Supplementary Material (ESI) for Soft Matter

pzncoohdesorbandmovemovie.avi

The tethered vesicles are shown diffusing along the surface of the supported lipid bilayer (SPB) in real time. In addition to 10 wt % PVHQ, the POPC vesicles were doped with 0.2 wt % lissamine rhodamine B 1,2-dihexadecanoyl-sn-glycero-3-phophaditylethanolamine (rhodamine–DHPE, $\lambda_{exc/em}$ = 550/590 nm, Molecular Probes, The Netherlands). The assemblies exhibited lateral mobility in the plane of the SPB that were on the order of 0.1 $\mu m^2\ s^{-1}$. The disappearance of the vesicles by the end of the movie does not appear to result from physical detachment, but rather from photobleaching of the rhodamine.

pzncoohstreptavidinsensor.avi

This movie is for the same system, but with an additional 5 wt % biotin-functionalized lipid (1,2-dipalmitoyl-sn-glycero-3-phosphoethanolamine-*N*-biotinyl) (sodium salt), Avanti Polar Lipids, Inc., U.S.A.). When the completed assemblies were exposed to a 50 mM streptavidin solution, the streptavidin rapidly coupled to the exposed biotin on the surfaces of the vesicles. Since streptavadin has 2 biotin binding sites on each end of the molecule, the binding also led to the formation of large vesicle aggregates. Not only are these aggregates relatively large compared to the individual vesicles, but the movie also shows that they are completely stationary. Therefore the aggregate size and diffusion rate provide two separate indicators for biomolecular binding. Although the current system is too concentrated, one can perform single particle tracking measurements on more dilute systems, making it possible to record individual biorecognition events.