Electronic Supplementary Information

CRISPR/Cas12a-assisted electrochemiluminescent detection of ochratoxin A based on COF@Ru coupling with DNA tetrahedral scaffold

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Experimental section

1. The preparation of positively charged gold nanoparticles

Positively charged Au NPs were synthesized according to the previous literature [1]. Briefly, 2 mL of cetyltrimethylammonium bromide (CTAB, 10 mM) was added into 15 mL of $HAuCl_4$ (Sigma, America) solution (1.0 mM) and stirred for 15 min. Then, 2 mL of ice-cold $NaBH_4$ (100 mM) was introduced slowly. After continually stirred 30 min, the mixture was turned to wine red, showing that Au NPs has been generated.

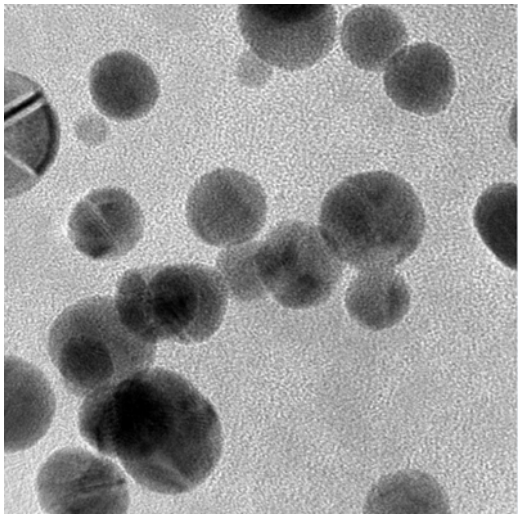

Fig. S1 The TEM of AuNPs.

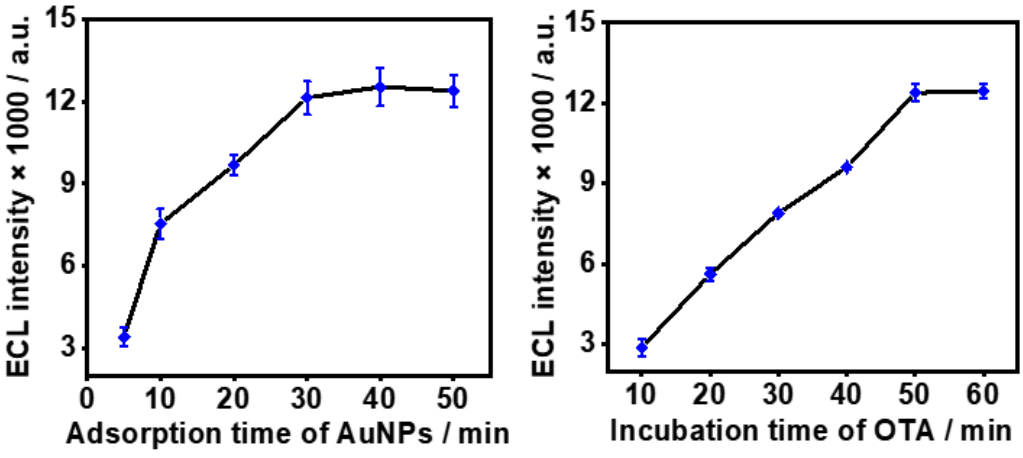

Fig. S2 Optimizing the detection conditions, (A) adsorption time (5, 10, 20, 30, 40 and 50 min) of

36 AuNPs; (B) the incubation time (10, 20, 30, 40, 50 and 60 min) of OTA.

Table S1 Comparing the analytical performances for OTA assays with other methods reported in recent years.

Methods	Specificity (Selectivity of the sensor to interferences)	Linear Range	LOD	Reference
ECL aptasensor	AFG1, AFB2, AFB1, FB1	10^{-5}–10^{2} ng·mL^{-1}	3.5 fg·mL^{-1}	This work
Fluorescent aptasensor	OTB, OTC, AFB1, ZEA	10−10^{6} fg·mL^{-1}	4.3 fg·mL^{-1}	[2]
Colorimetric and fluorescent sensor	AFB1, AFB2, AFG1, OTB	10–1.5 ×10^{3} μg·kg^{-1}; 0.05–1.0 × 10^{3} μg·kg^{-1}	4 μg·kg^{-1}; 0.01 μg·kg^{-1}	[3]
Electrochemical/ visual dual-readout aptasensor	AFB1, DON, ZEN, T-2	0.1−200 ng·mL^{-1}; 1 × 10^{-4} −200 ng·mL^{-1}	25.2 fg·mL^{-1}; 100 pg·mL^{-1}	[4]
Electrode-ECL biosensor	ZEN, DON, AFG1, AFB2, AFM1	0.01− 5 ng·mL^{-1}; 5− 10^{2} ng·mL^{-1}	3 pg·mL^{-1}	[5]
Colorimetric aptasensor	OTB, AFB1, AFG1, ZEN	0.05 − 33.35 ng·mL^{-1}	0.069 ng·mL^{-1}	[6]
fluorescence assay	ZEN, FB1, FB2, CIT, DON, PAT, T-2	10 − 10^{6} pg·mL^{-1}	0.247 pg·mL^{-1}	[7]
ECL aptasensor	OTB, AFB1, ZEN, T-2	0.01–1 nM	0.2 pM (80.7 fg·mL^{-1})	[8]
ECL aptasensor		0.1– 320 ng·mL^{-1}	0.03 ng·mL^{-1}	[9]
ECL biosensor	OTB, AFB1, ZEN	10 – 10^{7} fg·mL^{-1}	3.19 fg·mL^{-1}	[10]
ECL aptasensor	AFB1, ZEN, FB1, DON, SEB	0.05 – 5 nM	0.012 nM (4.84 pg·mL^{-1})	[11]
ECL aptasensor	OTB, FB1, DON	5× 10^{-4} –50 ng·mL^{-1}	0.17 pg·mL^{-1}	[12]
Electrochemical aptasensor	OTA, AFB1, ZEN	0.05–10 ng·mL^{-1}	0.05 ng·mL^{-1}	[13]

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Table S2 Analytical results for the detection of OTA in corn and wine samples

Sample	Spiked OTA	Concentration determined (%, mean ±s, n=5)	Recovery (%, mean ±s, n=5)
corn	0	ND	
	10	9.83±0.016	101.2±2.8
	100	99.65±0.032	98.5±4.6
	1000	996.78±0.026	103.1±4.3
wine	0	ND	
	10	10.16±0.018	99.4±2.3
	100	98.92±0.029	98.7±2.9
	1000	998.46±0.031	103.8±5.2

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