Electronic Supplementary Material (ESI) for Analyst.

Supporting Information

A label-free, versatile and low-background chemiluminescence aptasensing strategy based on gold nanoclusters catalysis combined with separation of magnetic beads

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Confirmation of as-synthesized DNA-templated AuNCs by fluorescence spectra

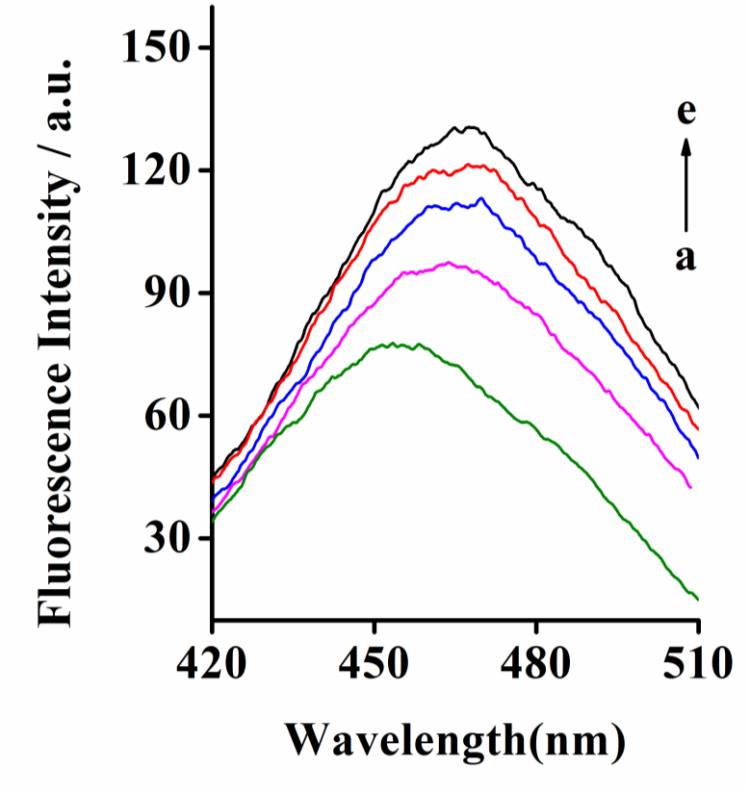

Fig. S1 Fluorescence spectra of A30-stabilized AuNCs, upon different excitation wavelengths. (a) 250, (b) 260, (c) 270, (d) 280 and (e) 290nm.

Fig. S1 shows that the emission band of the as-synthesized AuNCs was centered at approximately 470 nm, when excitation varied in the range 250 − 290 nm. These experimental results demonstrate that AuNCs were synthesized successfully [1].

Confirmation of the immobilization of DNA1 onto magnetic beads (MBs)

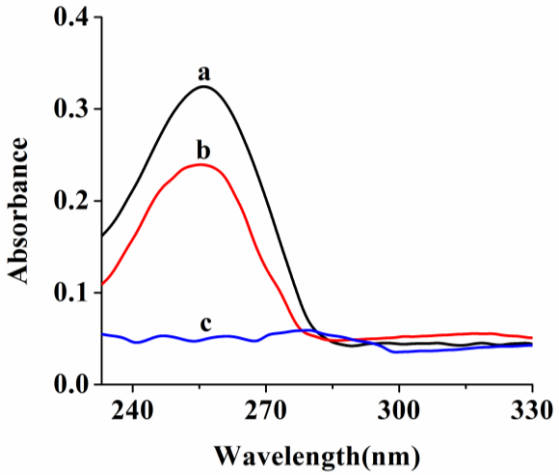

Fig. S2 UV absorption spectrum of DNA1- magnetic beads (MBs) conjugates under different conditions. (a) DNA1; (b) MBs + DNA1; (c) MBs

To confirm DNA1 attached to MBs, UV spectra of the DNA1, MBs, and DNA1 with MBs were recorded by spectrophotometer as shown in Figure S2. Curve b exhibited both the characteristic absorbance of DNA (curve a) [2] and the absorbance of MBs (curve c) at ~260 nm. The results indicated that DNA1 had been successfully attached to MBs, due to the strong interaction between the carboxylated DNA1 and amino-MBs.

Confirmation of DNA2-AuNCs separation from magnetic beads (MBs)

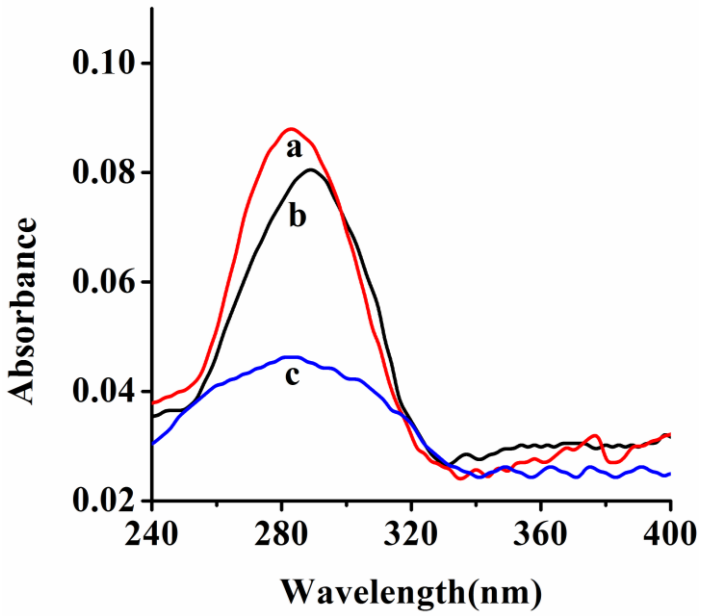

Fig. S3 Absorption spectrum of DNA-templated AuNCs under different conditions. (a) AuNCs; (b) DNA2-AuNCs + MBs-DNA1; (c) after magnetic separation of targets + (b)

To confirm separation of AuNCs from magnetic beads in the presence of targets, an assay of absorption spectrum of DNA-templated AuNCs under different conditions has been implemented. Curve a reveals a typical plasma resonance absorption peak of AuNCs [1]. The absorbance exhibits a slight decrease (curve b) in the mixture solution of DNA2-AuNCs and MBs-DNA1, which may be resulted from the formation of double strand configuration DNA1 and DNA2. But at the same time it also proved that the formation of double strand configuration DNA1 and DNA2 hardly affect the prepared the AuNCs. However, in the presence of targets, significant absorption decrease was observed (curve c) compared with curve b. The experimental results demonstrated that DNA2-AuNCs separation from magnetic beads in the presence of targets.

The effect of common milk adulterants and drugs excipients

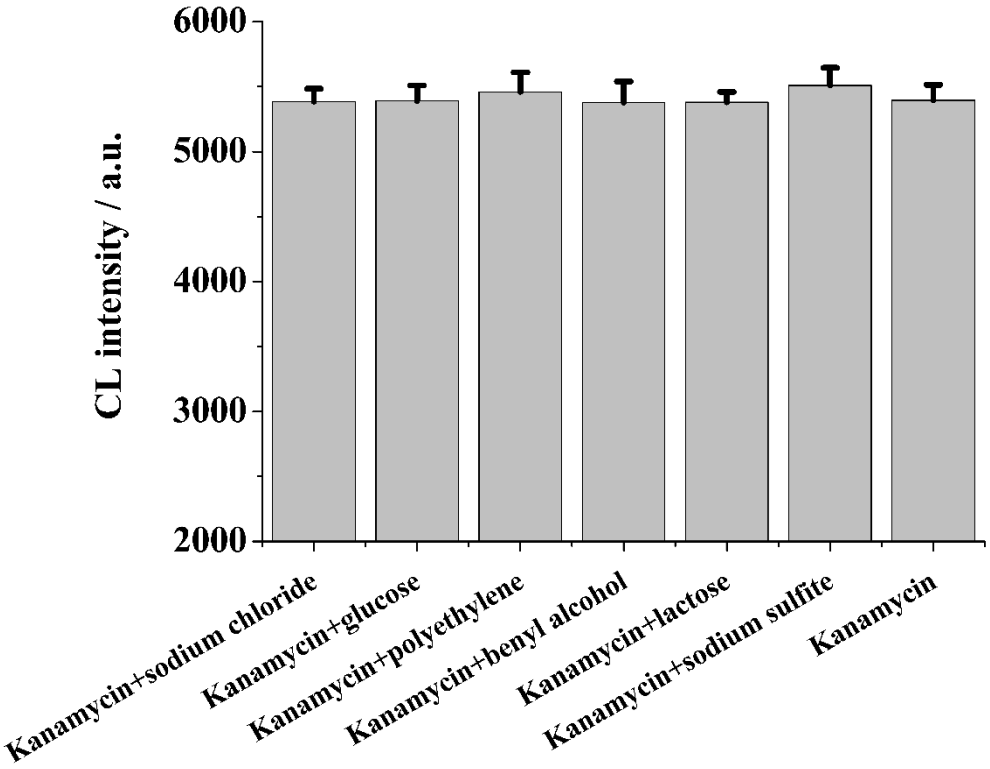

Fig. S4 CL response of the system in the presence of kanamycin and common food adulterants and drugs excipients, respectively. The concentrations of the above kanamycin were all 2.0 nM.

Table S1 Comparison of the different assay methods for kanamycin detection

Detection method	Linear range	Limit of detection (LOD)	Ref.
Electrochemistry	10.0 – 450.0 nM	2.85 nM	3
Electrochemistry	0.1 – 50 μM	0.1 μM	4
Photoelectrochemical	0.2 – 200 nM	0.1 nM	5
UV-vis spectrocopy	1 – 100 nM.	1.49 nM	6
Photoelectrochemical	1 – 230 nM	0.2 nM	7
Chemiluminescence	0.2 – 4.4 nM	0.035 nM	This work

Table S2 Precision (RSD %) and accuracy (recovery %) of kanamycin spiked into the milk samples

Concentration of kanamycin added (nM)	Concentration of kanamycin measured (nM)	RSD (%) (n = 6)	Recovery (%)
0.20	0.198	5.3	99.0
1.00	1.05	4.6	105.0
4.00	4.12	3.4	103.0

Table S3 Precision (RSD %) and accuracy (recovery %) of kanamycin spiked into the 1% human serum matrix

Concentration of kanamycin	Concentration of kanamycin added (nM)	Concentration of kanamycin measured (nM)	RSD (%) (n = 3)	Recovery (%)
Not detected	1.00	1.09	4.8	109.0
Not detected	2.00	1.93	4.1	96.5

References:

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