Electronic Supplementary Material (ESI) for Analyst

Supporting Information

Electrochemical Immunoassay For *Salmonella* Typhimurium Based On Magnetically Collected Ag-Enhanced DNA Biobarcode Labels

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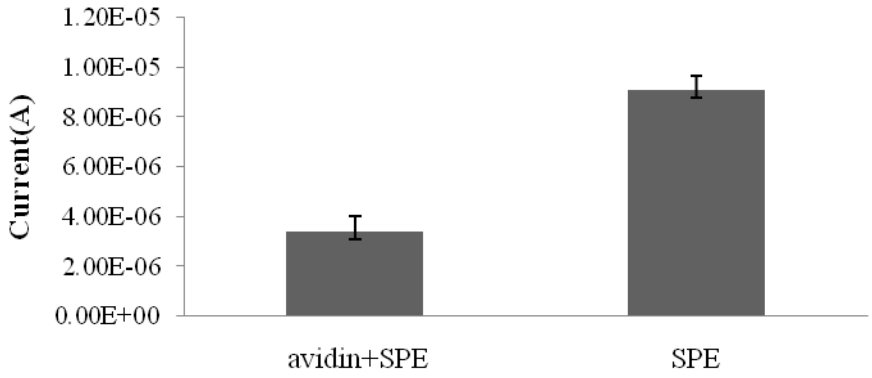
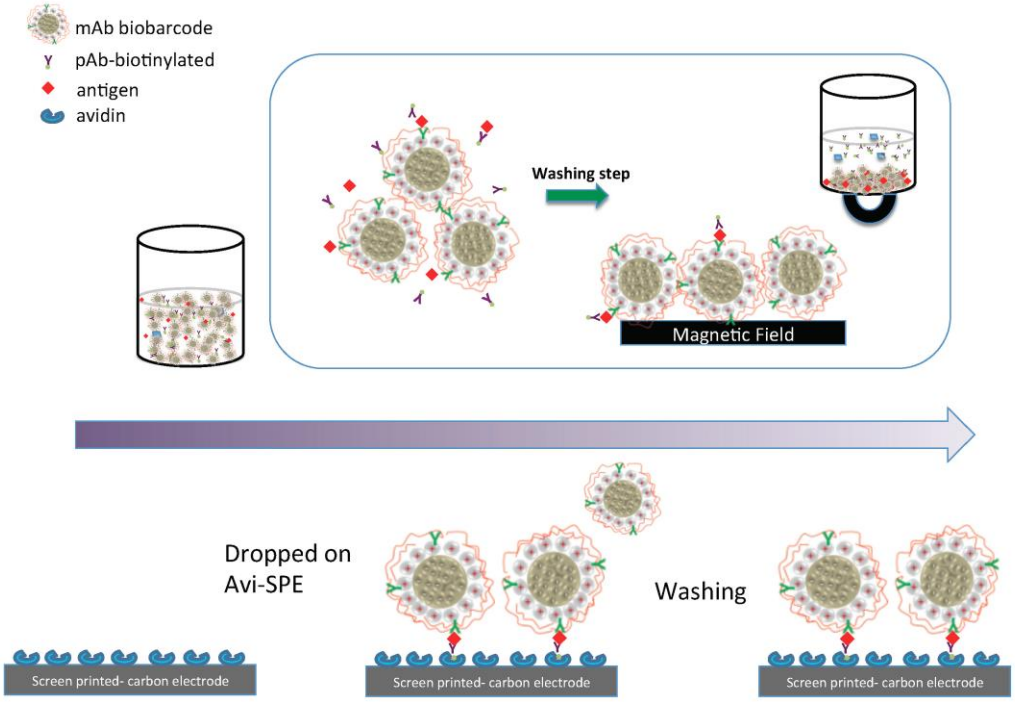


Figure S-1 DPASV peak current following the addition of Ag enhancer solution to an SPE and an avidin-modified SPE in the absence of antibody and substrate. The enhancer solution was left to react for 10 min before being washed off. DPASV conditions were as given in the Experimental section. Error bars show $\pm$ 1 std. dev. (n = 4).

(a)



(b)

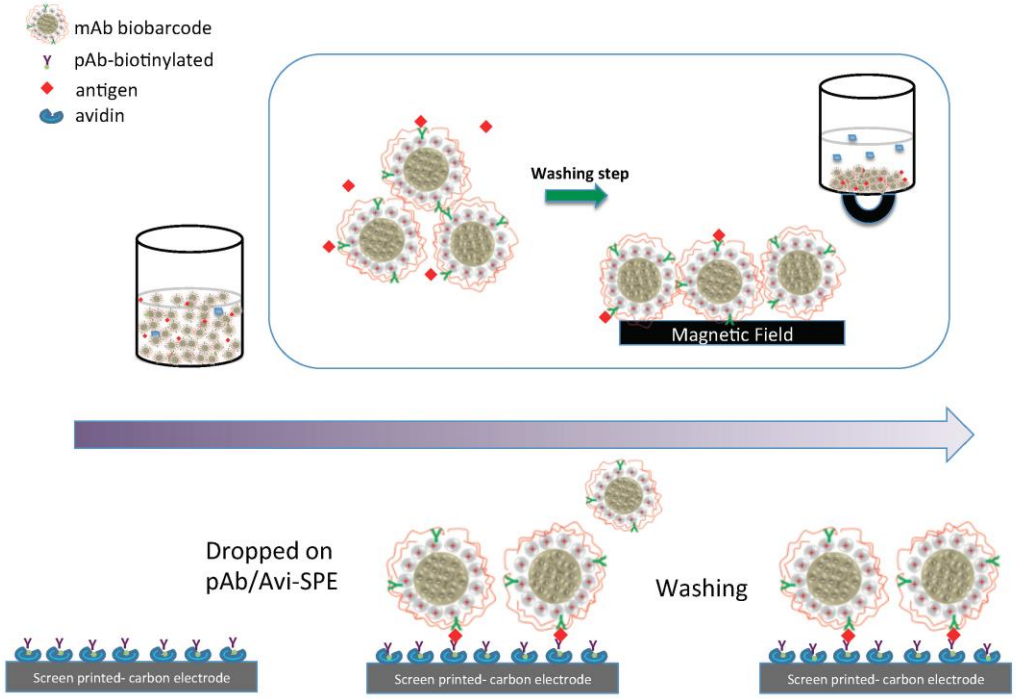


Figure S-2A Alternate assay protocols for biobarcode detection. Protocol (a) describes one step binding of antigen to both mAb-biobarcode and pAb-biotin, exactly as illustrated in Scheme 1 of the paper. Protocol (b) describes a two step process in which antigen is first exposed to mAb-biobarcode, and then after magentic separation and washing the antigen-mAb-biobarcode conjugate is exposed to a screen printed electrode modified by pAb-biotin.

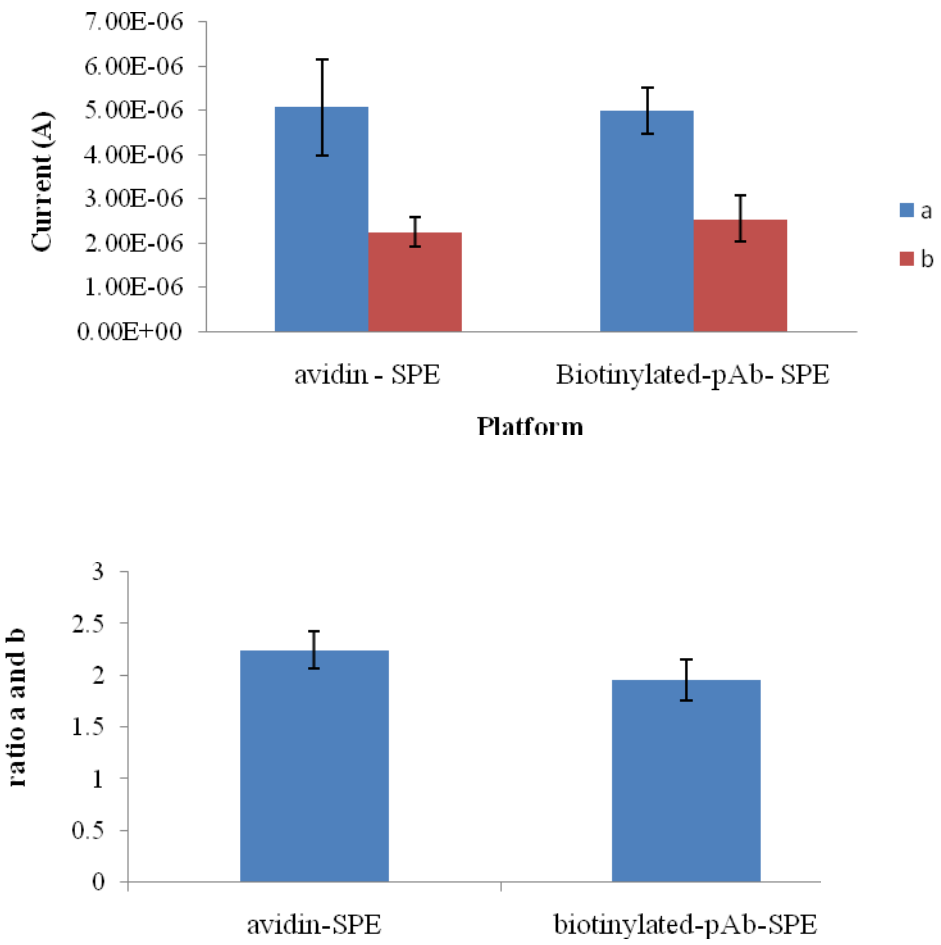


Figure S-2B Experimental comparison of the two protocols illustrated in Fig. S-3A, where the platform type "avidin-SPE" refers to protocol (a) and "biotinylated-pAb-SPE" refers to protocol (b). Histogram (A) shows the response to *Salmonella* Typhimurium cells at 10^5 CFU mL^{-1} (a) and 0 CFU mL^{-1} (b). Histogram (b) shows the response ration (a)/(b) for each platform. Error bars give $\pm$ 1 std. dev. (n = 5).

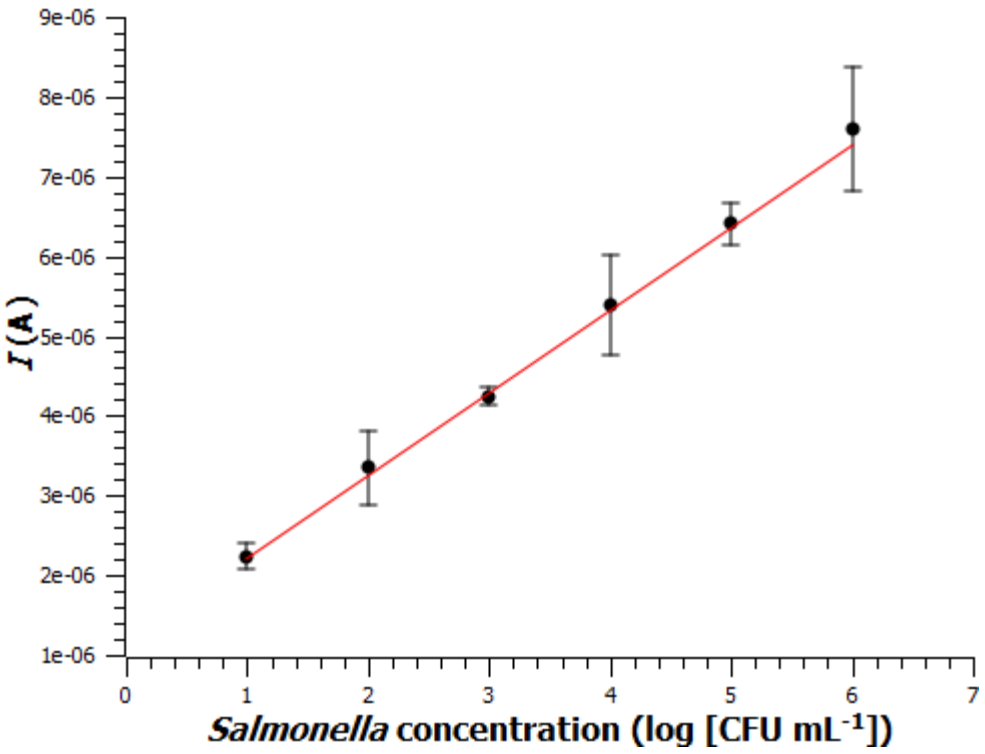


Figure S-3 Linear range of calibration curve shown in Fig. 5 of paper. Red line is linear regression (r^2 = 0.996, n = 30).

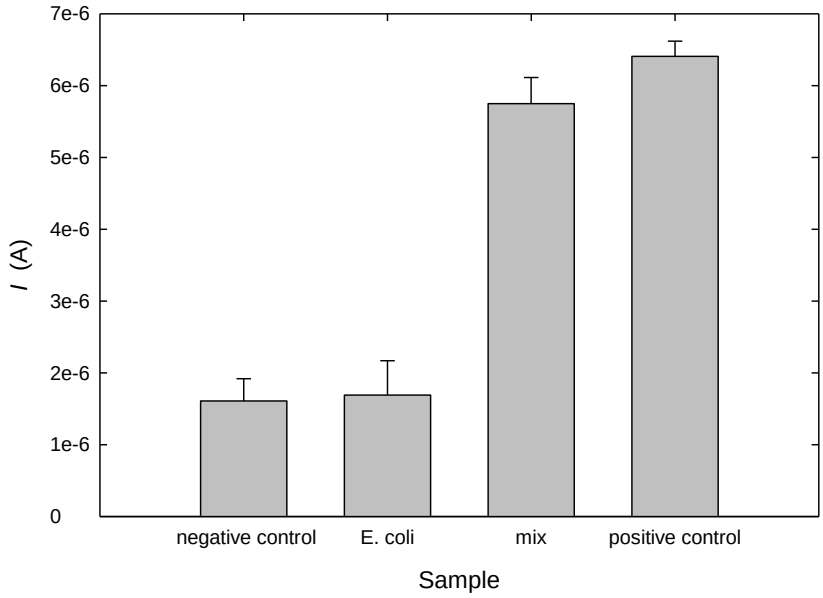


Figure S-4 Immunoassay response to heat-killed bacteria in buffer: 0 CFU mL^{-1} *Salmonella* Typhimurium (negative control), 10^7 CFU mL^{-1} *E. coli*, 10^7 CFU mL^{-1} *E. coli* + 10^5 CFU mL^{-1} *Salmonella* Typhimurium (mix), and 10^5 CFU mL^{-1} *Salmonella* Typhimurium (positive control). DPASV conditions as given in Fig. 1 of main paper. Error bars show $\pm$ 1 std. dev. (n = 7).

Sample	Heat-killed			Whole cell		
	LOD (CFU/mL)	Sensitivity (A/(log CFU mL^{-1}))	r^2 (n=30)	LOD (CFU/mL)	Sensitivity (A/(log CFU mL^{-1}))	r^2 (n=30)
Plain milk	20	9.82×10^{-7}	0.984	26	9.01×10^{-7}	0.995
Green bean sprout	22	9.69×10^{-7}	0.983	17	9.21×10^{-7}	0.993
Raw egg	20	1.05×10^{-6}	0.992	13	1.06×10^{-6}	0.993

Table S-1 Sensitivities and detection limits of *Salmonella* Typhimurium in different sample matricies.