Supporting Information

Versatile and highly sensitive homogeneous electrochemical strategy based on split aptamer binding-induced DNA three-way junction and exonuclease III-assisted target recycling

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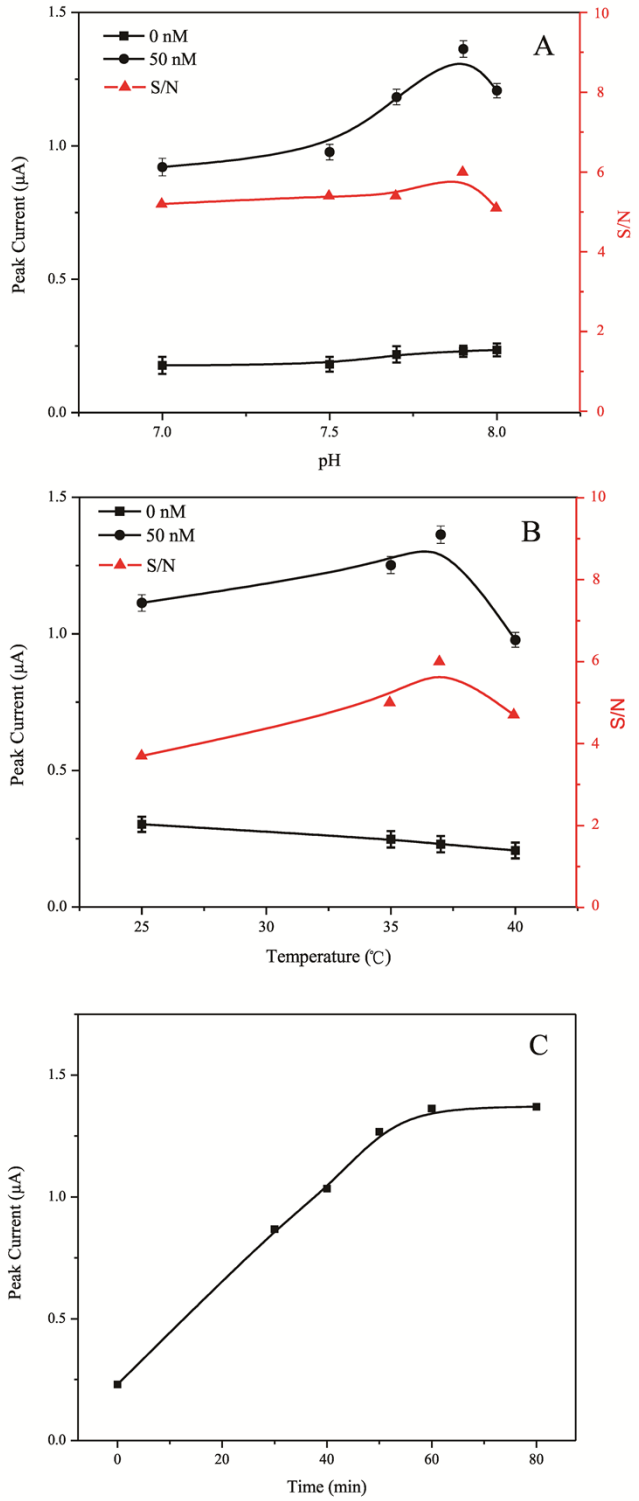

Fig. S1. (A) The DPV peak current versus pH value of the buffer solution in the absence and presence of 50 nM ATP, respectively, and the signal-to-noise ratio (S/N) versus pH value. (B) The DPV peak current versus the reaction temperature in the absence and presence of 50 nM ATP, respectively, and the signal-to-noise ratio (S/N) versus the reaction temperature. (C) The DPV peak current versus the reaction time toward the detection of 50 nM ATP.

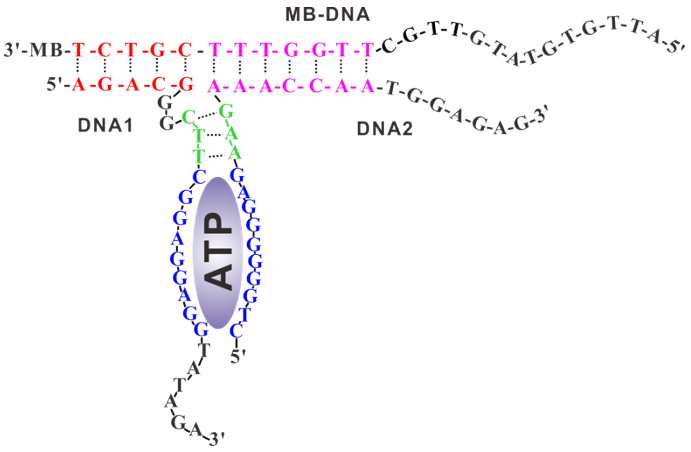

Fig. S2 The schematic illustration of the DNA three-way junction self-assembled by DNA1, DNA2 and MB-DNA in the presence of the target analyte (ATP).

Table S1 Sequences of the oligonucleotides used in the experiments [a]

Name	Sequence (from 5′ to 3′)
DNA1	5′–AGACGGG*CTT***CGGAGGAGG**TATAGA–3′
DNA2	5′–**CTGGGGGAG***AAG*AAACCAATGGAGAG–3′
MB-DNA	5′–ATTGTGTATGTTGCTTGGTTTCGTCT–methylene blue–3′

[a] In DNA1 and DNA2, the boldface letters represent the sequences of ATP split aptamer fragments. The italic letters in DNA1 and DNA2, the singly underlined letters in DNA1 and MB-DNA, and the doubly underlined letters in DNA2 and MB-DNA represent the sequences complementary to each other, respectively.

Table S2 Comparison of analytical performance for ATP detection by our strategy and other electrochemical methods reported in literature

Method	Detection Limit (M)	Strategy	Ref.
Homogeneous	1.0×10^{-10}	Split aptamer binding-induced three-way junction and signal amplification by Exo III-assisted target recycing	This work
Homogeneous	1.0×10^{-9}	Aptamer-based strategy with signal amplification by Exo III-assisted ATP recycling	1
Heterogeneous	1.0×10^{-8}	Highly generalizable target-responsive electrochemical aptamer switch (TREAS)	2
Heterogeneous	1.0×10^{-8}	Utilization of the aptamer complementary DNA oligonucleotides as probes for electrochemical sensing	3
Heterogeneous	1.0×10^{-6}	An electrochemical sandwich assay based on split aptamers	4
Heterogeneous	1.0×10^{-10}	Blank peak current-suppressed electrochemical aptameric sensing platform	5
Heterogeneous	3.0×10^{-10}	Microfluidic electrochemical aptamer-based sensor by constructing Au/Ag dual-metal array three-electrode on-chip	6
Heterogeneous	3.0×10^{-8}	"Signal on" and one-spot simultaneous detection of multiple small molecular analytes based on electrochemically encoded barcode quantum dot tags	7

References

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