Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Sensitive fluorescence "turn-on" detection of bleomycin based on a superquenched perylene–DNA complex

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Experimental section

Synthesis of PDI

Cationic perylene diimide derivative (PDI) was synthesized following the literature procedure. [1] Briefly, under nitrogen atmosphere, a mixture of perylene tetracarboxylic dianhydride (1.0 g, 2.42 mmol) and N, N-Dimethyl-1, 3-propanediamine (5 mL, 39.3 mmol) in 50 mL of isobutanol was stirred at 90 °C overnight. After filtering, the solid was washed twice with water and ethanol. The unreacted perylene tetracarboxylic dianhydride was then removed from the crude product by treating with 5% aqueous NaOH solution at 90 °C for 1 h. After filtering, washing with triply distilled water and ethanol, and drying under vacuum, 1.1 g of N, N-bis (propylenedimethylamine)-3, 4, 9, 10-perylenediimide was obtained as a red solid. It was added together with 1.5 mL of methyl iodide (24.1 mmol) to 50 mL of toluene, and heat to reflux for 3 h under nitrogen. The mixture was slowly brought to room temperature, and then filtered and washed with cool ether to give an iodide of compound 1 as a brown-red solid. The nitrate of compound 1 was further prepared by treating it with silver nitrate. It was characterized using NMR and MS analytical spectroscopic techniques (data not shown), and the results agree well with the previously reported data.[1]

Supplementary Figures

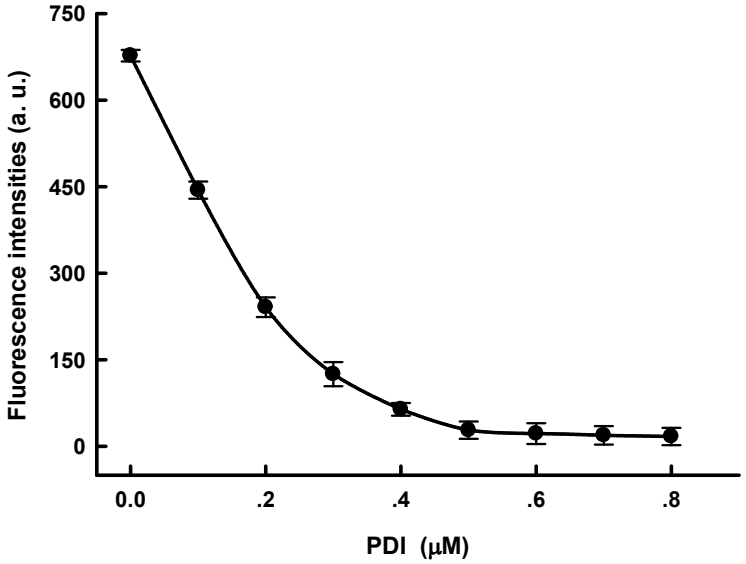

Fig. S1 The effect of different concentration of PDI on the fluorescence response of F-ssDNA. Error bars were estimated from three replicate measurements.

Table S1 Comparison of the assay performance of various methods for BLM detection

Detection method	Total Time	LOD	Linear range	References
Electrochemical detection	6.5 h	0.1 nM	0.1 nM～1 μM	2
Colorimetric assay using unmodified gold nanoparticles	7.5 min	2 nM	2 nM～150 nM	3
Fluorescent method based on exonuclease III-aided recycling amplification	40 min	0. 38 pM	0.001 nM～10 nM	4
Fluorescent method using DNA-templated silver nanoclusters	60 min	54 nM	100 nM～700 nM	5
Fluorescent method based on graphene oxide-DNA complex	30 min	0.2 nM	5 nM～1 μM	6
Fluorescent assay using WS_2 nanosheet-based platform	23 min	0.3 nM	0.5 nM～1 μM	7
Fluorescent method based on DNA–perylene complex	40 min	0.2 nM	0.5 nM～100 nM	This work

References

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