Electronic Supplementary Material (ESI) for Analytical Methods.

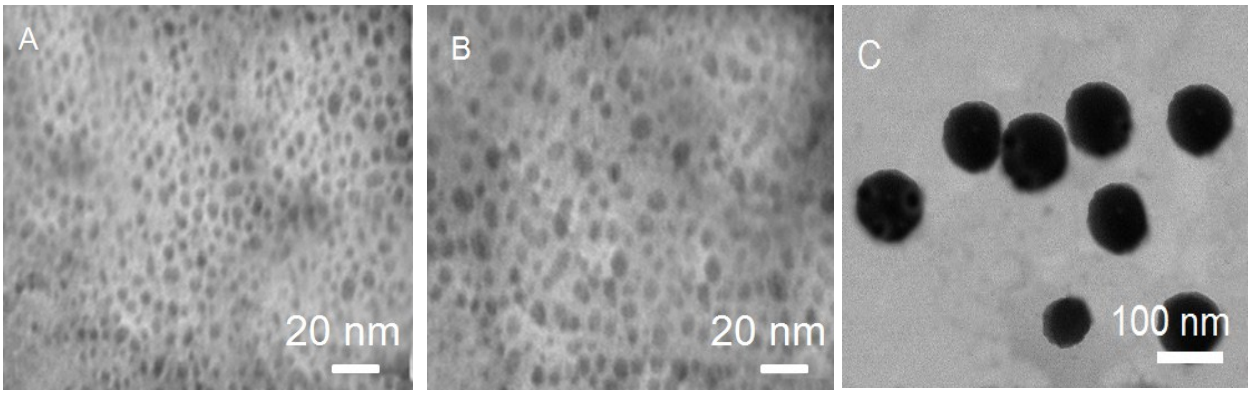

Figure S1. TEM image of ^{520}QDs (A), ^{625}QDs(B) and ^{520}QDs@SiO_2 (C).

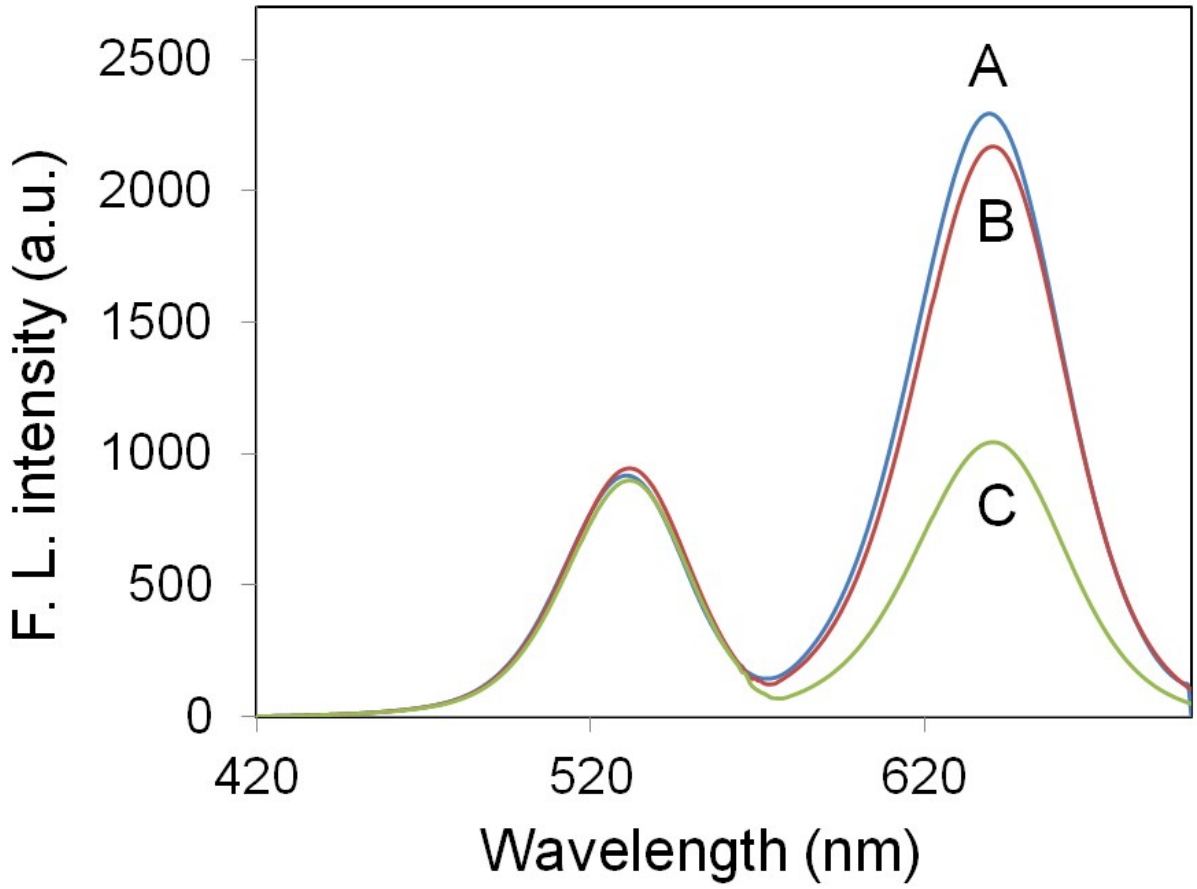

Figure S2. The fluorescence intensities of NIP coated QDs (A) and MIP-coated QDs after (B) and before (C).

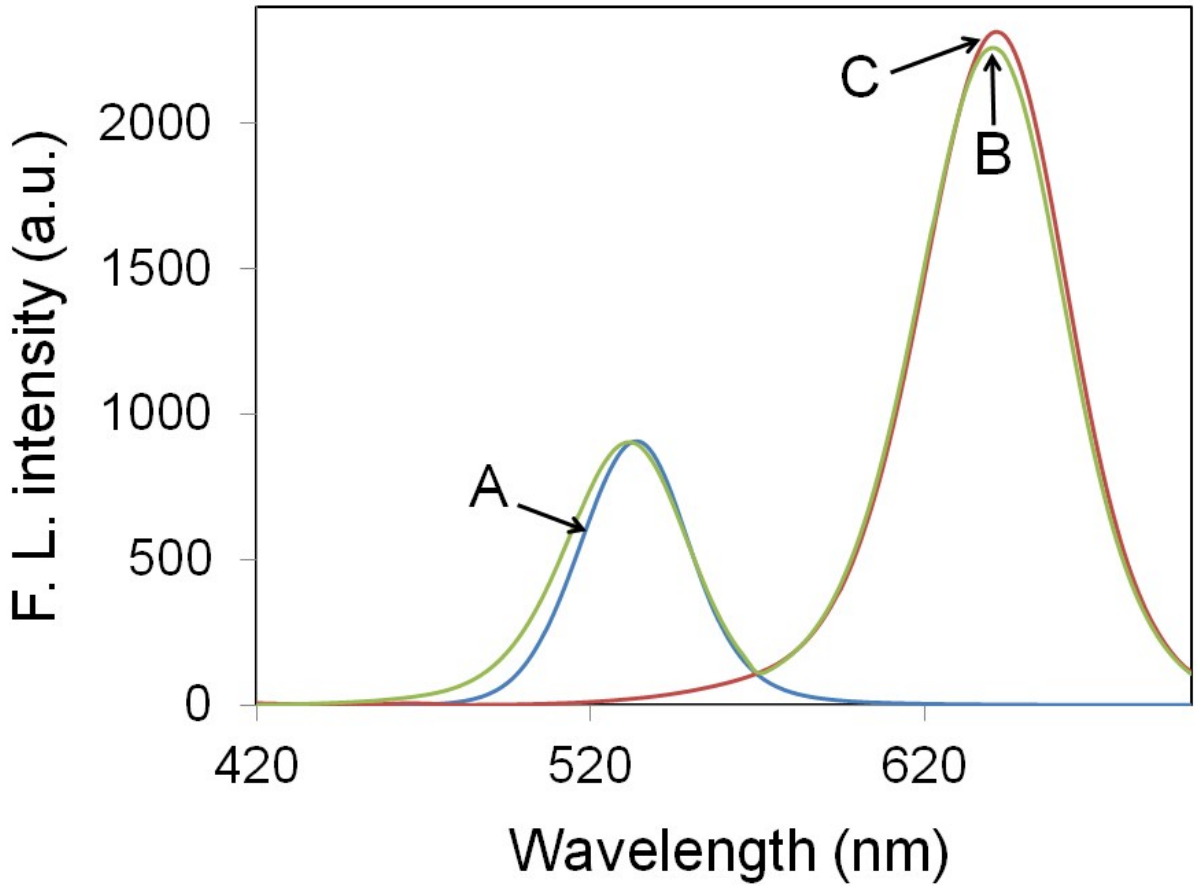

Figure S3. The fluorescence spectra of green emissive QDs (A), the ratiometric probe (B), and red emissive QDs@SiO_2 solutions (C) are determined.

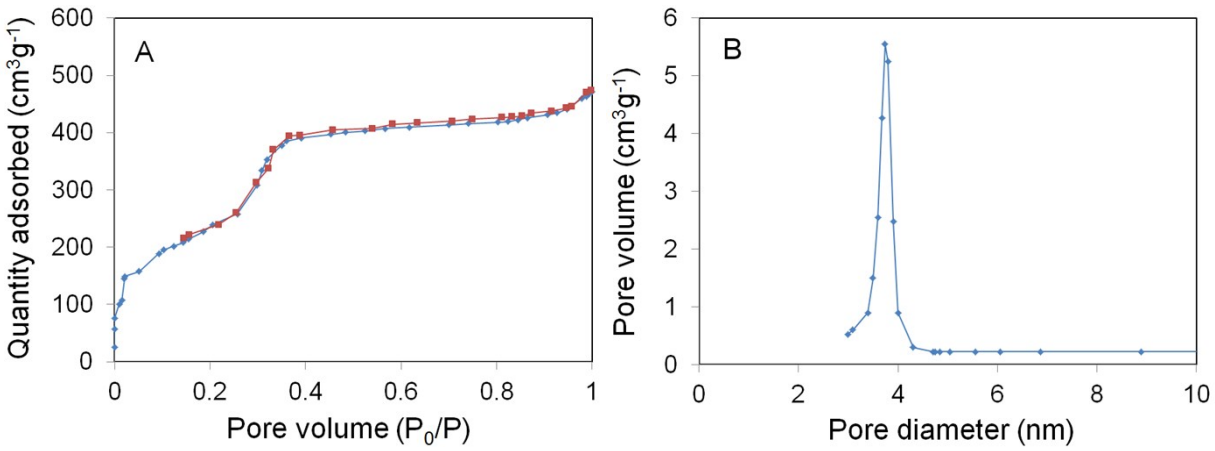

Figure 4S. N_2 adsorption–desorption isotherms (A) and pore size distribution (B) for QD@SiO_2@EMSiO_2.

Table 1S. Independent variables, their symbols and levels in central composite design (Evaluate the influence of time and temperature).

Factor	Symbol	Levels				
		-α	-1	0	+1	+α
Time	A	1.92	16	50	84	98.08
Tempreature	B	69.65	80	105	130	140.35

Table 2S. Design matrix (coded value of variables) and responses (the maximum fluorescence emission wavelength of the synthesized QDs).

Run	Block	A	B	Response
1	1	50.00	105.00	599.00
2	1	16.00	130.00	624.00
3	1	50	105.00	602.00
4	1	84.00	80.00	539.00
5	1	50	105.00	585.00
6	1	16.00	80.00	515.00
7	1	84.00	130.00	654.00
8	2	50	105.00	582.00
9	2	50	105.00	585.00
10	2	50	105.00	586.00
11	2	50	140.36	606.00
12	2	50.00	69.64	493.00
13	2	98.08	105.00	612.00
14	2	1.92	105.00	545.00

Table 3S. Analysis of variance (ANOVA) for quadratic response surface model (Evaluate the influence of time and temperature).

Source	Sum of Square	d.f[a]	Mean of Square	F-value	p-value, prob> F	Significance
Block	848.64	1	848.64			
Model	22943.97	5	4588.79	33.78	< 0.0001	significant
A	2765.91	1	2765.91	20.36	0.0028	
B	18413.39	1	18413.39	135.55	< 0.0001	
AB	9.00	1	9.00	0.066	0.8043	
A^2	6.21	1	6.21	0.046	0.8369	
B^2	1755.13	1	1755.13	12.92	0.0088	
Residual	950.89	7	135.84			
Lack of fit	777.56	3	259.19	5.98	0.0584	Not significant
Pure Error	173.33	4	43.33			
Core Total	24743.50	13				

Table 4S. The pH-dependent fluorescence intensity changes of QD@SiO_2@EMSiO_2 and non-imprinted QD@SiO_2@MSiO_2 by template pTyr.

pH	$(F_0\text{-}F/F)_{MIP}$[a]	$(F_0\text{-}F/F)_{NIP}$[a]	IF
4.0	0.0708 ±0.045	0.0201 ± 0.041	3.45
5.5	0.0662 ± 0.037	0.0180 ± 0.027	3.74
6.2	0.0746 ± 0.078	0.0175 ± 0.036	4.38
6.8	0.0771 ± 0.029	0.0160 ± 0.021	4.96
7.0	0.0878 ± 0.015	0.0162 ± 0.034	5.42
7.2	0.0758± 0.047	0.0141 ± 0.027	5.27
7.6	0.0570 ± 0.042	0.0112 ± 0.018	5.13
8.0	0.0404 ± 0.050	0.0085 ± 0.036	4.72

[a] Mean ± std, n=5

Table 5S. The stability investigation of the QD@SiO_2@E$MSiO_2$ probe toward time.

Time (min)	F. L. intensity (a.u.)[a]
0	2295.34 ±3.9
2	2204.53 ±2.5
4	2187.93 ±3.7
6	2134.8 ±1.9
8	2078.89 ±4.5
10	2060.42 ±2.8
12	2060.12 ±2.6
14	2060.02 ±3.4
16	2059.84 ±1.6
18	2059.49 ±4.2
20	2059.09 ±3.8

[a] Mean ± std, n=5

Table 6S. The stability investigation of the QD@SiO_2@E$MSiO_2$ probe during a week.

Time (day)	F. L. intensity (a.u.)[a]
1	2295.34 ±3.7
2	2295.12 ±4.8
3	2294.54 ±2.9
4	2294.25 ±5.6
5	2293.43 ±4.5
6	2293.12 ±5.2
7	2293.10 ±3.6

[a] Mean ± std, n=5

Table 7S. The effect of amount of composite on quenching efficiency.

Amount of composite (mg)	F_0-F[a]
30	1804.45 ± 3.6
40	1745.89 ± 5.7
50	2066.44 ± 4.8
60	1548.93 ± 3.5

[a] Mean ± std, n=5

Table 8S. Comparison of the obtained fluorescence emission wavelength value and that predicted by the experimental design

Fluorescence Emission Wavelength Value		RSD (%) [c]
Predicted Value [a] (nm)	Experimental Value [b] (nm)	
540	520 ± 3.5	-3.70
630	625 ± 2.7	-0.79

[a] Prediction ± 95 % confidence interval

[b] Mean ± std, n=5

[c] Relative deviation of the QY obtained value regarding the QY predicted value by the experimental design.

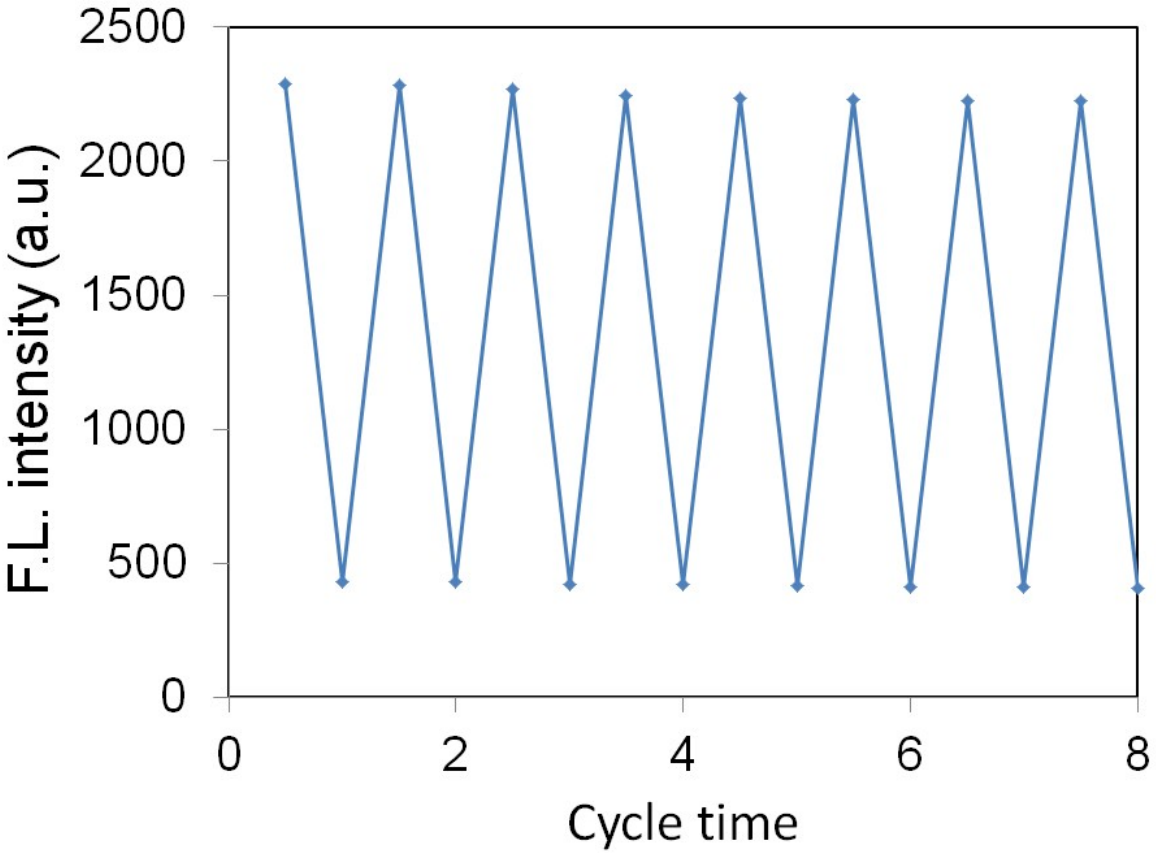

Figure S5. Reusability of QDs@SiO_2@EMSiO_2 for detection of pTyr.