

Supporting information for

A chronopotentiometric flow injection system for aptasensing of *E. coli* O157

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Materials and Methods. 2-Nitrophenyl octyl ether (*o*-NPOE), high molecular weight poly(vinyl chloride) (PVC), dinonylnaphthalene sulfonic (DNNS, 50 wt% solutions in heptane), tetradodecylammonium tetrakis(4-chlorophenyl)borate (ETH 500), protamine sulfate salt from herring, and tris(hydroxymethyl)aminomethane (Tris) were purchased from sigma. Bacterial strains for *Salmonella typhimurium*, and *Listeria monocytogenes* were kindly provided by Yantai Import and Export Inspection and Quarantine Bureau. The strain of *E. coli* O157 ATCC35150 and the chromogenic medium (SMAC, HBPM017) were brought from Qingdao Hope Biotechnology Co. Ltd (Qingdao, China). The number of the colony-forming unit per mL (CFU mL⁻¹) for each culture was determined by the surface plate counting method. The morphology of *E. coli* O157 was characterized by scanning electron microscopy (SEM, JSM5600 LV, operating at 5.0 KV).¹

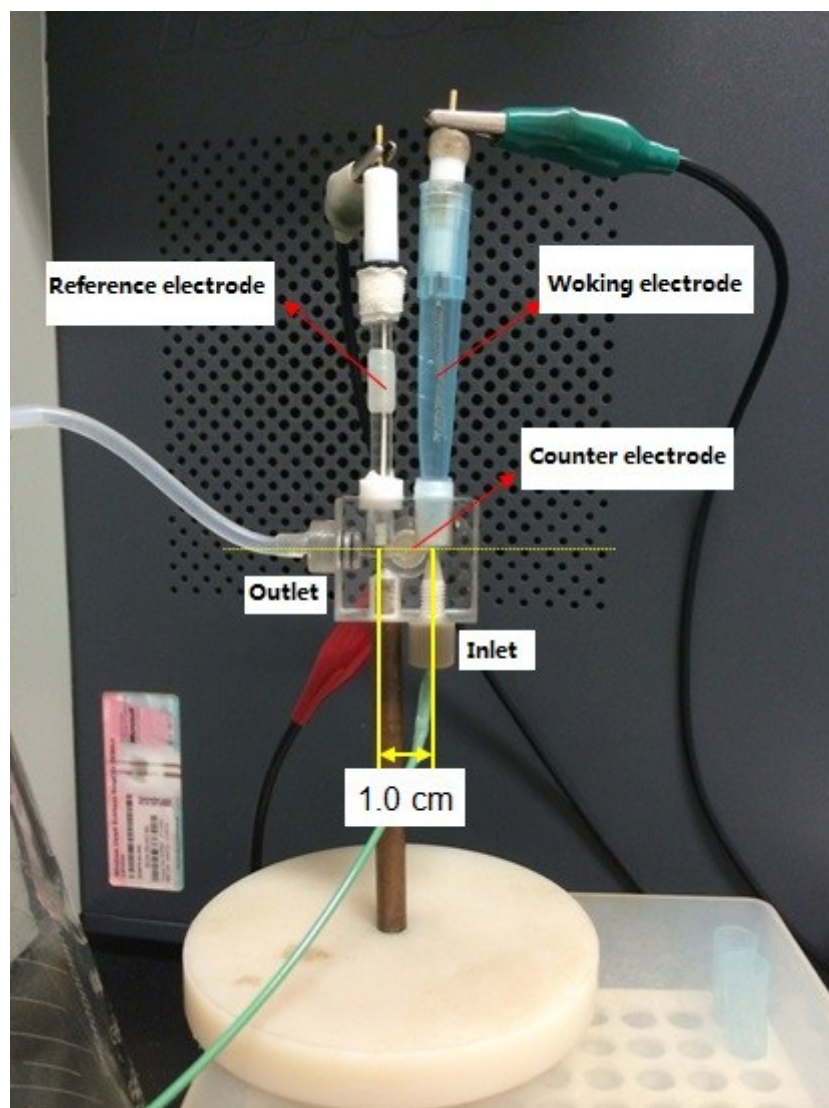
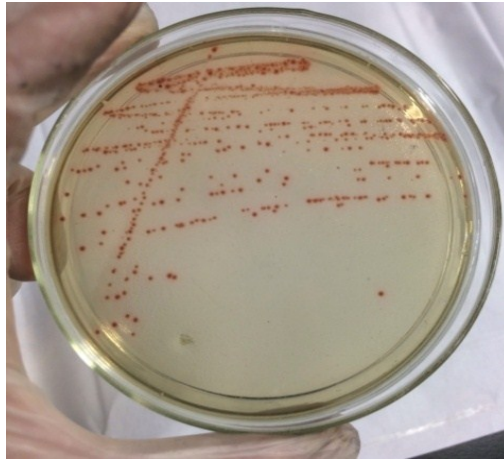
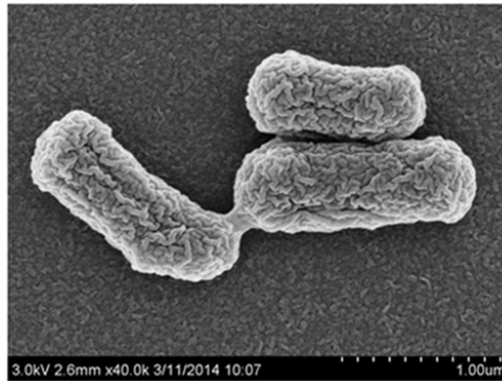


Fig. S1. Photograph of the detection chamber.



E. coli O157 ATCC 35150

Fig. S2. Typical characteristics of *E. coli* O157 ATCC35150 in the chromogenic medium.



E. coli O157 ATCC 35150

Fig. S3. SEM imagine of *E. coli* O157 ATCC35150.

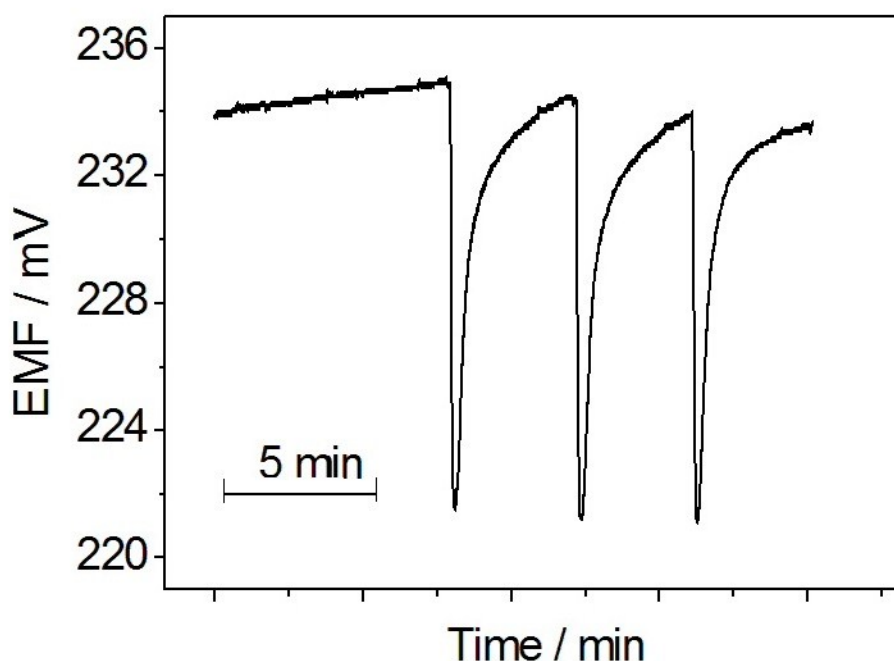


Fig. S4. Potentiometric responses of the electrode to 1.0 μM aptamer Eco 3 Rev in the absence of *E. coli O157*.

Calculations of the detection limit

As shown in Figure S5, the s.d. value for the blank measurement was 0.503 mV ($n=3$). (The potential peak heights were 13.6 mV, 13.2 mV and 12.6 mV, respectively). The detection limit is given by the equation $DL = 3sb1/S$, where the sb1 is the standard deviation of the blank measurements and the sensitivity of the calibration graph. In the presence of 10 CFU mL^{-1} target bacteria, the difference in the potential peak height was 1.65 ± 1.3 mV (as shown in figure 4B). Thus, S can be obtained as $(1.65 \text{ mV} / 10 \text{ CFU mL}^{-1})$. The detection limit of *E. Coli O157* was calculated as below:

$$DL = 3 \times 0.503 \text{ mV} / (1.65 \text{ mV} / 10 \text{ CFU mL}^{-1})$$

Since the concentration of the bacteria was defined as the number of colony-forming units per mL, the detection limit was calculated to be ca 10 CFU mL^{-1} (3σ).

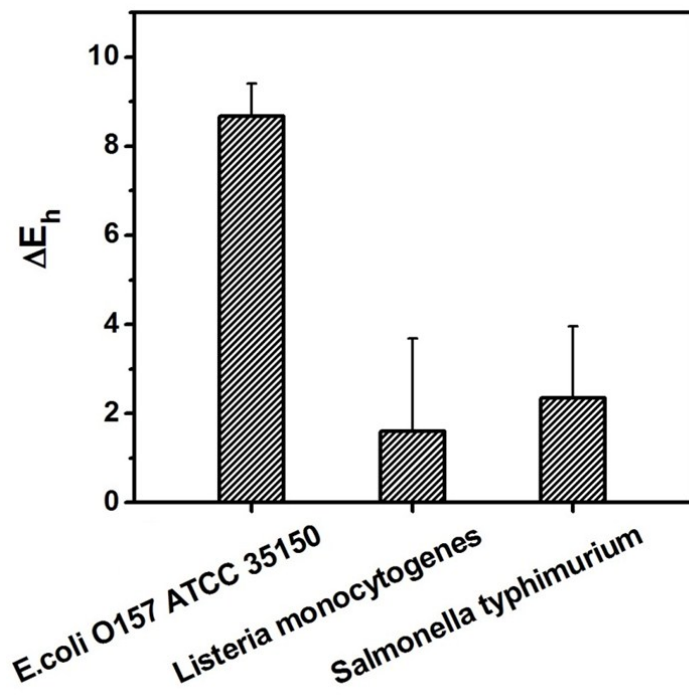


Fig. S5. Potential responses to *E. coli* O157 ATCC35150, *Listeria monocytogenes*, and *Salmonella typhimurium*. The concentration of *E. coli* O157 and that of other bacteria were 10^7 CFU mL⁻¹ and 10^8 CFU mL⁻¹, respectively.

Table S1. Comparison of the detection limits for measuring *E. coli* O157 using different methods.

Detection method	Detection limit (CFU/mL)	Detection range (CFU/mL)	Reference
ELISA with electrochemical detection	10^3	10^3 - 10^8	2
ELISA with impedometric detection	6×10^3	6×10^3 - 6×10^7	3
Chemiluminescence immunoassay	1.2×10^3	4.3×10^3 - 4.3×10^5	4
immunomagnetic separation with realtime RT-PCR	10	10 - 10^7	5
Inductively coupled plasma mass spectrometry	500	5×10^2 - 5×10^5	6
Magnetoelastic immunosensors	10^2	10^2 - 10^6	7
Surface plasmon-enhanced fluorescence spectroscopy	10	10 - 10^6	8
Potentiometric aptasensing	10	10 - 10^4	this work

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