Supporting information

From LUVs to GUVs - how to cover micrometer-sized pores with membranes

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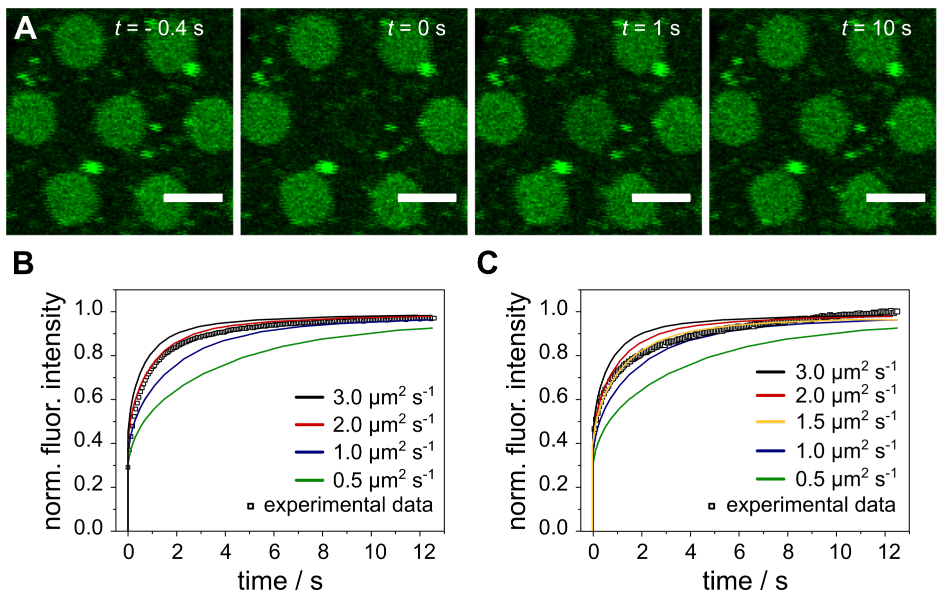

Figure 1: Indirect FRAP experiment and FEM simulations for the determination of the lipid diffusion coefficient of the s-PSM. (A) Exemplary fluorescence micrographs of an indirect FRAP experiment. Fluorescence intensity was bleached in a ROI (r_n = 2.2-2.3 µm) on top of an entire f-PSM and the fluorescence recovery was observed over time. Scale bar: 5 µm. Normalized, averaged fluorescence recovery curves of indirect FRAP experiments of the s-PSM on (C) Au/6MH and $SiO_{1\leq x\leq 2}$ coated substrates. Simulated recovery curves were modeled for $D_{\text{f-PSM,sim}} = 13\,\mu\text{m}\,\text{s}^{-1}$ and different $D_{\text{s-PSM,sim}} = 0.5\text{-}3\,\mu\text{m}\,\text{s}^{-1}$. Lipid diffusion coefficients of the s-PSM on Au/6MH functionalized substrates of $D_{\text{s-PSM,Au}} = 2\,\mu\text{m}\,\text{s}^{-1}$ and on $SiO_{1\leq x\leq 2}$ coated substrates $D_{\text{s-PSM,SiO}} = 1.5\,\mu\text{m}\,\text{s}^{-1}$ agreed best with the experimental data.

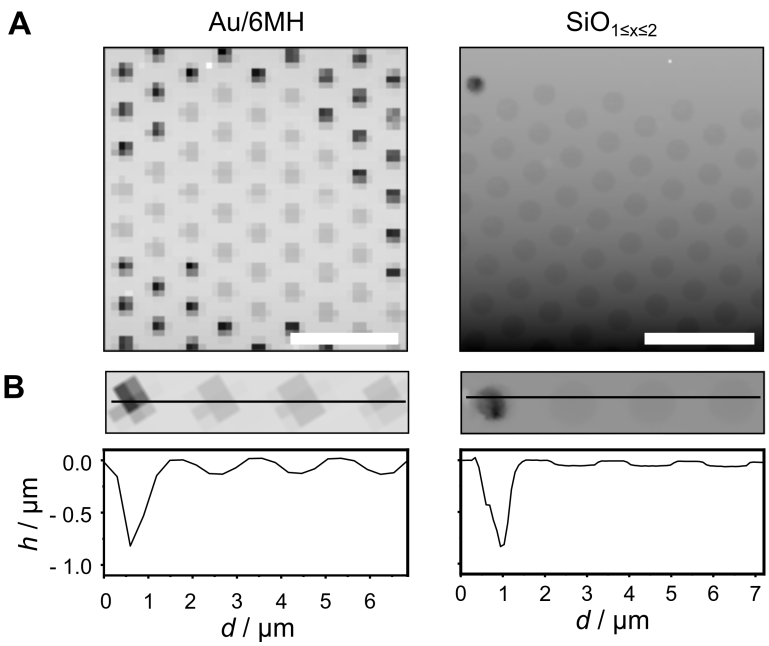

Figure 2: (A) Atomic force micrographs of PSMs prepared by spreading electroformed GUVs on porous substrates ($d_{\mathrm{pore}} = 1.2\,\mu\mathrm{m}$) functionalized with Au/6MH or $SiO_{1\leq x\leq 2}$. Scale bars: $5\,\mu\mathrm{m}$. (B) Atomic force micrographs and corresponding height profiles along the black solid line.

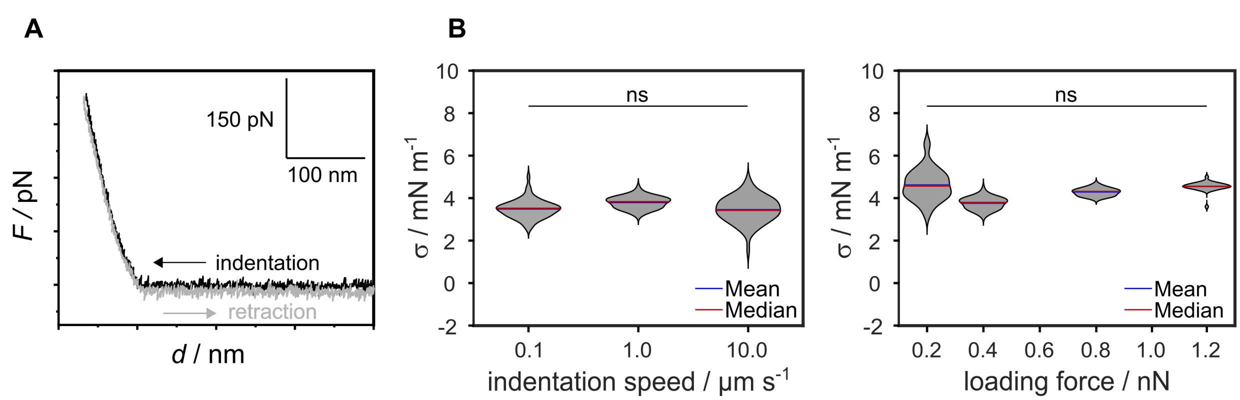

Figure 3: (A) Exemplary force-displacement curve measured in the center of an f-PSM. Influence of (B) indentation speed and (C) loading force on the lateral membrane tension. Force-displacement curves were obtained from PSMs derived from microfluidic GUVs on $SiO_{1\leq x\leq 2}$ functionalized substrates (B) at different indentation speeds ($n_{\mathrm{all}} = 62$) and (C) loading forces ($n_{0.2} = 85$, $n_{0.4} = 62$, $n_{0.8} = 30$, $n_{1.2} = 32$). Statistical t-test: $p > 0.05$ (ns).

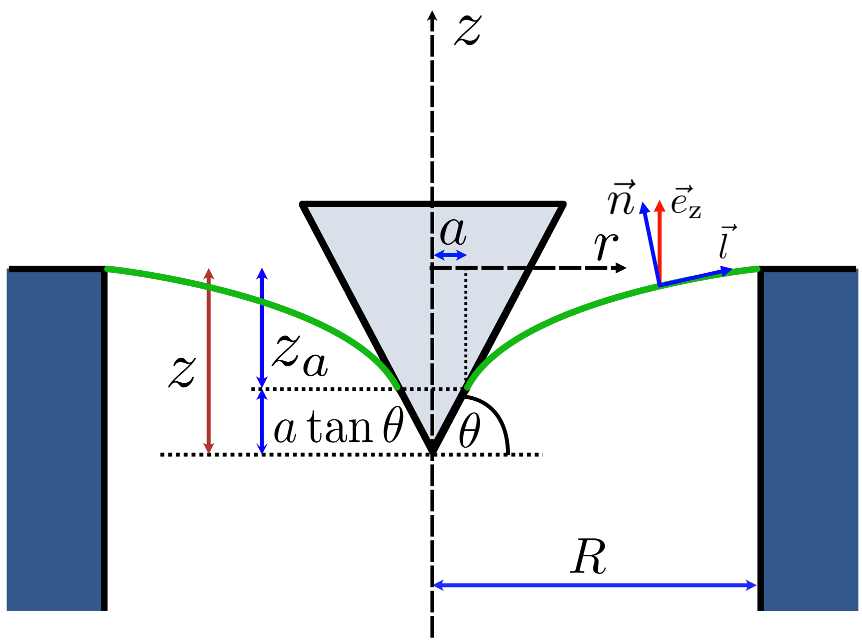

Figure 4: Parametrization of a pore-spanning membrane that is indented with a conical indenter. The symmetry is centrosymmetric. The pore edges (dark blue) act as a hinge to fix the biased membrane (green), which forms a catenoid to minimize the area or free energy. a denotes the contact radius of the membrane with the indenter, while z is the total depth of indentation. θ is the contact angle with the indenter, while $90 - \theta$ is half the angle of the cone.