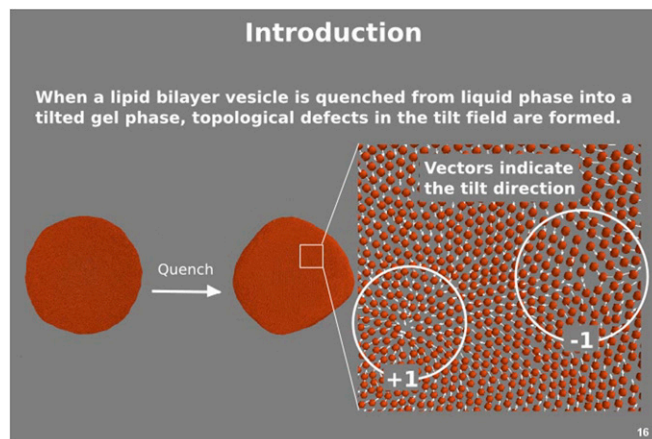


# Supporting Information

Hirst et al. 10.1073/pnas.1213994110



**Movie S1.** Simulations of topological defects and shape evolution in lipid vesicles. In the first simulation, the translational viscosity is low and rotational viscosity is high; hence membrane deformation is fast and defect motion is slow. At the beginning of the simulation, positive and negative defects nucleate at the  $L_\alpha$ - $L_\beta$  transition, and then the defect density drops through pair annihilation. The vesicle develops visible protrusions around isolated defects, inhibiting further pair annihilation. In the second simulation, the translational viscosity is high and rotational viscosity is low; hence membrane deformation is slow and defect motion is fast. In this case, the pair annihilation can proceed further, leaving only two defects of charge +1, which is the minimum required by topology. As a result, the final shape is much smoother than in the first simulation.

[Movie S1](#)