Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Study on the interaction of berberine with nucleic acid in presence of silver nanoparticles and the fluorometric determination of nucleic acids

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Effect of pH and the Choice of Buffer Solution

The effect of solution pH on the fluorescence intensity of the system is shown in Fig. S1. It can be seen that *ΔI* value reaches the maximum and remains constant in the pH range of 6.7-7.1, so pH 7.0 is used for subsequent work. Experimental results indicated that different kinds of buffers had diverse effects on the *ΔI* of the system. The *ΔI* for H_2O, barbital sodium-HCl, hexamethylenetetramine-HCl, potassium hydrogen phthalate-NaOH and citric acid-K2HPO4 and Briton-Robinson were 93.3, 61.6, 70.0, 39.7, 35.0 and 74.1, respectively. The results indicated that H_2O was the most suitable medium.

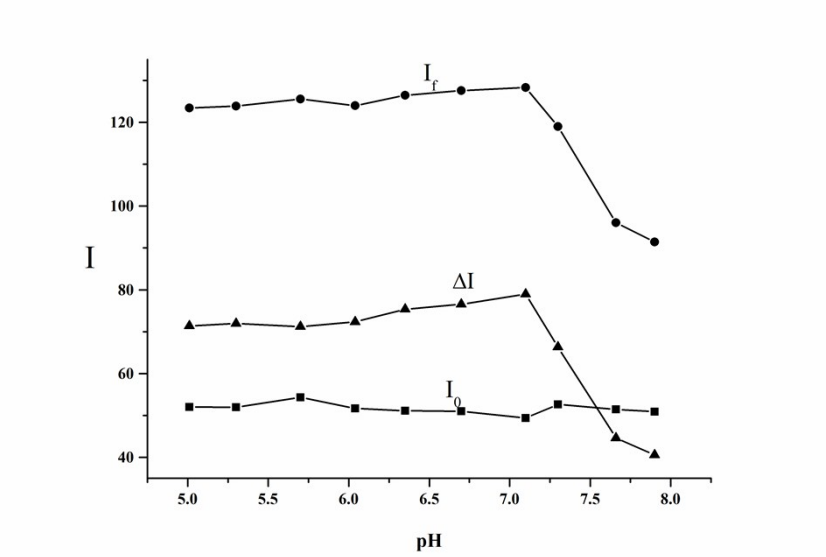


Fig. S1 Effect of pH. Conditions: AgNPs: 3.2×10^{-7} g mL^{-1}; BER: 8.0×10^{-6} mol L^{-1}; ctDNA: 1.0×10^{-6} g mL^{-1}.

Effect of AgNPs concentration

The influence of AgNPs concentration on the fluorescence intensity of the system is shown in Fig. S2. It can be seen in Fig. S2 that Δ*I* of the system remains the maximum and basically constant when the concentration of AgNPs is above 1.6×10^{-7} g mL^{-1}. In this paper, 3.2×10^{-7} g mL^{-1} AgNPs is chosen for further experiment.

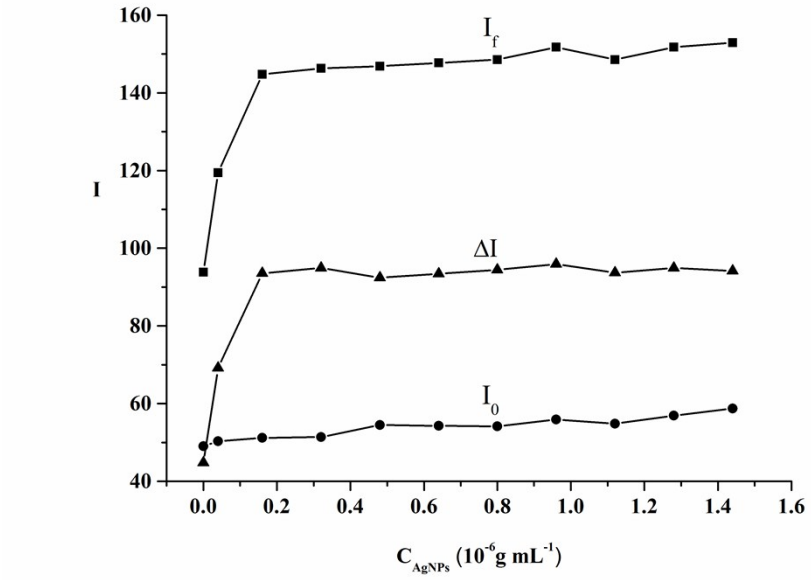


Fig. S2 Effect of AgNPs. Conditions: BER: 8.0×10^{-6} mol L^{-1}; ctDNA: 1.0×10^{-6} g mL^{-1}.

Effect of BER concentration

Figure S3 shows the effect of the BER concentration on the fluorescence intensities of the systems. With the increasing of BER concentration, the fluorescence intensities of ctDNA and AgNPs-ctDNA were gradually enhanced. Whereas, Δ*I* value of the AgNPs-ctDNA-BER system reached a maximum when the concentration of BER was 8.0×10^{-6} mol L^{-1}, so it was chosen for the further experiment.

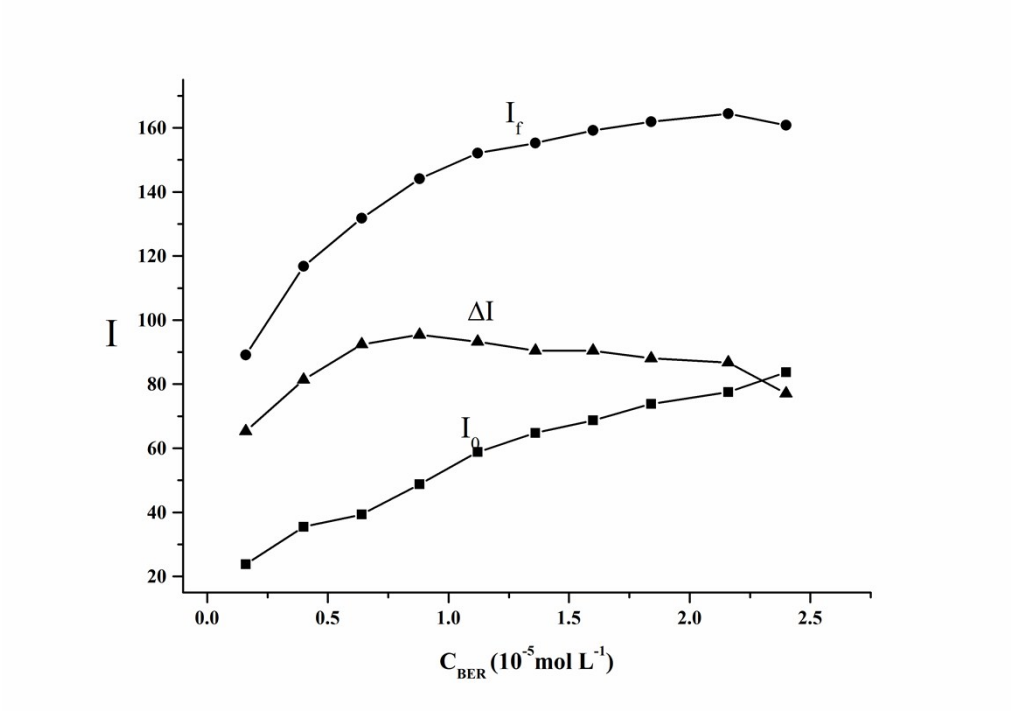


Fig. S3 Effect of BER. Conditions: AgNPs: 3.2×10^{-7} g mL^{-1}; ctDNA: 1.0×10^{-6} g mL^{-1}.

Calibration graphs

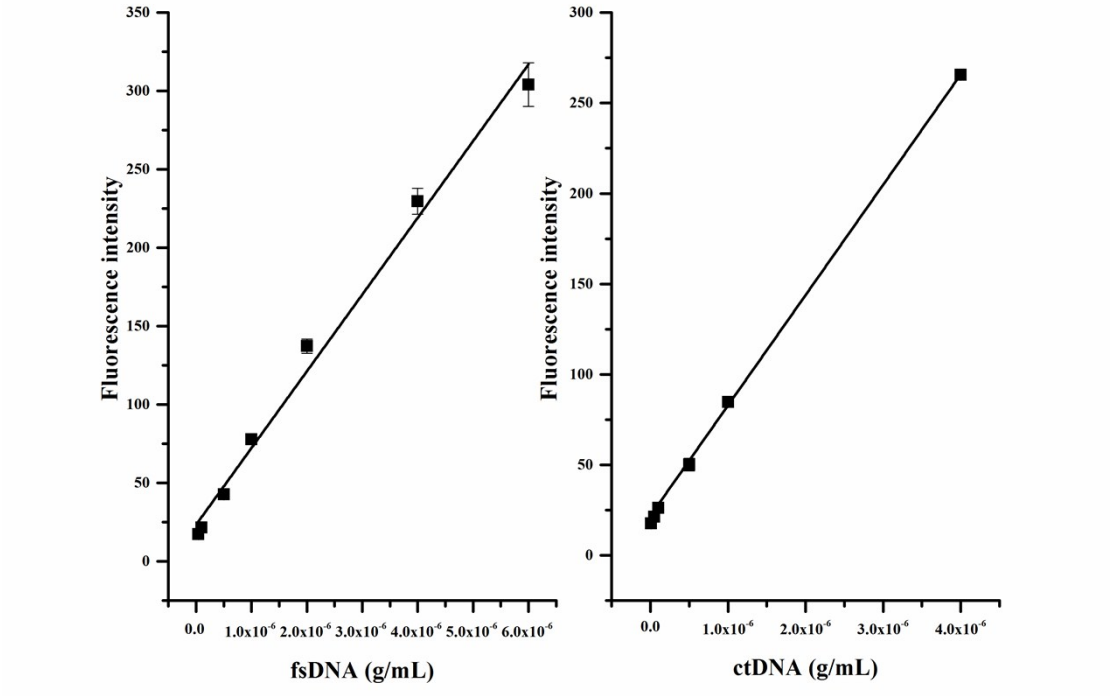
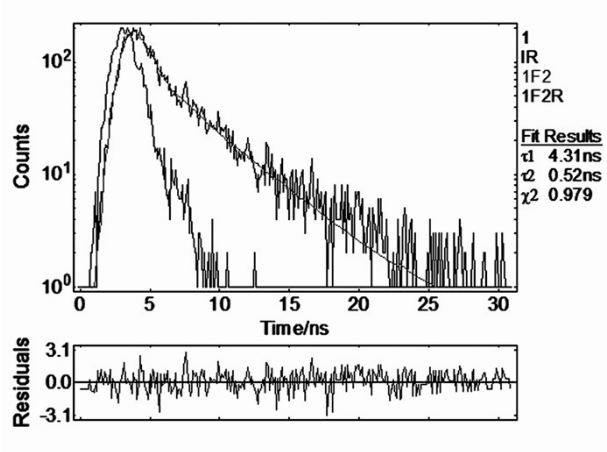
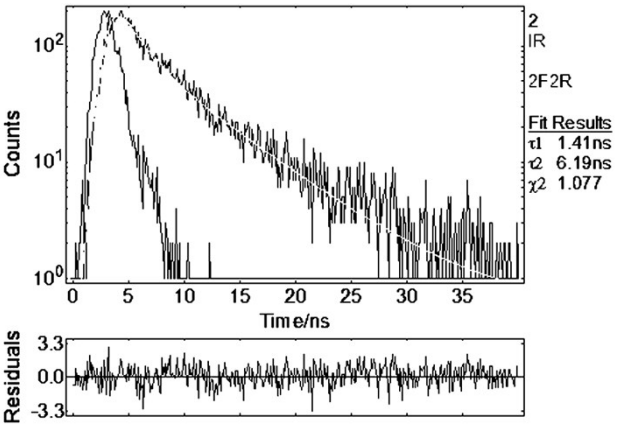


Fig. S4 Calibration curves. Conditions: BER: 8.0×10^{-6} mol L^{-1}; AgNPs: 3.2×10^{-7} g mL^{-1}.

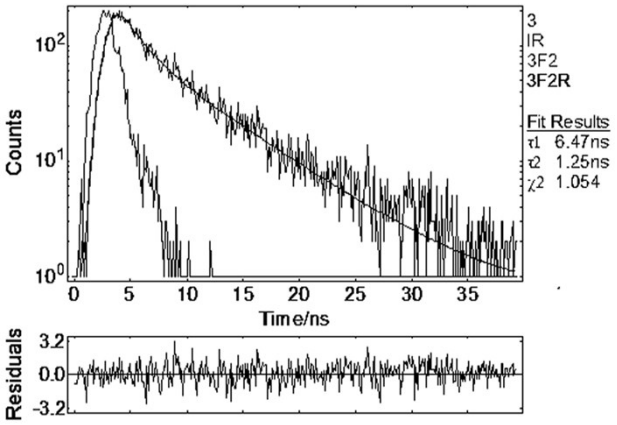
The fluorescence lifetime decay curves



(a) The fluorescence lifetime decay curve of BER



(b) The fluorescence lifetime decay curve of BER-ctDNA



(c) The fluorescence lifetime decay curve of AgNPs-BER-ctDNA

Fig. S5 The fluorescence lifetime decay curves of the system. Conditions: AgNPs: 3.2×10^{-6} g mL^{-1}; BER: 8.0×10^{-5} mol L^{-1}; ctDNA: 1.0×10^{-5} g mL^{-1}.