

Supplementary information

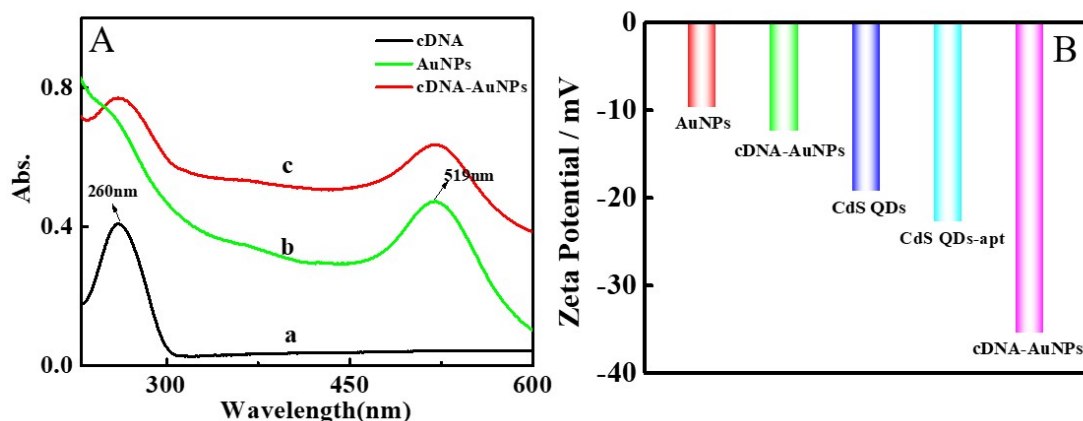


Fig S1. (A) UV-vis absorption spectra of (a) free cDNA, (b) AuNPs, (c) cDNA-AuNPs. (B) Zeta potential of CdS QDs, CdS QDs-apt, AuNPs and cDNA-AuNPs.

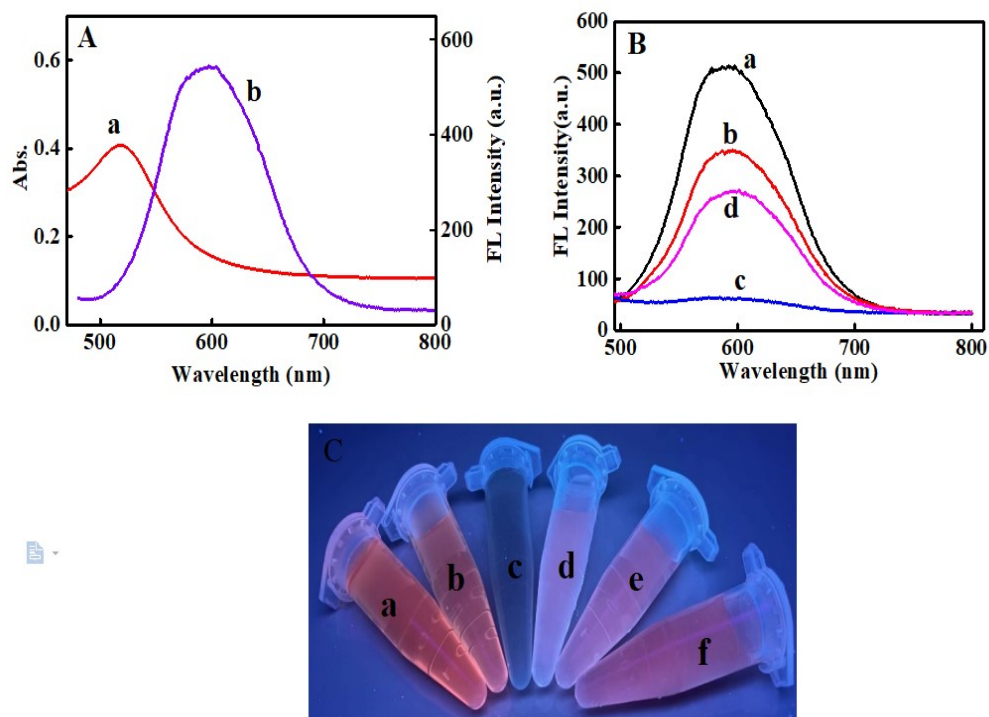


Fig S2. (A) UV-vis absorption spectrum of AuNPs (a) and fluorescence spectra of CdS QDs (b). (B) Fluorescence spectra of (a) CdS QDs (b) CdS QDs-AuNPs (c) CdS QDs-apt/cDNA-AuNPs (d) CdS QDs-apt/cDNA-AuNPs@TB. (C) Photographs of the luminescence in each step by shining a UV lamp (a) CdS QDs (b) CdS QDs-AuNPs (c) CdS QDs-apt/cDNA-AuNPs (d) CdS QDs-apt/cDNA-AuNPs@TB (1.35 nmol/L) (e) CdS QDs-apt/cDNA-AuNPs@TB (13.5 nmol/L) (f) CdS QDs-apt/cDNA-AuNPs@TB (27.0 nmol/L).

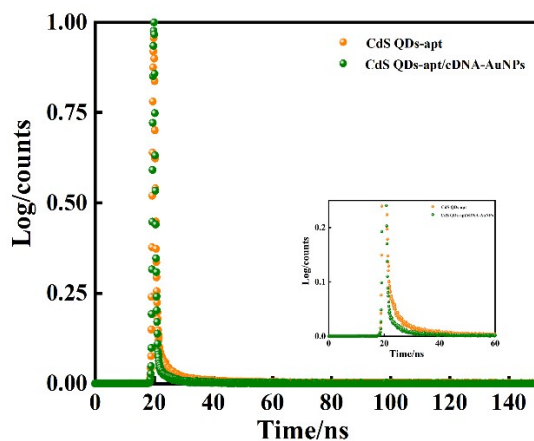
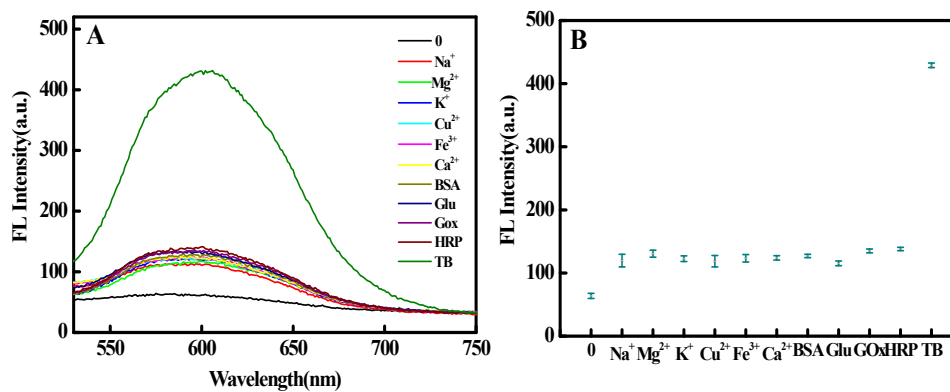


Fig. S3. The luminescence time decay resolution curves of CdS QDs-apt in the absence and presence of cDNA-AuNPs.

Table 1. Fluorescence emission lifetimes/ns (τ) and fractional amplitudes (A) of CdS QDs-apt in the absence and presence of cDNA-AuNPs.

Fluorescent material ($\lambda_{ex}=445$ nm)	lifetime τ /ns and fractional amplitudes (A)	Average life time/ns
CdS QDs-apt ($\lambda_{em}=593$ nm)	$\tau_1=0.48(72.46\%)$	$\tau_{avg}=3.82$
	$\tau_2=4.32(17.00\%)$	
	$\tau_3=25.97(10.55\%)$	
	$\chi^2=1.162$	
CdS QDs-apt/cDNA-AuNPs ($\lambda_{em}=593$ nm)	$\tau_1=0.38(88.72\%)$	$\tau_{avg}=1.63$
	$\tau_2=4.66(7.11\%)$	
	$\tau_3=23.03(4.17\%)$	
	$\chi^2=0.943$	



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g. S4. The fluorescence intensity of TB and interfering substances added to fluorescent probes. (B) The fluorescence intensity was measured in parallel for three times.