxamine 1107 and polyethylene glycol (PEG), are effective in sealing of injured cell membranes, and able to prevent acute necrosis. Despite these broad applications of these polymers for human health, the fundamental mechanisms by which these polymers interact with cell membranes are still under debate. Here, the effects of a group of biocompatible polymers on phospholipid membrane integrity under osmotic and oxidative stress were explored using giant unilamellar vesicles as model cell membranes. Our results suggest that the adsorption of the polymers on the membrane surface is responsible for the cell membrane resealing process due to its capability of slowing down the surface hydration dynamics.

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