

Supplementary information

Switchable lipid provides pH-sensitive properties to lipid and hybrid polymer/lipid membranes

Victor Passos Gibson ¹, Martin Fauquignon ², Emmanuel Ibarboure ², Jeanne Leblond Chain ^{1,3,*} and Jean-François Le Meins ^{2,*}

¹ Gene Delivery Laboratory, Faculty of pharmacy, University of Montréal, Montréal, QC, Canada; victor.passos.gibson@umontreal.ca

² Laboratoire de Chimie des Polymères Organiques LCPO Université de Bordeaux CNRS Bordeaux INP UMR 562916 Avenue Pey Berland F-33600 Pessac France; lemeins@enscbp.fr

³ ARNA Laboratory, INSERM U1212, CNRS UMR 5320, University of Bordeaux, Faculty of pharmacy, F-33016 Bordeaux, France. Jeanne.leblond-chain@inserm.fr.

* Correspondence: Jeanne.leblond-chain@inserm.fr; lemeins@enscbp.fr

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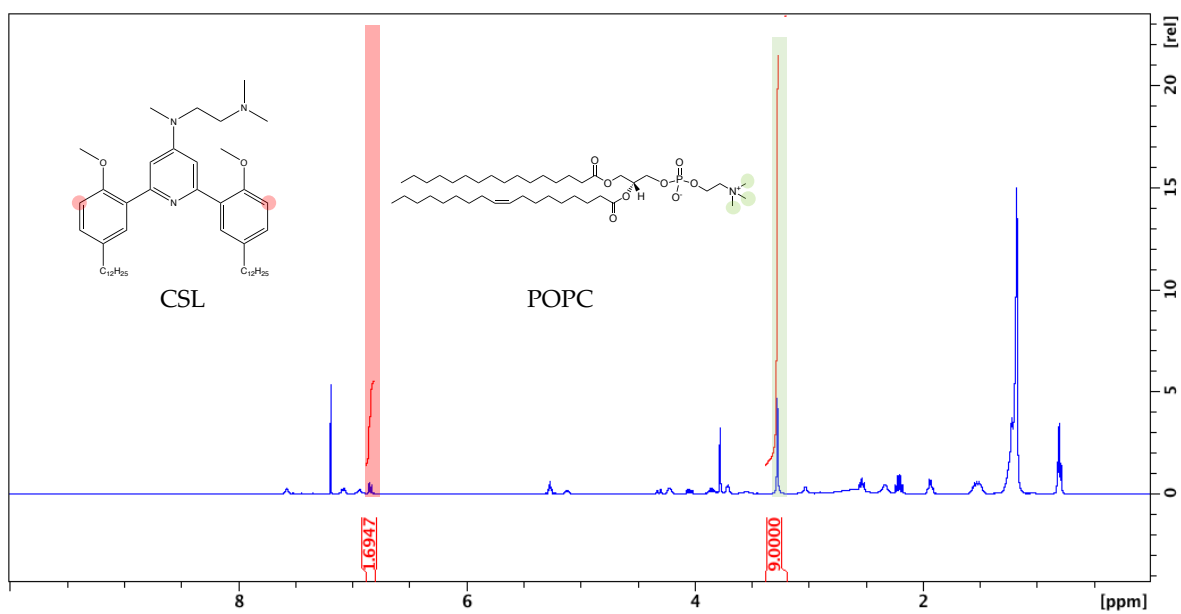
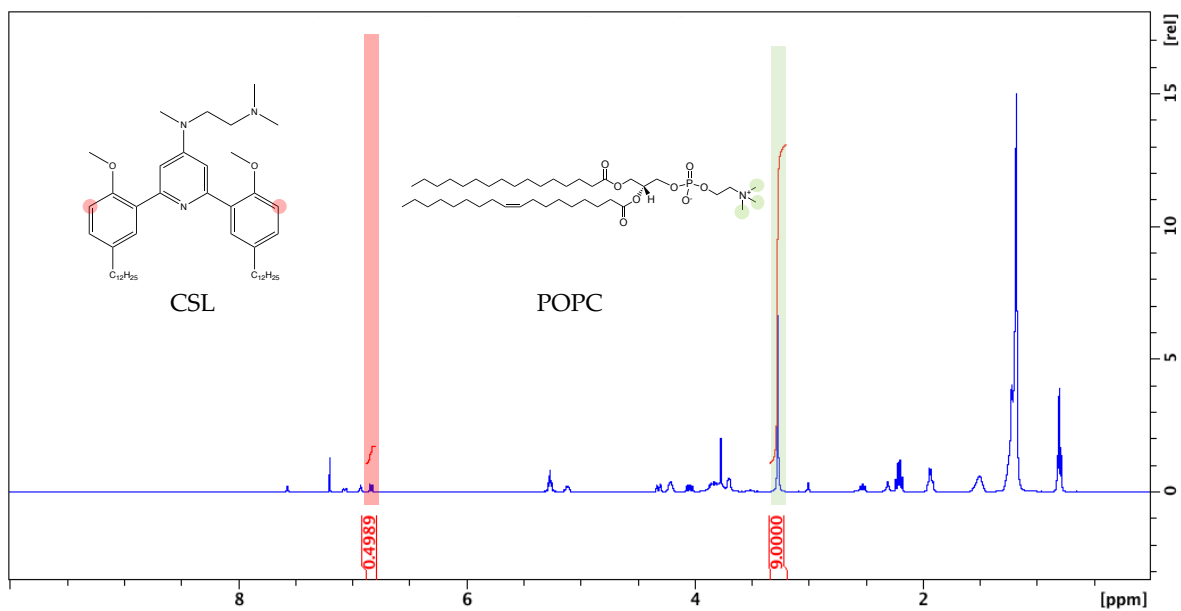
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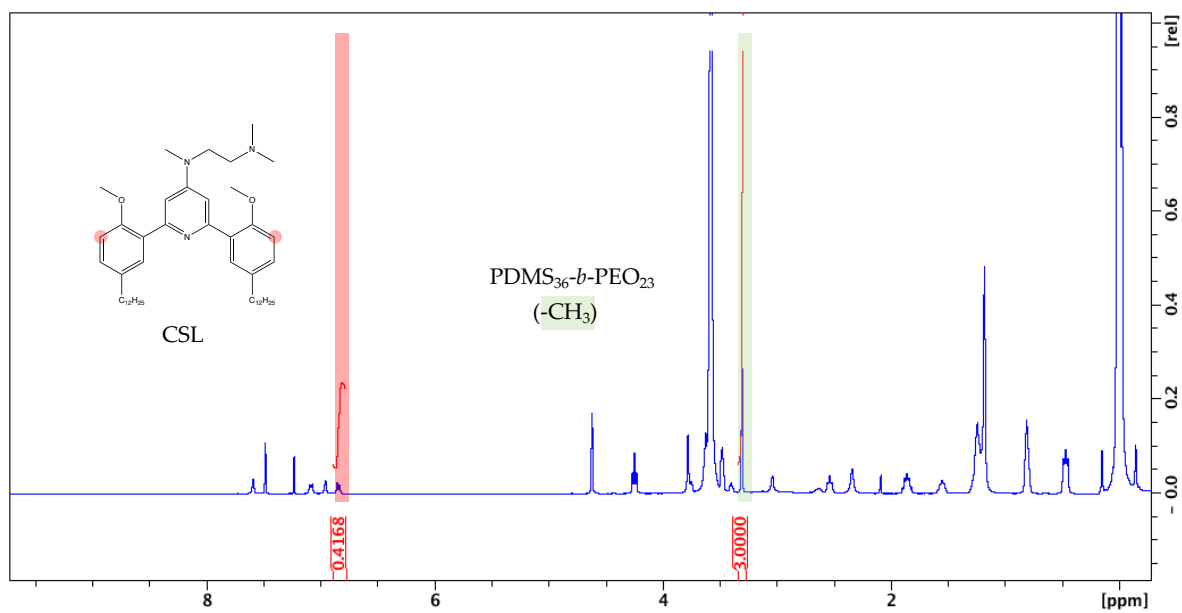


Figure S3. ^1H NMR spectrum of GHUV-CSL 20% in CDCl_3

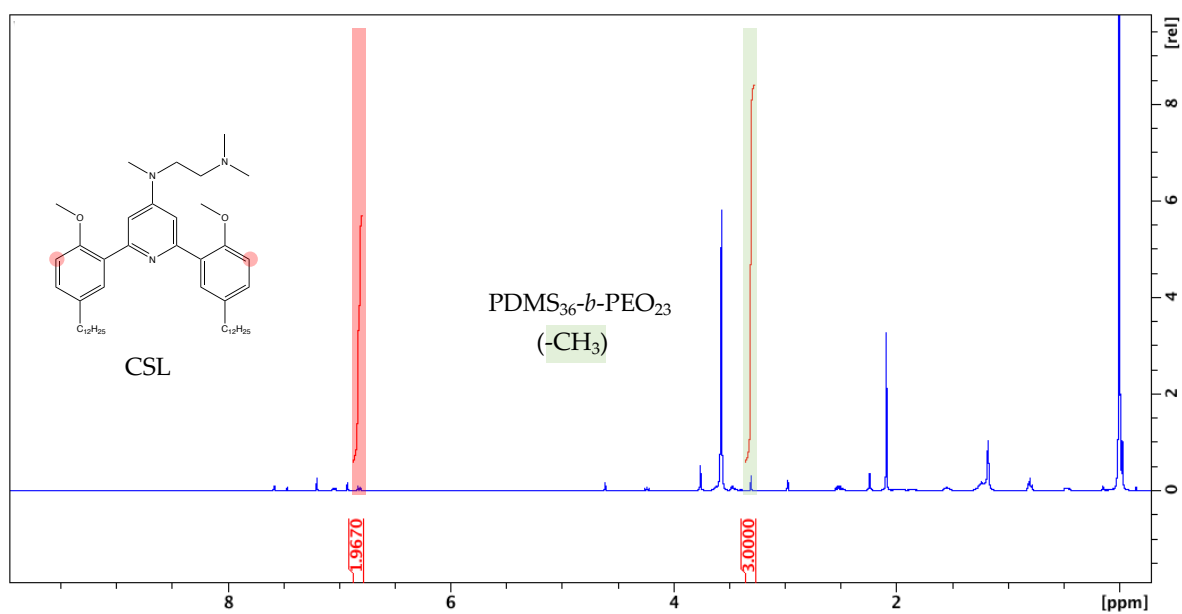


Figure S4. ^1H NMR spectrum of GHUV-CSL 50% in CDCl_3

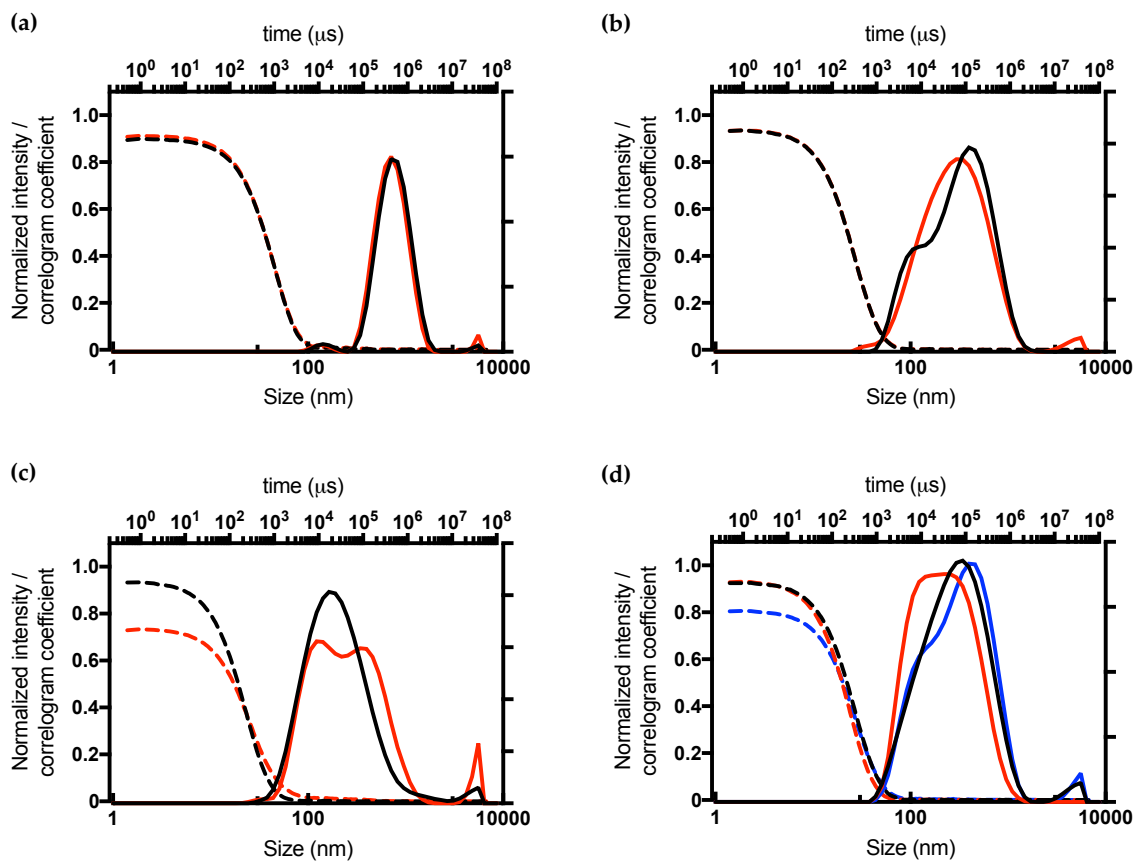


Figure S5. Size distribution and correlogram fit of LUV and LHUV at pH 6.8 and 2.8. (a) LUV-POPC, (b) LHUV-POPC 20%, (c) LHUV-POPC 50%, (d) LHUV-CSL 20%. Black line: pH 6.8; red line: pH 2.8; blue line: NaCl.

Table S1. Physico-chemical properties of LUVs and LHUVs before and after treatment with HCl or NaCl.

| Name | Composition (% mol) | Hydrodynamic diameter (nm) | | | DCR (Derived count rate) | | |
|-----------|--|----------------------------|--------------------|-----------------|--|---|--|
| | | pH 6.8 | pH 2.8 | NaCl | pH 6.8 | pH 2.8 | NaCl |
| LUV-POPC | n/a | 687 ± 6 (0.254) | 657 ± 9 (0.336) | ND ¹ | 1.0 × 10 ⁵ ± 0.6 × 10 ³ | 0.9 × 10 ⁵ ± 0.4 × 10 ³ | ND |
| LUV-CSL | POPC:CSL 50:50 | 245 ± 3 (0.338) | 126 ± 1 (0.243) | ND | 2.4 × 10 ⁵ ± 1.3 × 10 ³ | 1.2 × 10 ⁵ ± 0.2 × 10 ³ | ND |
| LHUV-POPC | PDMS ₃₆ - <i>b</i> -PEO ₂₃ : POPC 80:20 | 234 ± 1 (0.339) | 232 ± 3 (0.360) | ND | 6.1 × 10 ⁴ ± 0.2 × 10 ³ | 6.1 × 10 ⁴ ± 0.1 × 10 ³ | ND |
| | PDMS ₃₆ - <i>b</i> -PEO ₂₃ : POPC 50:50 | 165 ± 2 (0.291) | 216 ± 1 (0.514) | ND | 4.5 × 10 ⁴ ± 0.1 × 10 ³ | 4.8 × 10 ⁴ ± 3.7 × 10 ³ | ND |
| LHUV-CSL | PDMS ₃₆ - <i>b</i> -PEO ₂₃ : CSL 80:20 | 228 ± 2 (0.354) | 177 ± 1 (0.250) | 242 ± 8 | 6.4 × 10 ⁴ ± 1.0 × 10 ³ | 6.1 × 10 ⁴ ± 0.07 × 10 ³ | 6.7 × 10 ⁴ ± 2.2 × 10 ³ |
| | PDMS ₃₆ - <i>b</i> -PEO ₂₃ : CSL 50:50 | 320 ± 1 (0.340) | 183 ± 1 (0.297) | 312 ± 10 | 8.4 × 10 ⁴ ± 0.8 × 10 ³ | 6.3 × 10 ⁴ ± 0.3 × 10 ³ | 9.0 × 10 ⁴ ± 0.5 × 10 ³ |

¹Not determined

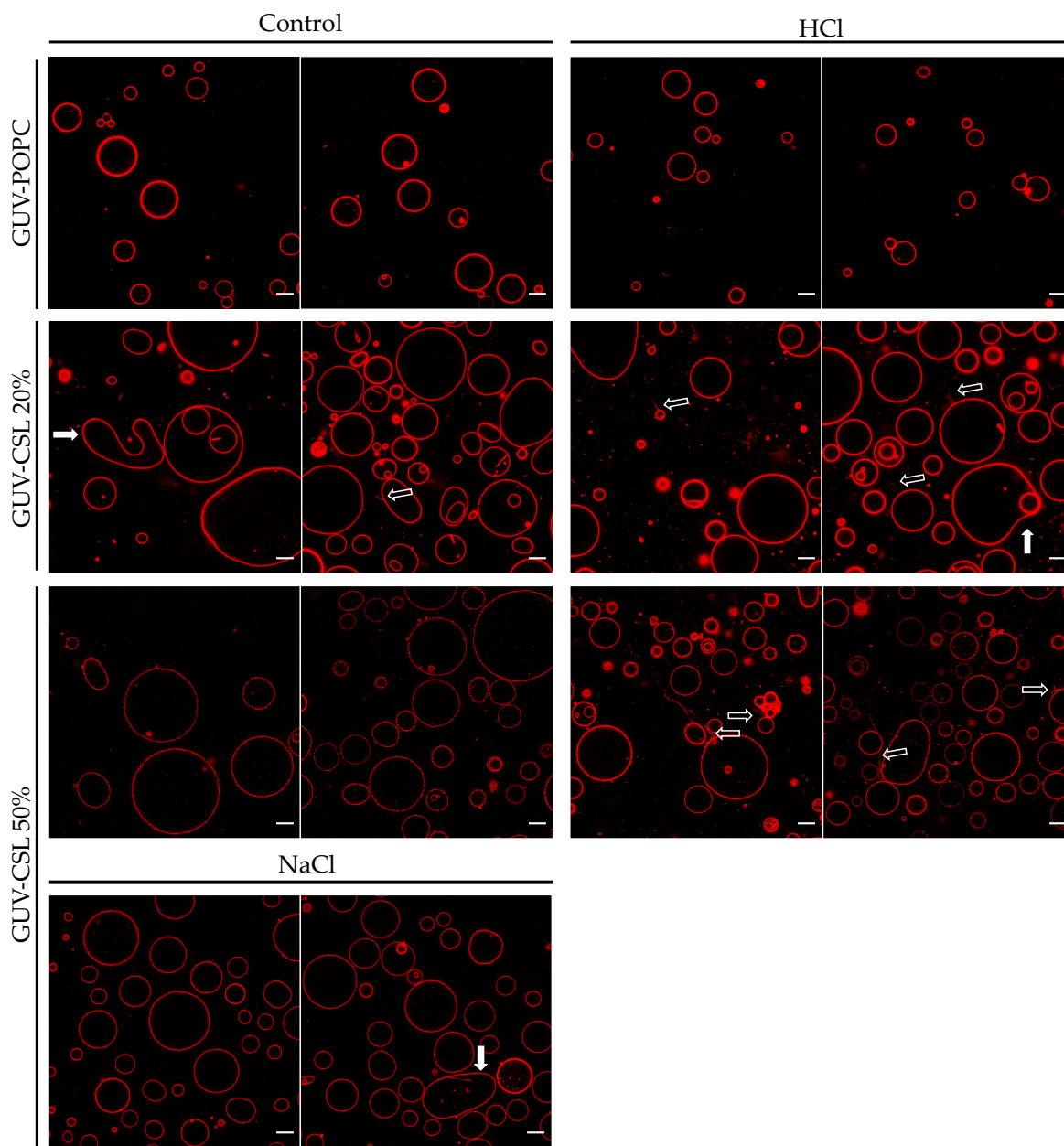


Figure S6. Morphological changes of GUVs upon HCl or NaCl treatment. Open arrows: vesicles with outward projections. Full arrows: membrane fluctuation events. Scale bar: 10 μm .

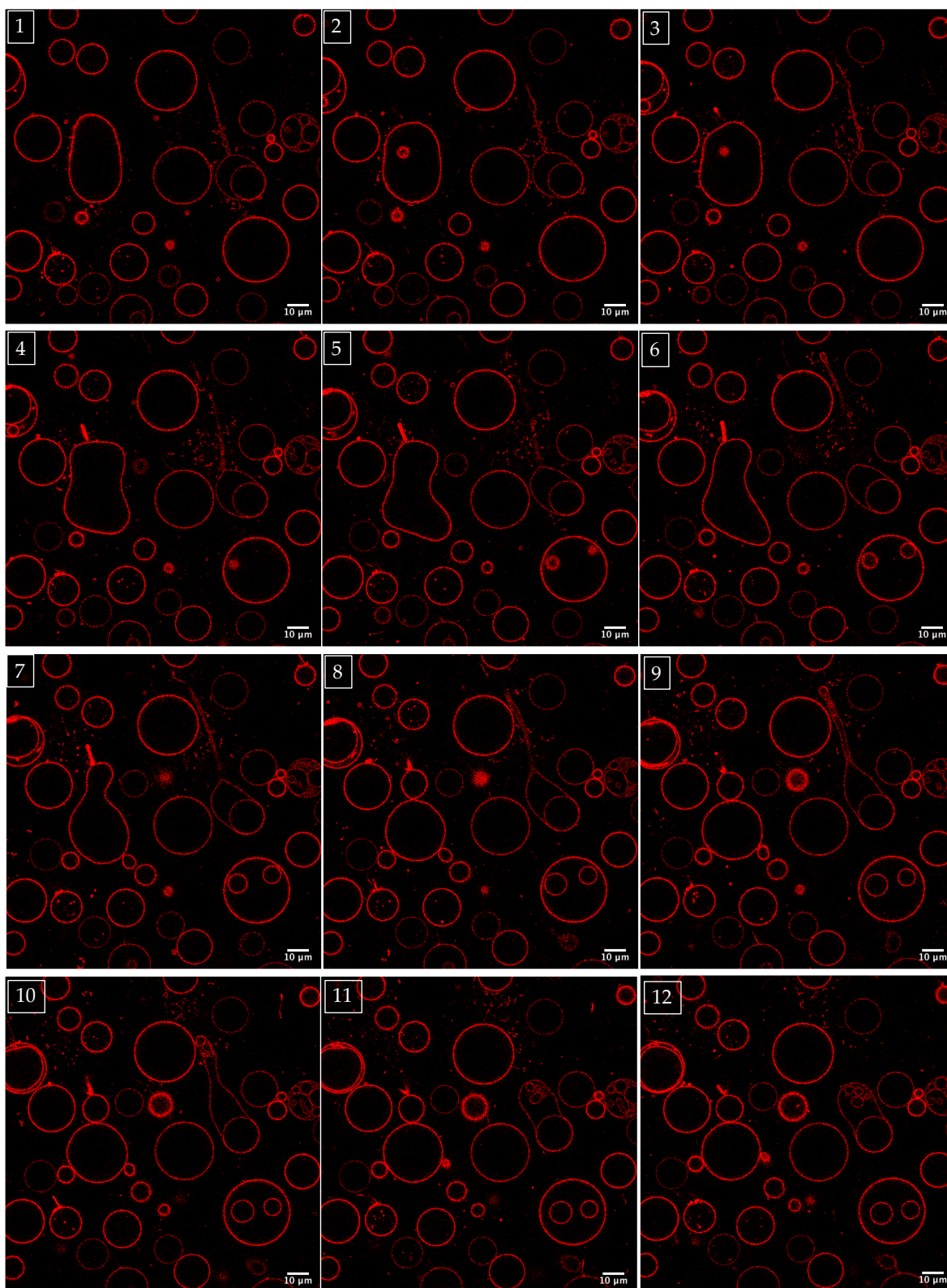


Figure S7. Snapshots of morphological changes in GUV-CSL 50% treated with HCl. White boxes in the upper left corner indicate frame order. Time-lapse between pictures is 0.143 second; total time-lapse is 1.86 seconds. Scale bar: 10 μm .

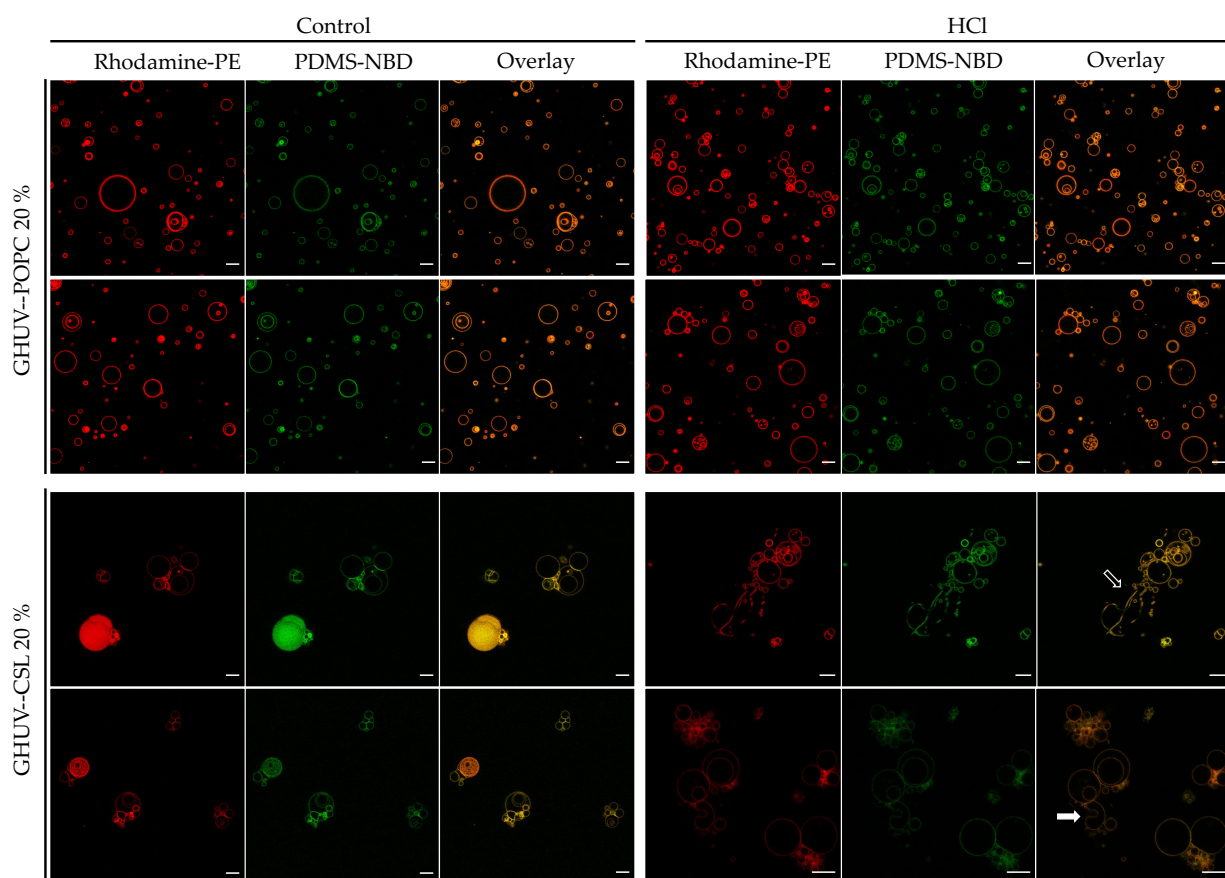


Figure S8. Morphological changes of GHUVs upon HCl treatment. Open arrows: vesicles with outward projections. Full arrows: membrane fluctuation events. Scale bar: 10 μm .

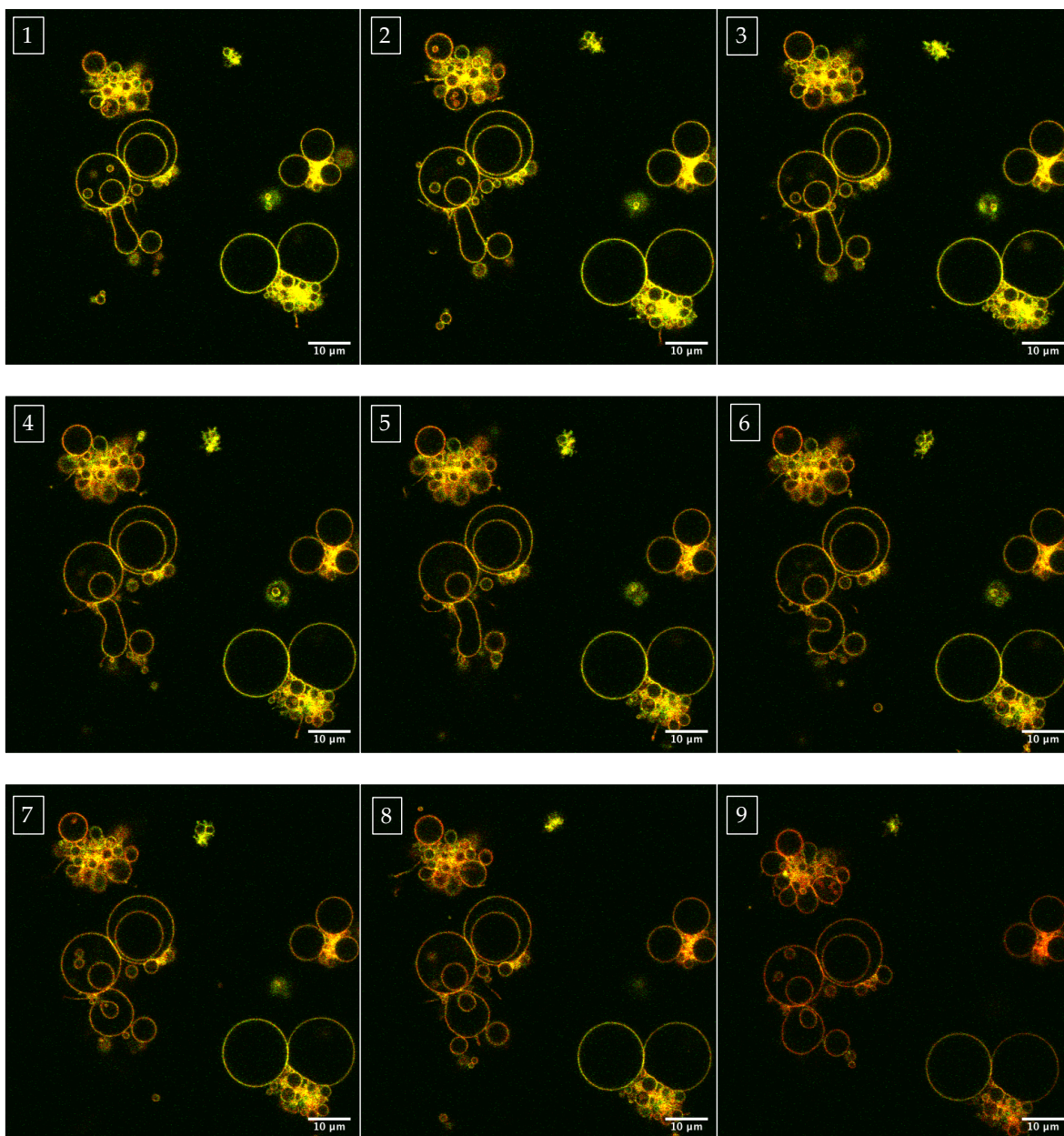


Figure S9. Snapshots of morphological changes in GHUV-CSL 20% treated with HCl. Merged PDMS-NBD and Rhodamine-PE filters. Time-lapse between pictures is 0.694 second; total time-lapse is 6.25 seconds. Scale bar: 10 μm .

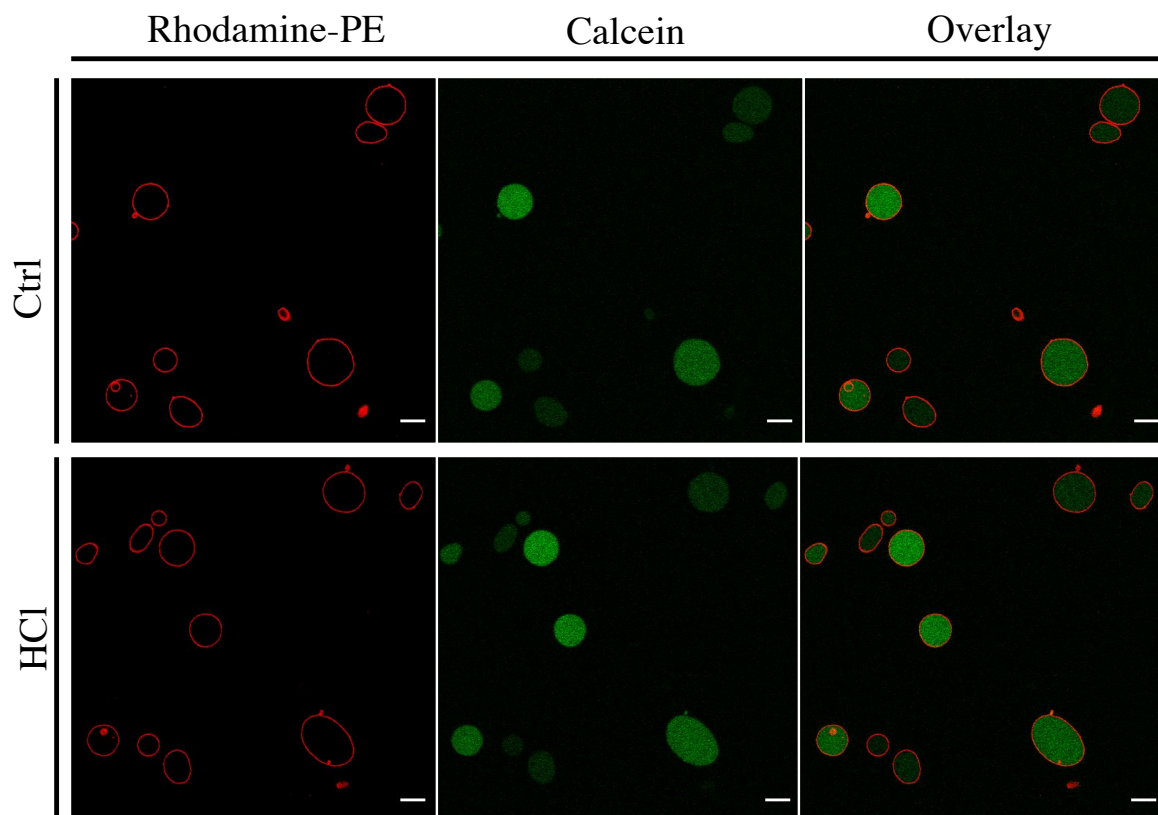


Figure S10. Permeability of calcein-loaded GUV-POPC 50% treated with HCl. Snapshots of morphological changes in GUV-POPC 50% treated with HCl. Rhodamine, calcein and merged filters. Scale bar: 10 μm

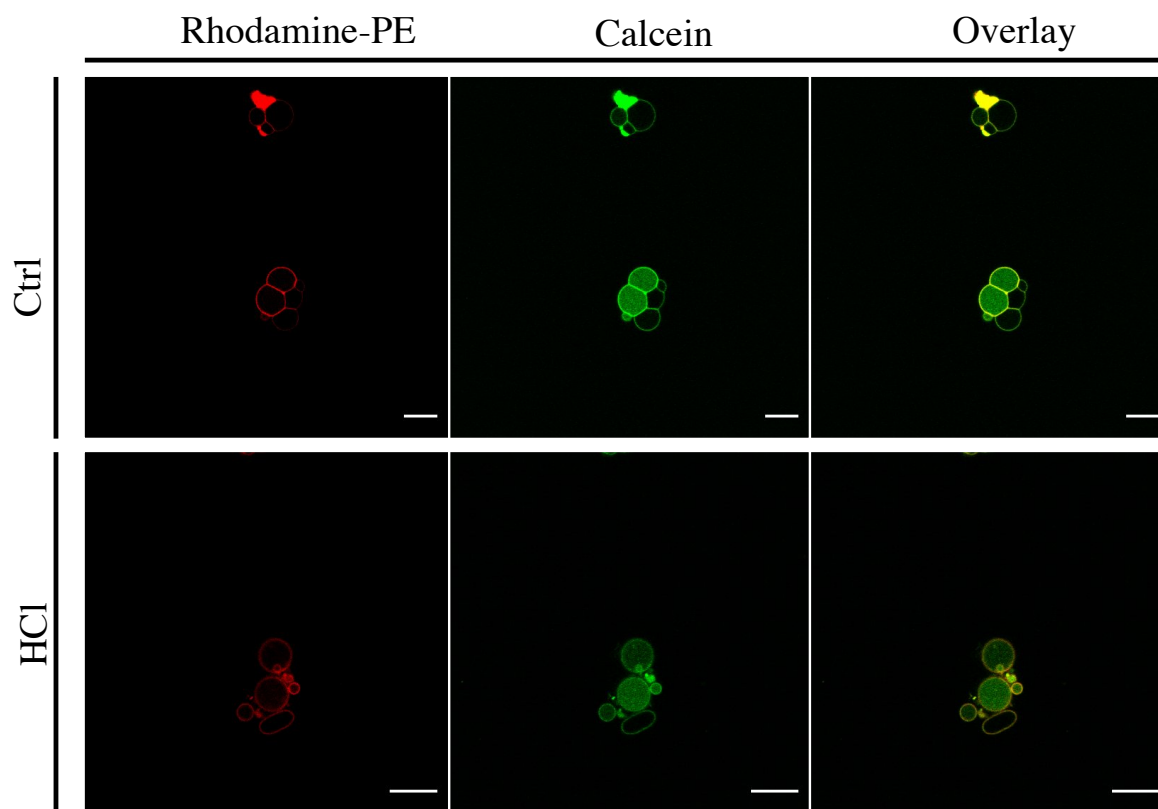


Figure S11. Calcein-loaded GUV-CSL 50% treated with HCl. Rhodamine, calcein and merged filters. Scale bar: 10 μm

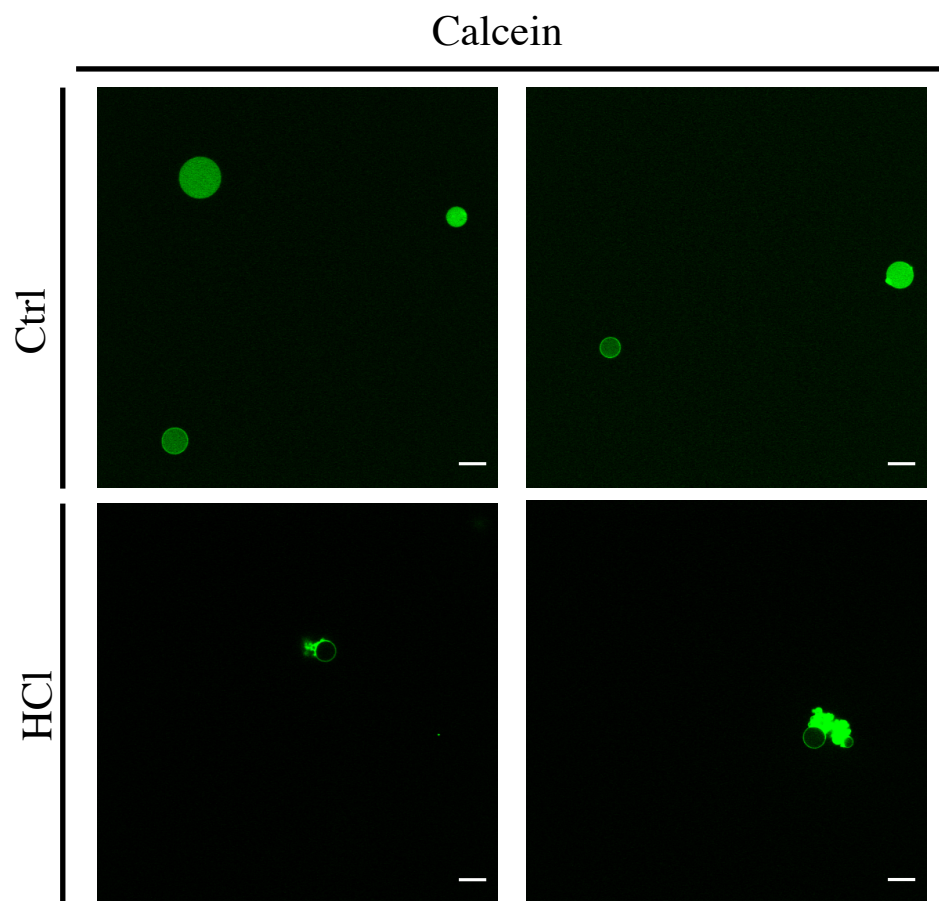


Figure S12. Calcein-loaded GHUV-CSL 50% treated with HCl. Calcein filters. Scalebar: 10 μ m.