Electronic Supplementary Information

Immobilising hairpin DNA-conjugated distyryl boron dipyrromethene on gold@polydopamine core-shell nanorods for microRNA detection and microRNA-mediated photodynamic therapy

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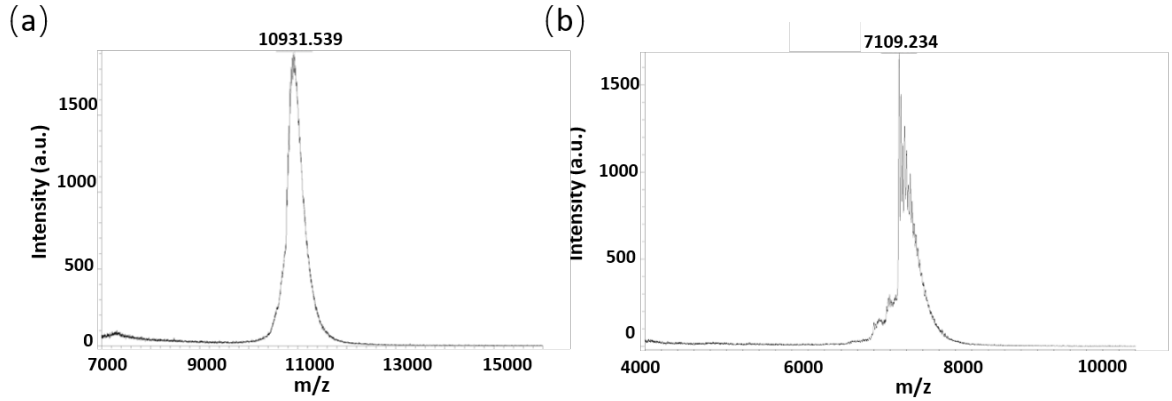

Oligonucleotide **4**: 5'-CCGGGTTCAACATCAGTCTGATAAGCTAACCCGG-alkyne-3'
Oligonucleotide **5**: 5'-CATTAATGTCGGACAACTCAAT-alkyne-3'

Fig. S1 MALDI-TOF mass spectra of oligonucleotides (a) **4** and (b) **5**.

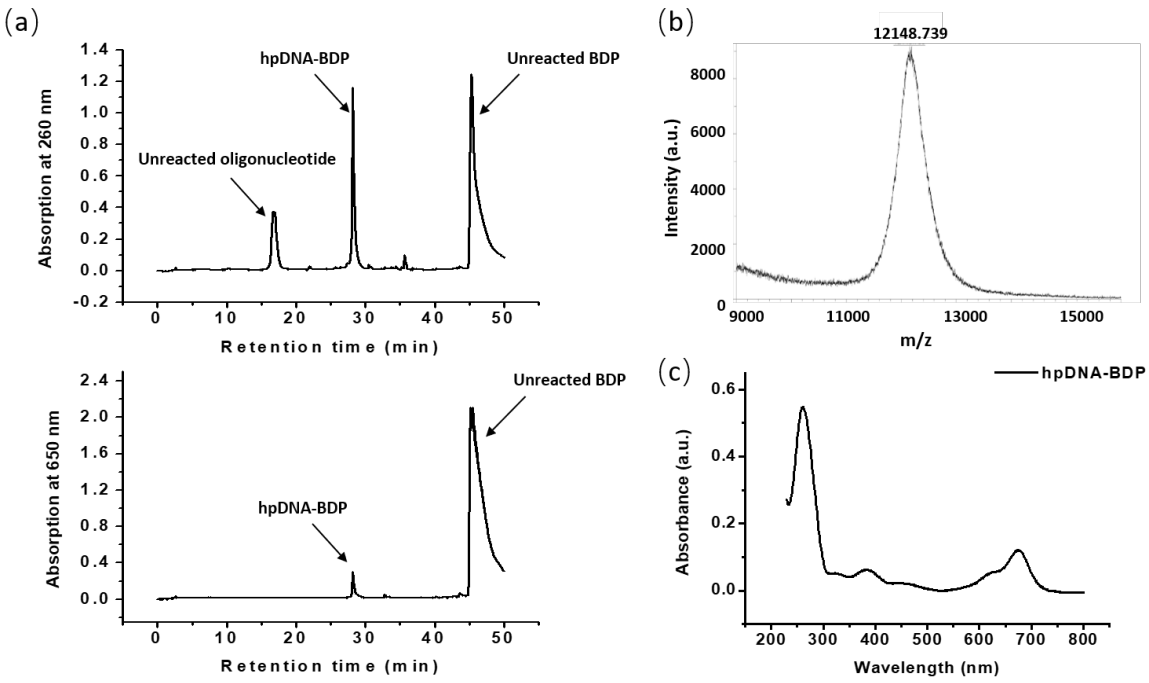

Fig. S2 (a) HPLC chromatograms of the reaction mixture of DSBDP **3** and hpDNA **4** monitored at two different channels. (b) MALDI-TOF mass spectrum and (c) UV-Vis spectrum (in PBS) of hpDNA-DSBDP **6**.

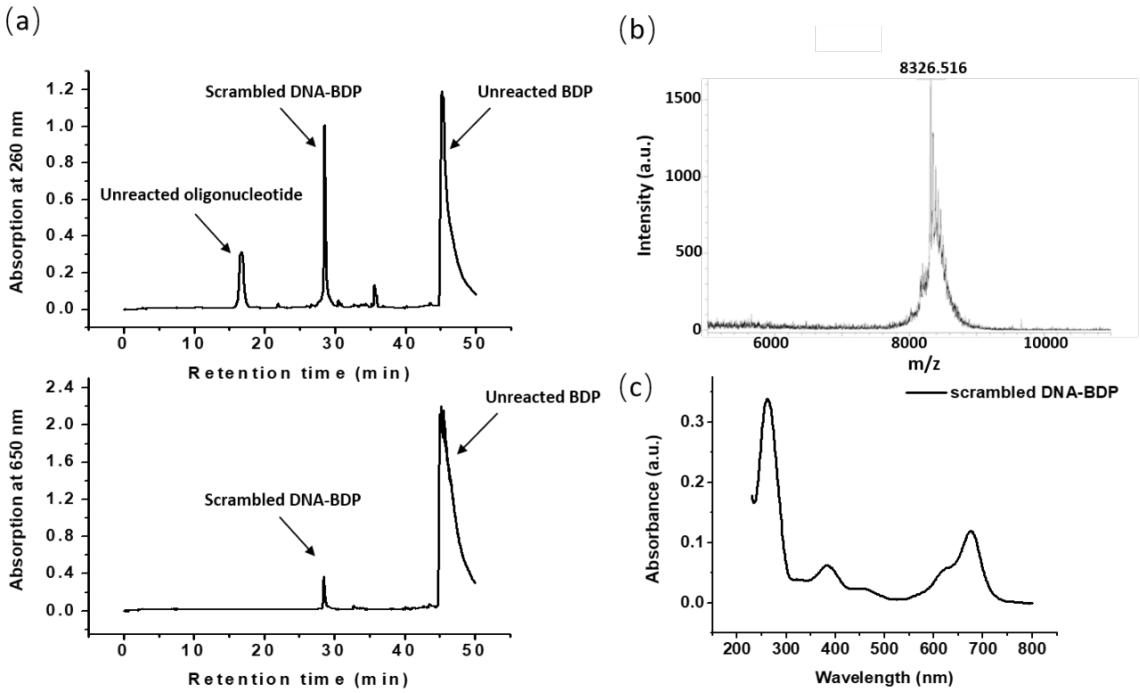

Fig. S3 (a) HPLC chromatograms of the reaction mixture of DSBDP **3** and DNA **5** monitored at two different channels. (b) MALDI-TOF mass spectrum and (c) UV-Vis spectrum (in PBS) of DNA-DSBDP **7**.

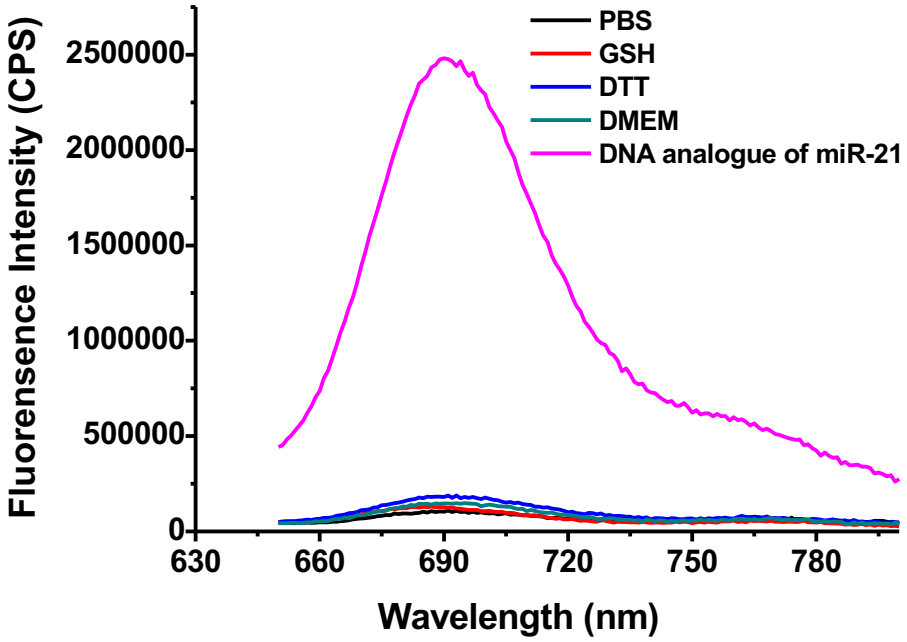

Fig. S4 Fluorescence spectra (λ_{ex} = 610 nm) of AuNR@PDA-hpDNA-DSBDP6 (1 nM) after incubation under various conditions at 37 °C for 8 h: in PBS (pH 7.4), in PBS with 1 mM glutathione (GSH), in PBS with 1 mM dithiothreitol (DTT), in DMEM and in PBS with 400 nM of a DNA analogue of miR-21.

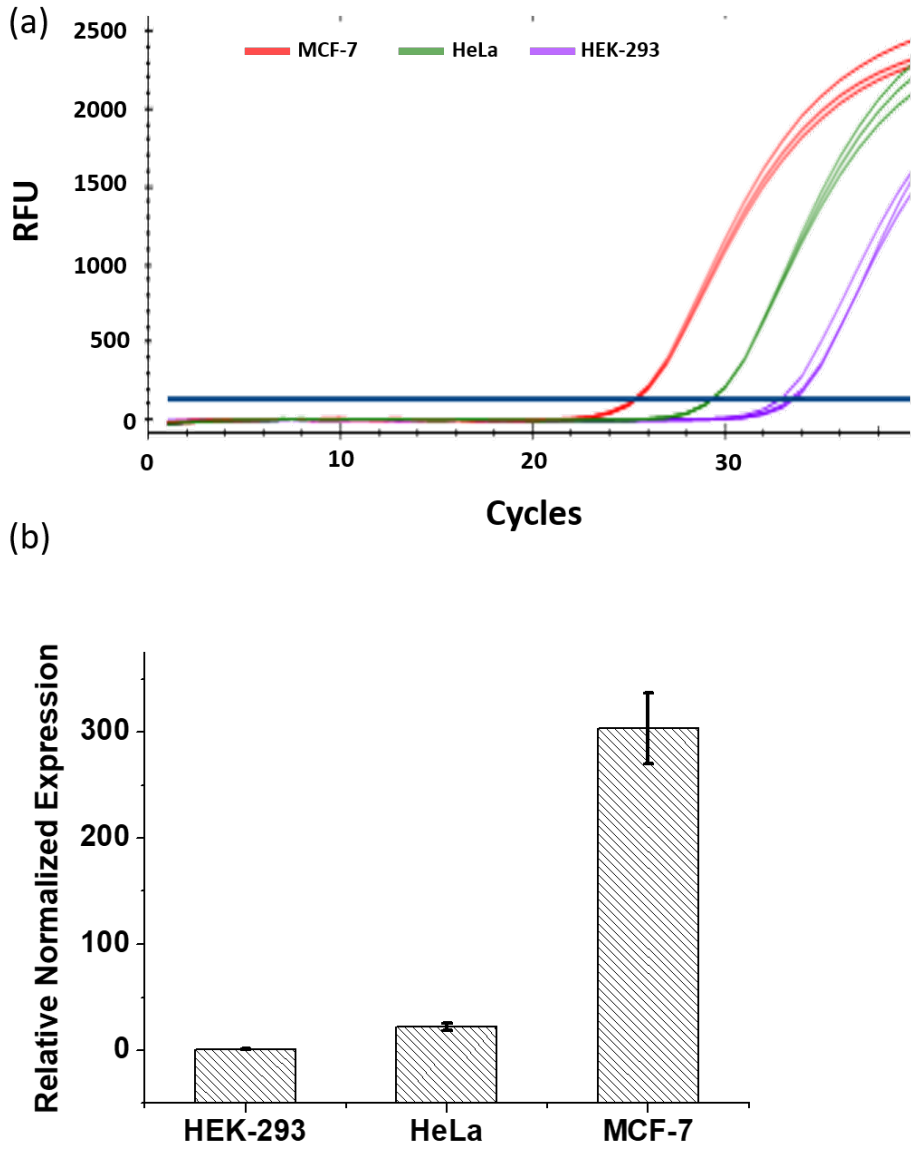

Fig. S5 qRT-PCR results for miR-21 expression levels in MCF-7, HeLa and HEK-293 cells. (a) Relative fluorescence units (RFU) by qRT-PCR. (b) Quantitative expression levels of miR-21 in the three cell lines. Data in Fig. S5b were obtained from 3 independent measurements and are presented as the mean ± SD.

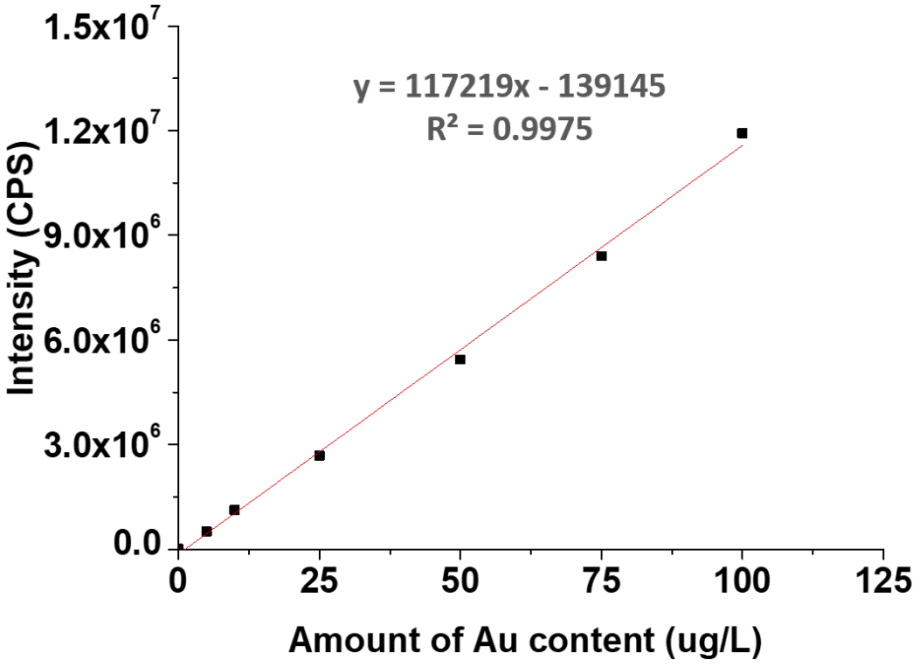

Fig. S6 Calibration curve obtained from the ICP-MS measurements of standard solutions of gold with different concentrations.

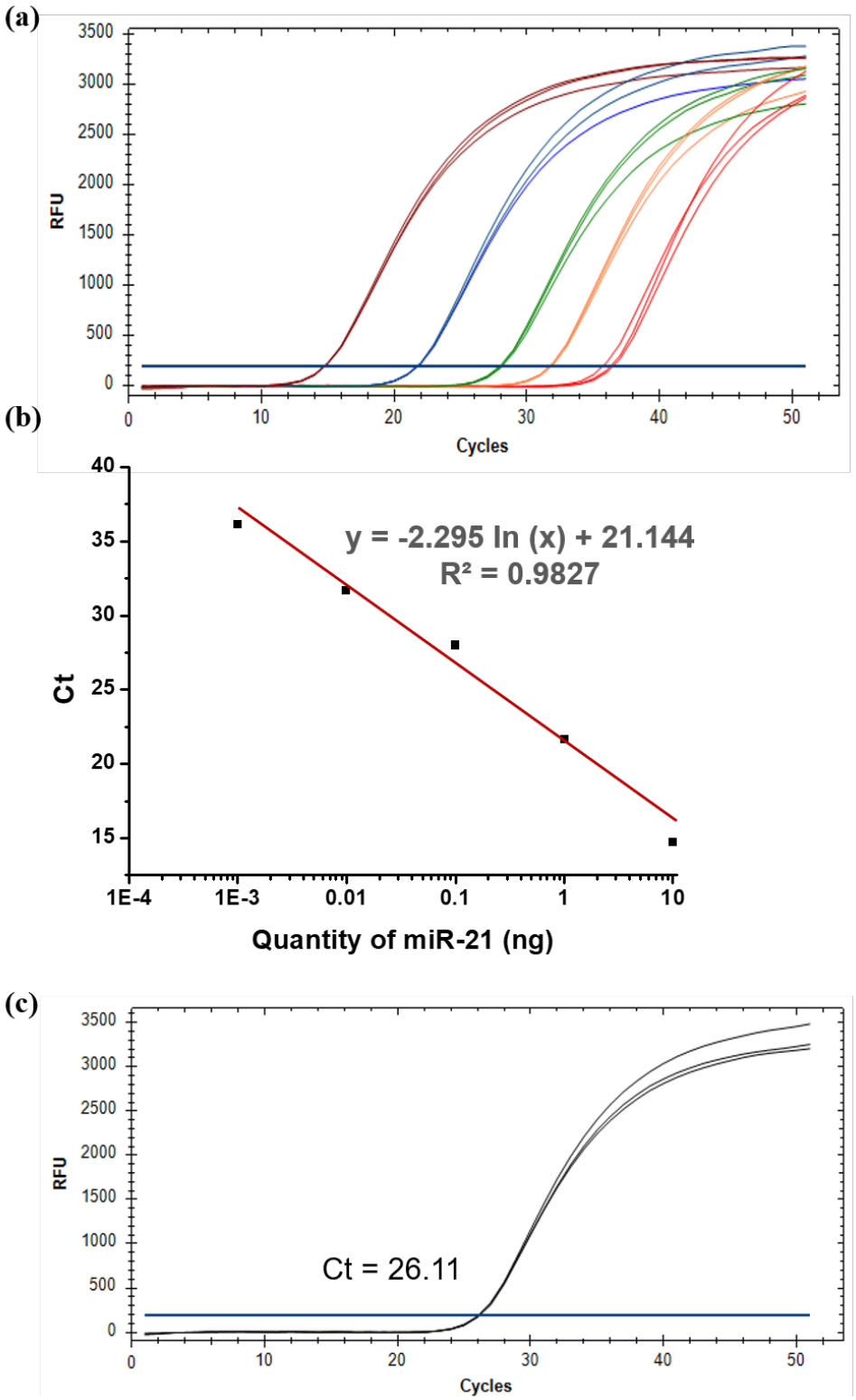

Fig. S7 (a) Amplification plot of synthetic miR-21 over five orders of magnitude. Synthetic miR-21 input ranges from 1×10^{-3} ng to 1×10^{1} ng in PCR. (b) Standard curve of miR-21. (c) qRT-PCR quantification of miR-21 in HeLa cells.

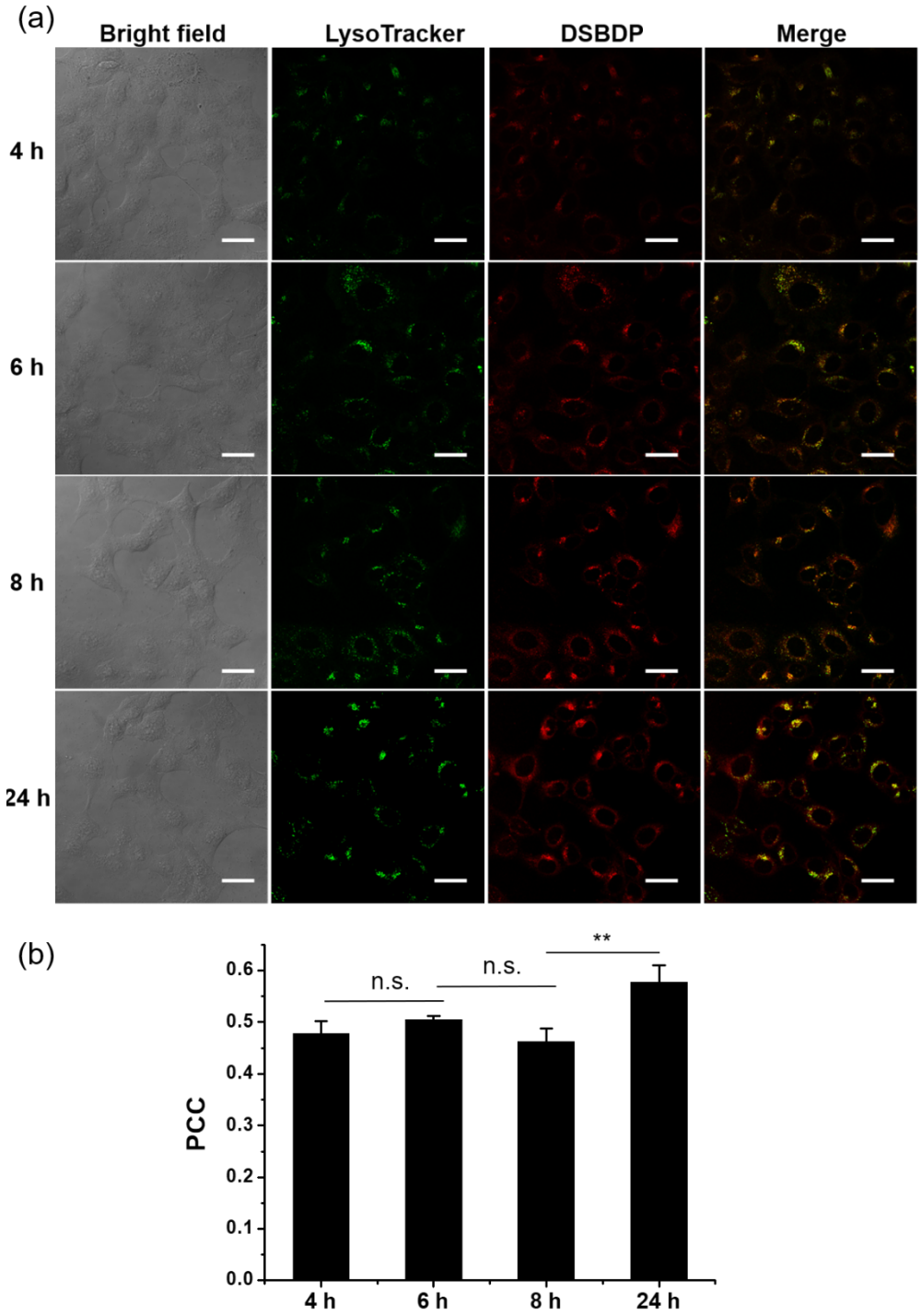

Fig. S8 (a) Confocal images of HeLa cells that were incubated with AuNR@PDA-hpDNA-DSBDP6 (0.2 nM) (red) for different time intervals. Lysosomes were stained with LysoTracker Green (75 nM) (green) (scale bar: 25 μm). (b) Pearson's correlation coefficient (PCC) values at different time points. Data were obtained from 3 independent measurements and are presented as mean ± SD. n.s., not significant; $^{**}p < 0.01$.

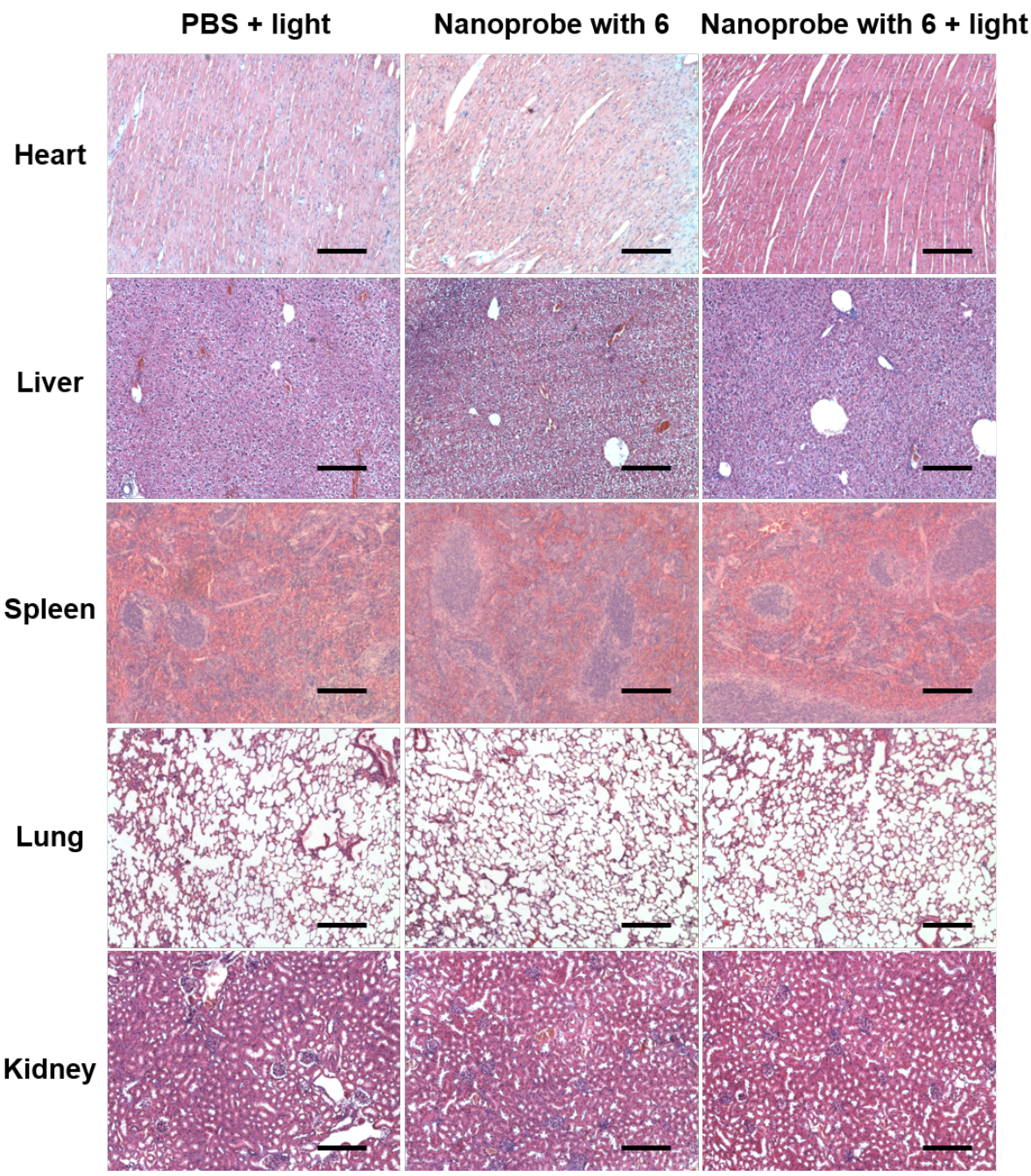

Fig. S9 H&E staining images indicate the integrity of major organs dissected from the tumour-bearing mice after different treatments (scale bar: 200 μm).

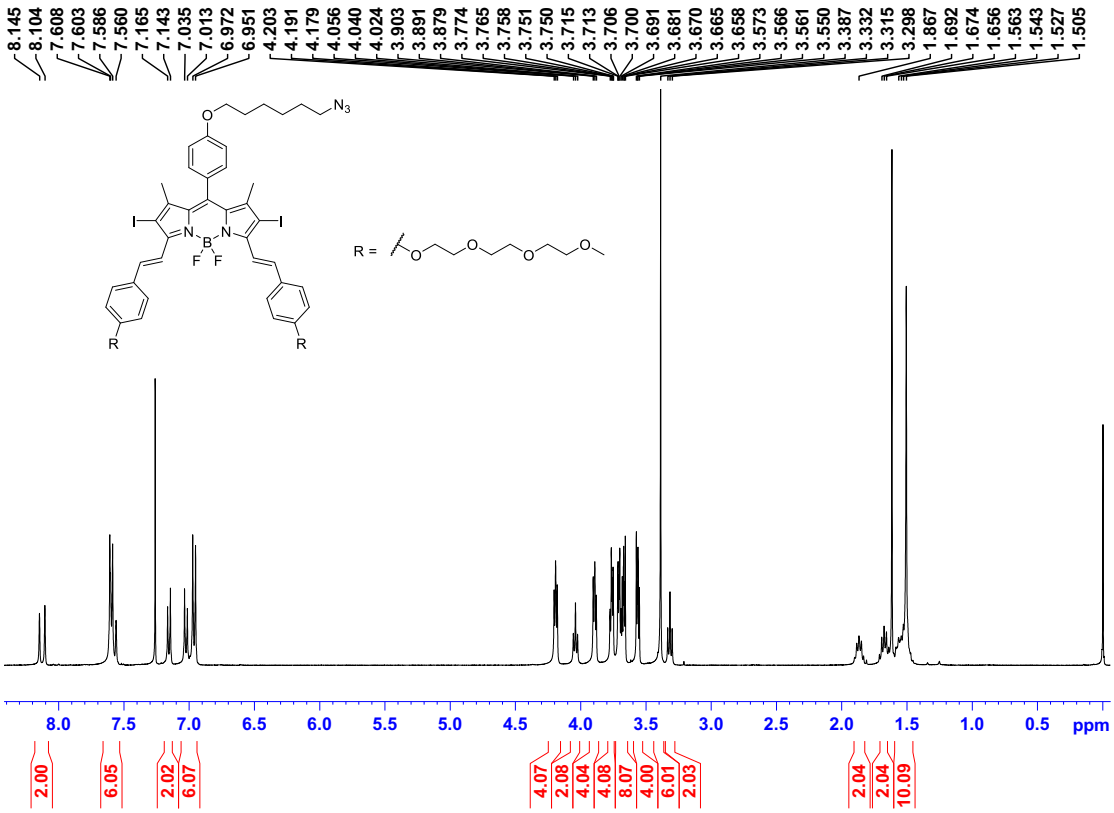

Fig. S10 ^{1}H NMR spectrum of **3** in $CDCl_3$.

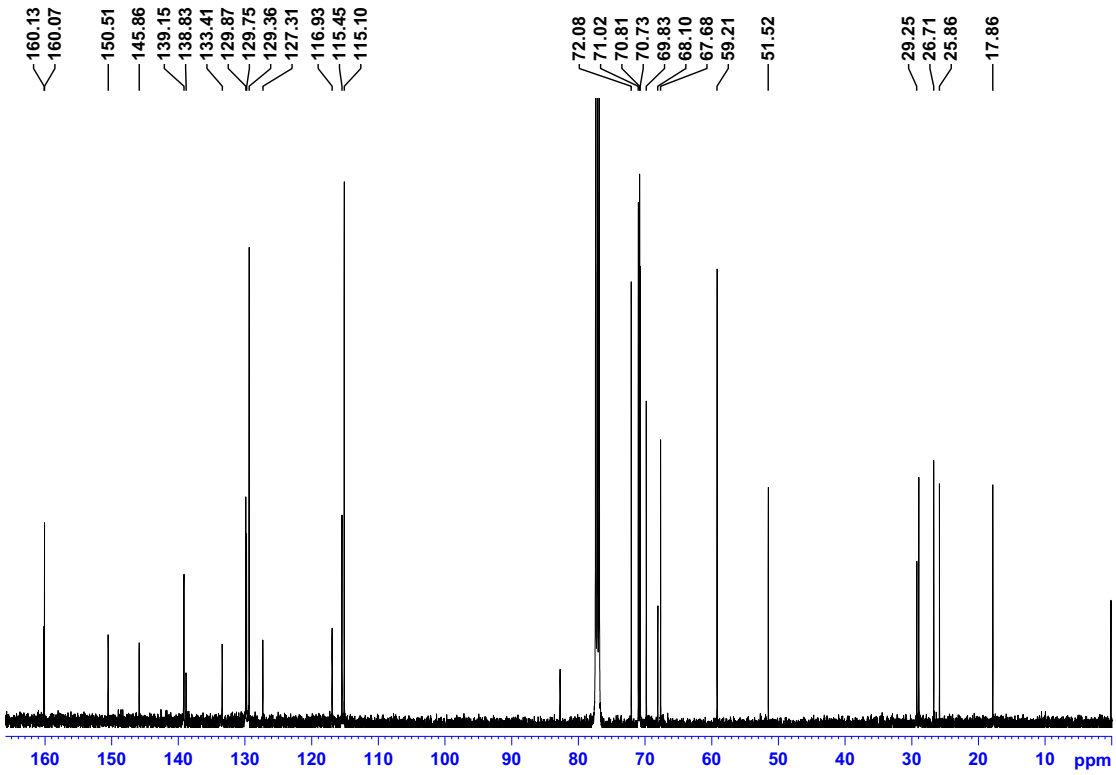

Fig. S11 $^{13}C\{^{1}H\}$ NMR spectrum of **3** in $CDCl_3$.

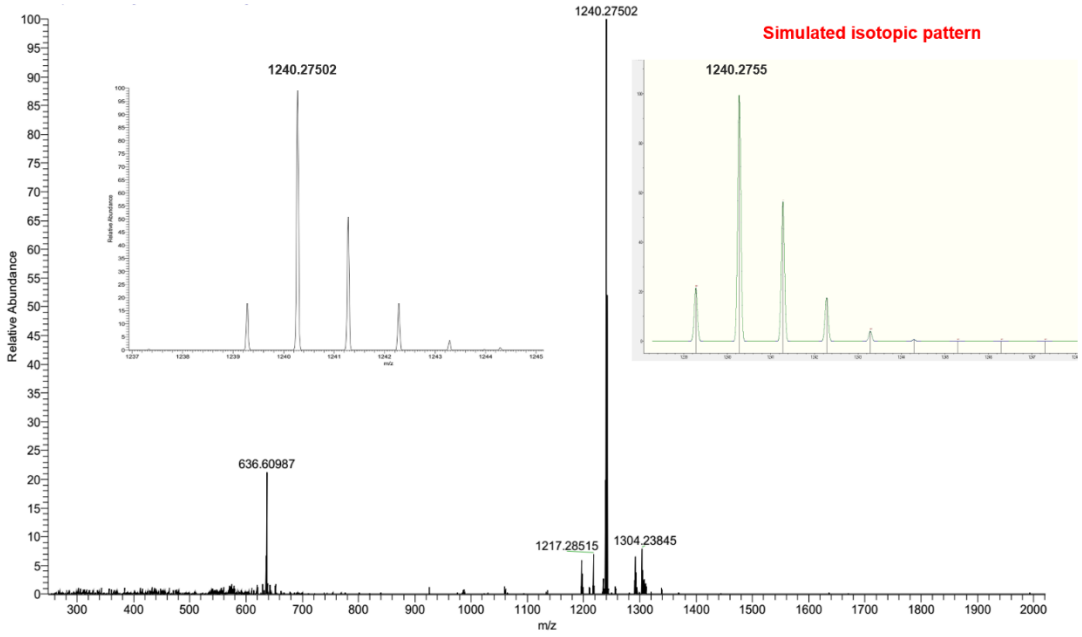

Fig. S12 ESI mass spectrum of **3**. The isotopic cluster for the $[M+Na]^+$ ion and the corresponding simulated pattern are given in the insets.