Supporting information

1. TIRF spectra

TIRF analysis of amide groups of gA are located between 1500 cm\(^{-1}\) to 1700 cm\(^{-1}\) and allow well characterizing helix structures. We have performed TIRF experiments (Fig. S1) and it is extremely tricky to conclude on these signals. Indeed, the absorbance pick of polycarbonate hide the signal of gramicidins.

![Figure S1: TIRF spectra of raw membrane and PC\(_{15}\)-gA-W](image)

Electronic Supplementary Material (ESI) for Nanoscale
2. Diffusion of $K_2SO_4$ through PC$_{15}$-gA-W

![Figure S2: Kinetics of $K_2SO_4$ transfer through PC$_{15}$-gA-W (red open square), compared to PC$_{15}$ without gA membrane (black open circle)](image)

3. Ionic Diffusion in raw PC$_{15}$ Membrane

The diffusion coefficients measured for raw membrane (PC$_{15}$) are higher than for PC$_{15}$-gA-W for all salts (Figure 3 of manuscript). In addition they are not depending on the salt concentration contrary to PC$_{15}$-gA-W. These results show that the PC$_{15}$-gA-W ionic properties are probably due to the gA proteins.
Figure S3: Diffusion coefficient of PC$_{15}$ (without confined gramicidin) for MgCl$_2$, CaCl$_2$, NaCl and KCl

4. pH evolution and Chlorine salt transfer kinetics
Figure S4: pH evolution (open red square) and salt (a) MgCl$_2$ (b) NaCl transfer kinetic (open green square) for salt concentration 0.1 M at pH 2