Electronic Supporting Information

Design an aptamer-based fluorescence displacement biosensor for selective and sensitive detection of kanamycin in aqueous-derived samples

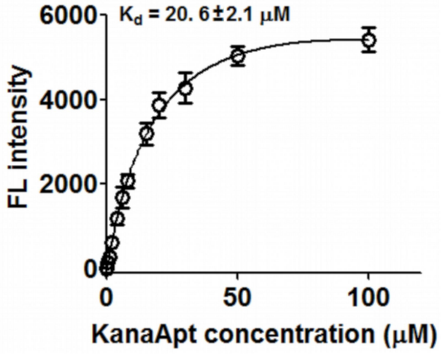

Figure SI-1. Fluorescence intensities of 5 μM ThT at 492 nm with various concentrations of kanamycin A. Triplicate independent experiments have been performed and error bars are give accordingly.

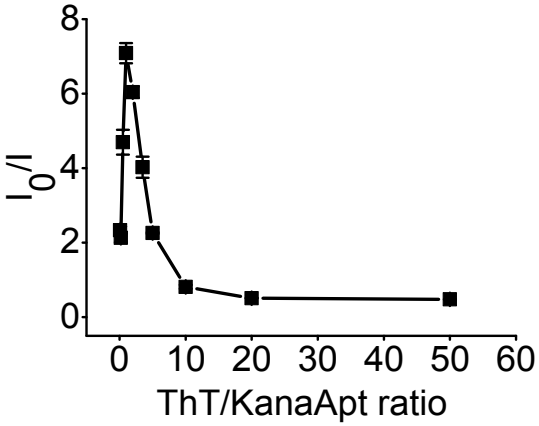

Figure SI-2. The optimisation of ratio of ThT/KanaApt for kanamycin A detection. Error bars represent the standard deviation in three individual experiments.

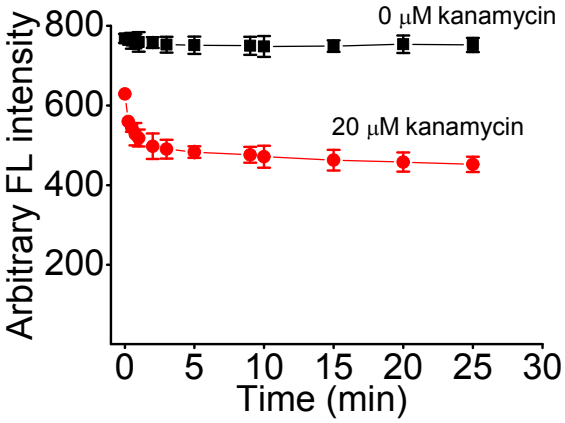

Figure SI-3. The optimisation of incubation time of KanaApt-ThT complex in the absence or presence of kanamycin A. Triplicate independent experiments have been performed and error bars are give accordingly.

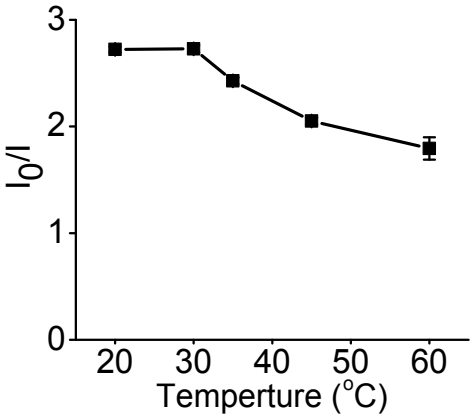

Figure SI-4. The optimisation of incubation temperature of KanaApt-ThT complex in the presence of kanamycin A. Triplicate independent experiments have been performed and error bars are give accordingly.

	Kanamycin A added (μM)	Measured (μM) mean[a] ± SD	Recovery (%)
Sample 1	0.1	0.1049 ± 0.008	104.9
Sample 2	2.0	1.896 ± 0.114	94.8
Sample 3	20.0	18.40 ± 1.254	92.0

a: Mean obtained from four separate measurements

Table SI-1. Detection results of kanamycin A spiked in liquid milk.

Detection method/instrument	Probes	Linear Range	(Limit of Detection) LOD	Real sample	Ref.
UV-Vis spectroscopy	DNA aptamer functionalised gold NPs	1-500 nM	1 nM	Milk	1
	DNA aptamer functionalised gold NPs	—	25 nM	Aqueous solutions	2
	Gold nanoparticles (Nanozyme)	0.1 nM-10 nM	1.49 nM	Aqueous solutions	3
HPLC	Borate complexation	–	~78 μM (38 μg/mL)	Aqueous solutions	4
Cantilever array sensor	DNA aptamer	100 μM to 10 mM	50 μM	Aqueous solutions	5
Fluorescence spectroscopy	Thiazole orange (TO) and a DNA aptamer	0.1 μM to 20 μM	59 nM	Milk	6
	Thioflavin T (ThT) and a DNA aptamer	**1 nM to 300 μM**	**300 pM**	**Aqueous solutions**	**This work**
luminescence	Platinum (II) complex with DNA aptamer	0.2-150 μM	143 nM	Aqueous solutions	7
Electrochemical aptasensor	DNA aptamer with chitosan-gold NPs, graphene-gold NPs and multi-walled carbon nanotubes-cobalt phthalocyanine nanocomposites	10 nM to 150 nM	5.8 nM	Milk	8
	Thionine, graphene-polyaniline composite film, and gold NPs	~0.02nM ~413nM (0.01 to 200 ng/mL)	~17.7 nM (8.6 ng/mL)	Milk	9
	Conducting polymer/gold self-assembled nanocomposite	0.05-9.0 μM	9.4 ± 0.4 nM	Milk	10
Electrochemical immunosensor	Ag@Fe3O4 nanoparticle and thionine mixed graphene sheet (TH-GS)	~103 pM to ~33 nM (0.050 to 16 ng/mL)	~0.03 nM (15 pg/mL)	Pork meat	11
	Graphene sheet (GS) -nafion (Nf)/thionine (TH)/Ptnanoparticles modi fied	~21 pM to ~25 nM (0.01 to 12.0 ng/mL)	~12 pM (5.74 pg/mL)	Chicken liver	12
Capillary electrophoresis (CE)		~43 nM to ~103 μM (2.1 × 10−5 to 5.0 × 10−2 mg/mL)	~14 nM (7 ng/mL)	Milk	13
		~5.2 μM to ~2mM (2.5 to 1000 μg/mL)	~1440 nM (0.7 μg/mL)	Aqueous solutions	14
Surface plasmon resonance (SPR)	Gold nanoparticles (AuNPs)	20-800 nM	2 nM	Human urine	15
	Imprinted BoronicAcid-Functionalized Au Nanoparticle Composites	1 pM to 1 nM	1 pM	Milk	16
ELISA	Antibody	–	~43 nM (21 ng/mL)	Milk	17
	Antibody	~0.4 to ~100 nM (0.2-50 ng/mL)	~0.4 nM (0.2 ng/mL)	Cattle milk, cattle plasma, cattle urine and chicken plasma	18
ELISA and immunochromatograp-hic assay	Antibody	–	~2 nM (1.0 ng/mL)	PBS solution,plasma and milk	19
Biosensor immunoassay (BIA)	Antibody	—	~31 nM (15 ng/ml)	Milk	20

Table SI-2. A summary of our proposed approach with others for detection of kanamycin A.

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