Electronic Supplementary Material (ESI) for Soft Matter.

Supplementary Material for

"Area difference between monolayers facilitates budding of lipid droplets from vesicles"

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Note 1. Budding of embedded lipid droplets (LDs) from vesicles with $A_{\text{out}}^0 / A_{\text{in}}^0 \geq 1$

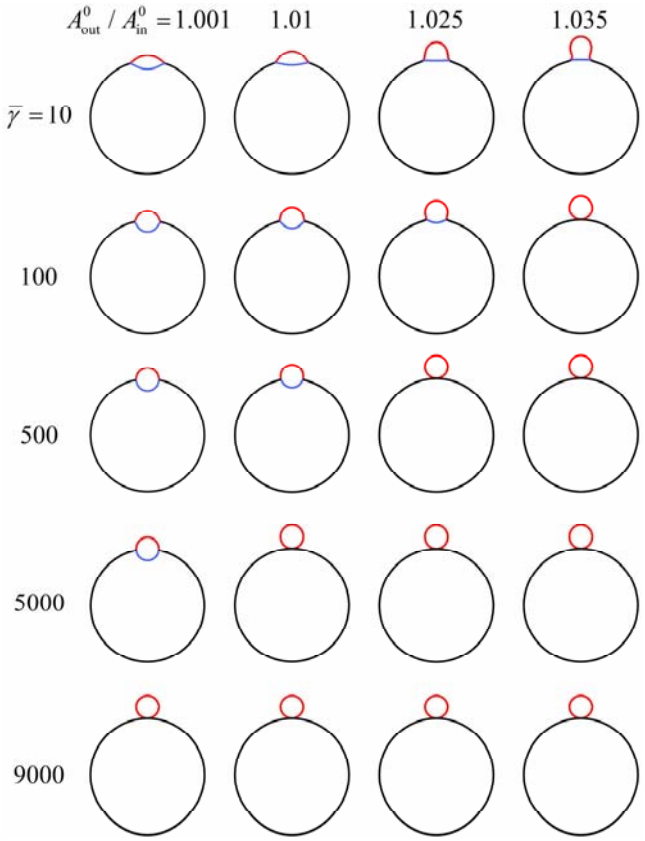

Fig. S1 Selected LD-vesicle configurations for different values of $\bar{\gamma}$ and $\bar{p}$ with vesicle radius $R = 5a$ and normalized osmotic pressure $\bar{p} = 10$.

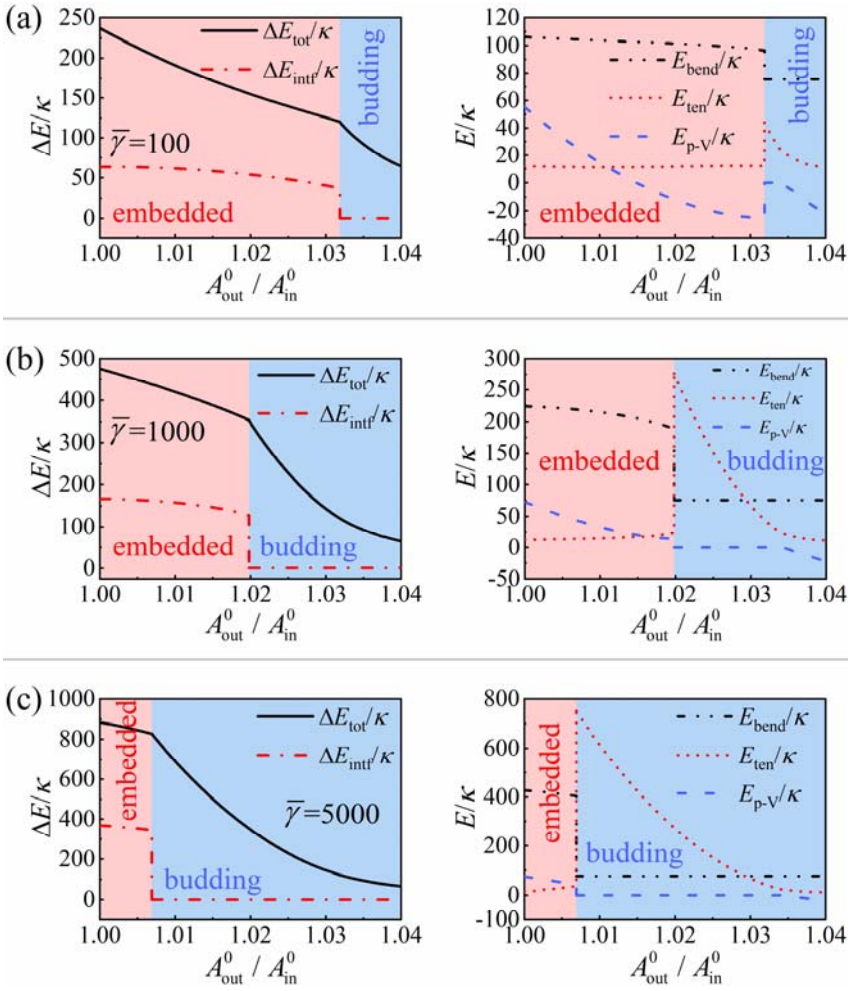

Fig. S2 Normalized total free energy variation $\Delta E_{tot} = E_{tot} - 4\pi\gamma a^2$ and its components (E_{bend}, E_{ten}, and $E_{p\text{-}V}$), and interfacial energy variation $\Delta E_{intf} = E_{intf} - 4\pi\gamma a^2$ versus monolayer area ratio A^0_{out}/A^0_{in} at $R = 5a$ and $\bar{p} = 10$ for $\bar{\gamma}$ = 100 (a), 1000 (b), and 5000 (c).

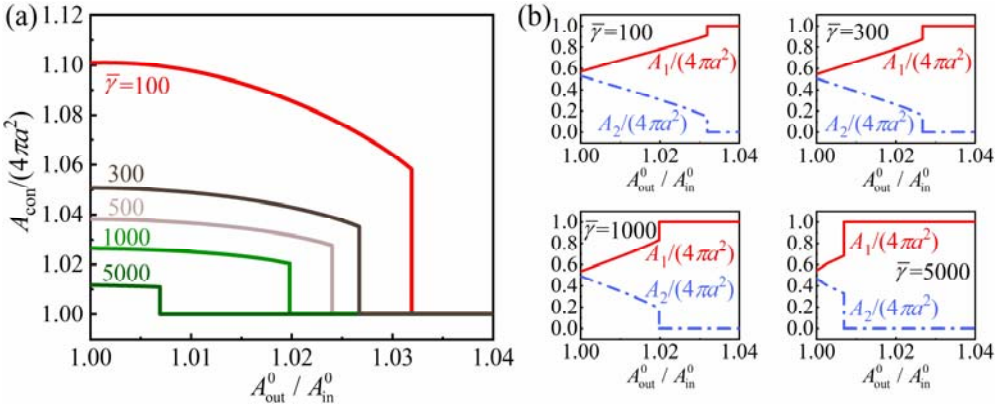

Fig. S3 The LD-vesicle contact area $A_c = A_1 + A_2$ (a) and outer (A_1) and inner (A_2) contact areas (b) versus monolayer area ratio A^0_{out}/A^0_{in} for different values of $\bar{\gamma}$ at $R = 5a$ and $\bar{p} = 10$.

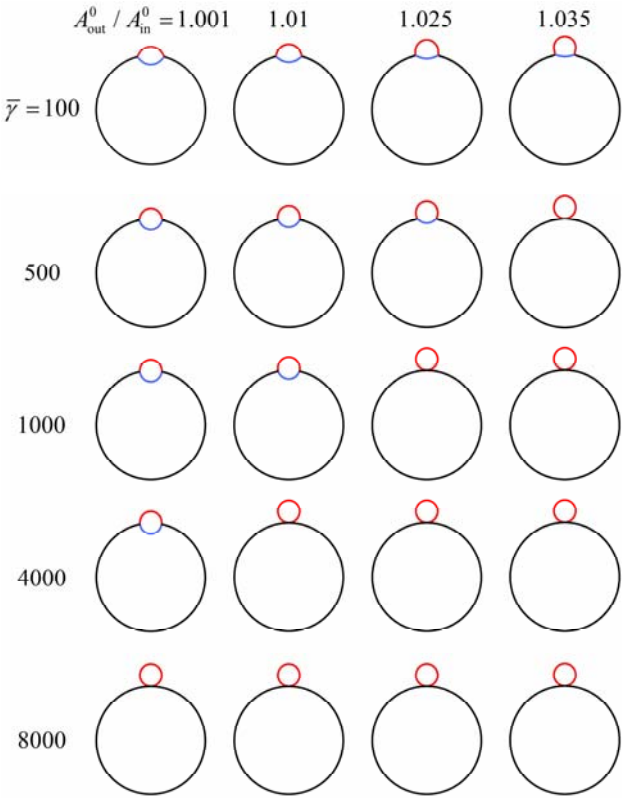

Fig. S4 Selected LD-vesicle configurations for different values of $\bar{\gamma}$ and $\bar{p}$ with vesicle radius $R = 5a$ and normalized osmotic pressure $\bar{p} = 30$.

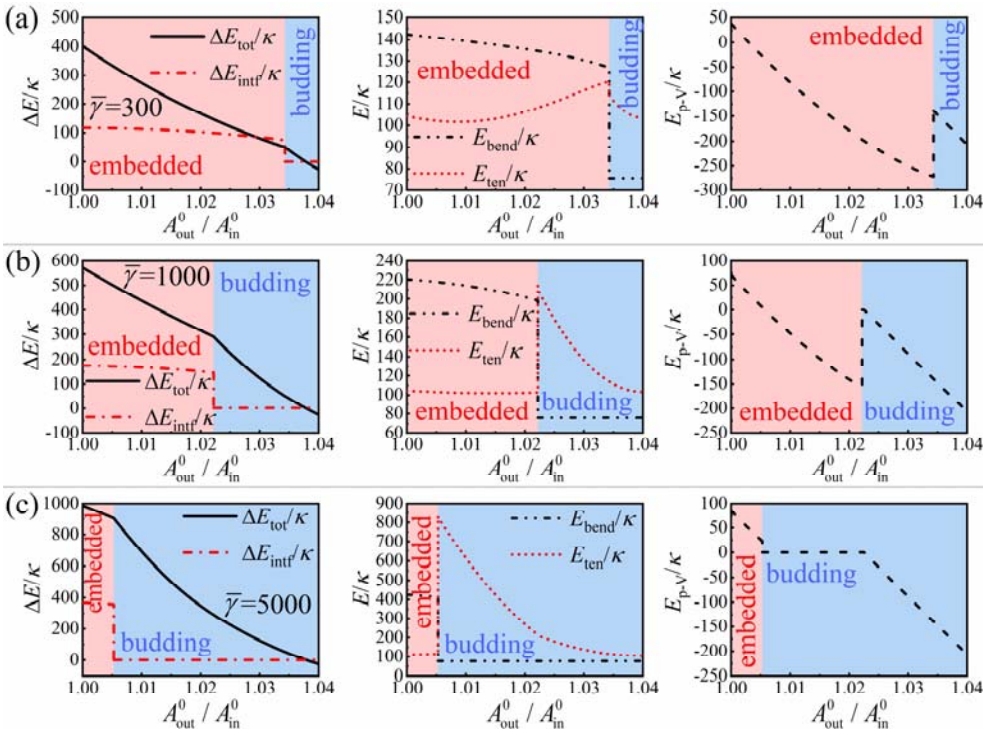

Fig. S5 Normalized total free energy E_{tot} and its components (E_{bend}, E_{ten}, and $E_{p\text{-}V}$), and interfacial energy variation $\Delta E_{intf} = E_{intf} - 4\pi\gamma a^2$ versus monolayer area ratio A^0_{out}/A^0_{in} at $R = 5a$ and $\bar{p} = 30$ for $\bar{\gamma} = 300$ (a), 1000 (b), and 5000 (c).

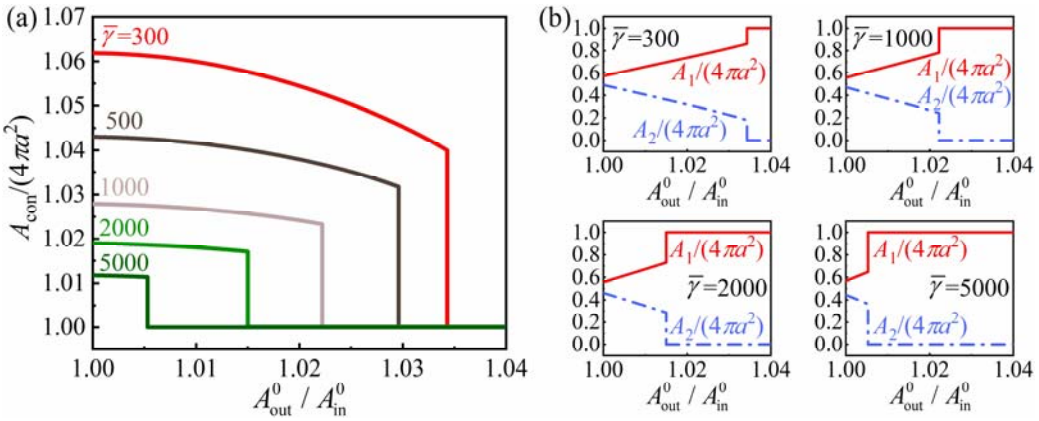

Fig. S6 The LD-vesicle contact area $A_c=A_1+A_2$ (a) and outer (A_1) and inner (A_2) contact areas (b) versus monolayer area ratio A^0_{out}/A^0_{in} for different values of $\bar{\gamma}$ at $R=5a$ and $\bar{p}=30$.

Note 2. Budding of embedded LDs from vesicles with $A^0_{out}/A^0_{in}\le 1$

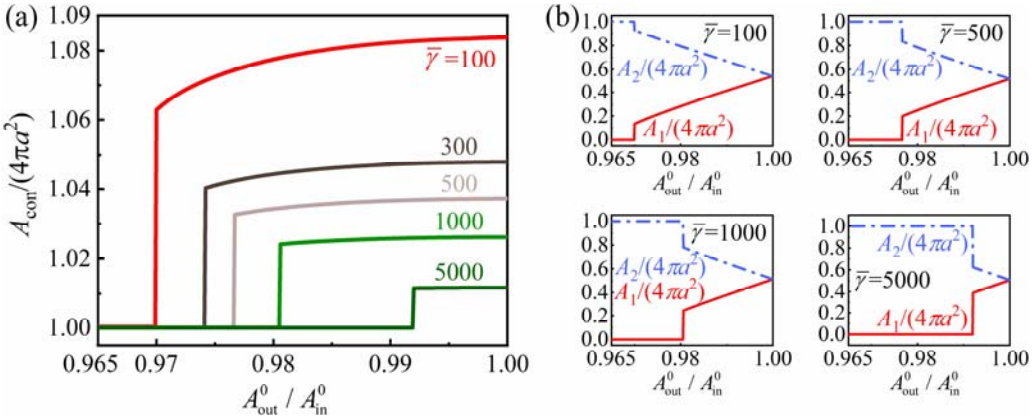

Fig. S7 The LD-vesicle contact area $A_c=A_1+A_2$ (a) and outer (A_1) and inner (A_2) contact areas (b) versus monolayer area ratio A^0_{out}/A^0_{in} for different values of $\bar{\gamma}$ at $R=5a$ and $\bar{p}=0$.

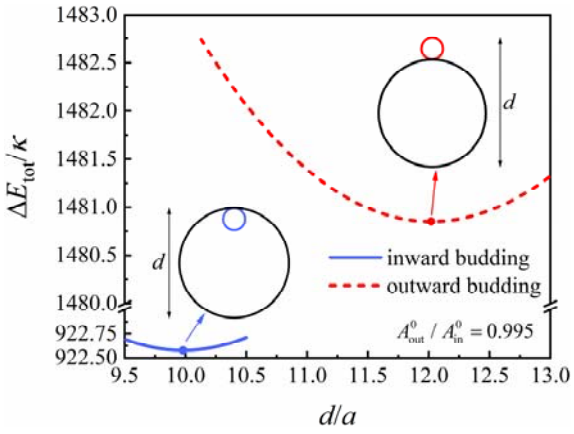

Fig. S8 Total free energy variations $\Delta E_{tot}=E_{tot}-4\pi\gamma a^2$ versus distance d between two poles of the LD-vesicle complex for outward and inward budding at $\bar{\gamma}=5000$, $A^0_{out}/A^0_{in}=0.995$, $R=5a$, and $\bar{p}=0$. Local minimum values of E_{tot} in the outward and inward budding states can be well determined by Eqs. (5) and (7), respectively.