

Supporting information

A fluorescence active gold nanorod-quantum dots core-satellite nanostructure for sub-attomolar tumor marker biosensing

Table S1 Summary of limits of detection (LODs) for PSA via various methods.

Number	Method	LOD of PSA	Reference
1	Fluorescence probe	9.4fM	(Liu et al. 2013)
2	Nanocomposite immunosensor	17.6fM	(Dey et al. 2012)
3	Organic electrochemical transistor	29.4fM	(Kim et al. 2010)
4	Enzyme immunoassay	94.1pM	(Adel Ahmed and Azzazy 2013)
5	Immunosensing probe	0.22pM	(Wang et al. 2015)
6	Electrochemistry	2.94pM	(Chuah et al. 2012)
7	Plasmonic biosensor	0.12fM	(Liang et al. 2015)
8	Circular dichroism(CD)	0.015aM	(Wu et al. 2013)
9	Electrochemical immunosensor	0.16pM	(Yang et al. 2015)
10	SERS	0.96aM	(Xu et al. 2015)

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2 **Table S2** The PSA detection in human serum samples

Serum samples ^a	Original concentration(pM) ^b	Diluted concentration(aM) ^c	Detected concentration (aM) ^d
1	41.7	4.17	4.09±0.13
2	8.1	0.81	0.79±0.05
3	1.6	0.16	0.18±0.07

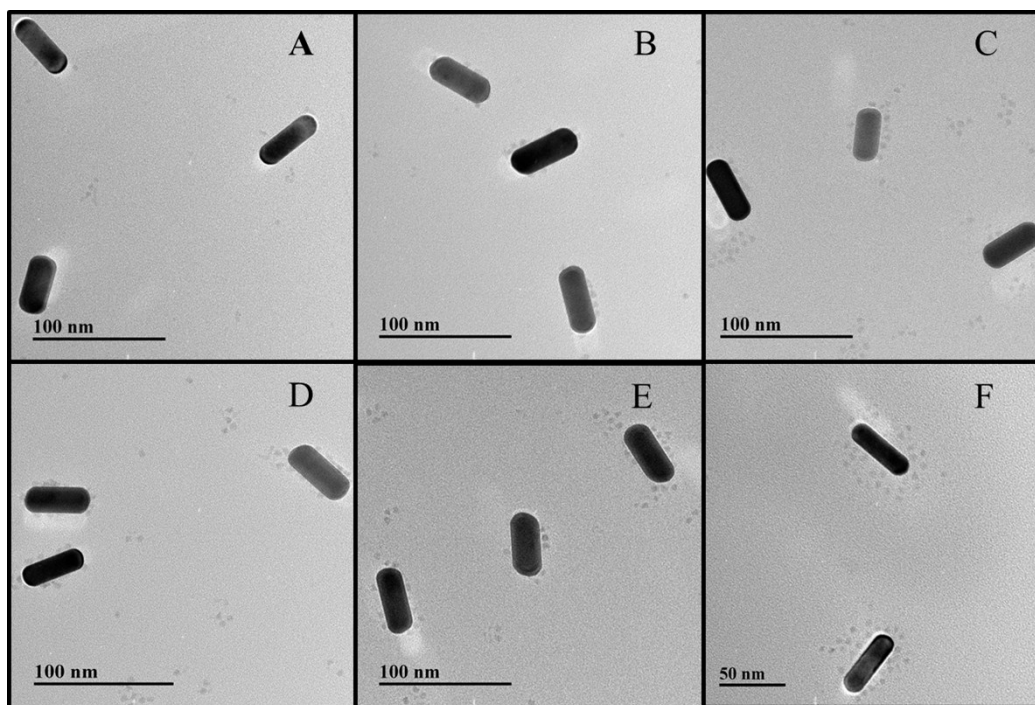
3 ^a Serum sample NO.1to NO.3 are human sera, which are sampling from four healthy
4 donors at the Second Hospital in Wuxi, China.

5 ^b Original concentrations of PSA in the sera were determined by the standard clinical
6 diagnostic assay (ADVIA Centaur, Siemens).

7 ^c Original serum samples were serially diluted and then stood for at least 2 h before
8 the determination.

9 ^d SD was calculated based on five parallel experiments for each sample.

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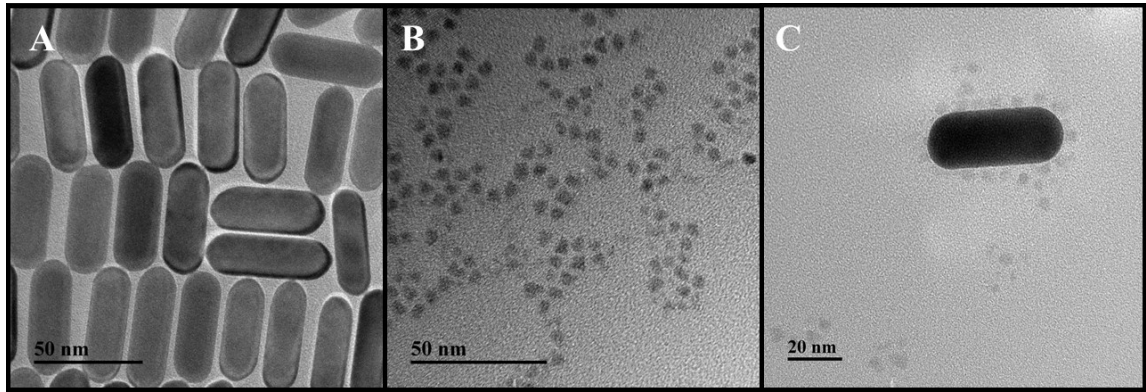


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2 **Fig. S1** Representative TEM images of Au NRs-QDs core-satellite assemblies for
3 different hybridization times, (A) 5 min, (B) 30 min, (C) 1h, (D) 3h, (E) 6h, and (F)
4 12 h.

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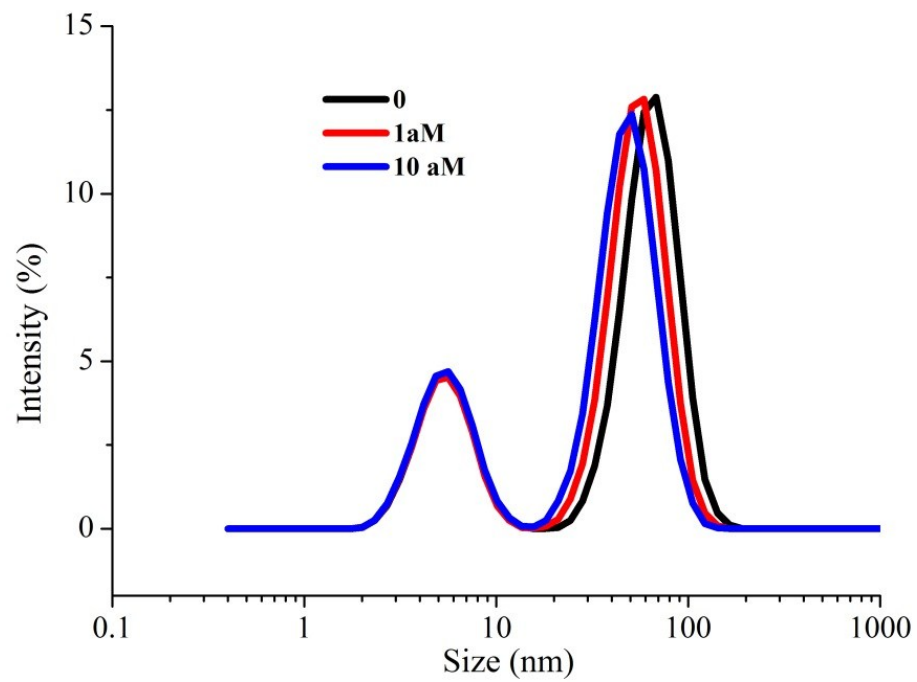


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2 **Fig. S2** Typical TEM images of AuNR (A), QDs (B) and core-satellite assembly (C).

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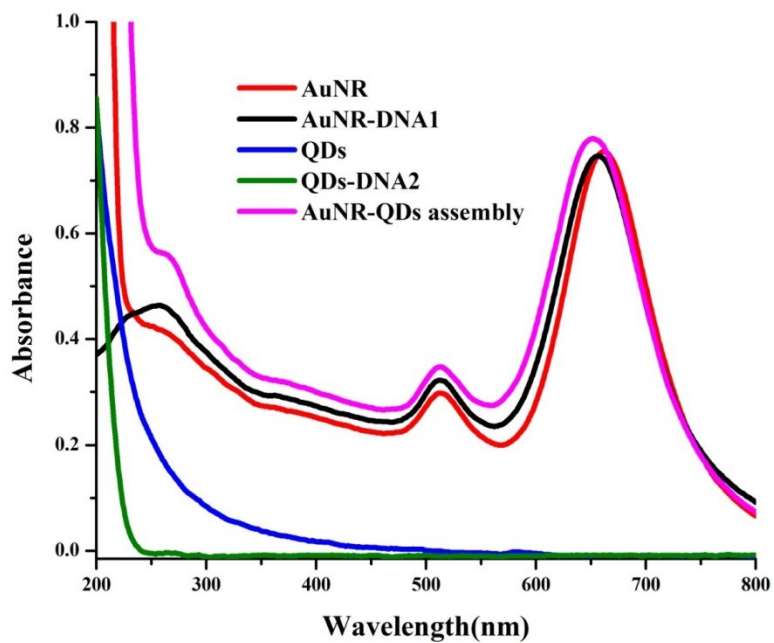
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6 **Fig. S3** DLS of Au NR-QDs core-satellite assemblies in suspension with the
7 addition of different concentration of PSA target.

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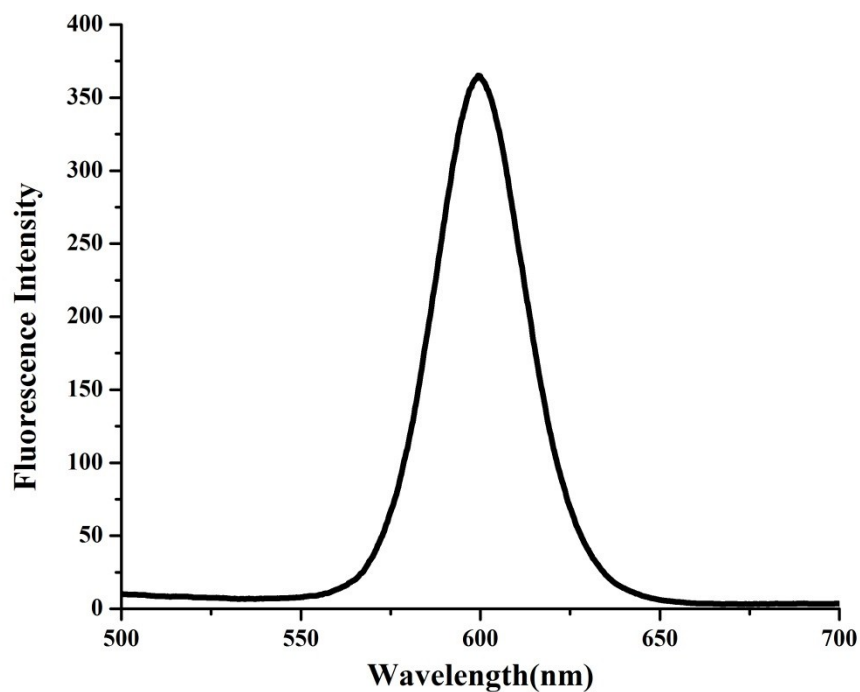
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2 **Fig. S4** UV-Vis spectra of AuNR, AuNR-DNA1, QDs, QDs-DNA2 and Au NR-
3 QDs core-satellite assemblies.

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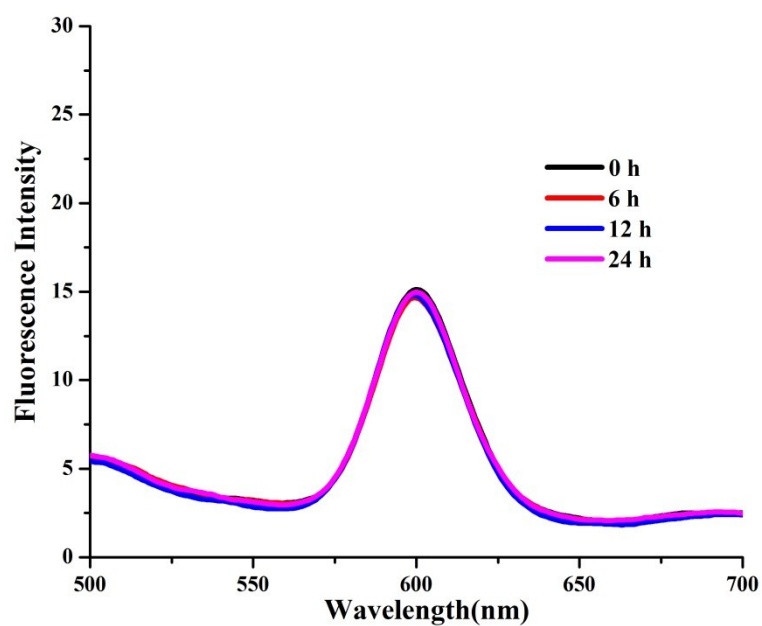
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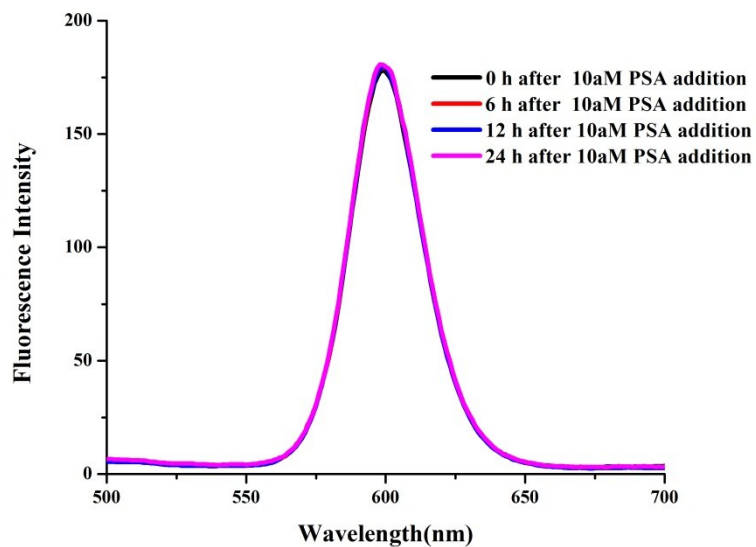
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Fig. S5 The emission spectrum of QDs.



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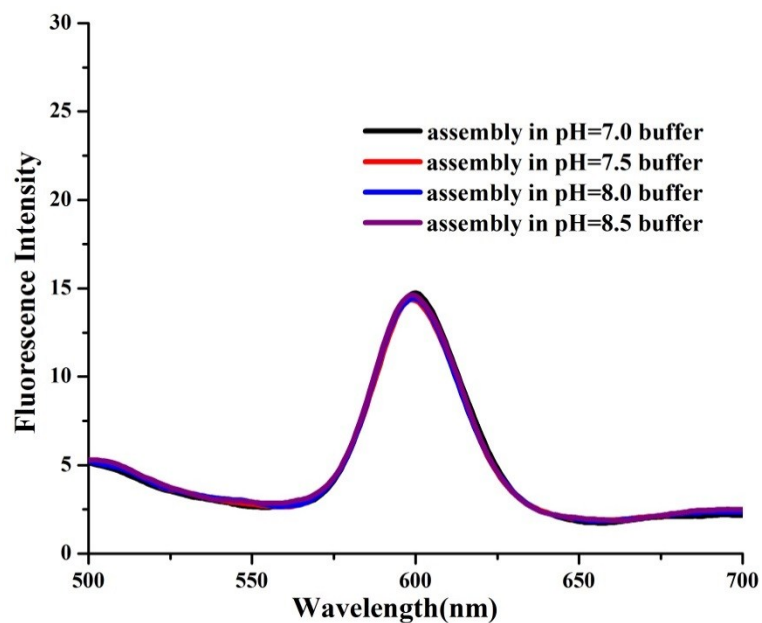
7 **Fig. S6** The fluorescence spectrum of the Au NR-QDs core-satellite assemblies in
8 suspension for different time with the absence of PSA target.



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2 **Fig. S7** The fluorescence spectrum of the Au NR-QDs core-satellite assemblies in
 3 suspension for different time with addition of 10 aM PSA target.

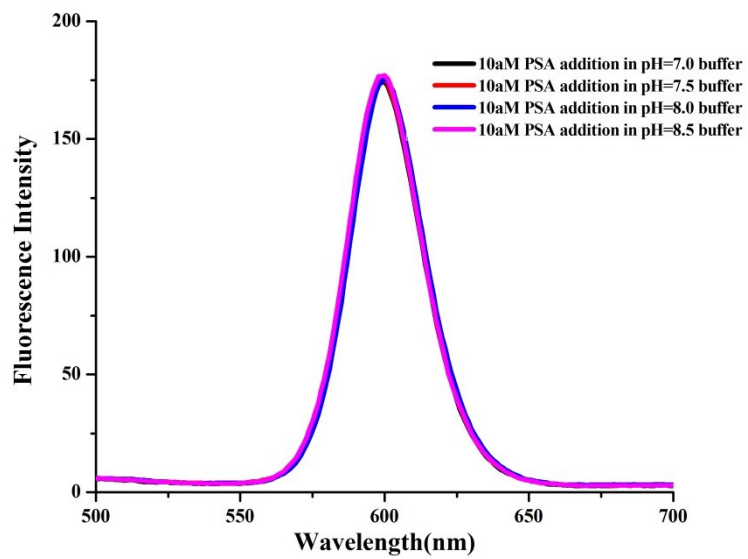
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6 **Fig. S8** The fluorescence spectrum of the Au NR-QDs core-satellite assemblies in
 7 suspension under different pH values with the absence of PSA target.

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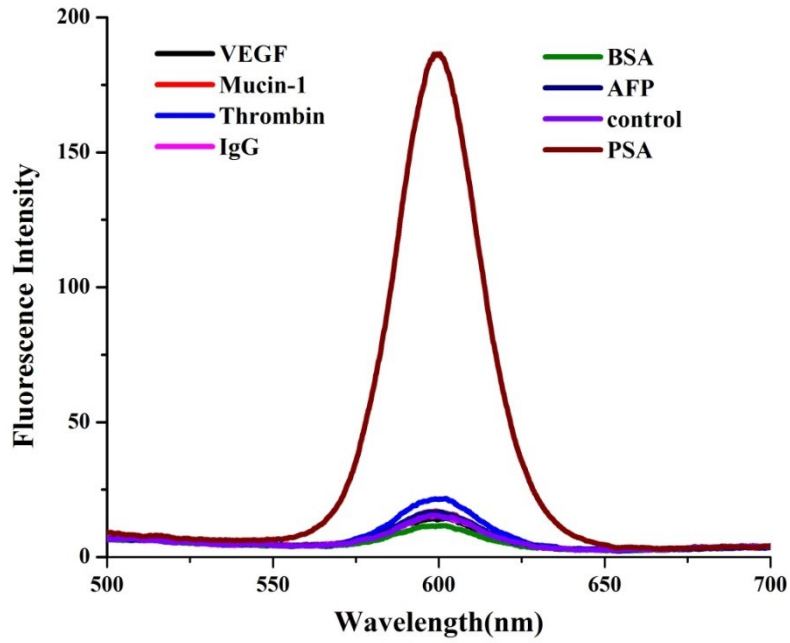


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2 **Fig. S9** The fluorescence spectrum of the Au NR-QDs core-satellite assemblies in
3 suspension under different pH values with addition of 10 aM PSA target.

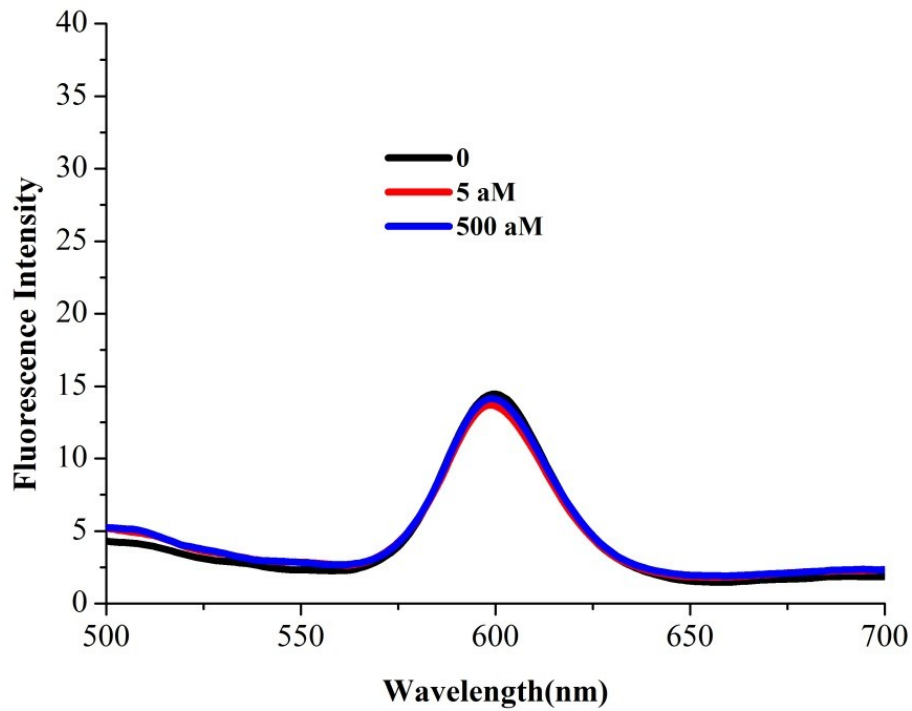
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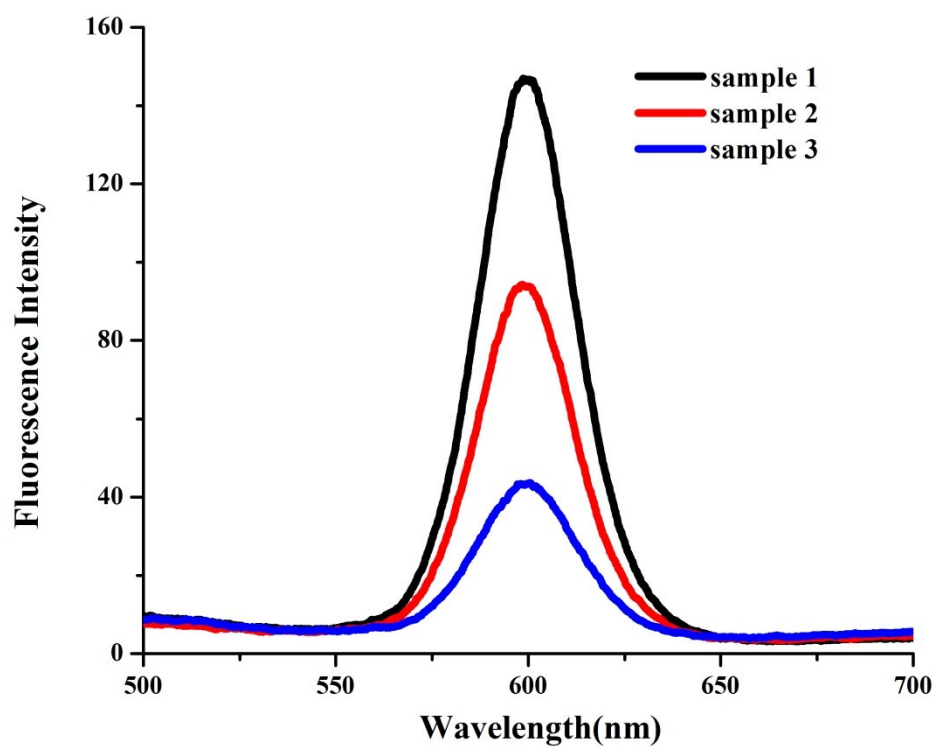
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Fig. S10 The fluorescence spectra of different targets addition.



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5 **Fig. S11** The fluorescence spectra of Au NR-QDs core-satellite assemblies for
6 different concentration of PSA target, where the Au NR-QDs core-satellite assemblies
7 were prepared using a DNA sequences that was not able to recognize the target PSA
8 protein.



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2 **Fig. S12** The fluorescence spectrum of the PSA detection in human serum samples.

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2 **Reference**

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