

## Supporting Information

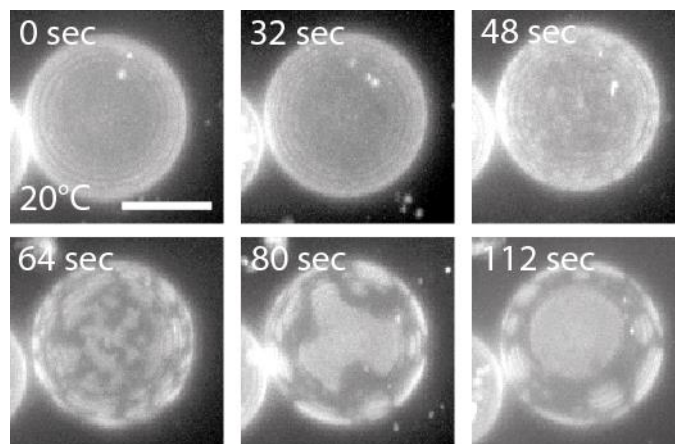


Figure S 1: At 40% cholesterol and a DOPC/DPPC ratio of 1/1 phase separation could be induced by extended light exposure. A temporal evolution of the separation process is shown. Scale bar is 10  $\mu\text{m}$ .

Lipid composition	$T_M$ ( $^{\circ}\text{C}$ )	$T_M$ (Veatch et al. <sup>1</sup> )
DOPC/DPPC 1/1 20% Chol	$28 \pm 1.5$	$\sim 33 \pm 3$
DOPC/DPPC 1/1 30% Chol	$32 \pm 1$	$\sim 32 \pm 1$
DOPC/DPPC 1/2 40% Chol	$34 \pm 1.5$	$\sim 35.5$

Figure S 2: The transition temperatures  $T_M$  of electroformed vesicles are shown for different lipid compositions. They are compared to already published data by Veatch et al.<sup>1</sup>

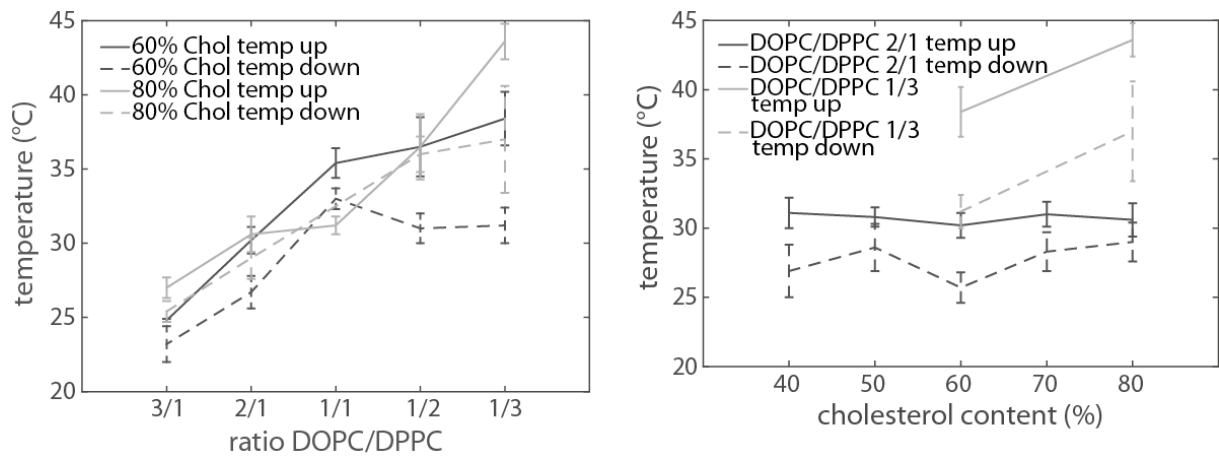


Figure S3: Line plots show how the transition temperature  $T_M$  varied with different DOPC/DPPC ratios and cholesterol percentages.

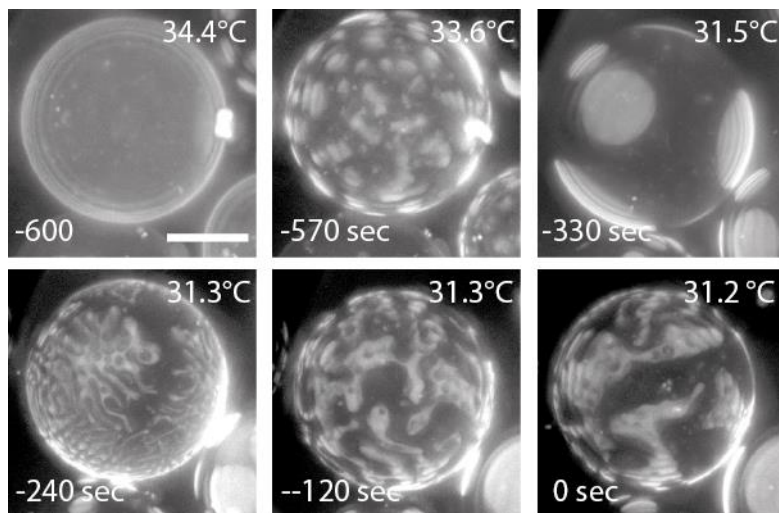


Figure S4: Fluorescent z-projections of spinodal demixing during the cooling process are shown. Vesicles were produced from lipid-oil emulsions that contained in total 0.5 mM lipids. 80% were cholesterol and the remaining portion of lipids was split in DOPC/DPPC 1/3. Scale bar is 20  $\mu\text{m}$ .

## Notes and references

1. S. L. Veatch and S. L. Keller, *Biophysical Journal*, 2003, **85**, 3074–3083.