Electronic Supplementary Material

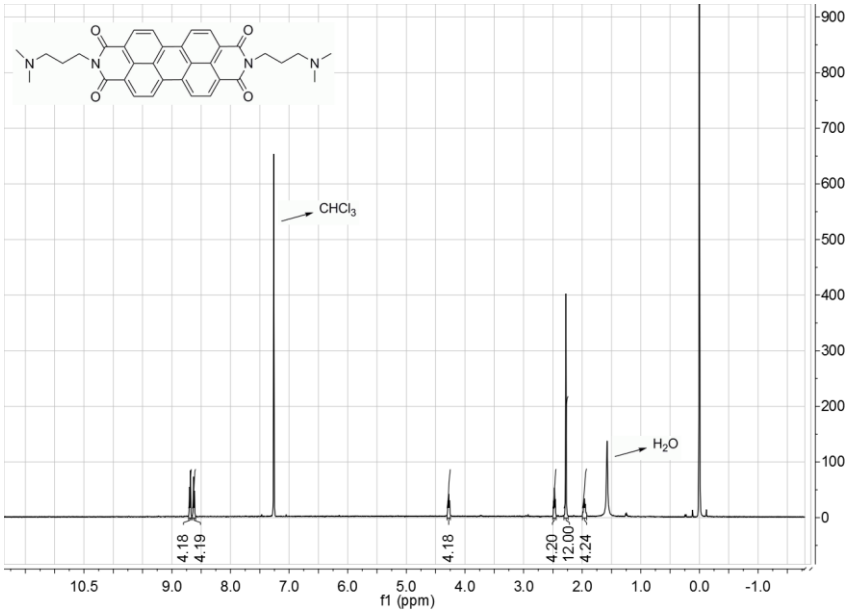
Aptamer-based spectrofluorometry for cellular prion protein using N, N'-bis[3,3'-(dimethylamino) propylamine]-3,4,9,10-perylenetetracarboxylic diimide

Lei Zhan, [a] Li Jiao Liang, [a] Shu Jun Zhen, [a] Chun Mei Li, [a] Cheng Zhi Huang [a, b,*]

[a]*Education Ministry Key Laboratory on Luminescence and Real-Time Analysis, College of Chemistry and Chemical Engineering, and* [b]*College of Pharmaceutical Sciences, Southwest University, Chongqing 400715, P R China*

Figure S1.

The ^{1}HNMR of N, N'-bis [3, 3'-(dimethylamino)propylamine] - 3, 4, 9, 10-perylenetetracarboxylicdiimide



^{1}H NMR (500 MHz, $CDCl_3$) δ 8.69 (d, *J* = 7.9 Hz, 4H, CH), 8.62 (d, *J* = 8.1 Hz, 4H, CH), 4.25–4.30 (m, 4H, CH_2), 2.47 (t, *J* = 7.1 Hz, 4H, CH_2), 2.28 (s, 12H, CH_3), 1.92– 2.00 (m, 4H, CH_2).

Figure S2.

Effect of buffer E solution on the fluorescence of DAPER alone and the DAPER/aptamer conjugates at different dilute times (Blank: without buffer E solution; a-g: buffer E solution diluted 5, 20, 80, 320, 1280, 5120, 9250 times respectively). Aptamer, 30 nmol/L; DAPER, 0.24 μmol/L; PrP^C, 2 nmol/L; pH, 6.25. The incubation time is 5 min.

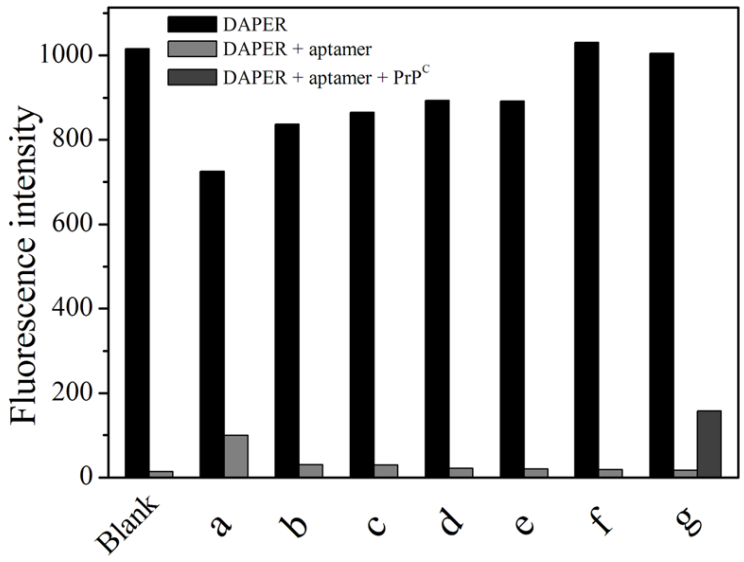


Figure S3.

Fluorescence emission spectra of 0.24 μmol/L DAPER in the presence of different amounts of aptamer (a-h: 0, 10, 15, 20, 25, 30, 35, 40 nmol/L) in MES buffer (pH 6.25). Inset: fluorescent intensity ratio (F/F_0, where F_0 and F correspond to the fluorescence intensity before and after addition of ssDNA) of DAPER upon addition of aptamer at different concentrations.

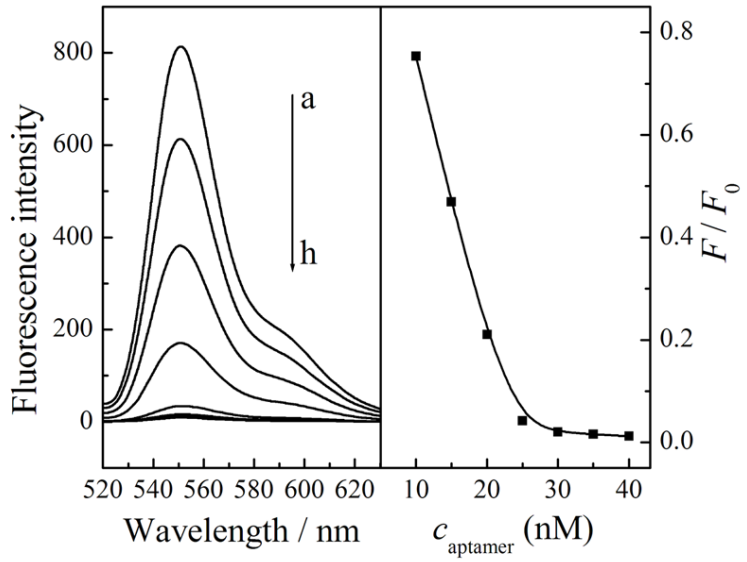


Figure S4.
Kinetics of the interaction of DAPER/aptamer conjugates with different concentrations of PrP^C (0.8, 1.4, 1.8 nmol/L). For each measurement, the cell was filled with 250 μl the MES buffer solution containing DAPER and aptamer, then different concentrations was introduced into the cell. The transition between each regime is marked an arrow.

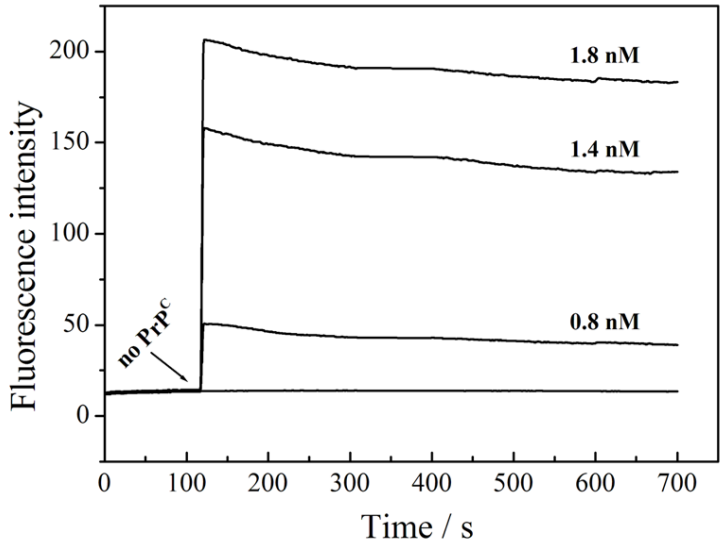


Figure S5.
Effect of the NaCl on the fluorescence of DAPER alone, and aptamer/DAPER conjugates without or with PrP^C in MES buffer (20 mmol/L, pH 6.25). The concentration of the PrP^C aptamer, PrP^C and DAPER were 30 nmol/L, 1.4 nmol/L，0.24 μmol/L, respectively.

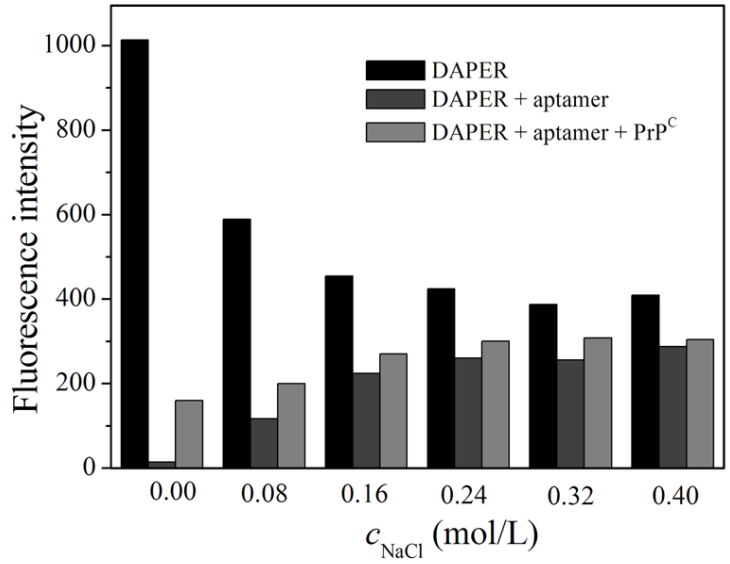


Table S1.

Oligonucleotides studied in the specificity investigation

Name	Sequence	Bases number
Oli-1	5’ - TTA TAG CGG AGG AAG GTA -3’	18
Oli-2	5’ - GTA ATT TAA CTG TGA T -3’	16
Oli-3	5’ - AAC GGT ACG TAG ACT G -3’	16
Oli-4	5’ - CCA CAA CCA CAA CAC ACA -3’	18
Oli-5	5’ - TAT AGC GGA GGA AGG T -3’	16
Oli-6	5’ - GCA ATT TAA ATG TGA T-3’	16
Oli-7	5’ - GAA ATT TAA CTG TGA T-3’	16

Table S2.

Fluorescence lifetimes (τ_t) obtained from the fluorescence decay curves of DAPER at different situation

Sample [a]	$\tau_1/\times10^{-10}$s	$\tau_2/\times10^{-9}$s	A_2/A_1
DAPER		4.05	
DAPER + aptamer	3.14	4.07	4.26
DAPER + aptamer + PrP^C	2.47	4.09	8.77

[a] Aptamer, 30 nmol/L; DAPER, 0.24 μmol/L; PrP^C, 2 nmol/L; pH, 6.25. The incubation time is 5 min.

Figure S6.

Polyacrylic acid (A) and polymethacrylic acid (B) induced compound DAPER aggregation and fluorescence quenching. The concentration of polyacrylic acid was increased from 0 to 4.7 nmol/L and concentration of polymethacrylic acid was increased from 0 to 109 nmol/L. DAPER concentration: 0.24 μmol/L.

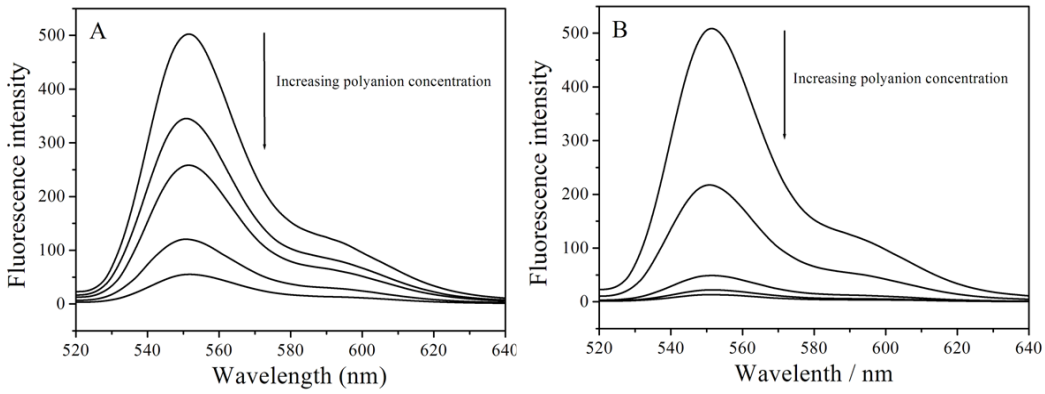


Figure S7.

Investigation of the quenching effect of the nucleic acid bases on the fluorescence intensity of DAPER. a: DAPER only; b: DAPER + aptamer; c: DAPER + nuclease; d: DAPER + Zn^{2+}; e: DAPER + aptamer digested with nuclease S1 (+ 2 mmol/L Zn^{2+}). DAPER: 0.24 μmol/L; aptamer: 30 nmol/L. ssDNA aptamer was digested with 100 U of nuclease S1 for two hours at 37 °C and then mixed with DAPER and the emission spectrum was measured.