Supporting Information

pH-dependent Ionic-Current-Rectification in Nanopipettes Modified with Glutaraldehyde Cross-linked Protein Membranes

Mustafa Sen[1,2]*, Ali Demirci[3]

[1] Biomedical Engineering Department, Izmir Katip Celebi University, Izmir, Turkey

[2] Biomedical Technologies Graduate Program, Izmir Katip Celebi University, Izmir, Turkey

[3] UNAM-National Nanotechnology Research Center, Bilkent University, Ankara, Turkey

*Address correspondence to mustafa.sen@ikc.edu.tr
Tel: +90-232-2953535 (3782)

Fax: +90(232) 329 39 99

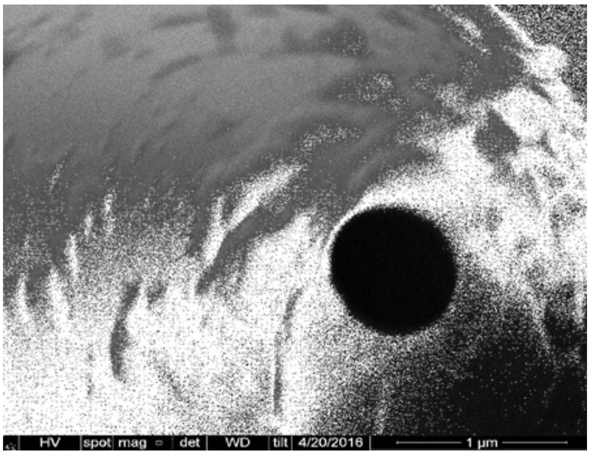

Figure S1. An SEM image of a nanopipette showing the diameter of the tip opening.

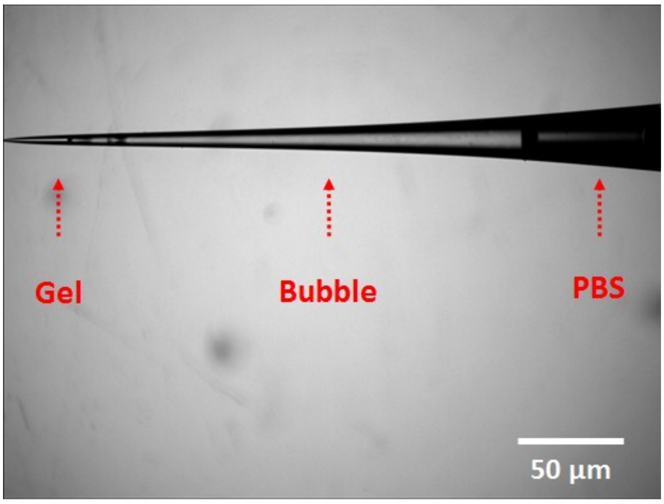

Figure S2. PBS solution was filled into the glass nanopipettes right after they were filled with artificial membrane mixture leaving bubble in between to prevent loss of mixture at the tip of the nanopipettes. After gelation, the bubbles were removed by titrating the nanopipettes gently.

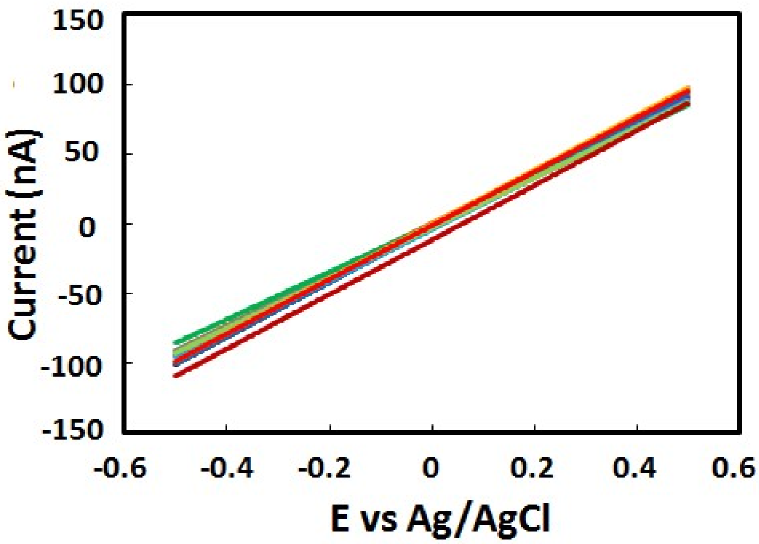

Figure S3. I-V curves of 15 different nanopipettes in 50 mM PBS at pH 7.

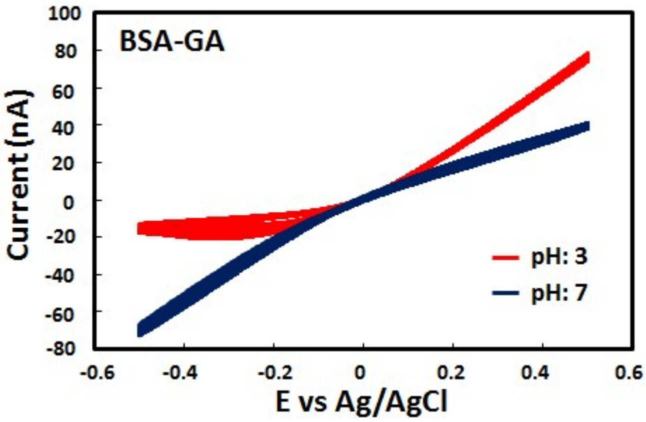

Figure S4. 30 cycles I-V curves of BSA-GA modified nanopipettes in PBS at pH: 3 and pH: 7.

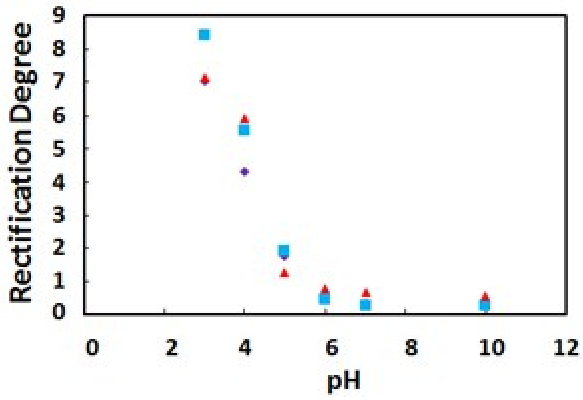

Figure S5. The rectification degrees of three different BSA-GA artificial membrane modified nanoprobes in PBS solutions with various pHs (pH: 3-10).

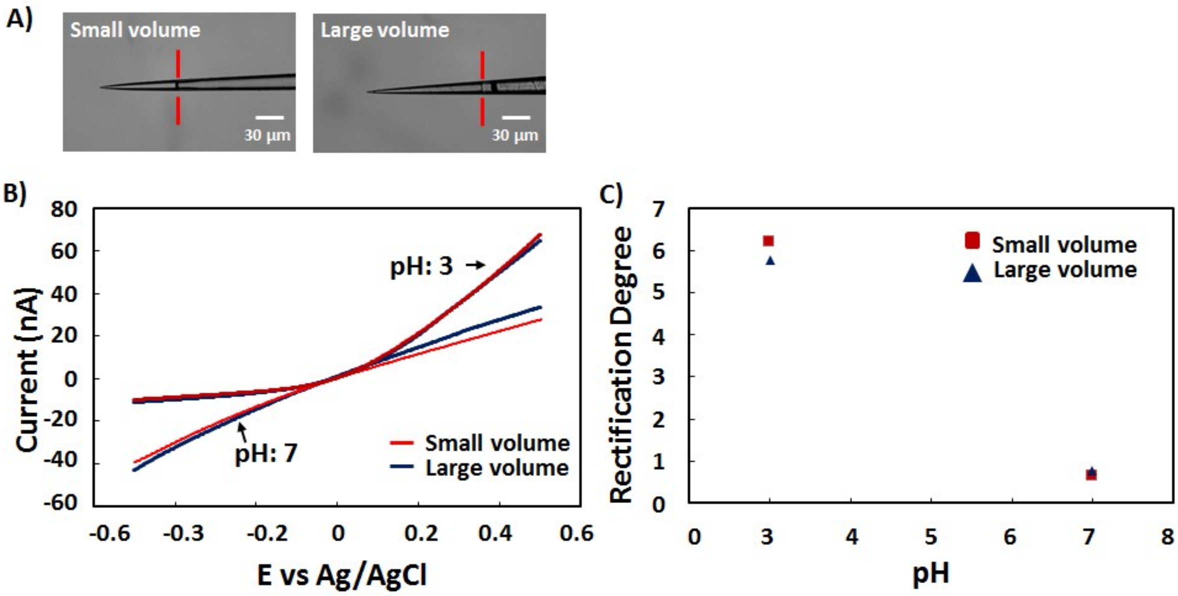

Figure S6. Ionic current rectification of nanopipettes modified with different volumes of BSA-GA (A) (small and large volumes) in PBS solutions at pHs 3 and 7. The rectifications degrees of nanopipettes modified with different volumes of BSA-GA were compared. Results clearly showed that using different volumes of BSA-GA did not have significant impact on the Ionic current rectification of nanopipettes.

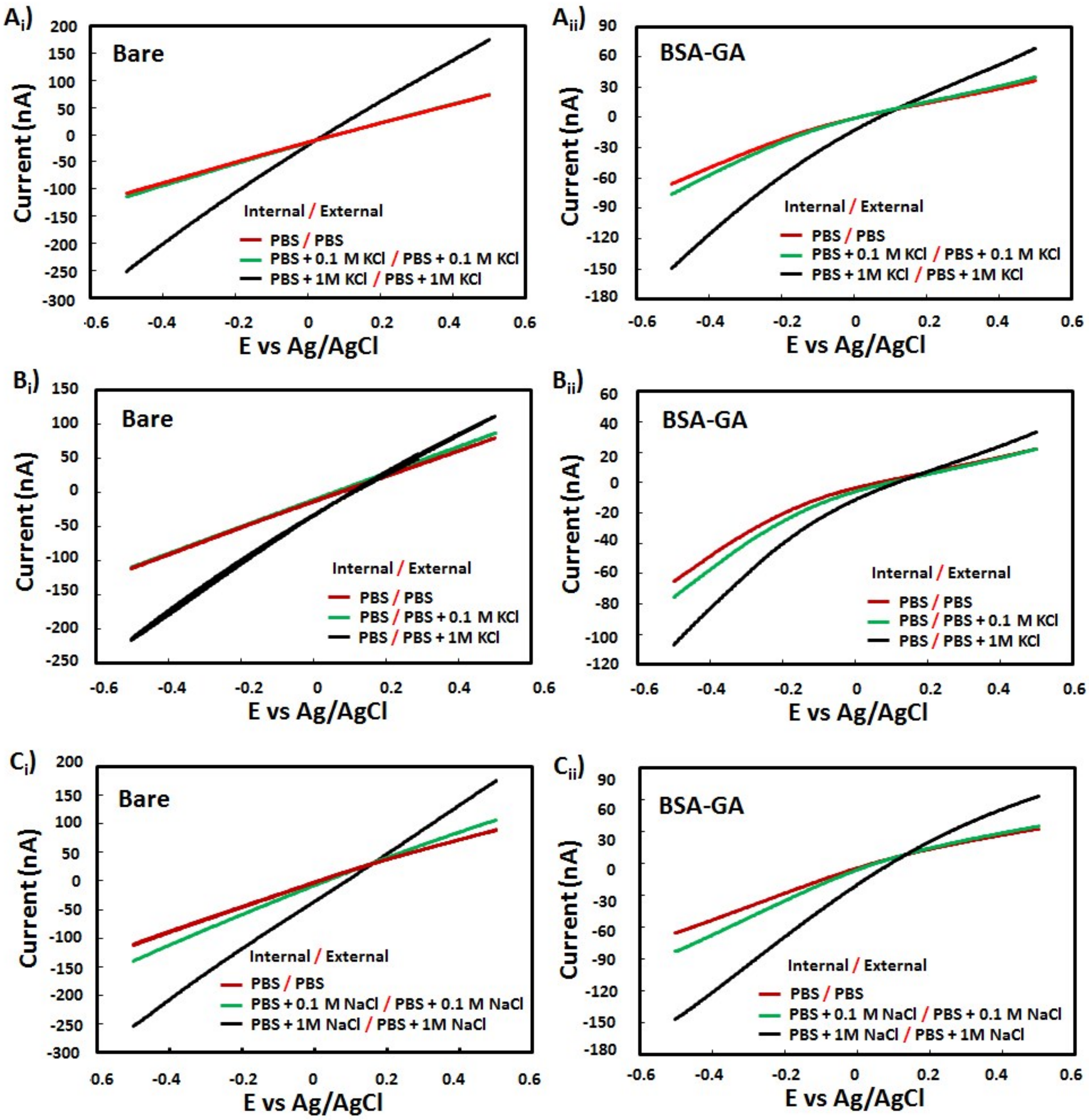

Figure S7. Typical I-V curves of bare (A_i) and BSA-GA modified (A_{ii}) nanopipettes when both internal and external solutions contain same concentration of KCl. Typical I-V curves of bare (B_i) and BSA-GA modified (B_{ii}) nanopipettes when the KCl concentration of the external solution was varied between 0 and 1M. Typical I-V curves of bare (C_i) and BSA-GA modified (C_{ii}) nanopipettes were also obtained in PBS with varying concentrations of NaCl.