Supporting Information

Methacrylate Polymer Scaffolding Enhances the Stability of Suspended Lipid Bilayers for Ion Channel Recordings and Biosensor Development

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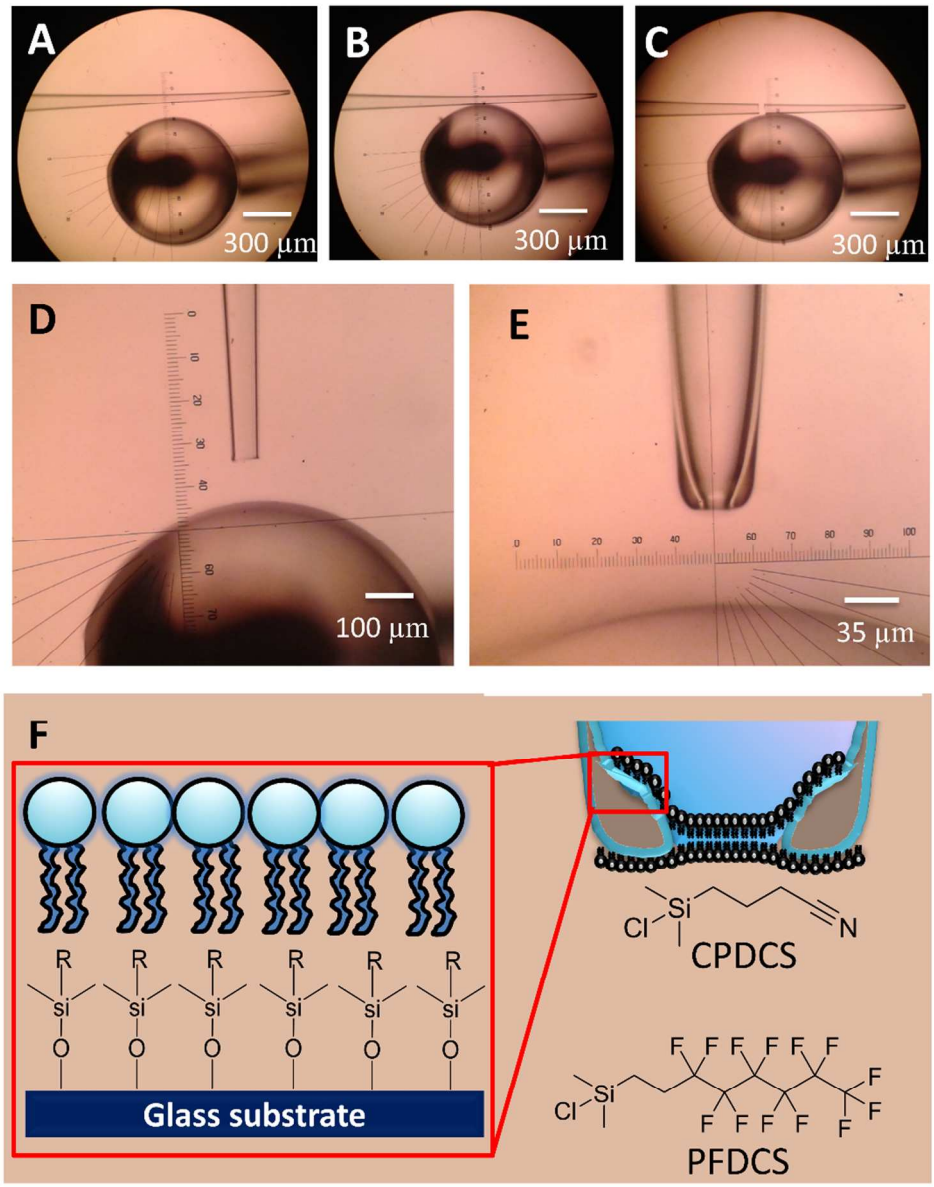

Figure S 1. ***Fabrication of pipette microapertures for suspended lipid bilayer (BLM) formation***. **A**. Glass pipette is aligned orthogonal to the glass bead. **B**. The pipette is allowed to barely touch glass bead. **C**. Mild heating of glass bead fuses glass to pipette. **D**. Fused opening of glass pipette is aligned vertically with the glass bead to facilitate fire polishing. **E.** Pipette is fire polished to desired diameter. **F**. Schematic of CPDCS- or PFDCS-modified glass pipette aperture with lower surface energy that allows a lipid monolayer to deposit on opposite sides of aperture to form BLM.

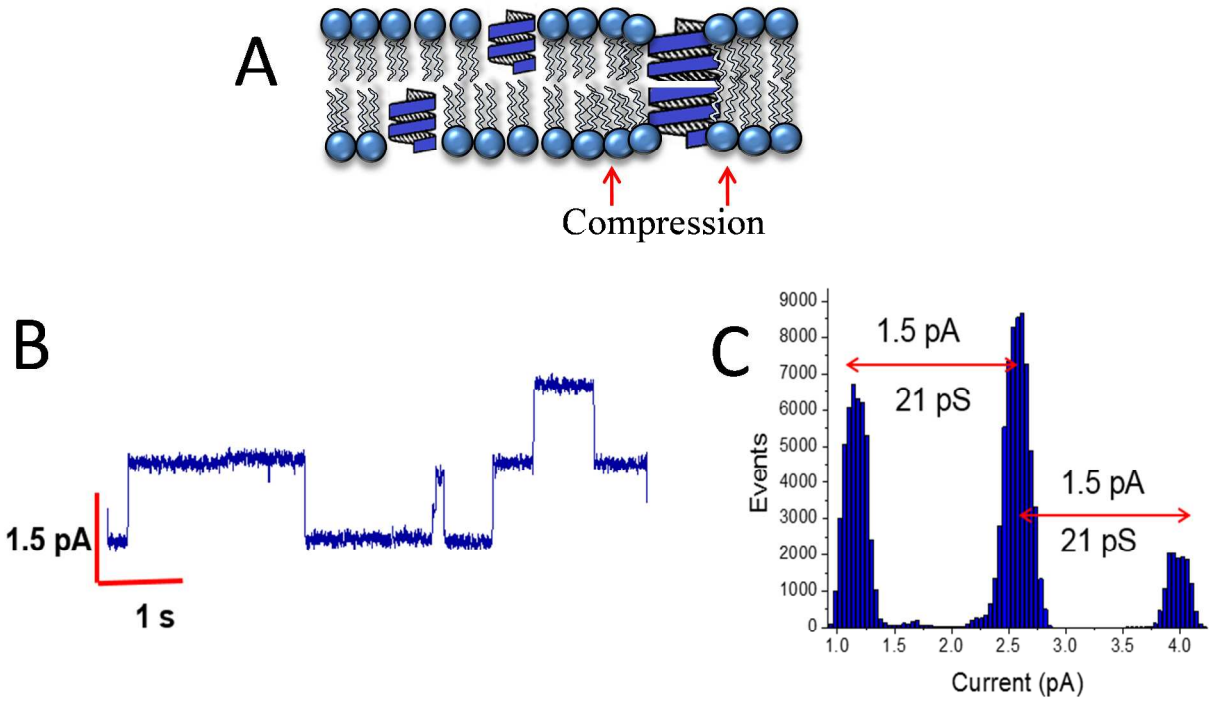

Figure S 2. ***Gramicidin A activity in conventional (unpolymerized) suspended lipid bilayers.*** **A.** Bilayer compression is required to facilitate gramicidin pore formation (modified from Andersen et al.).[1] **B.** A representative trace of gramicidin ion current in a conventional BLM with an applied potential of 70 mV shows characteristic gating activity. **C.** The all-points histogram of the current trace shown in part B shows quantized conductance states separated by ca. 21 pS, which is a characteristic of gramicidin ion channels in conventional BLMs.

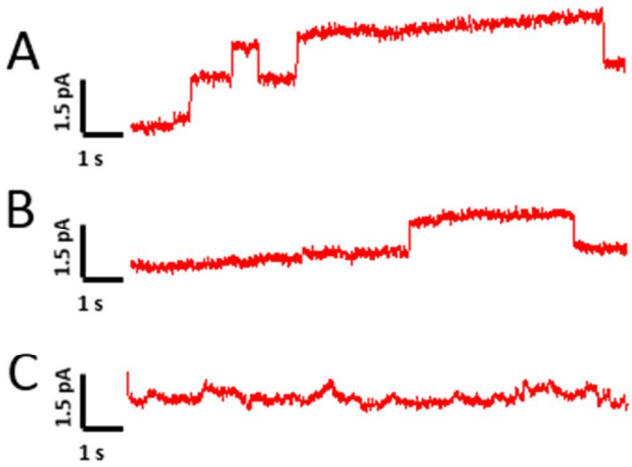

Figure S 3. ***Gramicidin A activity in pre-formed PSS-BLMs.*** **A**. Ion channel maintains activity after 5 h of reconstitution with slight drift in baseline and peak current. **B.** Activity of ion channel decreases after 7 h and **C.** loss of channel activity after 9 h of reconstitution.

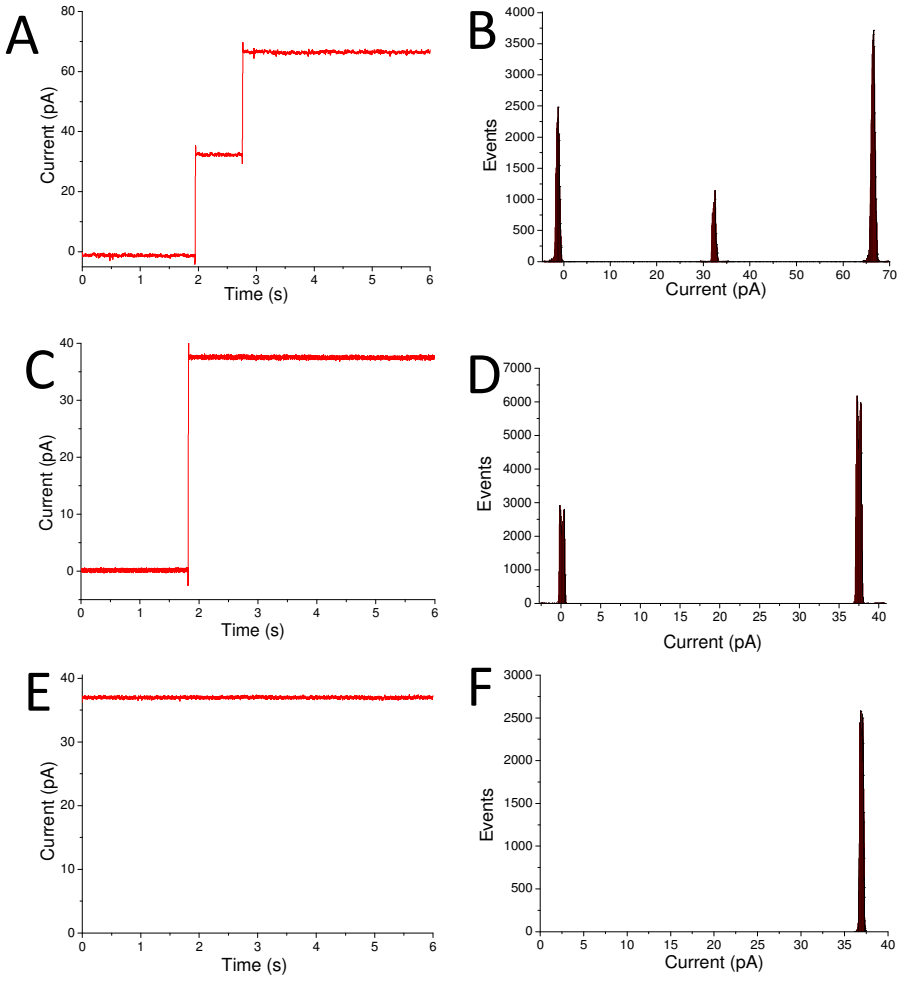

Figure S 4. ***Single ion channel recordings and all-points histograms of α-HL in BLMs suspended on PFDCS-modified pipette apertures***. **A,B.** Single channel recording and all-points histograms reveal multiple insertions of α-HL in a conventional BLM with characteristic conductance of ca. 1 nS per channel. **C, D** A single α-HL channel was allowed to insert into a MA-BLM, where the characteristic conductance of ca. 1 nS was observed. **E, F.** Following 10 min UV-irradiation of the BLM shown in E to form a PSS-BLM, α-HL activity was unaffected by extended cross-linking within the membrane. All recordings were made at a holding potential of 40 mV.

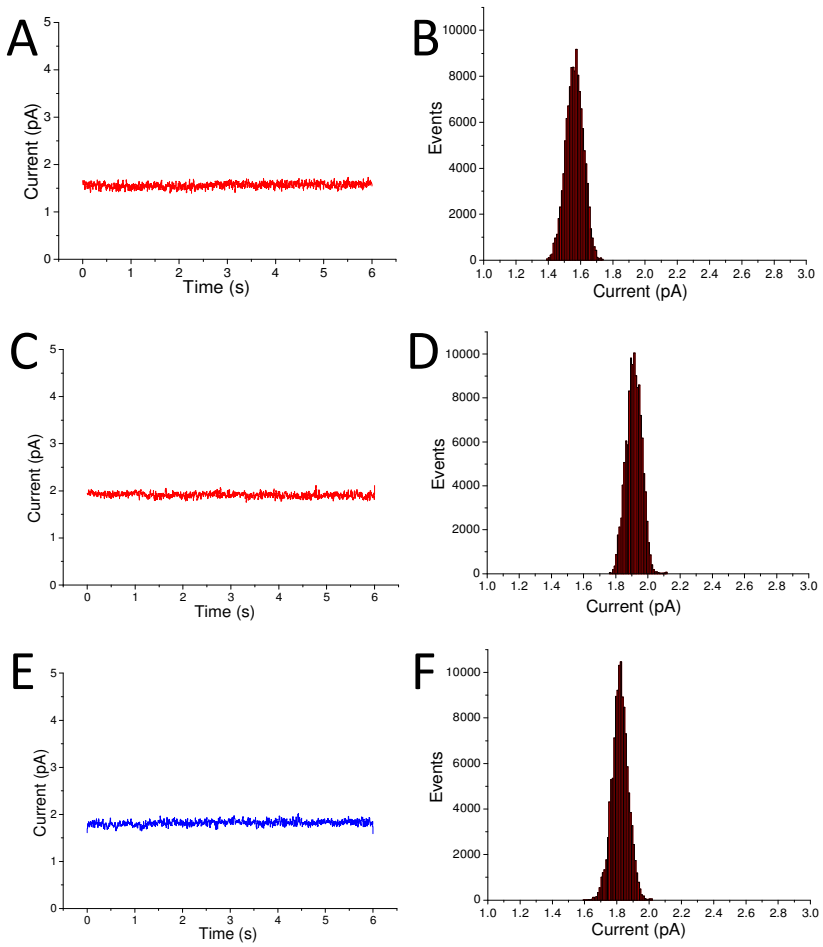

Figure S 5. ***Noise characteristics of conventional BLMs, MA-BLMs and PSS-BLMs***. **A, C, E.** Baseline recording and **B, D, F** all-points histograms reveal stable baseline and reproducible rms noise values for each membrane configuration. PSS-BLMs were formed via 10 min UV-irradiation of the BLM. All recordings were made at a holding potential of 40 mV.

References

(1) Andersen, O. S.; Koeppe, R. E.: Bilayer thickness and membrane protein function: an energetic perspective. *Annual Review of Biophysics and Biomolecular Structure* **2007**, *36*, 107-130.