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Supporting Material

Phase state dependent current fluctuations in pure lipid membranes

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Supplementary Information

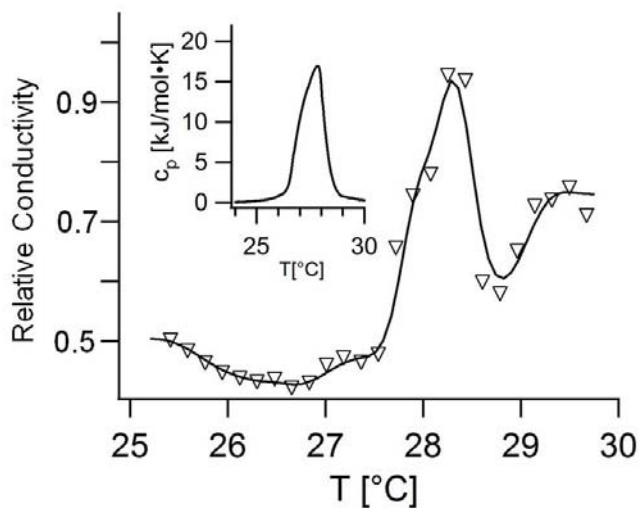


Figure S1: This figure demonstrates the increase in permeability of a DMPC/D15PC (1/1) lipid bilayer. The average current across the membrane as a function of temperature at $V_M = 110\text{mV}$ is plotted. A maximum between $27,5^\circ\text{C}$ and $28,5^\circ\text{C}$ is observed to which the data are normalized. The current trace clearly correlates with the heat capacity profile (see inset). In total the conductivity changes by a factor of 2 between the gel phase and the phase transition. In contrast to figure 1 in the manuscript the membrane was prepared in the gel phase and heated towards the fluid phase

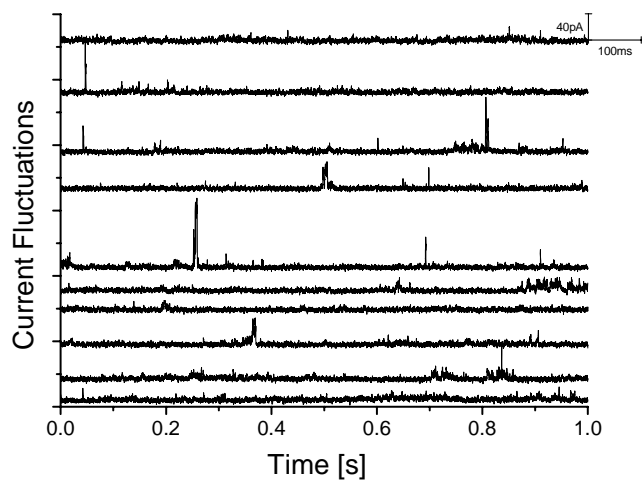


Figure S2a: Current Traces of a DOPC/D15PC (9/95) BLM in the fluid phase at 39°C. Such curves have been used to calculate the additional data points shown in figure 1 of the manuscript (squares) and revealed an average conductivity between 37-40°C of $2.3 \cdot 10^{-7} \text{ S/cm}^2$.

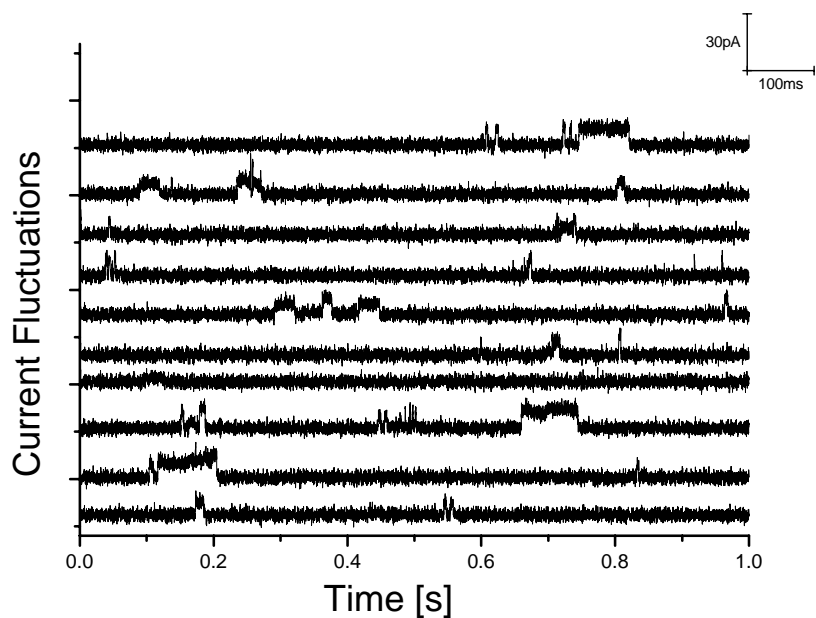


Figure S2b: Current Traces of a DOPC/D15PC (9/95) BLM in the phase transition at 27°C.

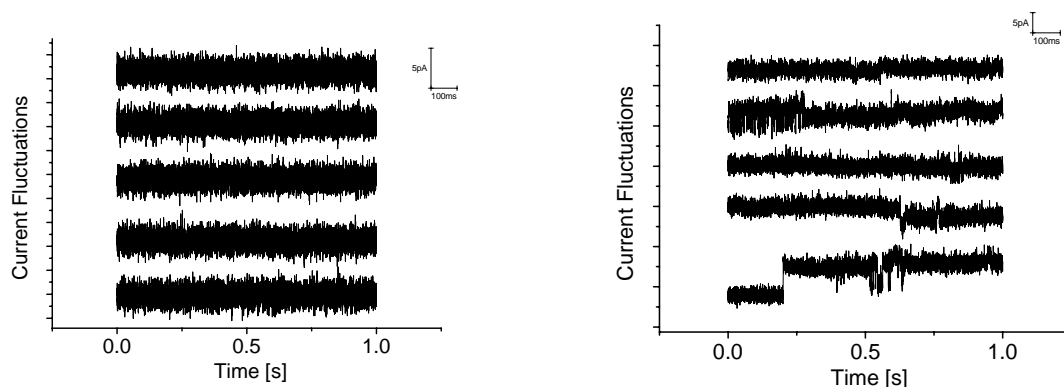


Figure S2c: Current Traces of a DOPC/D15PC (9/95) BLM in the gel phase at 21°C. Most of the time no current fluctuations can be detected (left). However on occasion current fluctuation of very large life time occur (right). A pore opens (lower trace) and continues to stay open for several seconds. Very often such events lead to membrane rupture. Such curves have been used to calculate the additional data points shown in figure 1 of the manuscript (triangles).

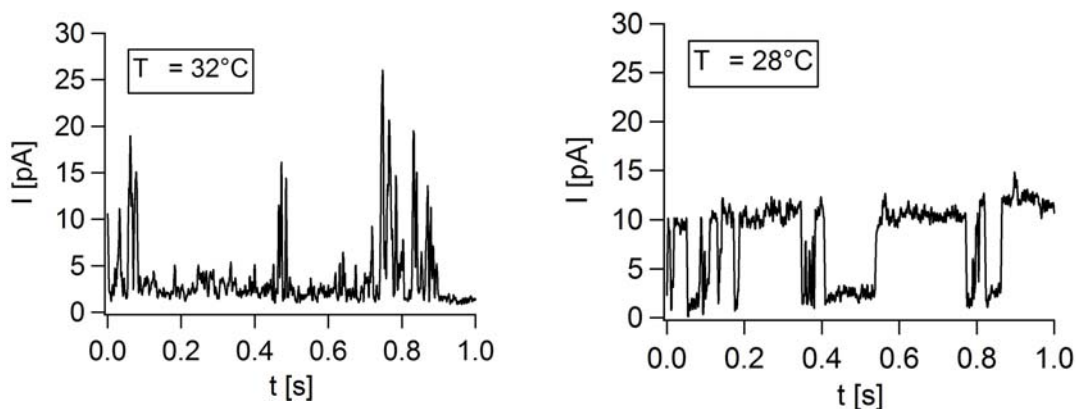


Figure S2d: Typical current traces of a D15PC-DMPC (1/1) left) in the fluid phase (34°C, $V_M = 400mV$) and right) the phase transition regime (28,5°C, $V_M = 500mV$). In the fluid phase spike-like current fluctuations on short times scales are observed. In the phase transition regime however, quantized fluctuations at longer time scales appear. Note that the typical time scales are strongly increased compared to the fluid phase. An average timescale of ~20ms in the fluid phase and ~300ms in the phase transition regime has been calculated. Taking a transition half width from Fig. S1 around 1.5 K, equation 1 predicts a relaxation time

in the range of 350 – 700 ms within one degree from the c_p maximum which is very close to the experimentally found average lifetime of ~300 ms.