Abstract Submitted
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Kinetics of rupture of a lipid bilayer under tension, with and without peptides in solution[1] PIERRE-ALEXANDRE BOUCHER, BELA JOOS, University of Ottawa, Ontario, Canada, MARTIN ZUCKERMANN, McGill University, Montreal QC, and Simon Fraser University, Burnaby, BC — The rupture of fluid membrane vesicles with a steady ramp of micropipette suction has been shown to produce a distribution of breakage tensions. The width and mean of the distribution increases significantly with tension rate (E. Evans et al. Biophys. J. vol. 85, p. 2342 (2003)). Starting from a lattice model which incorporates the essential features of the lipid bilayers held together with hydrophobic forces (Phys. Rev. E vol. 67, no. 051908 (2003)), and developing it to handle varying tension rates, we reproduce the essential features of the experimental results. In essence we show that the rupture kinetics are driven for all tension rates by the nucleation and growth of pores. The role of peptides in solution that can adsorb and insert themselves into the bilayer is also considered. Parameters relevant to various peptides and bilayers are used to explore the different possible scenarios that can occur, including recent experiments.

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