Supporting Information:

# Sensing Small Molecules Interactions with Lipid Membranes by Local pH Modulation

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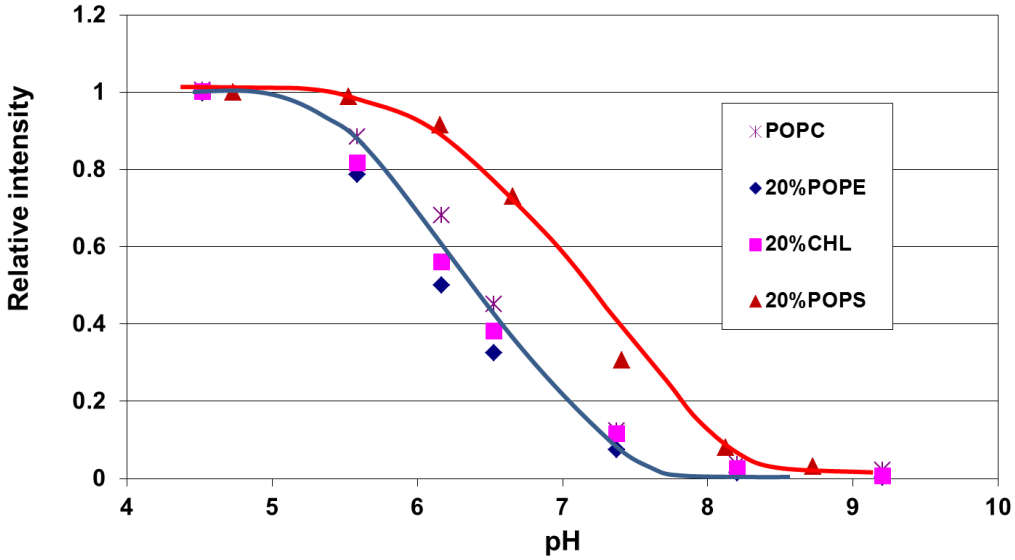


Figure S1. pH titration curve data for POPC membranes without and additional components or with 20 mol% POPE, 20 mol% cholesterol, or 20 mol% POPS. The solid circles represent individual fluorescence measurements and the solid lines are guides to the data.

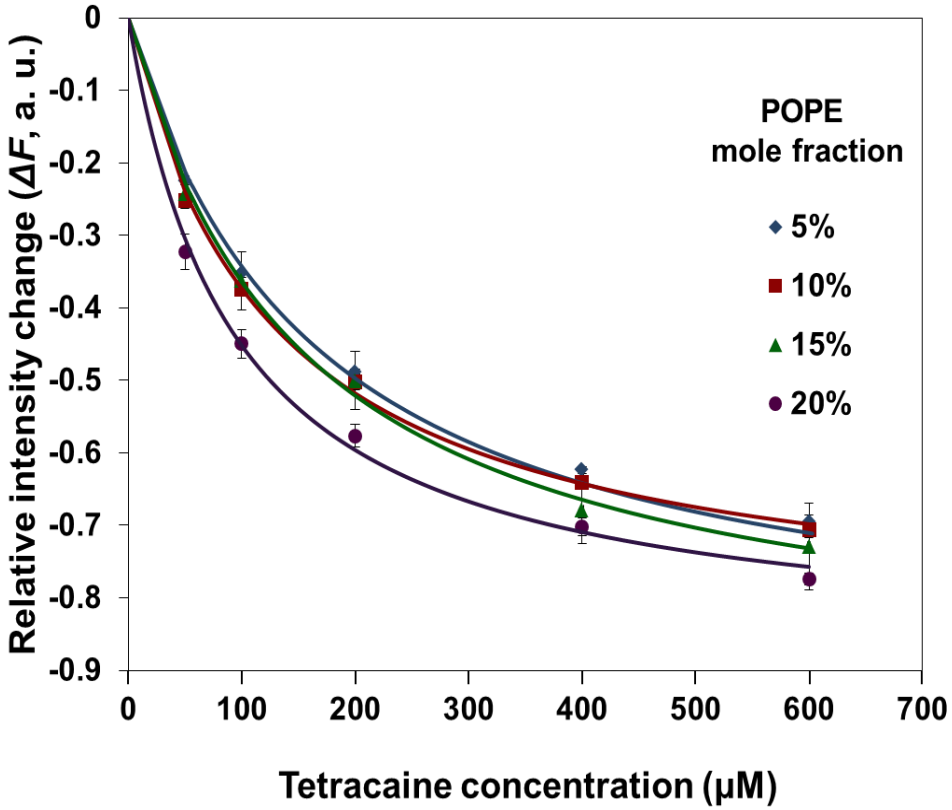


Figure S2. Plot of the relative fluorescence intensity change vs. bulk tetracaine concentration from bilayers containing various concentrations of POPE. The solid lines are the best fit to Langmuir isotherms.

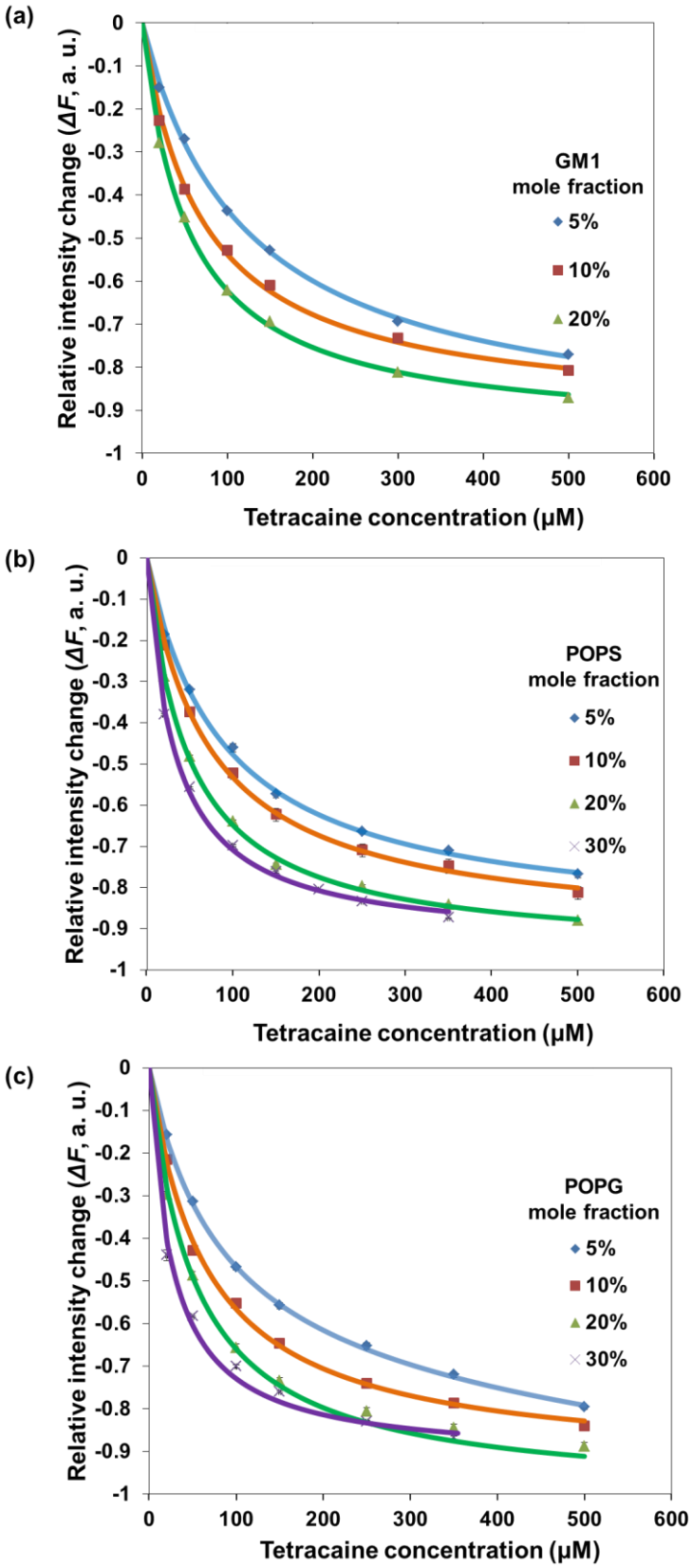


Figure S3. Plot of the relative fluorescence intensity change vs. bulk tetracaine concentration from bilayers containing various concentrations of negatively charged lipids: (a) GM1 containing bilayers, (b) POPS containing bilayers, and (c) POPG containing bilayers. The solid lines are the best fits to Langmuir isotherms.

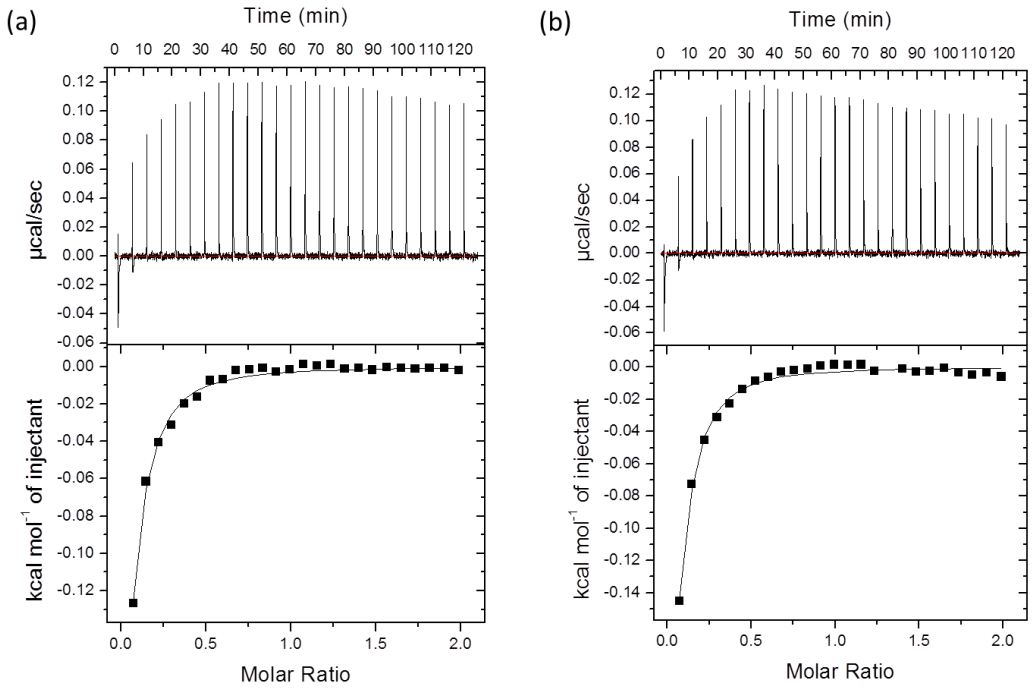


Figure S4. ITC data for (a) pure POPC vesicles and (b) POPC vesicles containing 0.5 mol% *o*RB-PE. The top graphs show individual heat spikes as sample injections are made. The bottom graphs are the plots of the evolved heat vs. the molar ratio of tetracaine introduced into solutions containing the POPC vesicles. The solid curves are the best nonlinear regression fits to the data and the extracted $K_d$ values are provided in the main text.

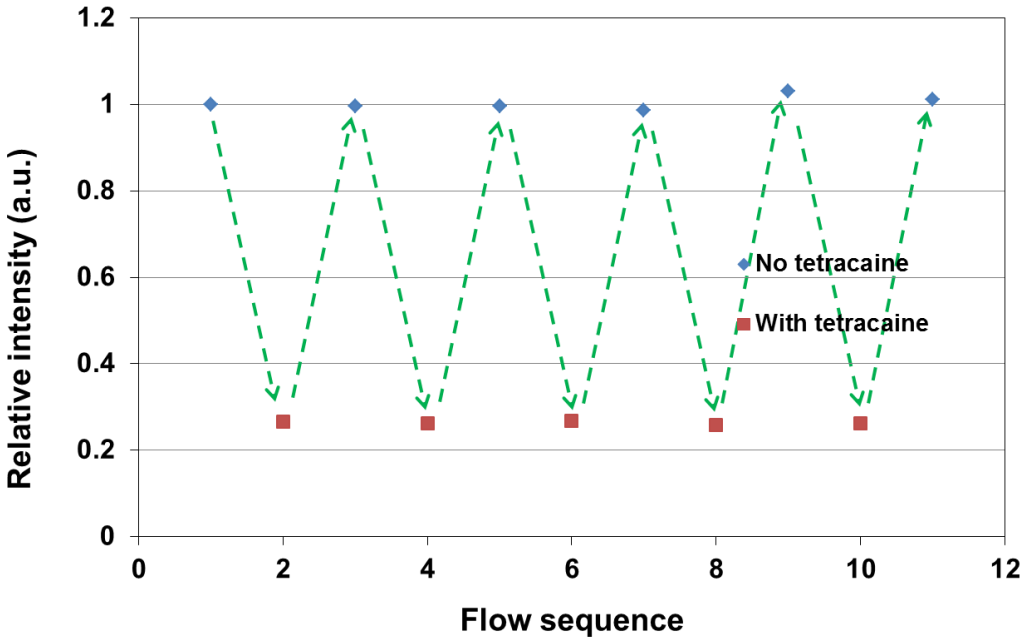


Figure S5. Testing the reversibility of the tetracaine-POPC SLB interaction. The blue dots are fluorescence data from POPC SLBs with 50 mM phosphate buffer at pH 7.1, while the red dots represent the same conditions, but with 500 µM tetracaine also in the solution flowing over the bilayers in the microfluidic channels. The buffer flow rate was approximately 1 ml/h. The SLB were stabilized under each condition for at least 30 min. before fluorescence data was captured.

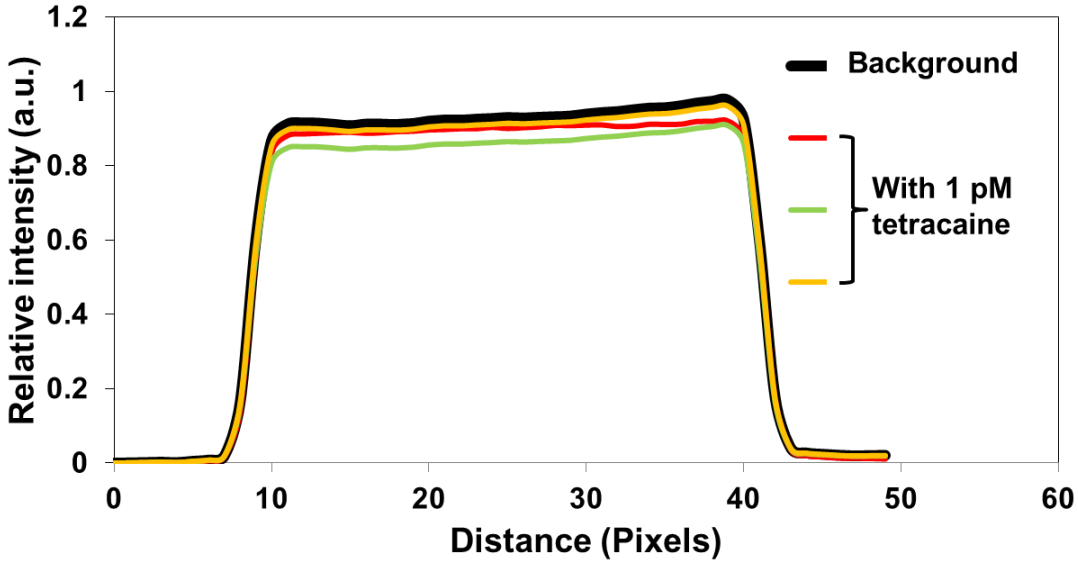


Figure S6. Fluorescence intensity line scan of a POPC SLB with 0.005 mM sodium phosphate buffer (pH 7.1 ± 0.1) without tetracaine (black) and with 1 pM tetracaine (red, green, and yellow). These three trials show representative data.