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Supporting Information.

Preparation of Polymer Vesicles. Chloroform and water used in this study were distilled. Tricosa-2,4-diynoic acid (TCDA) was purchased DOJINDO LABORATORIES (Japan) and used without purification. 10,12-Pentacosadiynoic acid (PCDA) was purchased from Lancaster Co. (U.K.) and was not purified before use. Dioctadecyl glycerylether-β-glucoside (DGG) was synthesized in our laboratory. It was prepared according to the method described by Six *et al.*[1] for the stereochemical isomers, starting with DL-α,β-dialkyl glycerol. The mixed vesicles were prepared using modified probe sonication method.[2] Vesicles of mixture of polymerizable matrix lipid and receptor have been formed by putting their chloroform solution in a rotatory evaporator and the molar ratio of receptor DGG to PCDA or TCDA was 0.02. The organic solvent was evaporated to yield a thin film of the lipids on the glass. An appropriate amount of double distilled water was added to give a total lipid concentration of 1mM. The sample was heated to 80°C, and sonicated for 30 min. The warm solution was filtered through a 0.8 mm nylon filter to remove undispersed lipid, and cooled to room temperature. Prior to polymerization the vesicle solution was purged with N_2 for 10 min. The polymerization was achieved by irradiation of the solution with a UV pencil lamp (254 nm) (UV-5, made in China).

Colorimetric Detection of E.coli and Amino Acid. The international standard strain of E.coli, [ATCC25922], used in this study was purchased from Center for Medical Culture Collection (Bacteria) – National Institute for the Control of Pharmaceutical and Biological Products, Ministry of Public Health, Beijing China. E.coli was dispersed in 0.85% aqueous solution of sodium chloride (pH 6.0). A 0.1 ml solution containing about 300×10^6 E.coli per ml was added to 2.5 ml of polymer vesicles. The color change of the polymer vesicles composed of TCDA/DGG or PCDA/DGG was detected by UV-Vis spectrometer. Aspartic acid, glutamic acid and alanine used in this study were all

biological pure and were not purified before use. A 0.1 ml aqueous solution of aspartic acid with the concentration of 2 mg/ml was added to 2.5 ml of polymer vesicles. Similarly glutamic acid and alanine were added and the solutions were analyzed with UV-Vis spectrophotometry.

Isotherms of Pure and Mixed TCDA/DGG and PCDA/DGG Monolayers. TCDA and PCDA were not purified before used in this study. All π-A isotherm curves were obtained by FACE surface pressure meter HBM (made in Japan). The pressure sensor has a resolution of 0.1 mN/m. For each isotherm experiment, 200 μl of 1.0mM sample was spread on the surface, waiting 15 min for solvent evaporation before compression. The barrier was compressed at a speed of 20 cm^2/min. Isotherms of monolayers with different ratio of TCDA/DGG and PCDA/DGG have been compared and shown in the enclosed Figure 4.

1 Six, L.; Rueb, K. P.; Lieflander, M. *J. Colloid & Interface Sci.* **1983**, *93*, 109.

2 New, R. R. C. In *Liposomes: a practical approach*; New R. R. C., Ed.; Oxford University Press: Oxford, 1990; pp 33-104.