Supporting Information

Screening of DNA Aptamers against Myoglobin Using Positive and Negative Selection Units Integrated Microfluidic Chip and its Biosensing Application

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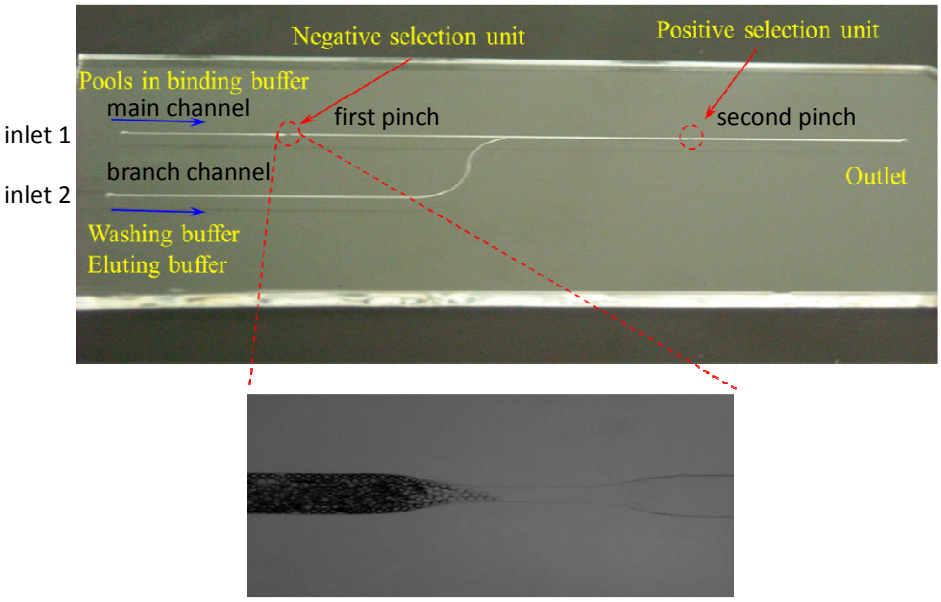


Figure S1. Structure of microfluidic device

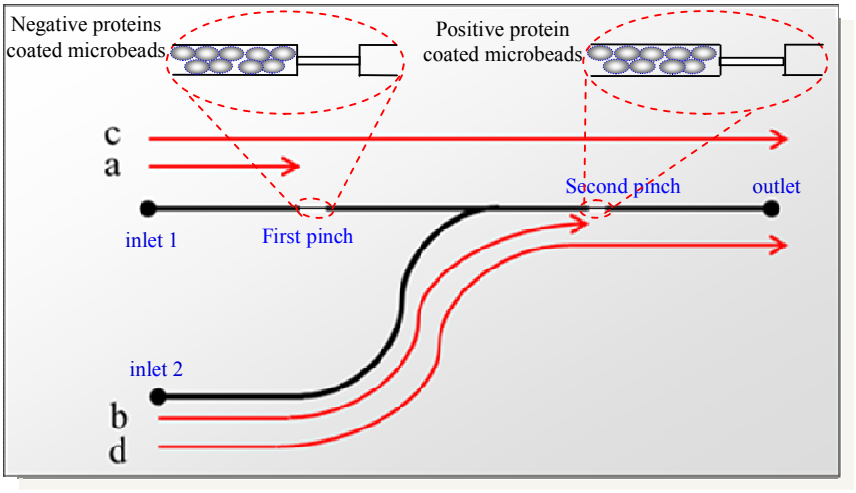


Figure S2. Sample injecting strategy. (a) Introduce the negative proteins-coated microbeads before the first pinch; (b) introduce the positive protein-coated microbeads before the second pinch; (c) inject the library in binding buffer; (d) inject washing buffer and eluting buffer in turn.

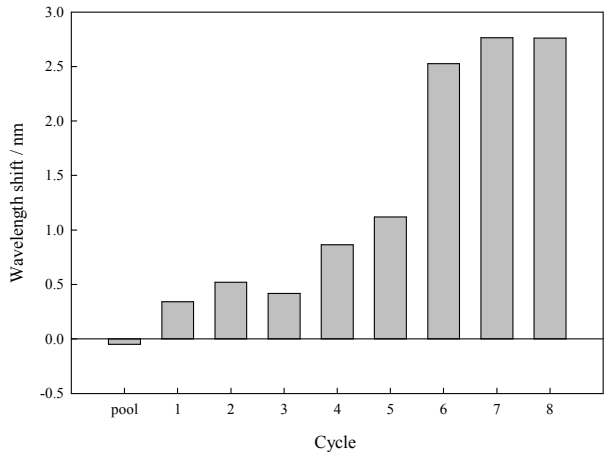
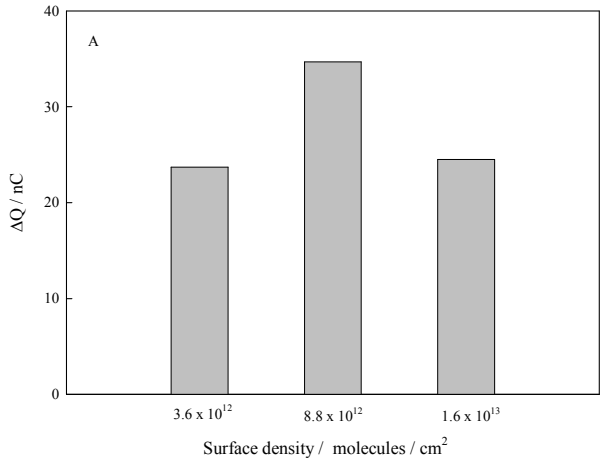
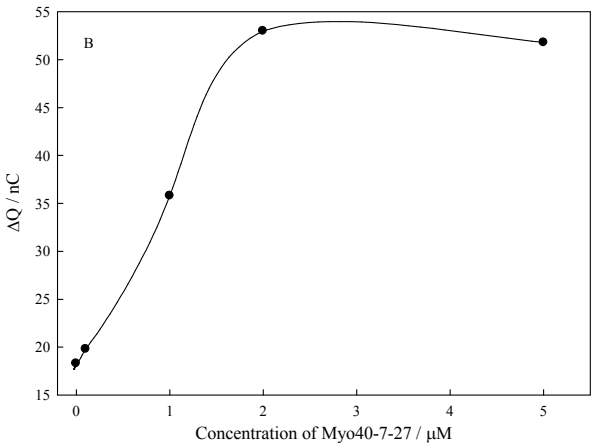
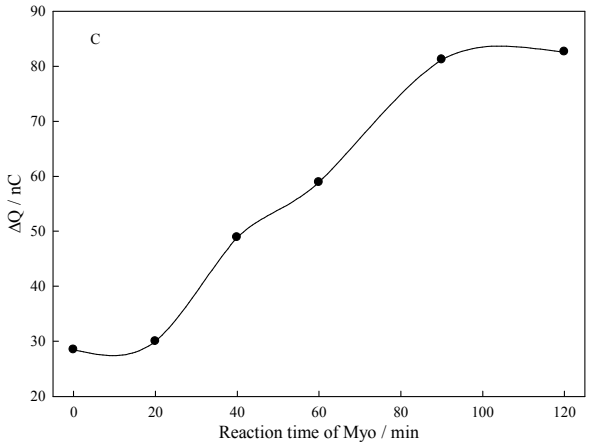


Figure S3. Efficiency of each round of selection. Original pool was used as control.


A
ΔQ / nC
0
10
20
30
40
3.6 x 10^12
8.8 x 10^12
1.6 x 10^13
Surface density / molecules / cm^2


B
ΔQ / nC
15
20
25
30
35
40
45
50
55
0
1
2
3
4
5
Concentration of Myo40-7-27 / μM


C
ΔQ / nC
20
30
40
50
60
70
80
90
0
20
40
60
80
100
120
Reaction time of Myo / min

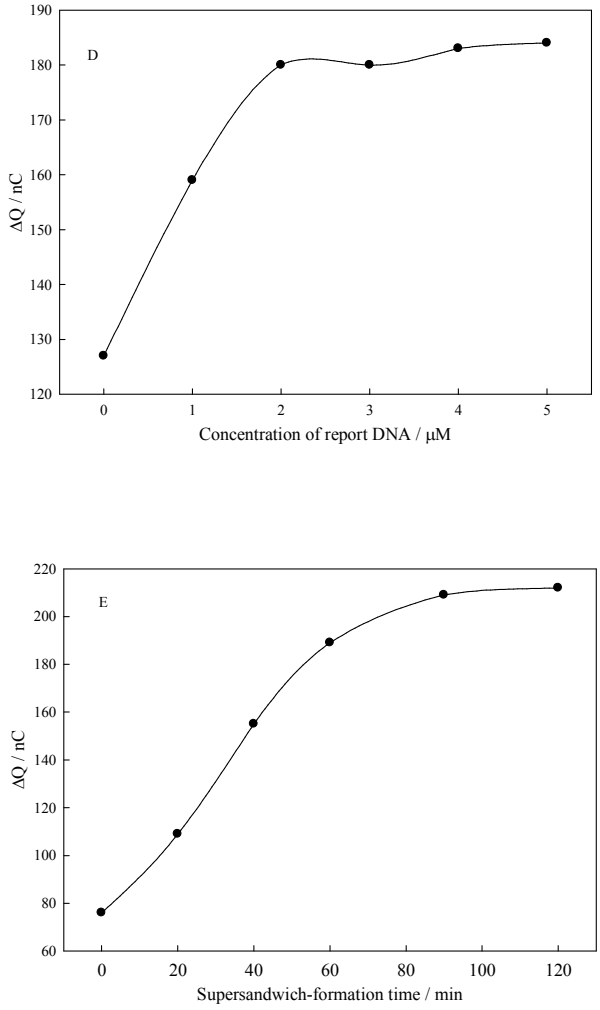


Figure S4. The effect of different factors on the detection of Myo.

(A) The effort of different surface density of capture DNA. Concentration of Myo: 10 nM; Concentration of Myo40-7-27: 5 μM; Reaction time of Myo on the electrodes: 60 min.

(B) The effort of different Myo40-7-27 concentration. Surface density: 8.8×10^{12} molecule/cm^2; Concentration of Myo: 10 nM; Reaction time of Myo on the electrodes: 60 min.

(C) The effort of different reaction time of Myo. Surface density: 8.8×10^{12}

molecule/cm^2; Concentration of Myo: 10 nM; Concentration of Myo40-7-27: 2 μM.

(D) The effort of different report DNA concentration. Here, the concentration of report DNA1 equal to that of report DNA2. Surface density: 8.8×10^{12} molecule/cm^2; Concentration of Myo: 10 nM; Concentration of Myo40-7-27: 2 μM; Reaction time of Myo on the electrodes: 90 min; Supersandwich-formation time: 90 min.

(E) The effort of different supersandwich-formation time. Surface density: 8.8×10^{12} molecule/cm^2; Concentration of Myo: 10 nM; Concentration of Myo40-7-27: 2 μM; Concentration of report DNA: 2 μM. Reaction time of Myo on the electrodes: 90 min.

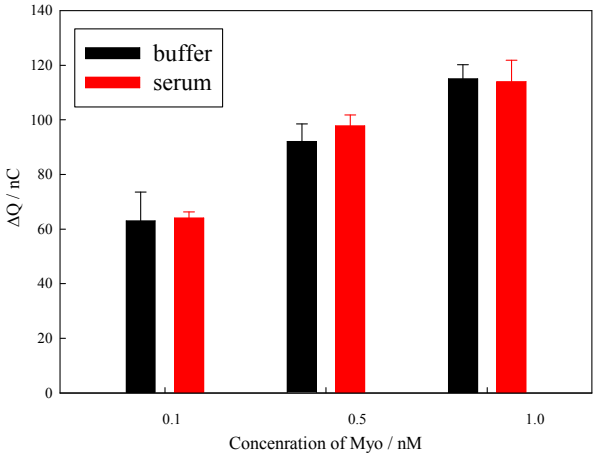


Figure S5. Detection of Myo in Human serum and buffer. The error bars represent the standard deviation of three measurements.