Supplementary Information

Materials and Methods

Materials. All chemicals and reagents were purchased from Sigma-Aldrich (Sydney, Australia). Dodecene was vacuum redistilled from sodium and stored over molecular sieves. Cholera toxin B subunit was purchased from BIOMOL International, LP (Plymouth Meeting, PA, USA). B-doped silicon (100) wafers, resistivity 0.001-0.005 Ω cm were purchased from the Institute of Electronics Materials Technology (ITME, Warsaw, Polland). ^{125}I was purchased from Amersham biosciences (IMS30-5MCI, Piscataway, NJ, USA) and iodination supplies from Pierce biochemical (Rockford, IL, USA)

Rugate Filter Fabrication and Hydrosilylation. 60 layer rugate filters were prepared as described previosly[1]. Freshly etched filters were immersed under argon to degassed (freeze/pump/thaw) dodecene and brought to 200º C for 2 hours. The reaction was cooled to room temperature and the sample rinsed thoroughly with ethyl acetate and dichloromethane with drying under a steam of UHP argon.

Lipid Extrusion and hBLM formation. Lipid solutions were extruded and applied to the sample as described in the communication.

Cholera B Iodination and Sample Incubation. Protein was radiolabelled using the Pierce biochemical iodo-bead protocol as described previously[2]. Briefly, 1 mCi of ^{125}Iodine was added to an iodo-bead for 5 minutes and 500 µg of resuspended cholera B (1 mg/ml) added. Iodinated protein was eluted from a PD-10 column in 0.5 mL fractions. Protein concentration was determined using a BCA reagent assay (Sigma, BCA-1). Protein was added to the 'wet' hBLM sample, 5 µl aliquots taken at time intervals and counted using a COBRA II Auto-gamma counter.

Spectroscopy and Microscopy. Reflectivity spectra were obtained via a monochromatic beam at normal incidence (J/Y SPEX 1681 spectrometer) and detected with a silicon detector. FTIR spectra were gathered using a ThermoNicolet AVATAR 370-FTIR spectrometer. Scanning electron micrographs were obtained with a Hitachi S900 SEM with a 12 kV field emission source.

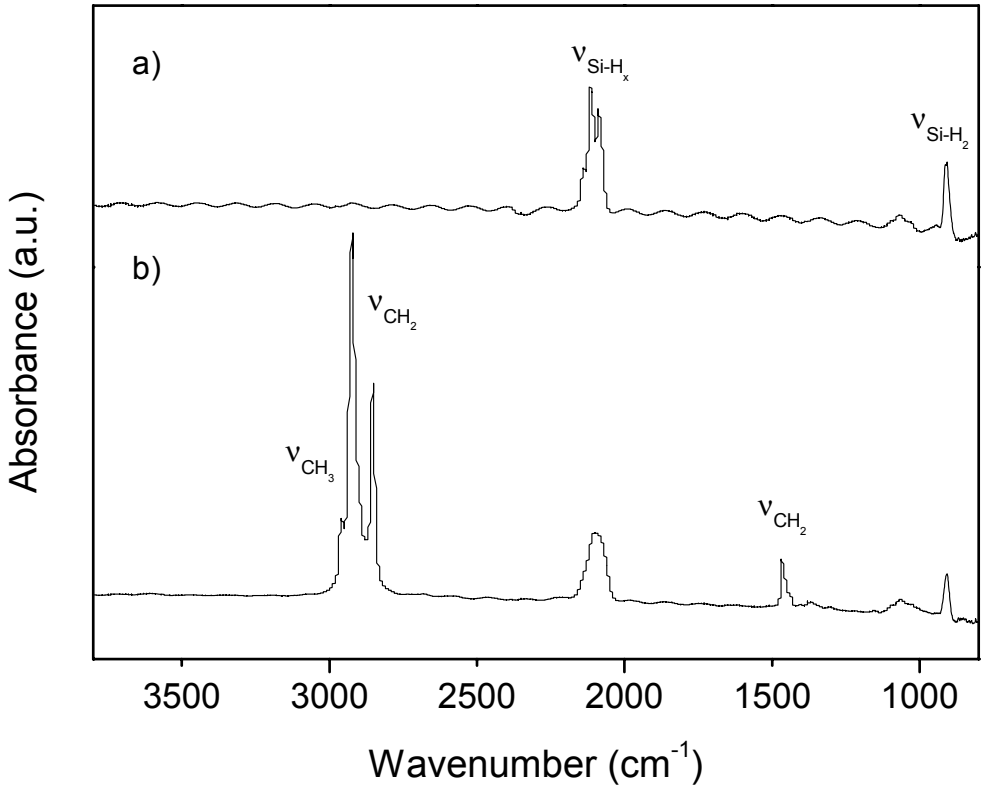

Figure ES1. FTIR spectra of a) freshly etched porous silicon and b) after derivatization by dodecene hydrosilylation. Si-H_x stretching modes (x = 1,2,3) at 2086 – 2145 cm^{-1} and Si-H_2 bending at 907 cm^{-1} with very low levels of silicon dioxide (Si-O-Si) stretching at 1070 cm^{-1}. Hydrosilylation of dodecene results in the appearance of symmetric and asymmetric CH_2 stretching at 2850 cm^{-1} and 2920 cm^{-1} and CH_3 stretching at 2960 cm^{-1}. Importantly, there is a negligible increase in silicon oxide formed during monolayer formation.

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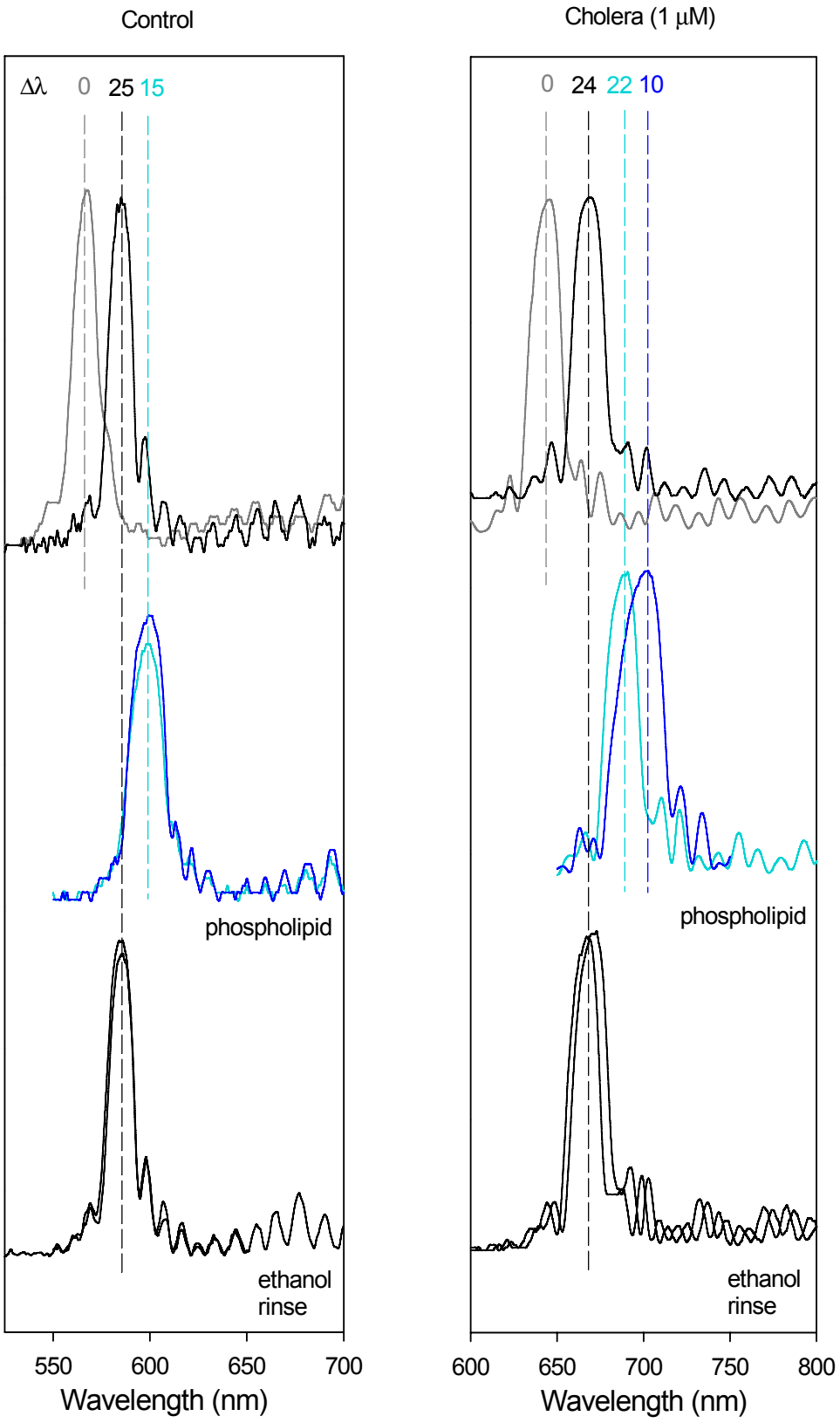

Figure ES2. Optical response of rugate filter. Top: freshly etched (grey), hydrosilylation of dodecene (black). Middle left panel: optical shift after vesicle fusion for PC lipid (light blue) and GM1:PC lipid (dark blue) demonstrating reproducible shifts. Middle right panel: Exposure of same hLBMs to cholera toxin. Bottom: After rinsing with ethanol. The slight red shift of GM1:PC lipid surface after rinsing is presumably due to non specific cholera adsorption to the hydrophobic surface.

1. S. Ilyas, T. Böcking, K. Kilian, P. J. Reece, J. Gooding, K. Gaus and M. Gal, *Optical Materials*, 2007, **29**, 619.
2. K. A. Kilian, T. Böcking, S. Ilyas, K. Gaus, M. Gal and J. J. Gooding, *Advanced Functional Materials*, 2007, In press.