Online Supporting Material

Fluidic and air-stable supported lipid bilayer and cell-mimicking microarrays

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Characterizing surface cholesteryl group density by XPS

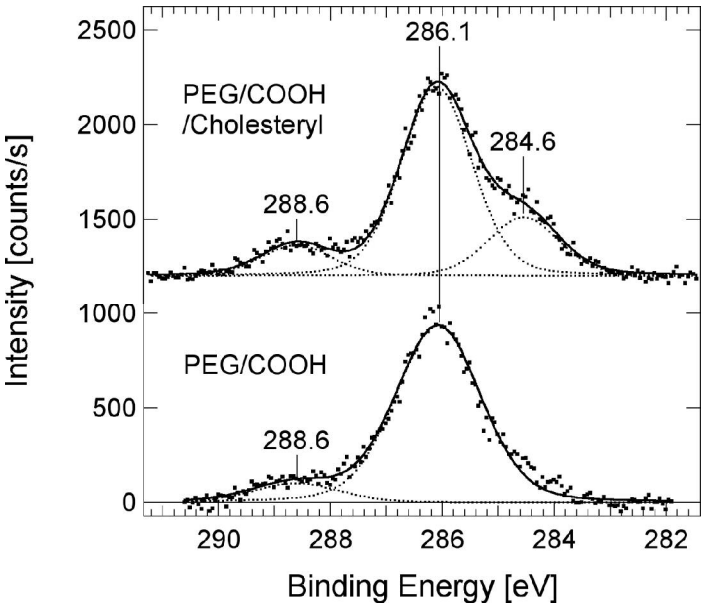

Figure S1: X-ray photoelectron spectra (XPS) in C_{1s} region of the –COOH functionalized PEG brush before (lower) and after (lower) cholesteryl attachment reaction (2 hours). The peaks at binding energy BE = 288.6, 286.1, and 284.6 eV represent carbon atoms in –COO-, PEG, and cholesteryl (hydrocarbon), respectively. The dots are experimental data and the solid curve is the sum of individual fits (dotted curve) to peaks at different binding energies.

The densities of covalently attached cholesteryl groups on the PEG brush surface are quantified by XPS. Figure S1 shows XPS in the C1s region for the PEG brush surface before (lower) and after (upper) cholesteryl group attachment. The C_{1s} spectrum for the PEG brush surface is dominated by ether carbon in the PEG brush (BE = 286.1 eV), with the smaller peak at BE 288.6 eV due to surface –COOH groups. Thickness of the PEG brush coating is 2.3 nm, as determined from the attenuation of the substrate XPS peaks. After reaction with cholesteryl chloroformate, the peak at BE = 284.6 becomes evident. This peak corresponds to zero valence carbon (C bonded to C or H) and is dominated by most carbon atoms in the cholesteryl group. Note there is also an increase in the 288.6 eV peak due to the formate linker. Because these different carbon peaks are well resolved, we obtain surface density from the relative peak areas, taking into account photoelectron attenuation factors, as detailed previously [1]. For the upper spectrum in Figure S1, this quantitatively analysis gives a surface cholesteryl density of 0.30 ± 0.06/nm^2. The error bar mainly comes from uncertainty in the photoelectron escape depth.

[1] Cha, T.; Guo, A.; Jun, Y.; Pei, D. Q.; Zhu, X.-Y. *Proteomics* **2004**, *4,* 1965