Supporting Information

Rapid and Label-Free Nanopore Proximity Bioassay for Platelet-Derived Growth Factor Detection

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1. A salt gradient method[1] to increase the frequency of DNA translocation

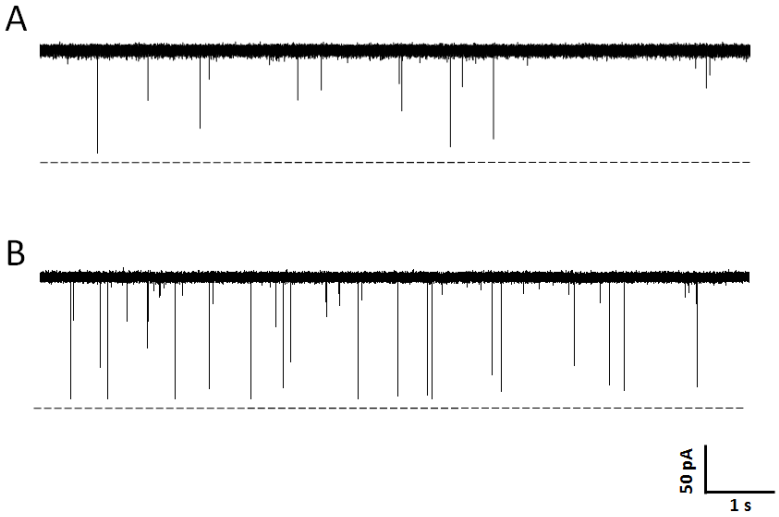

Figure S1. Comparison of DNA translocation under symmetrical and asymmetric salt concentration conditions. (A) Representative current trace that was conducted with 200 nM probe **C** in *cis* under 1 M *cis*/1 M *trans* KCl condition with the transmembrane potential held at +100 mV. (B) Representative current trace that was conducted with 20 nM probe **C** in *cis* under 0.5 M *cis*/3 M *trans* KCl condition with the transmembrane potential held at +75 mV.

2. Optimization of the transmembrane potential

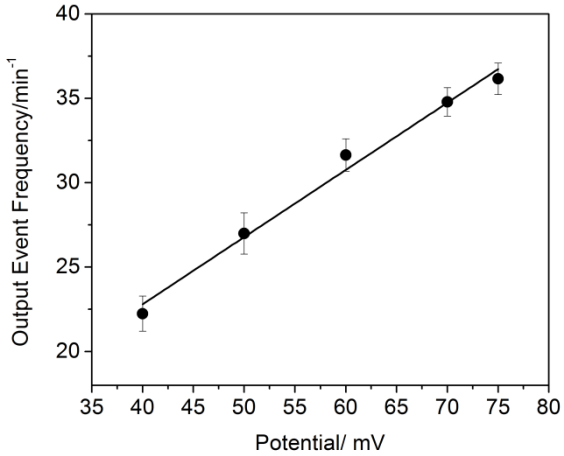

Figure S2. Dependence of output event frequency on the applied potential. For all the groups, nanopore tests were performed with preincubated 20 nM probes **AC** and **B** in presence of 1 nM PDGF-BB. All tests were performed under 0.5 M *cis*/3 M *trans* KCl condition with the transmembrane potential held at +40, +50, +60, +70 and +75 mV. Each experiment was repeated three times.

3. Optimization on the ratio of probe A to C

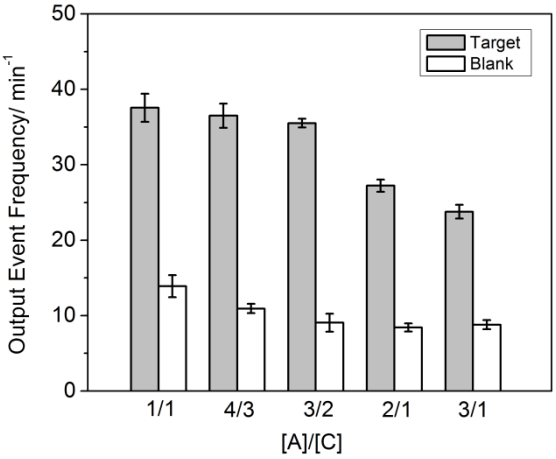

Figure S3. Dependence of output event frequency on the ratio of probe **A** to **C**. The tests were conducted with preincubated 20 nM probe B, 1 nM PDGF-BB and probe **AC** with various ratios. There was no PDGF-BB in every blank group. Different ratios were achieved by changing the concentration of probe **C** with a constant concentration of **A**. All tests were performed under 0.5 M *cis*/3 M *trans* KCl condition with the transmembrane potential held at +75 mV. Each experiment was repeated three times.

4. Optimization on the incubation time of proximity reaction

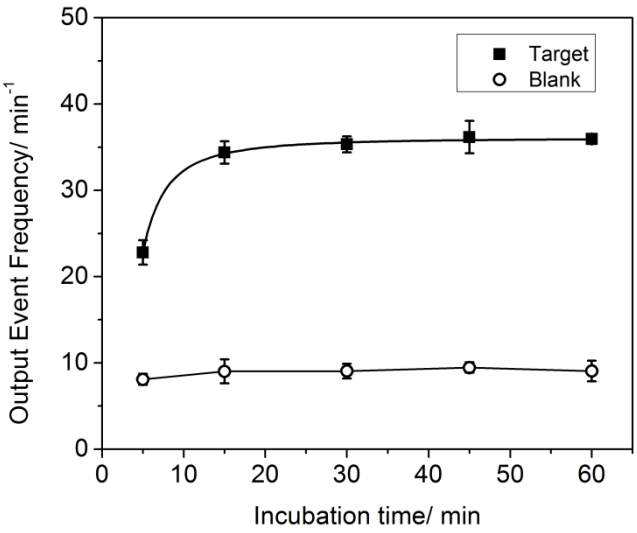

Figure S4. Dependence of output event frequency on the incubation time of proximity reaction. The tests were conducted with 20 nM probe **AC**, 20 nM probe **B** and 1 nM PDGF-BB mixture incubated for various periods of 5, 15, 30, 45 and 60 min. There was no PDGF-BB in every blank group. All tests were performed under 0.5 M *cis*/3 M *trans* KCl condition with the transmembrane potential held at +75 mV. Each experiment was repeated three times.

5. The experiments with protein samples

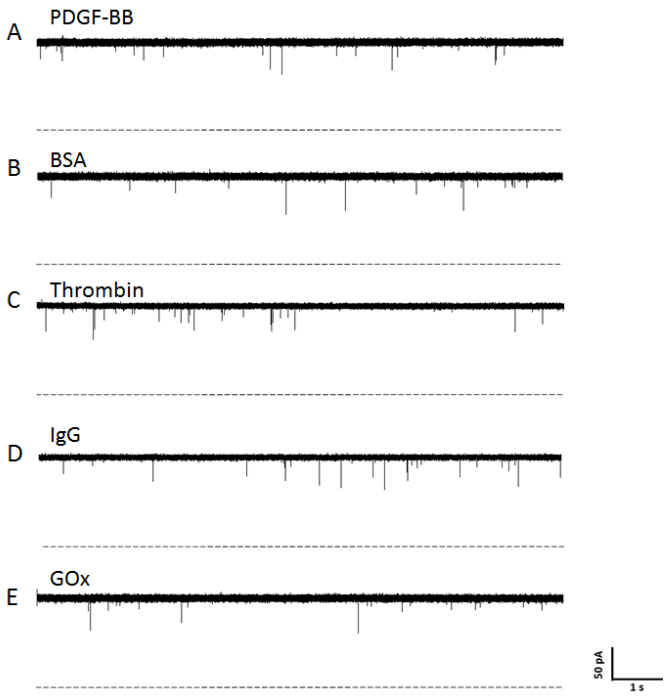

Figure S5. Representative current traces for protein samples in this work. The tests were conducted with 10 nM PDGF-BB, BSA, thrombin, IgG and GOx, respectively. All experiments were performed under 0.5 M *cis*/3 M *trans* KCl condition with the transmembrane potential held at +75 mV. Each experiment was repeated three times.

6. Representative current traces with expanded view

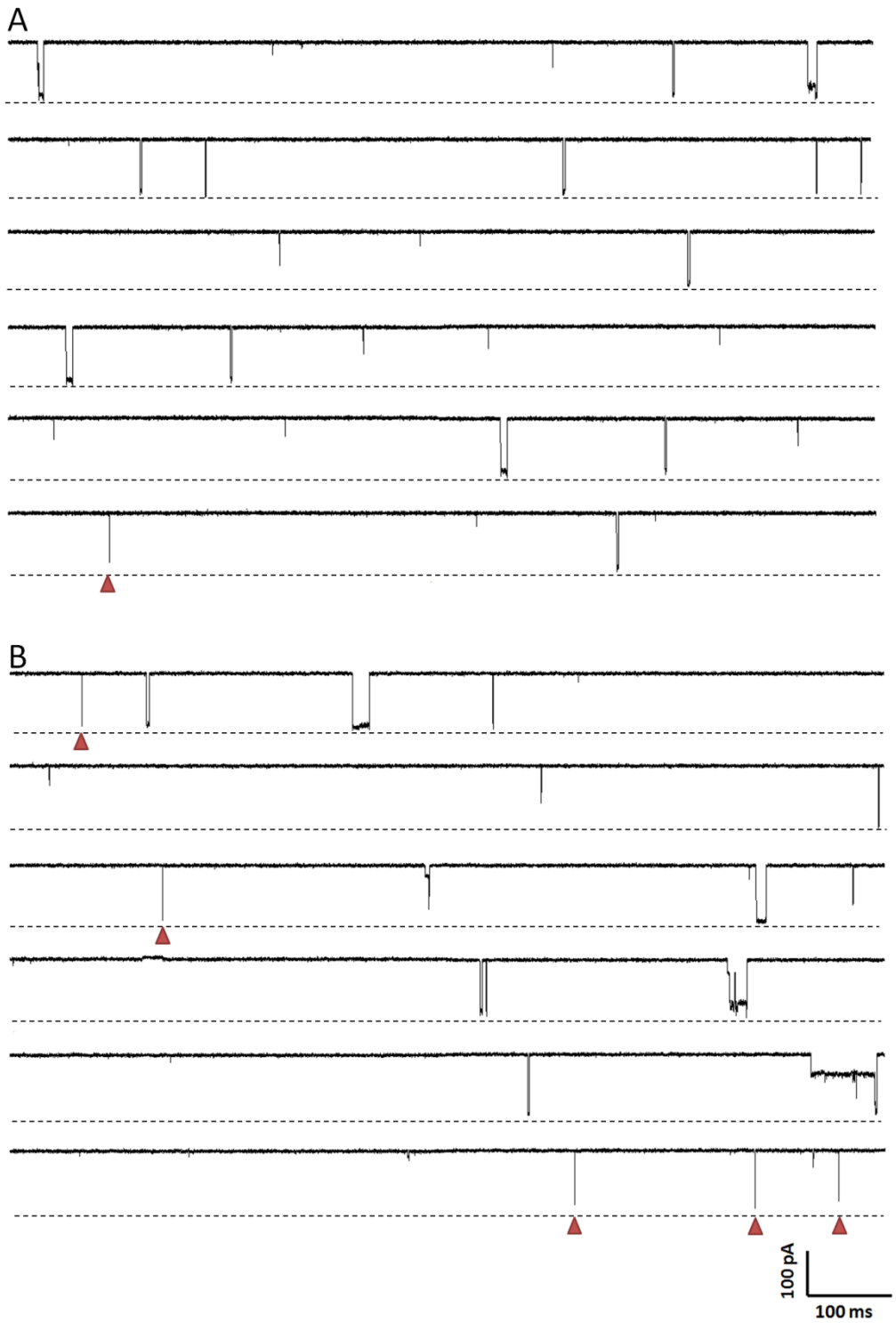

Figure S6. Representative current traces for detection of PDGF-BB in human serum samples without (A) and with (B) 10 nM target. Red arrowheads represent the output events in current traces. All experiments were performed under 0.5 M *cis*/3 M *trans*

KCl condition, with the transmembrane potential held at +75 mV. Each experiment was repeated three times.

References

(1) Wanunu, M.; Morrison, W.; Rabin, Y.; Meller, A. Nat. Nanotechnol. **2010**, 5, 160-165.