

Supporting Information

Ultrasensitive Detection of Cancer Cells Combining Enzymatic Signal Amplification with an Aerolysin Nanopore

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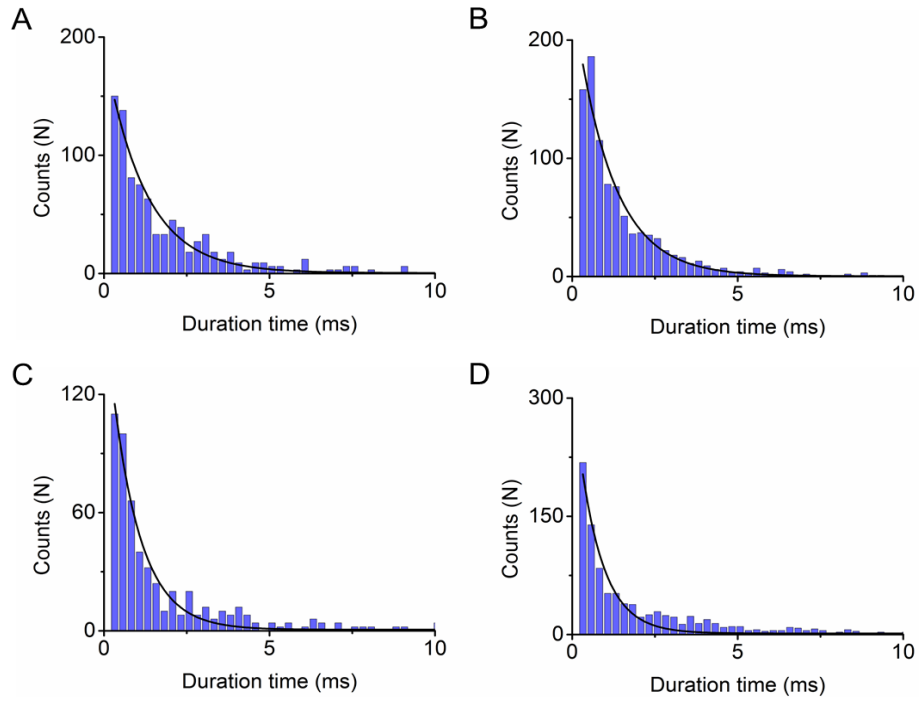


Figure S1. P1 duration histograms of output DNA at different voltages. Histograms of P1 duration for the blockages at potential of (A) +80 mV, (B) +90 mV, (C) +110 mV, (D) +120 mV. All of the histograms were fit to single Exponential functions.

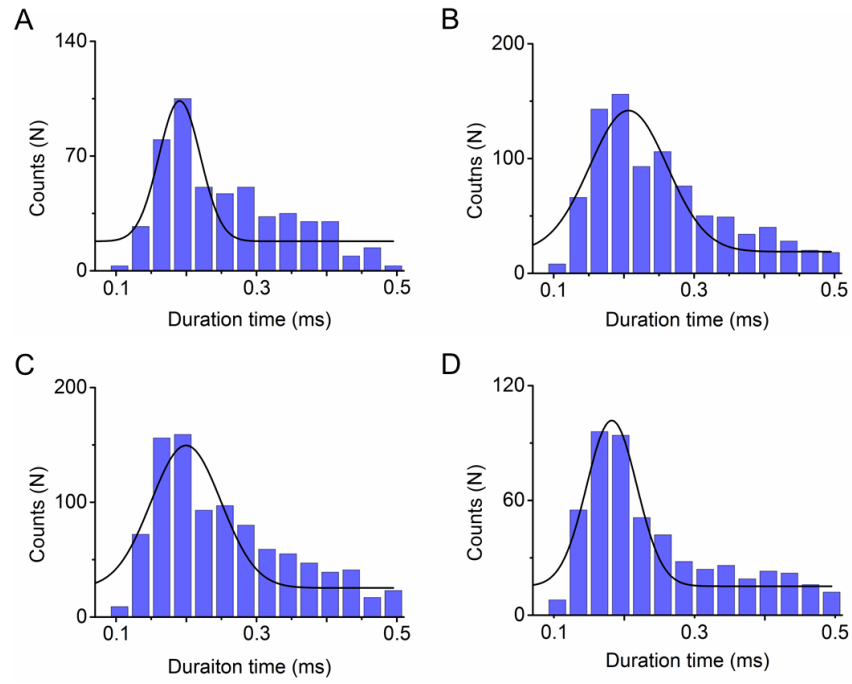


Figure S2. P2 duration histograms of output DNA at different voltages. Histograms of P2 duration for the blockages at potential of (A) +80 mV, (B) +90 mV, (C) +110 mV, (D) +120 mV. The histograms were fit to Gauss functions.

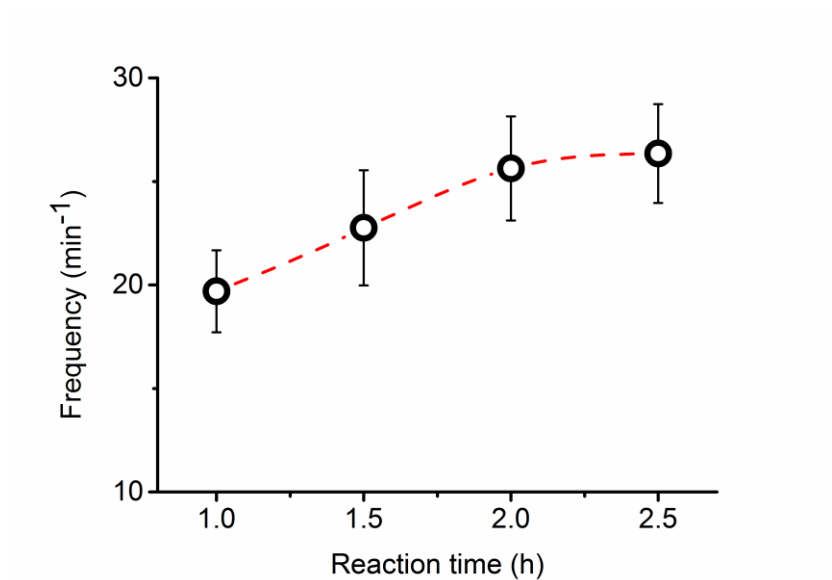


Figure S3. Dependence of the event frequency on the time of enzymatic cycling reaction. The tests were performed in the presence of 1000 cells, 100 U/mL Phi29 DNA polymerase, 150 U/mL Nt.BbvCI nickase, with the reaction time of 1 h, 1.5 h, 2 h, and 2.5 h, respectively.

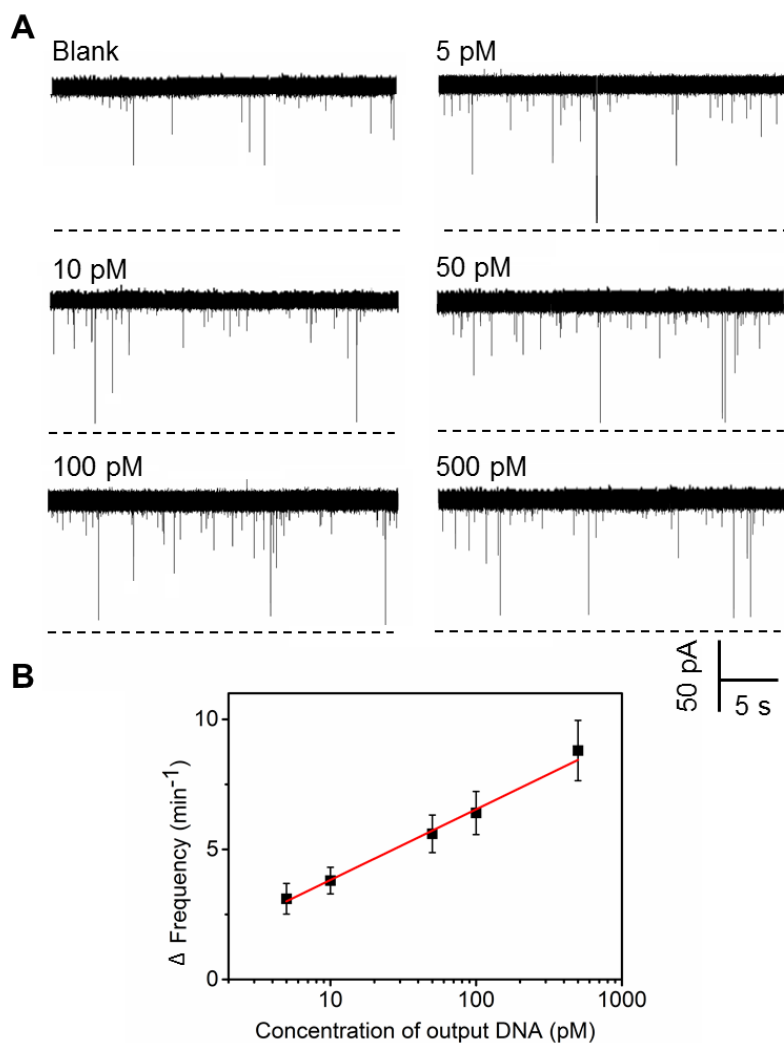


Figure S4. The correlation of event frequency versus the concentration of free output DNA. The amounts of the output DNA added to the *cis* chamber were 5 fmol, 10 fmol, 50 fmol, 100 fmol, 500 fmol, and their final concentrations ranged from 5 pM to 500 pM. (A) Representative current traces. (B) Correlation of the frequency with the concentration of the free output DNA. The data could be fitted with a linear equation $\Delta f = 1.106 + 2.717 \log C$ ($R = 0.992$), where Δf represents the frequency of DNA sample minus the blank measurement and C is the DNA concentration. Data were recorded at +100 mV in 0.5 M/3 M (*cis/trans*) KCl.

Table S1. Comparison between the current assay and other reported methods for cancer cell detection.

Cancer Cells	Method	Detection Limit	Reference
CCRF-CEM	Fluorescence imaging	250 cells/mL	S1
CCRF-CEM	Fluorescence detection	4000 cells/mL	S2
MCF-7	Fluorescence detection	500 cells/mL	S3
Ramos	Aptamer-nanoparticle strip biosensor	800 cells/mL	S4
MCF-7	Electrochemiluminescence	12 cells/mL	S5
HL-60	Electrochemiluminescence	15 cells	S6
Ramos	Chemiluminescence imaging	163 cells	S7
Hela	Electrochemical	10 cells/mL	S8
MCF-7	Electrochemical	47 cells/mL	S9
Ramos	Nanopore	5 cells	This work

References

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