Electronic Supplementary Material (ESI) for Soft Matter.

Membrane determinants for the passive translocation of analytes through droplet interface bilayers

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Supplementary figures

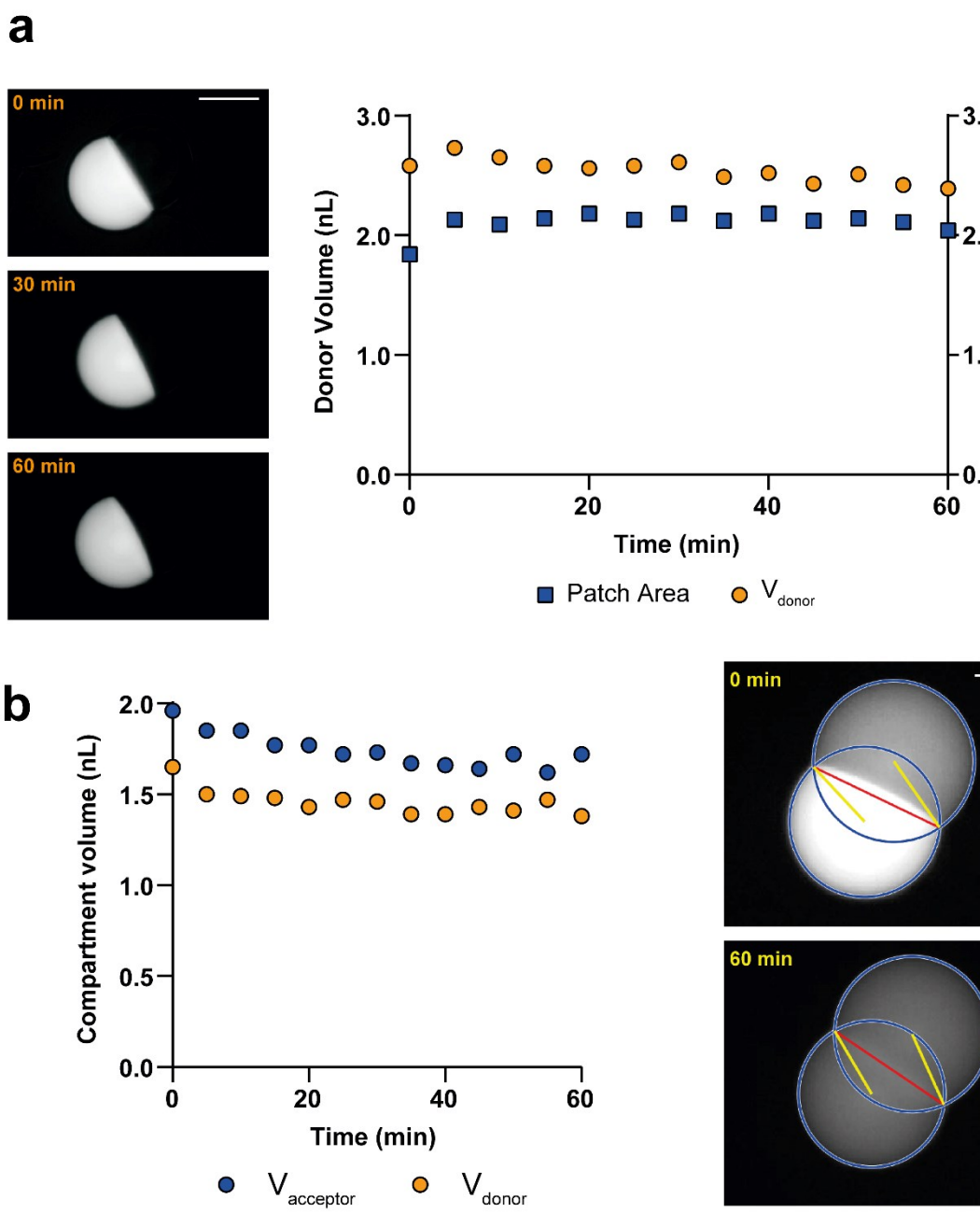
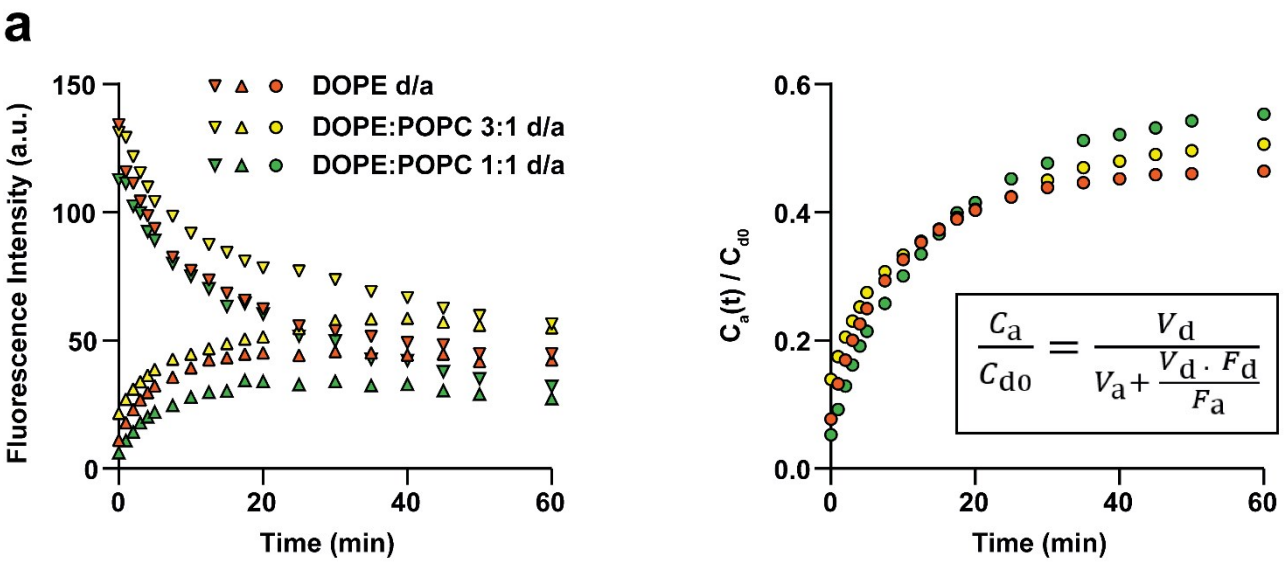
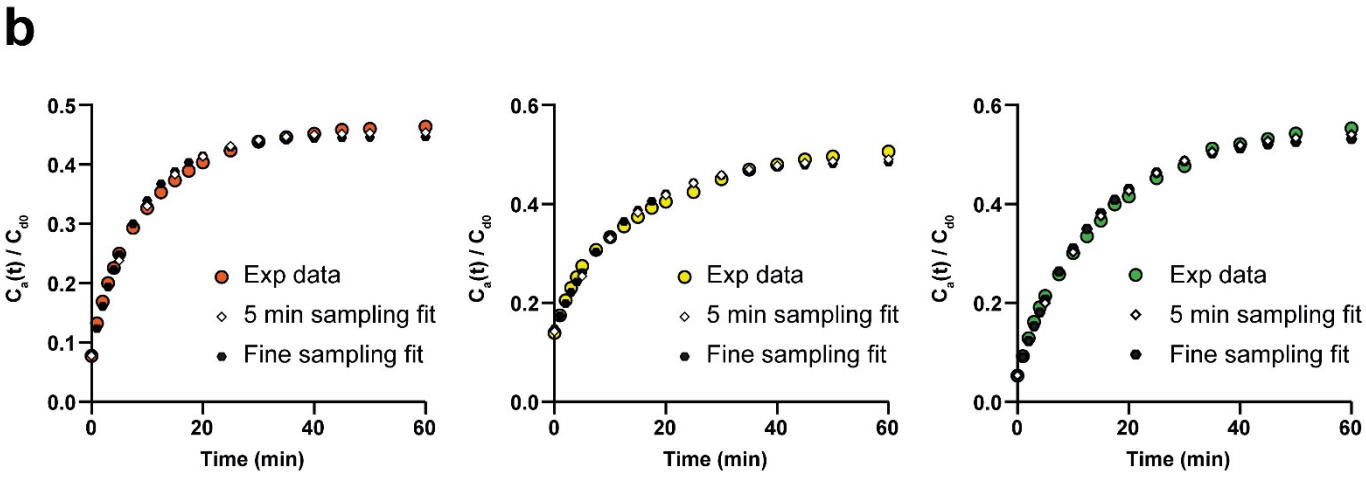


Figure S1:

(a) Control experiments show that droplet (yellow square) and patch (blue square) sizes do not significantly vary during the course of the permeation experiment. The example case shown is for carboxyfluorescein in DOPE DIBs and glyceryl trioctanoate. Scale bar, 100μm. **(b)** Both donor and acceptor droplets are shown in the case of fluorescein. Their sizes during permeation do not significantly change. Right, image illustrating that no significant change in size (blue circles) and contact angle (given by yellow and red lines) happens during the permeation of fluorescein. Scale bar, 50μm.





	DOPE	DOPE:POPC 3:1	DOPE:POPC 1:1
Fine sampling	μ = 0.122	μ = 0.082	μ = 0.076
5 minutes sampling	μ = 0.111	μ = 0.077	μ = 0.070
Shift	Δμ = - 9 %	Δμ = - 6 %	Δμ = - 7 %

Figure S2:

(a) A representative example of the fluorescence intensity in the donor and acceptor droplets over time is shown for the three following phospholipid composition: DOPE, DOPE:POPC 3:1 and DOPE:POPC 1:1. The subsequent acceptor concentration, C_a/C_{d0} as a function of time is shown. **(b)** Comparison of

fit with fine sampling (1 minute time span for the first 5 minutes, 2.5 minutes time span from 5 to 20 minutes, 5 minutes time span from 20 minutes to 50 minutes, 10 minutes time span from 50 to 60 minutes) and fit with 5 minutes sampling (5 minutes time span for the entire experiment duration), for the three studied compositions (Bottom table) Parameters obtained from the experimental fits using the two different sampling show close values with a similar shift.

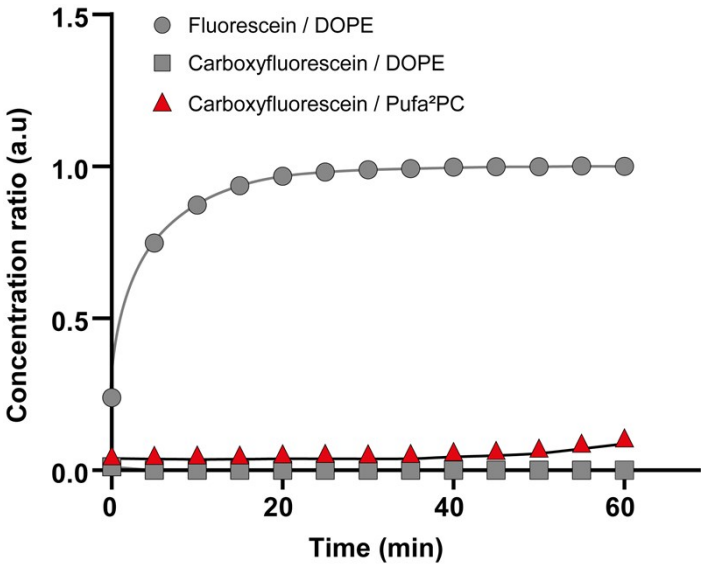


Figure S3:

Comparison of permeation kinetics for carboxyfluorescein through glyceryl trioctanoate DOPE and Pufa²PC DIB bilayers.

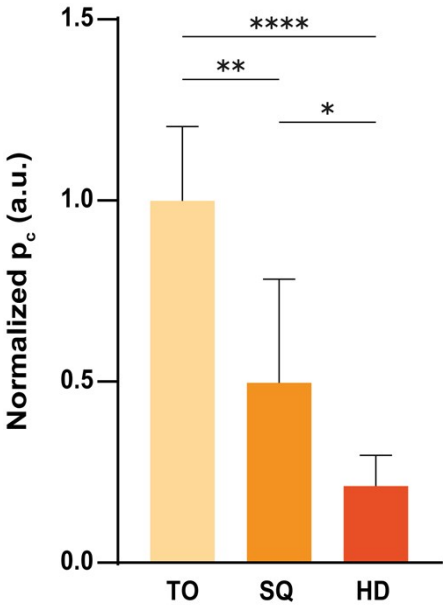


Figure S4:

Measurement of the monolayer tensions at a water/oil interface stabilized with phospholipids. **(a)** Schematic of the pendant drop method of the Teclis apparatus. Adsorption of the phospholipids at the water/oil interface and decrease in monolayer tension obtained from droplet shape analysis.

(b) Surface tension, fitted surface tension, volume and area as a function of time. Exponential fit enables to get the equilibrium value of surface tension γ_{m0}.

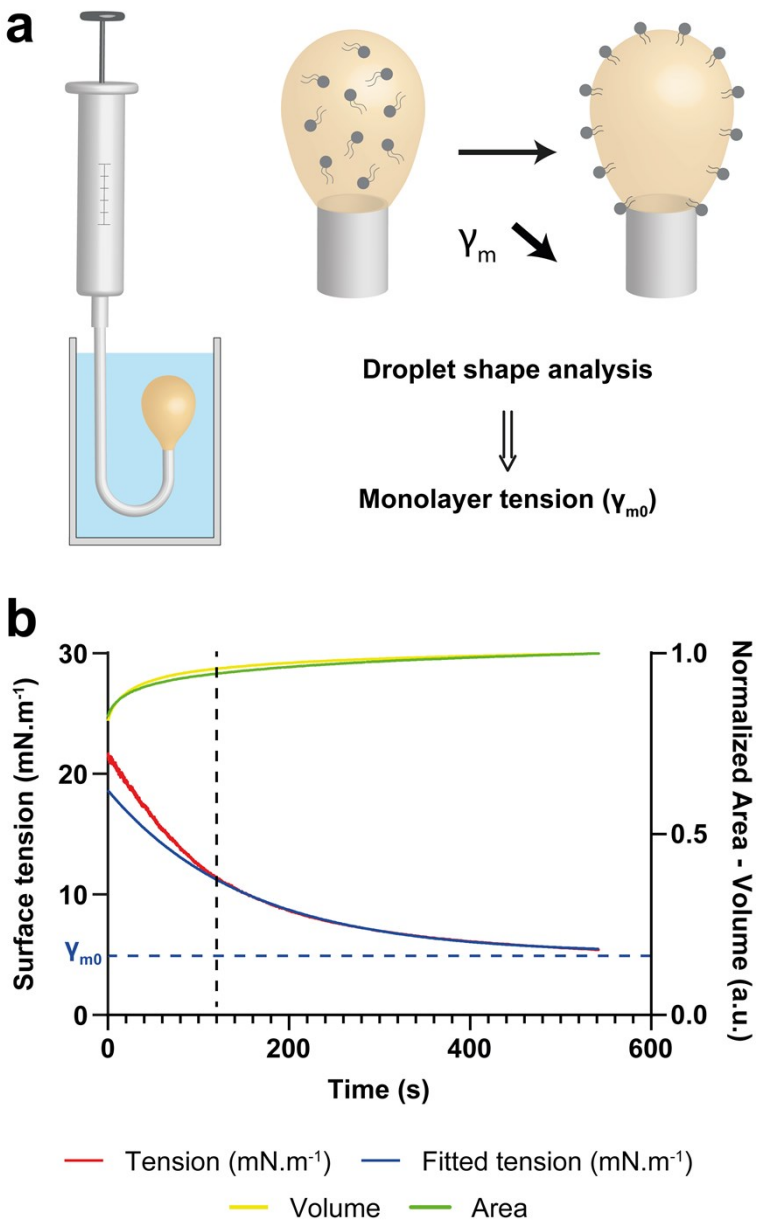


Figure S5:

Comparison of permeability through DOPE DIBs made of various oil, Glyceryl Trioctanoate (TO), Squalene (SQ), and Hexadecane (HD) (mean value, error bars represent the SD). * indicates $p < 0.05$, ** indicates $p < 0.01$, **** indicates $p < 0.0001$.