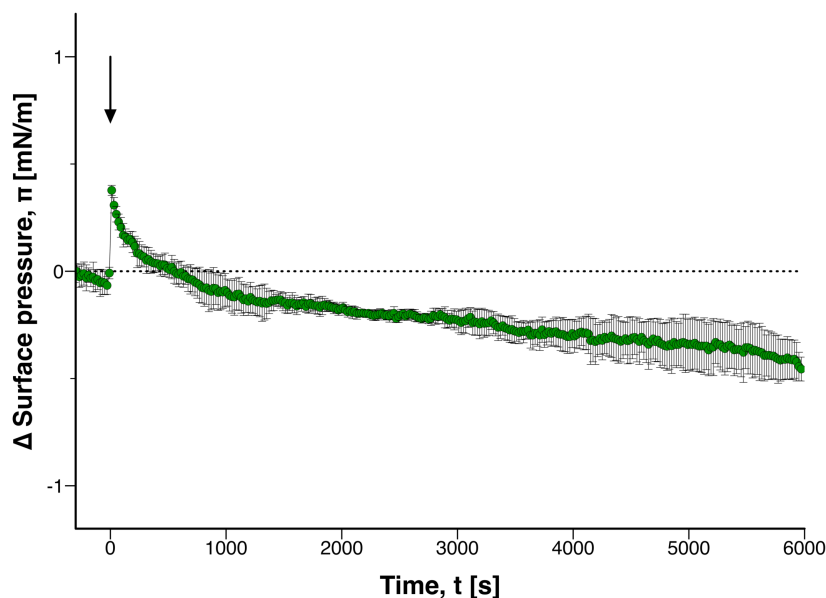
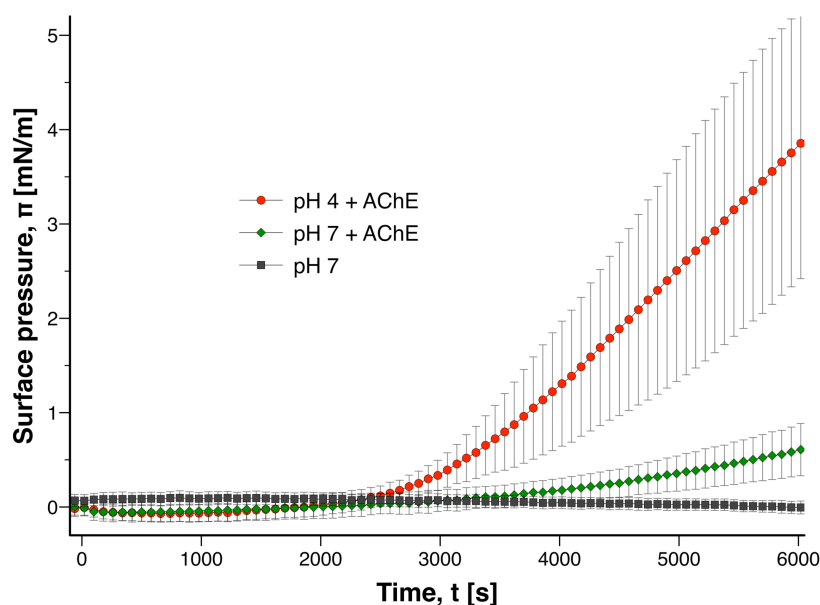


# Supplementary Materials: Lipid membrane state change by catalytic protonation and the implications for synaptic transmission

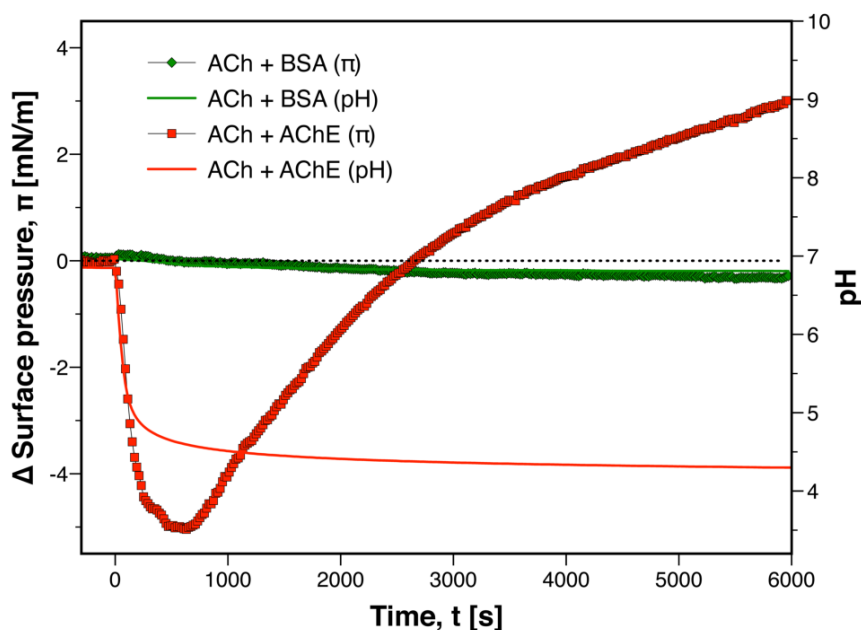
Christian Fillafer<sup>1\*</sup>, Yana S. Koll<sup>1</sup> and Matthias F. Schneider<sup>1</sup>



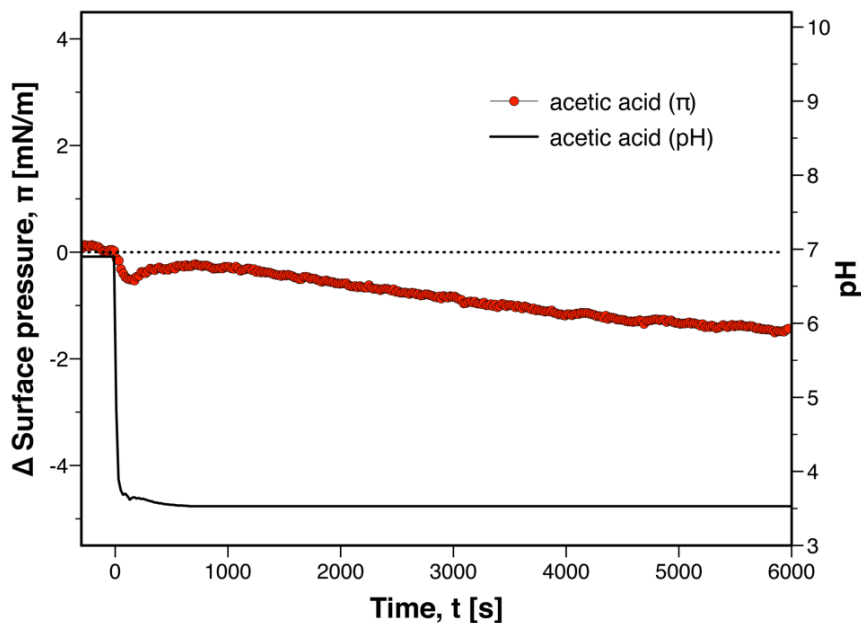
**Figure S1.** Surface pressure change upon injection of  $V = 160 \mu\text{L}$  of subphase onto DMPS monolayer. The initial surface pressure after equilibration for 60 min at  $23^\circ\text{C}$  was  $\pi \approx 20 \text{ mN/m}$ . The data series consists of mean values  $\text{StDev}$  of  $n = 3$  measurements.



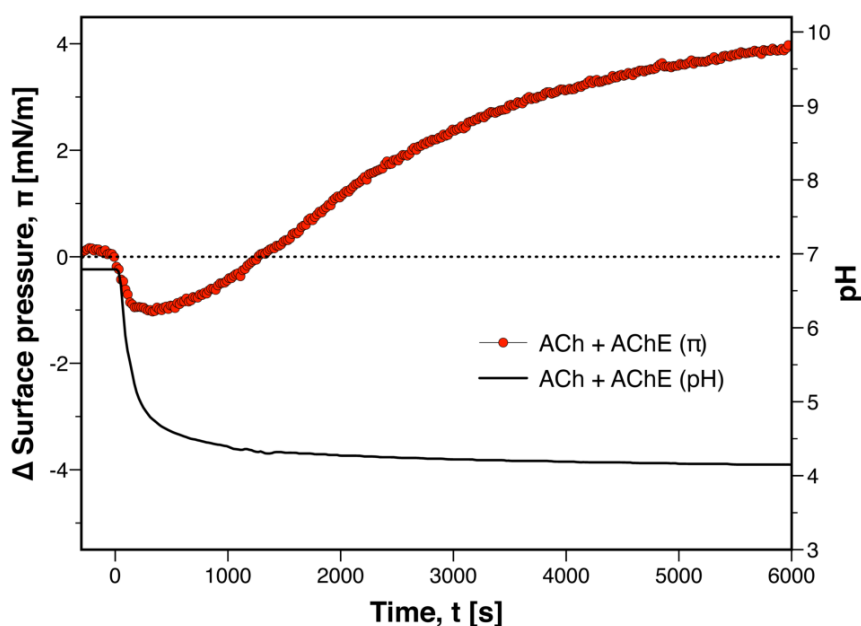
**Figure S2.** pH-dependent surface activity of acetylcholinesterase (AChE) from *E. electricus*. Change of surface pressure of the gas-solution interface when AChE was added to standard subphase at pH 4 (red circles) or pH 7 (green diamonds). Control experiments: change of  $\pi$  without AChE at pH 7 (black squares). Each data series consists of mean values  $\text{StDev}$  of  $n = 2 - 3$  measurements.



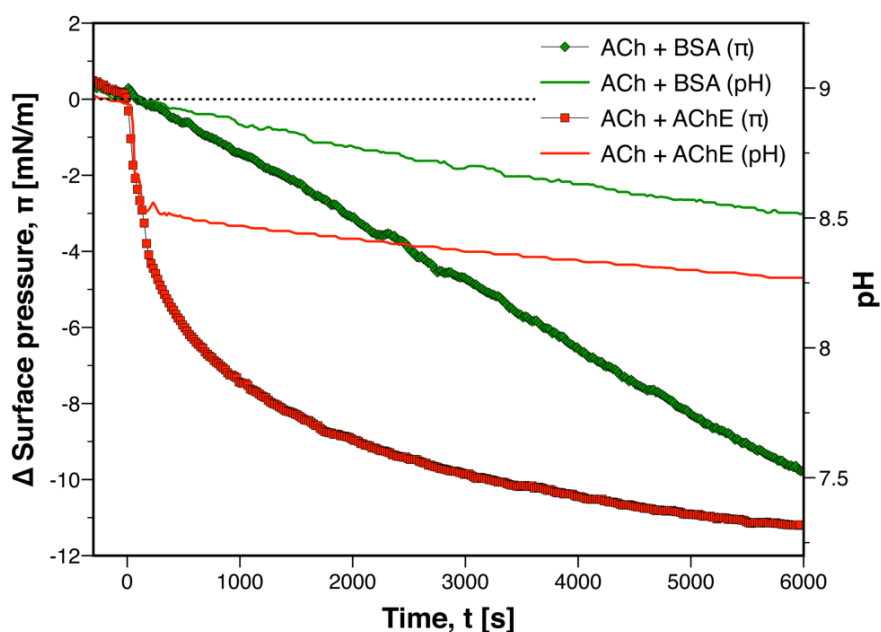
**Figure S3. Injection of ACh onto a DMPS monolayer in presence of bovine serum albumin (BSA).** Changes of surface pressure  $\pi$  (left axis, symbols) and subphase pH (right axis, solid lines) when ACh was injected at  $t = 0$ . The subphase contained either AChE (red) or BSA (green). The data for BSA are a representative example taken from a series of  $n = 2$  measurements. The data for AChE were replotted from Fig. 2 in the main text for comparison.



**Figure S4. Response of a monolayer made from DPPC to injection of acetic acid.** Changes of surface pressure  $\pi$  (left axis, symbols) and subphase pH (right axis, solid line) when acetic acid was injected at  $t = 0$ . The final concentration of acid was  $c = 10mM$ . Data series is a representative example taken from a series of  $n = 2$  measurements.



**Figure S5.** Response of a monolayer made from DPPC to injection of ACh in presence of AChE. Changes of surface pressure  $\pi$  (left axis, symbols) and subphase pH (right axis, solid line) when ACh was injected at  $t = 0$ . The final concentration of ACh was  $c = 10\text{mM}$ . Data series is a representative example taken from a series of  $n = 2$  measurements.



**Figure S6.** Injection of ACh onto a DMPA monolayer in presence of bovine serum albumin (BSA). Changes of surface pressure  $\pi$  (left axis, symbols) and subphase pH (right axis, solid lines) when ACh was injected at  $t = 0$ . The subphase contained either AChE (red) or BSA (green). The data for BSA are a representative example taken from a series of  $n = 2$  measurements. The data for AChE were replotted from Fig. 4 in the main text for comparison.