Supplementary figures:

Supplemental Fig. 1. The initial 2D structures used in this study. A) The initial 2D structure of G (Graphene) and GO (Graphene oxide) flakes. The dots at the top and bottom of G and GO represent the periodicity in the z direction. The x direction is across the sheet while the y direction is into the paper. B) 2D structure of phospholipids as retrieved from PubChem. The abbreviations as in Figure 1 of the main text.
Supplemental Fig. 2. The molecular structure of isolated phospholipids used in this study. The abbreviations and color coding as in Figure 1 of the main text.
Supplemental Fig. 3. OH arrangement in the head of phosphatidylglycerol. Color coding as in Figure 1 of the main text.

Supplemental Fig. 4. Plot of the interaction energy between paired phospholipids. Orange and red dots represent vacuum, while light- and dark blue shows calculations with water environment. The abbreviations as in Figure 1 of the main text.
Supplemental Fig. 5. A) SEM images of *S. aureus* interaction with vertically orientated graphene on polymer coated with 10 mg/mL graphene solution compared to the control non-coated polymer. The scale bar is 1 µm. B) AlamarBlue assay of MCF10a cells in the presence of coated polymers with 10 mg/mL GNP for 24 h. All values were normalized to those obtained from untreated cells (medium only). 10% DMSO was used as positive control. Data represent the mean ±SE of three independent replicates and it was statistically analyzed and compared with the control (**p ≤ 0.01, ***p ≤ 0.001, ns: not statistically significant) using Student’s t test.
Supplemental Fig. 6. Successful functionalization of graphene oxide (GO) with fluorescein. A) Size distribution from dynamic light scattering of functionalized GO with fluorescein (GO-F) and GO. B) Measured fluorescence from pure GO and GO-F in water.

Supplemental Fig. 7. PC/SM (50%/50%) liposomes representing mammalian cells membrane. Images from fluorescent microscopy of liposomes after treatment with GO-F compared to non-treated liposomes. Left and right images represent the bright field and fluorescent microscopic observations. The scale bar is 10 µm.