Electronic Supplementary Material (ESI) for Analytical Methods.
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Supporting Information

Nanopillar array-based electrochemical aptamer sensor for STX sensitivity detection

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The anti-STX aptamers and other DNA strands used in this work are as follows: aptamer modified with 3'-methylene blue (MB-Apt, HS 5'-TTTTT TTG AGG GTC GCA TCC CGT GGA AAC AGG TTC ATT G-3' MB) and T5 (a short DNA strand containing 5 thymine bases) (HS 5'-TTTTT-3')

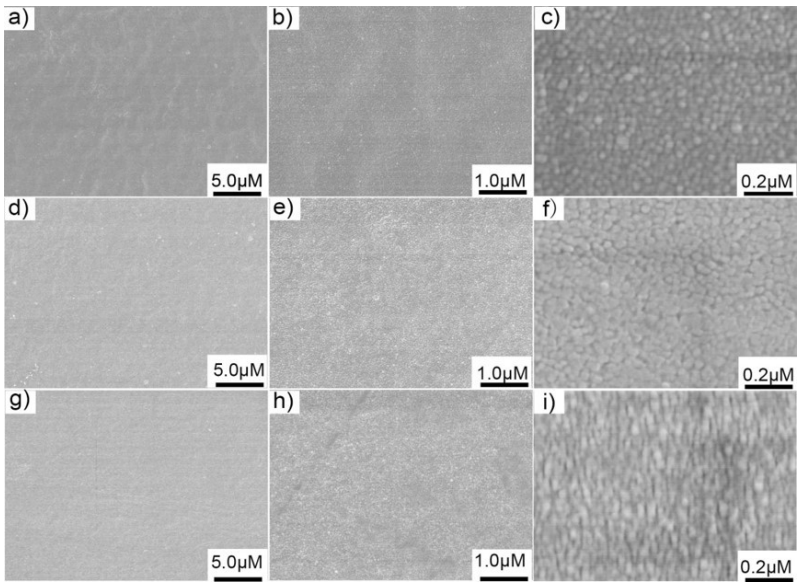

Fig. S1 SEM images of (a)-(c) Au@PAN electrode, (d)-(f) MB-Apt/Au@PAN electrode and (g)-(i) STX+T5/MB-Apt/Au@PAN electrode

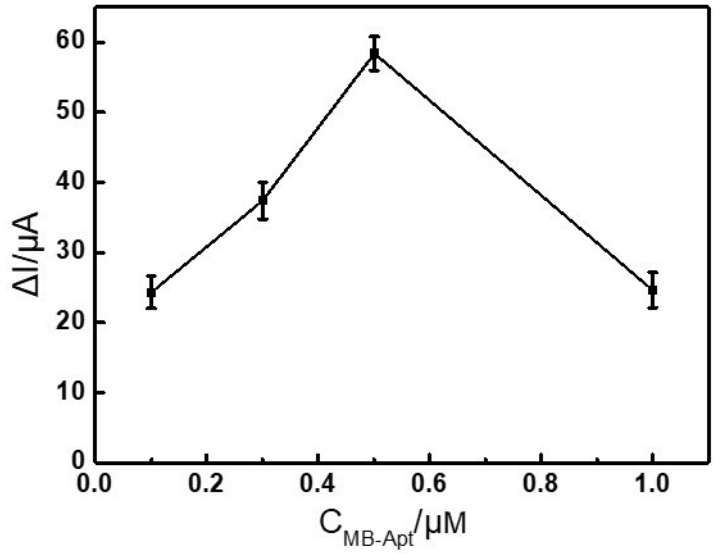

Fig. S2 The relationship between MB-Apt concentration and the relative anodic peak current change (ΔI) obtained in 1 mM $[Fe(CN)_6]^{3-/4-}$ solution containing 0.1 M KCl. (Scan rate of DPV: 25 mV/S)

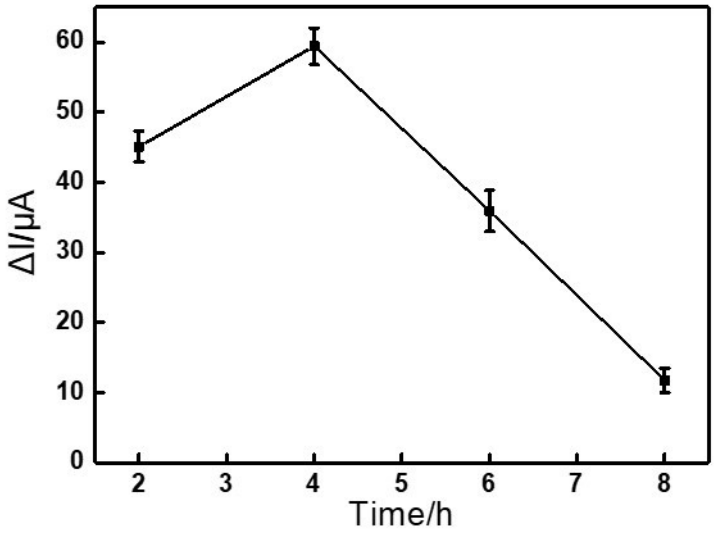

Fig. S3 The effect of the immobilization time of MB-Apt on the relative anodic peak current change (ΔI) obtained in 1 mM $[Fe(CN)_6]^{3-/4-}$ solution containing 0.1 M KCl. (Scan rate of DPV: 25 mV/S)

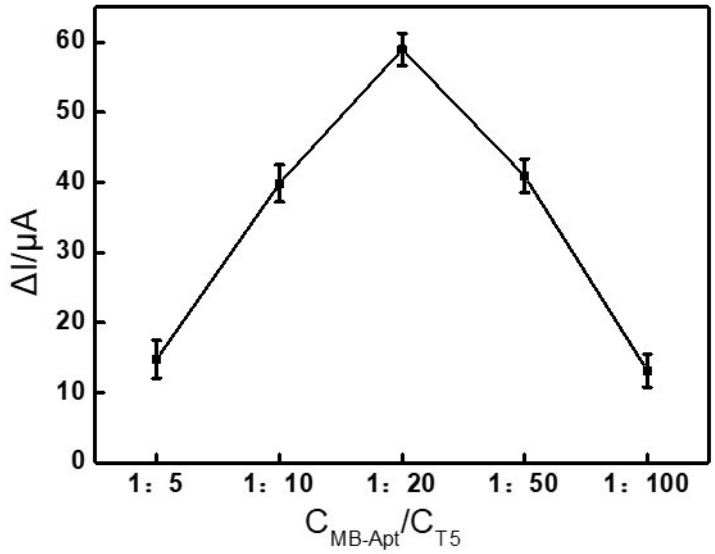

Fig. S4 The relationship between the $C_{MB\text{-}Apt}/C_{T5}$ and the relative anodic peak current (ΔI) obtained in 1 mM $[Fe(CN)_6]^{3-/4-}$ solution containing 0.1 M KCl. (Scan rate of DPV: 25 mV/S)

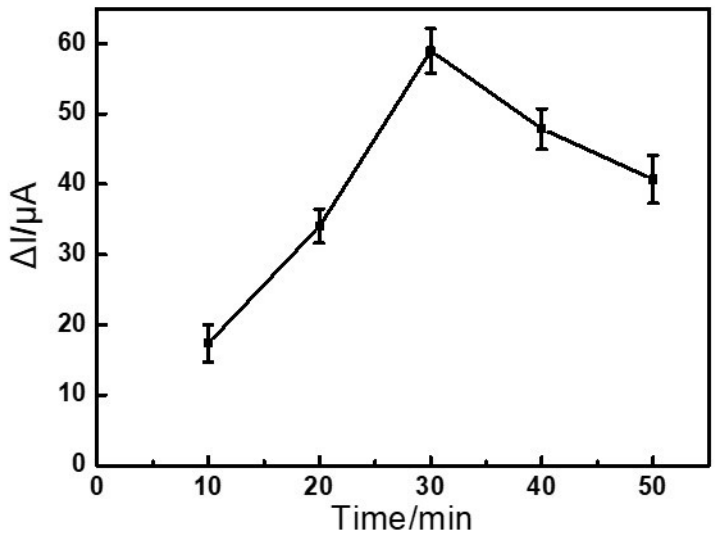

Fig. S5 The effect of reaction time between STX and MB-Apt on the relative anodic peak current change (ΔI) obtained in 1 mM [$Fe(CN)_6]^{3-/4-}$ solution containing 0.1 M KCl. (Scan rate of DPV: 25 mV/S)

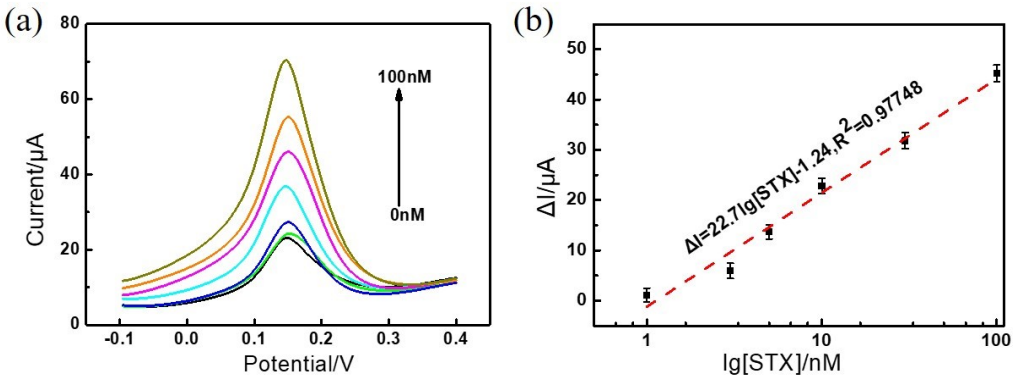

Fig. S6 (a) The DPVs of aptasensor without nanopillar arrays capture STX at different concentrations（1, 3, 5, 10, 30, 100 nM）and (b) The plot of DPV peaks changes (ΔI) vs. STX concentration (error bars: SD, n=3)

Table S1. Reproducibility of STX (30 nM) detection by the nanopillar array-based aptasensors

ΔI						RSD (%)
1	2	3	4	5	Average	
76.8	80.3	82.3	72.5	87.5	79.88	5.66

Table S2. Real samples analysis (n = 3)

Real Samples	Added	Detection	Recovery (%)	RSD (%)
shellfish	10 pM	10.3 pM	91-108	6.7
	100 pM	104 pM	87-110	8.1
	3 nM	2.8 nM	85-106	7.8
	10 nM	9.7 nM	98-107	6.9
	30 nM	28.5 nM	94-112	8.3