Supplemental figure 1:



Supplemental figure 1: Estimation of mass of avidin associated with the different layers using QCM-D. The estimation of mass for each of the percentage functionalised lipids was calculated using the Sauerbrey equation and we have plotted the maximal response in each case. Biotinyl-cap (BC-PE) lipids have the highest level of mass associated with the surface followed by the PEG-2 and then PEG-11 linkers. This is in contrast to the dry-mass calculated from dual polarisation calorimetry and highlights the level of coupled water is significantly higher for BC-PE compared to the longer linkers.

Supplemental figure 2:



Supplemental figure 2: Association rates measured from the on-rates at each percentage functionalisation using QCM-D. On-rates (Ka) were calculated using non-linear regression using Prism. The on-rates for the PEG-11 linkers are an order of magnitude faster than those of BC-PE lipids at lower lipid concentrations. At ~ 2 % both PEG-2 and PEG-1 -1 have similar on-rates whereas BC-PE is significantly slower until much higher percentages are used.

Supplemental figure 3:



Supplemental figure 3: Simulation of nearest neighbour distribution of functionalised lipids between percentages of 0.1 % and 5 %. Dots represent functionalized lipids in random positions. The number of particles and their relative distances between them are represented by the graph which range between 12.4 to 1.8 nm.