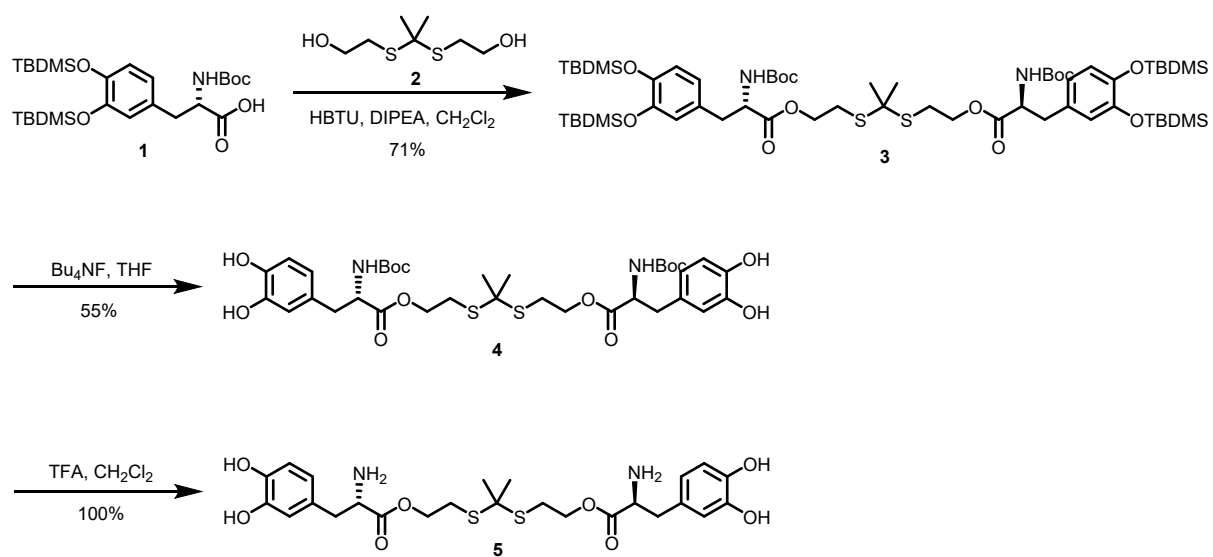


Electronic Supplementary Information

Reactive Oxygen Species-Responsive Polydopamine Nanoparticles for Targeted and Synergistic Chemo and Photodynamic Anticancer Therapy

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K. P. Ng*



Scheme S1. Synthesis of thioketal-linked L-DOPA dimer **5**.

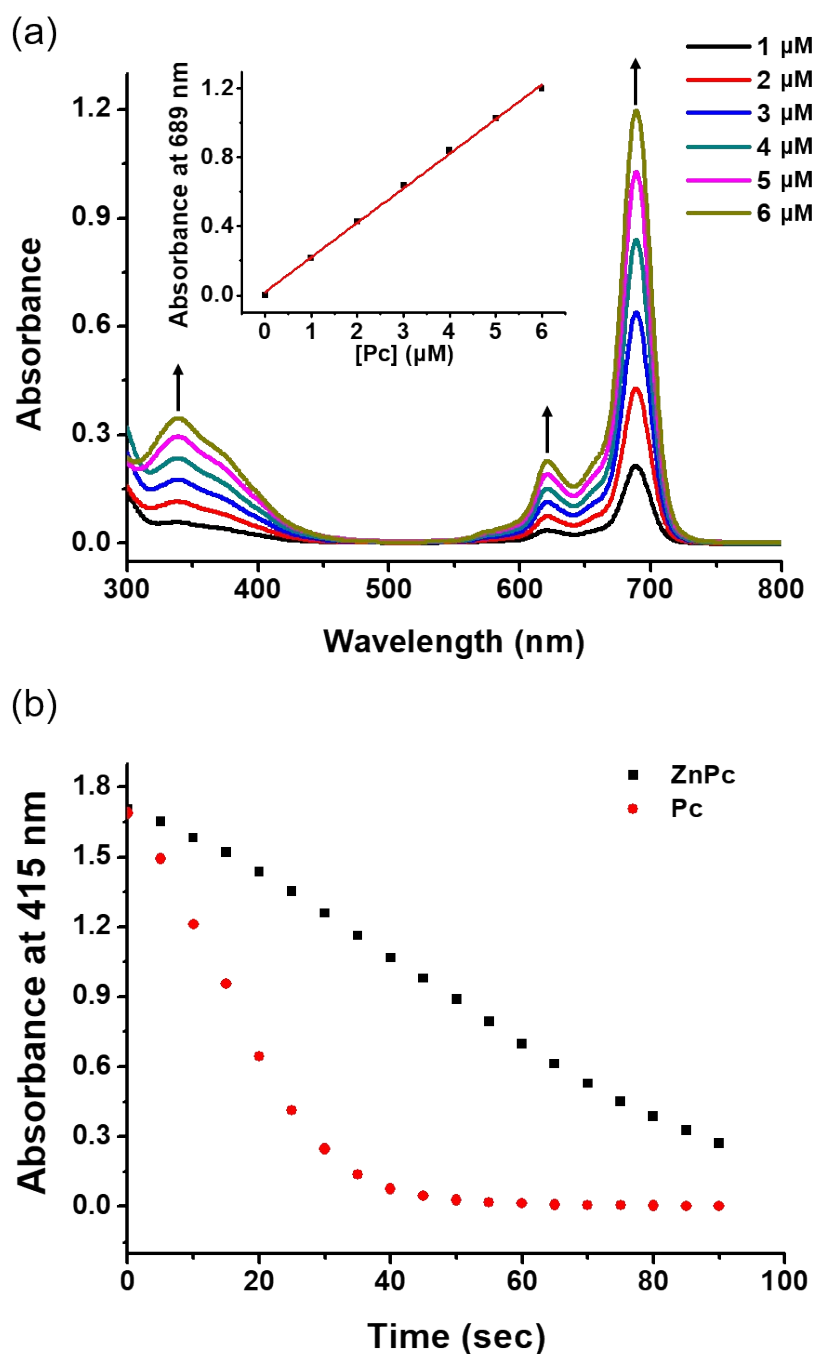


Fig S1 (a) UV-Vis spectra of Pc at different concentrations in DMF. The inset plots the Q-band absorbance versus the concentration of Pc. (b) Rate of decay of DPBF in DMF (initial concentration = 90 μM) using Pc (red circle) and ZnPc (black square) (both at 6 μM) as the photosensitisers.

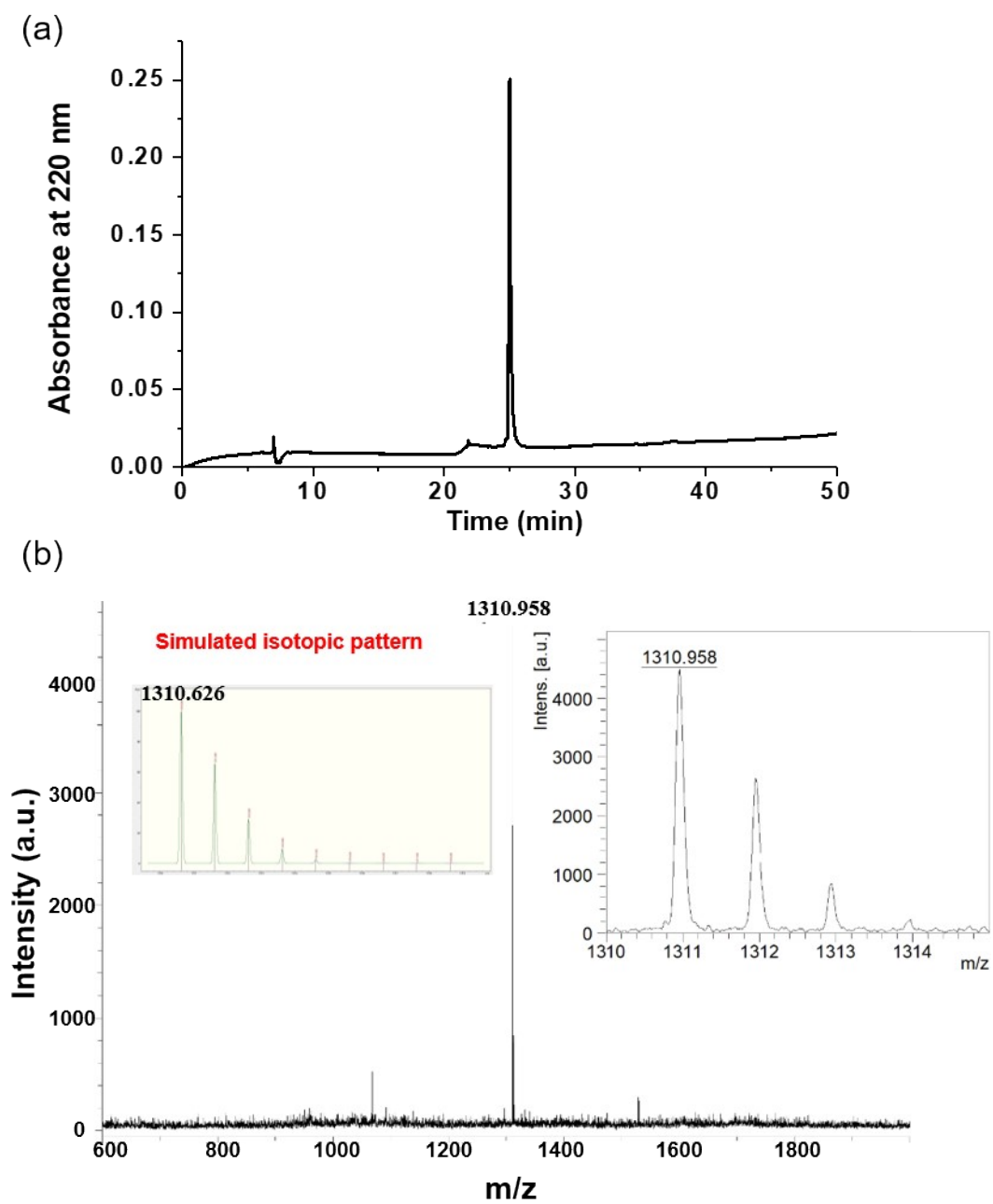


Fig. S2 (a) HPLC chromatogram and (b) MALDI-TOF mass spectrum of the QRH peptide.

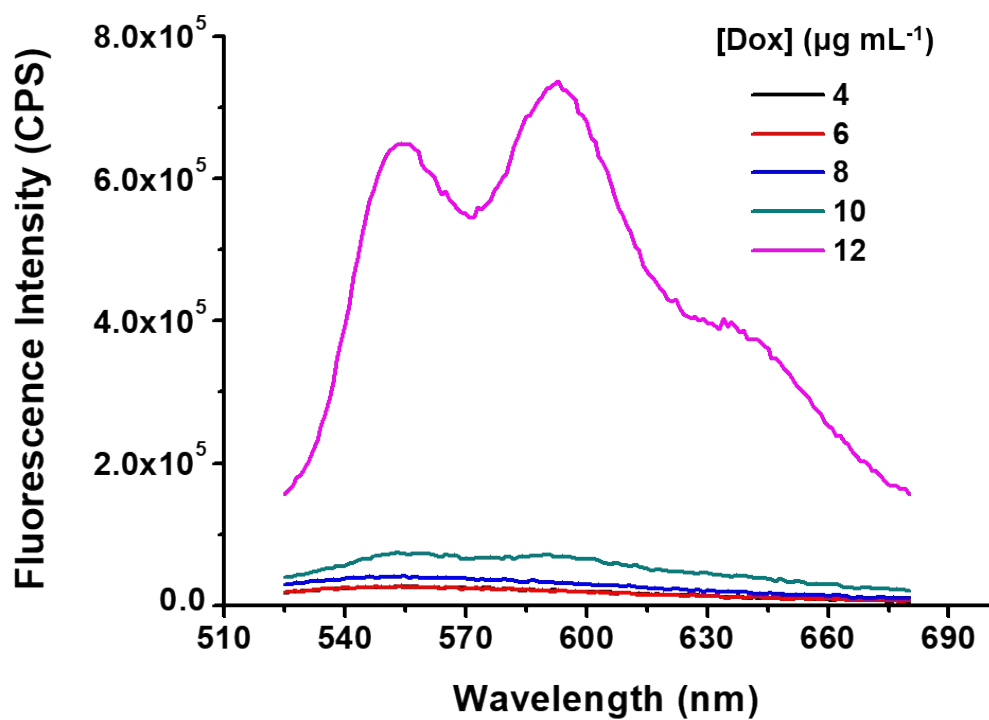


Fig. S3 Fluorescence spectra of Dox in the supernatant of the mixtures with different concentrations of Dox ($\lambda_{\text{ex}} = 488$ nm).

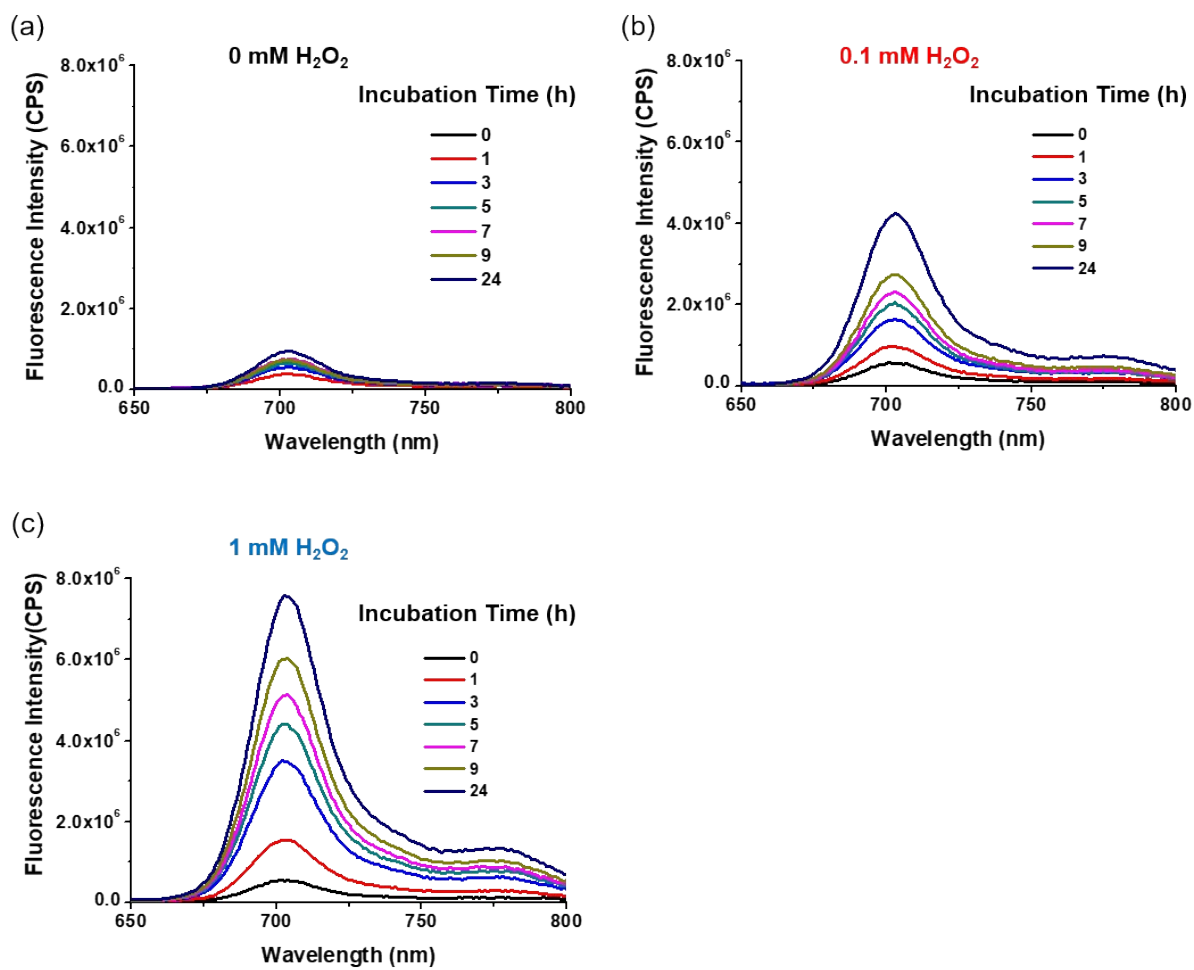


Fig. S4 Change in fluorescence spectrum ($\lambda_{ex} = 610$ nm) of PDA-Dox-Pc-QRH ($[Pc] = 2 \mu M$) in PBS with 0.5% Tween 20 upon exposure to different concentrations of H_2O_2 (0, 0.1 and 1 mM) at 37 °C over a period of 24 h.

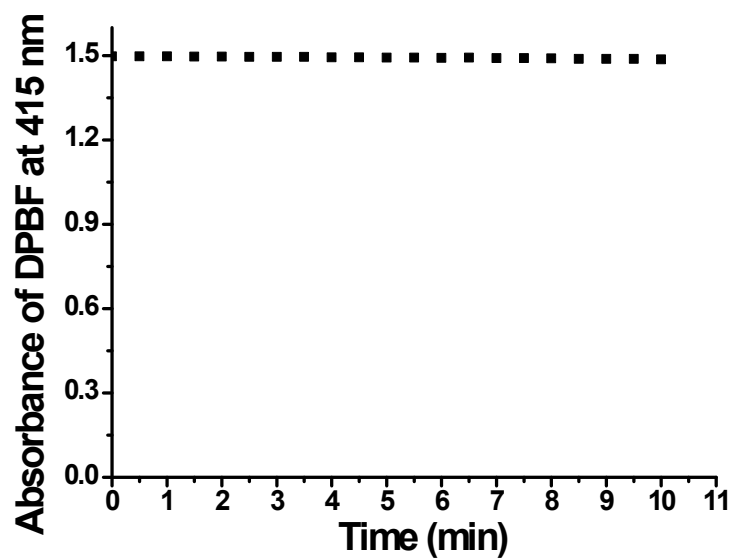


Fig. S5 Effect of H₂O₂ (1 mM) on DPBF (90 μM) in PBS with 0.5% Tween 20 upon light irradiation ($\lambda > 610$ nm).

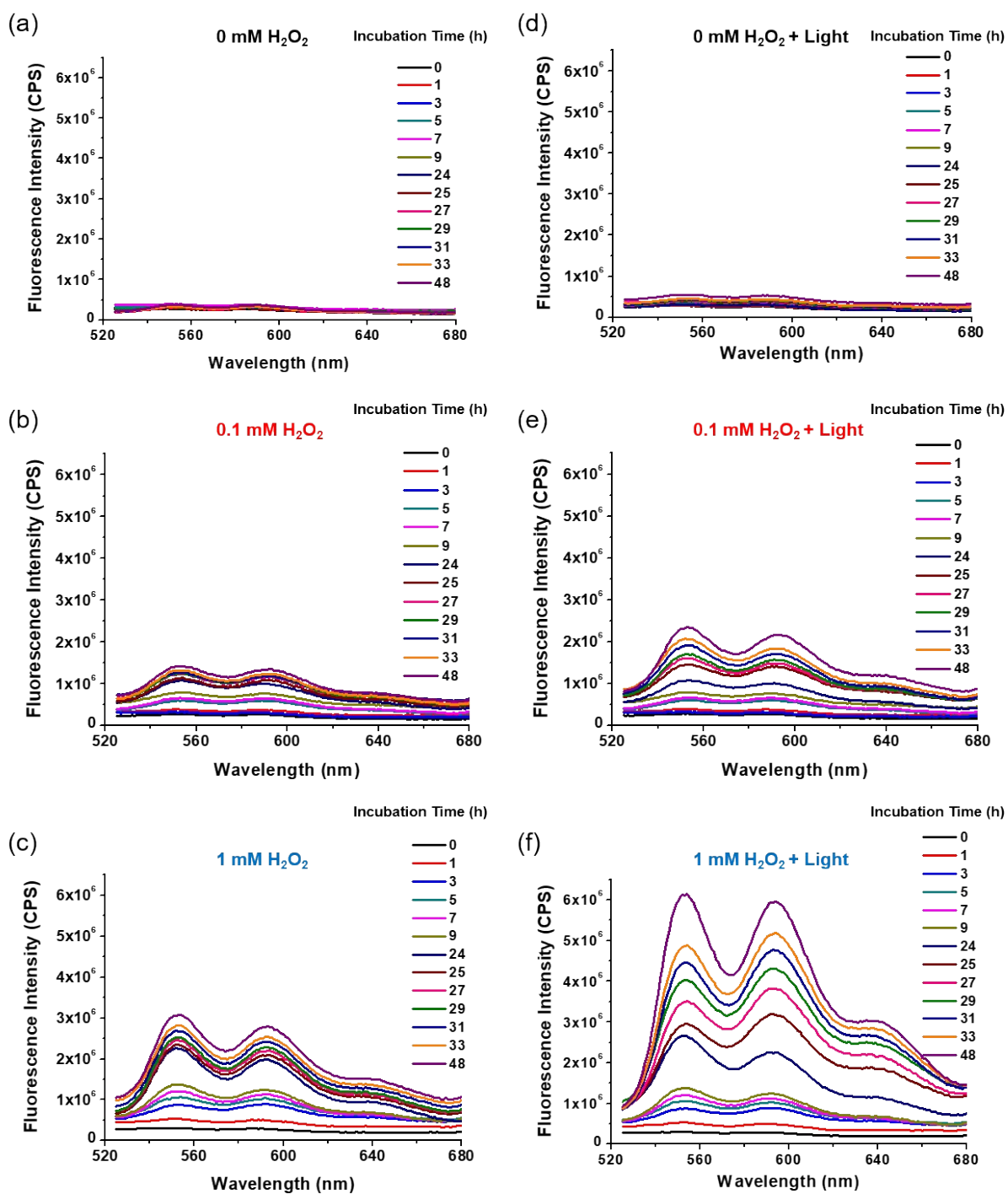


Fig. S6 Change in the fluorescence spectrum ($\lambda_{\text{ex}} = 488 \text{ nm}$) of PDA-Dox-Pc-QRH ($[\text{Dox}] = 1.8 \mu\text{M}$) in PBS with 0.5% Tween 20 upon exposure to different concentrations of H₂O₂ (0, 0.1 and 1 mM) at 37 °C over a period of 48 h (a-c) without and (d-f) with light irradiation ($\lambda > 610 \text{ nm}$) for 20 min at 24 h post-treatment with H₂O₂.

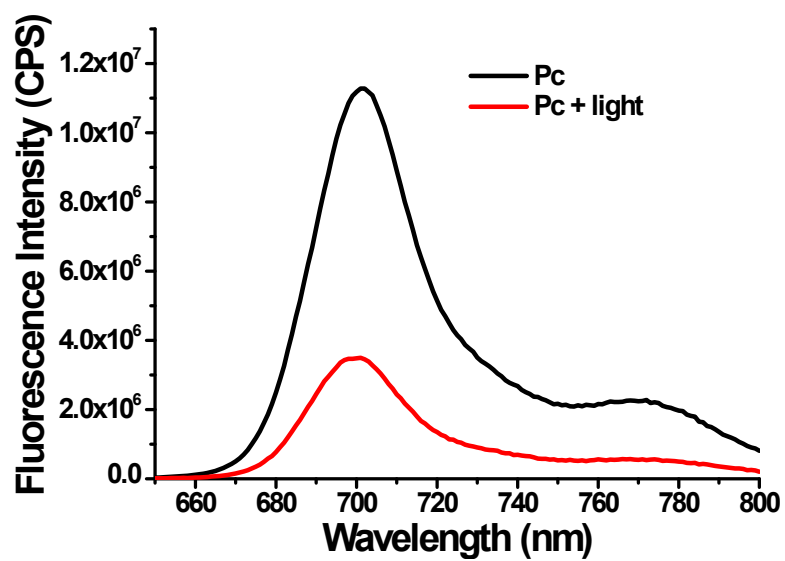


Fig. S7 Fluorescence spectra of Pc (2 μM) in PBS with 0.5% Tween 20 with and without light irradiation ($\lambda > 610$ nm) for 20 min ($\lambda_{\text{ex}} = 610$ nm).

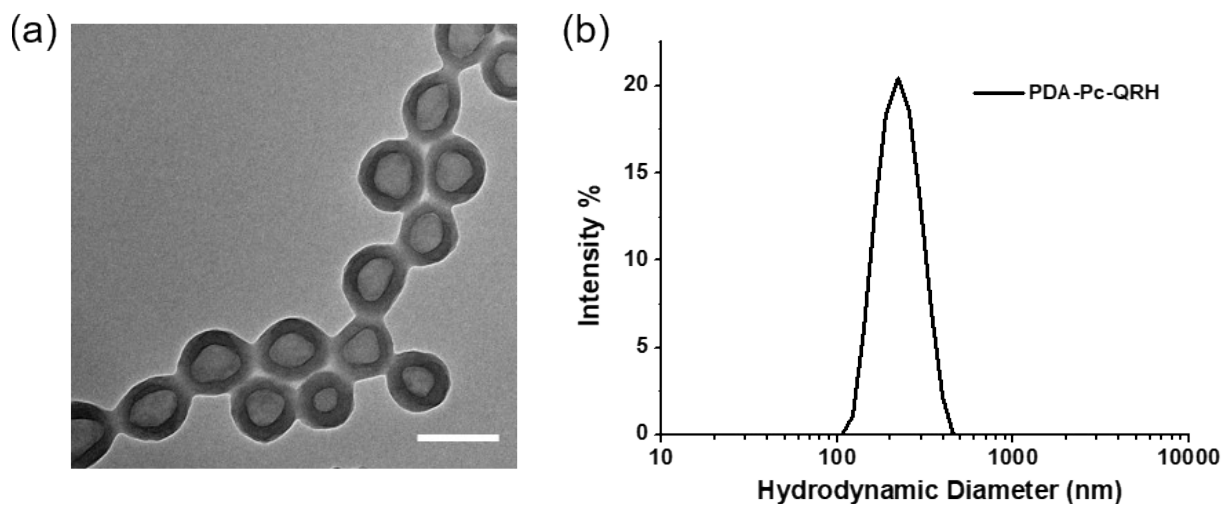


Fig. S8 (a) A representative TEM image of PDA-Pc-QRH. Scale bar: 200 nm. (b) Hydrodynamic diameter distribution of PDA-Pc-QRH in water measured by DLS.

Table S1. Characterisation data for PDA-Pc-QRH and PDA-Dox-Pc-QRH.

NPs	Hydrodynamic diameter (nm) ^a	Zeta potential (mV) ^a	PDI ^a	Pc loading (%)
PDA-Pc-QRH	217 ± 2	-13.3 ± 0.3	0.08 ± 0.04	15
PDA-Dox-Pc-QRH	220 ± 1	-11.6 ± 0.2	0.07 ± 0.03	15

^a The values are reported as the mean ± SD of 3 independent measurements.

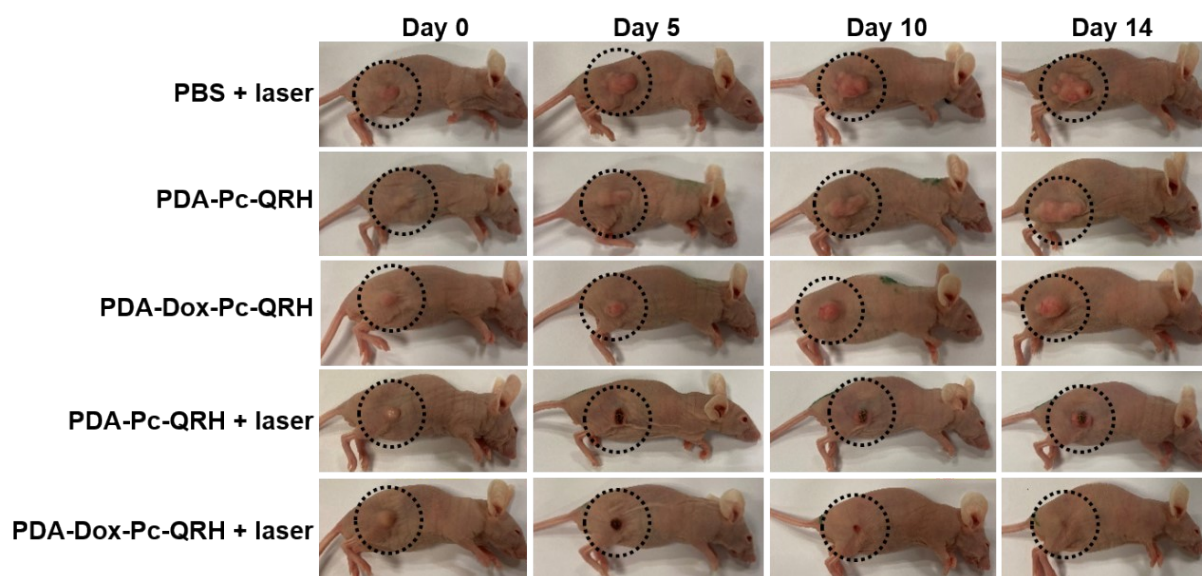


Fig. S9 Photographic images of tumour-bearing nude mice before and after being treated with an intravenous dose of PDA-Pc-QRH or PDA-Dox-Pc-QRH ([Pc] = 5 μ M, 200 μ L) with or without subsequent laser irradiation (675 nm, 20 J cm⁻²). The mice treated with PBS intravenously and exposed to laser irradiation (Row 1) were used as a negative control. The tumours are indicated by black circles. For treatment groups that involve laser irradiation (Rows 1, 4 and 5), the time point given on top of each column indicates the duration after laser irradiation.

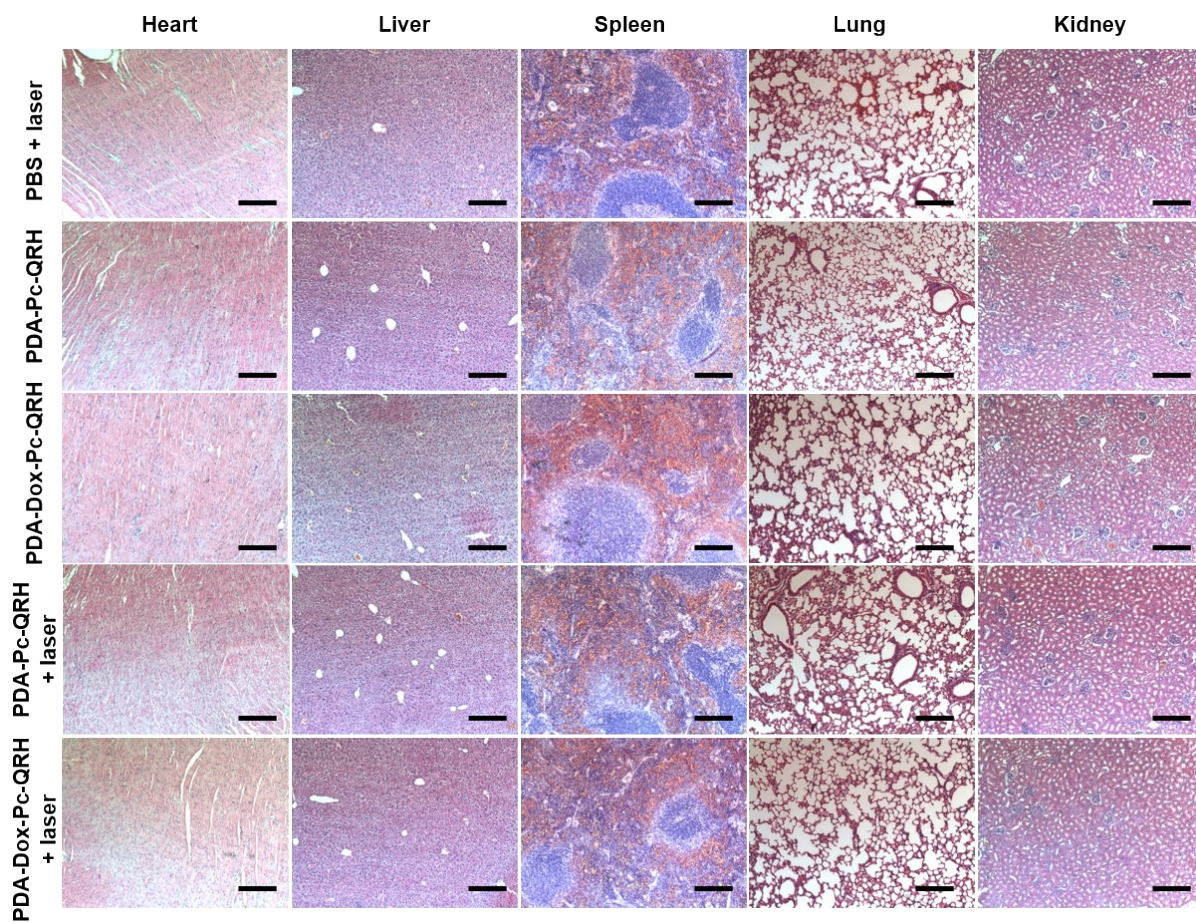


Fig. S10 Histological images indicate the structural integrity of major internal organs that were dissected from the tumour-bearing mice after different treatments. Scale bar: 200 μ m.

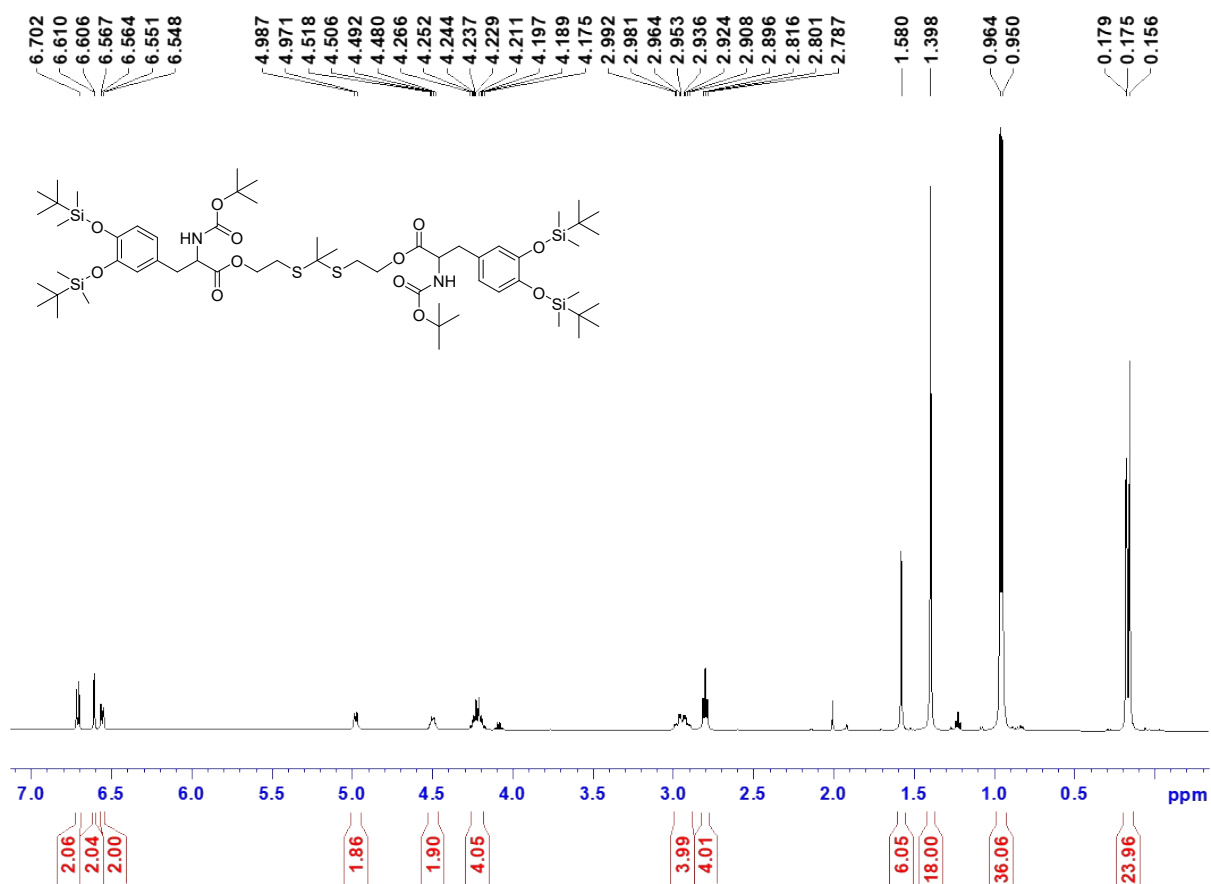


Fig. S11 ^1H NMR spectrum of **3** in CDCl_3 .

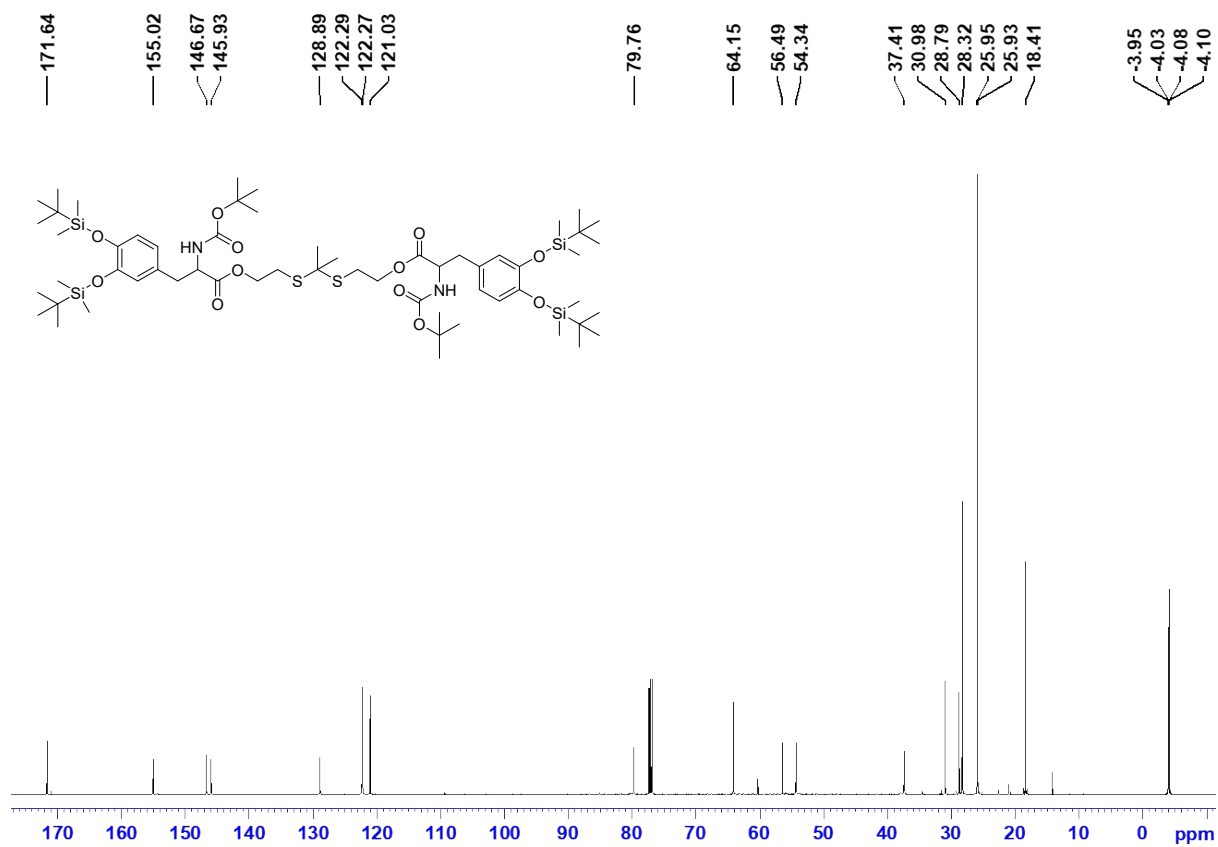


Fig. S12 $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of **3** in CDCl_3 .

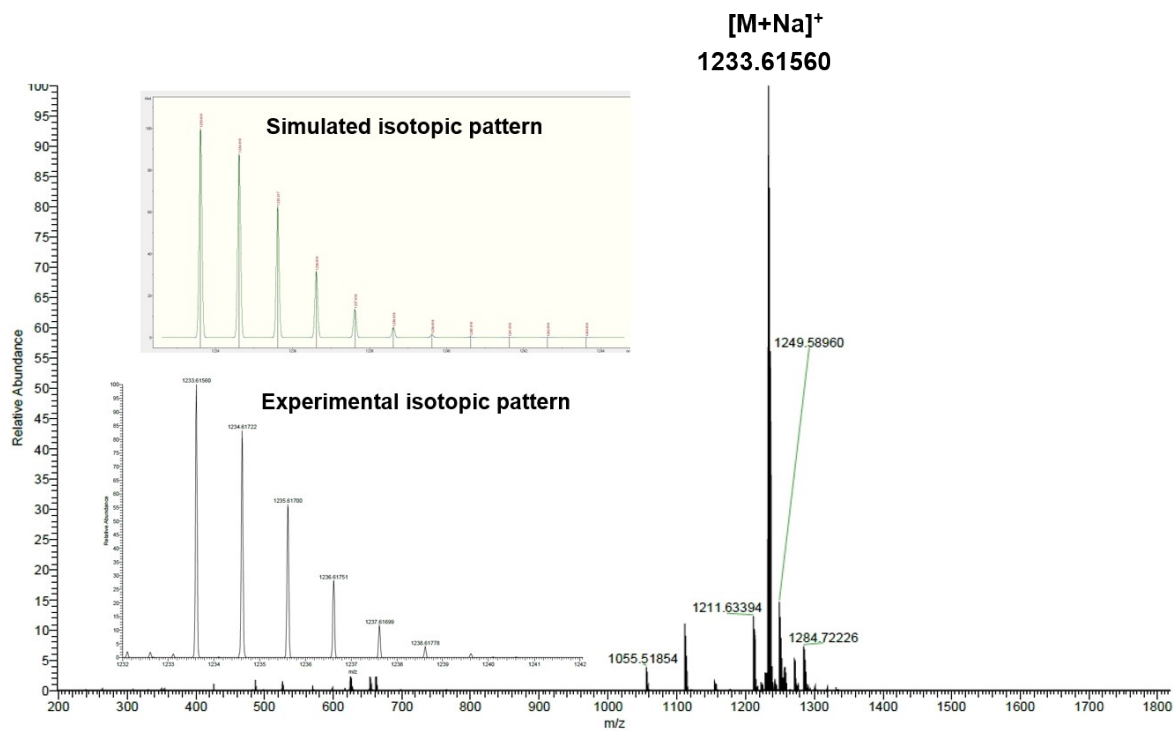


Fig. S13 ESI mass spectrum of **3**. The isotopic cluster for the $[M+Na]^+$ ion and the corresponding simulated pattern are given in the insets.

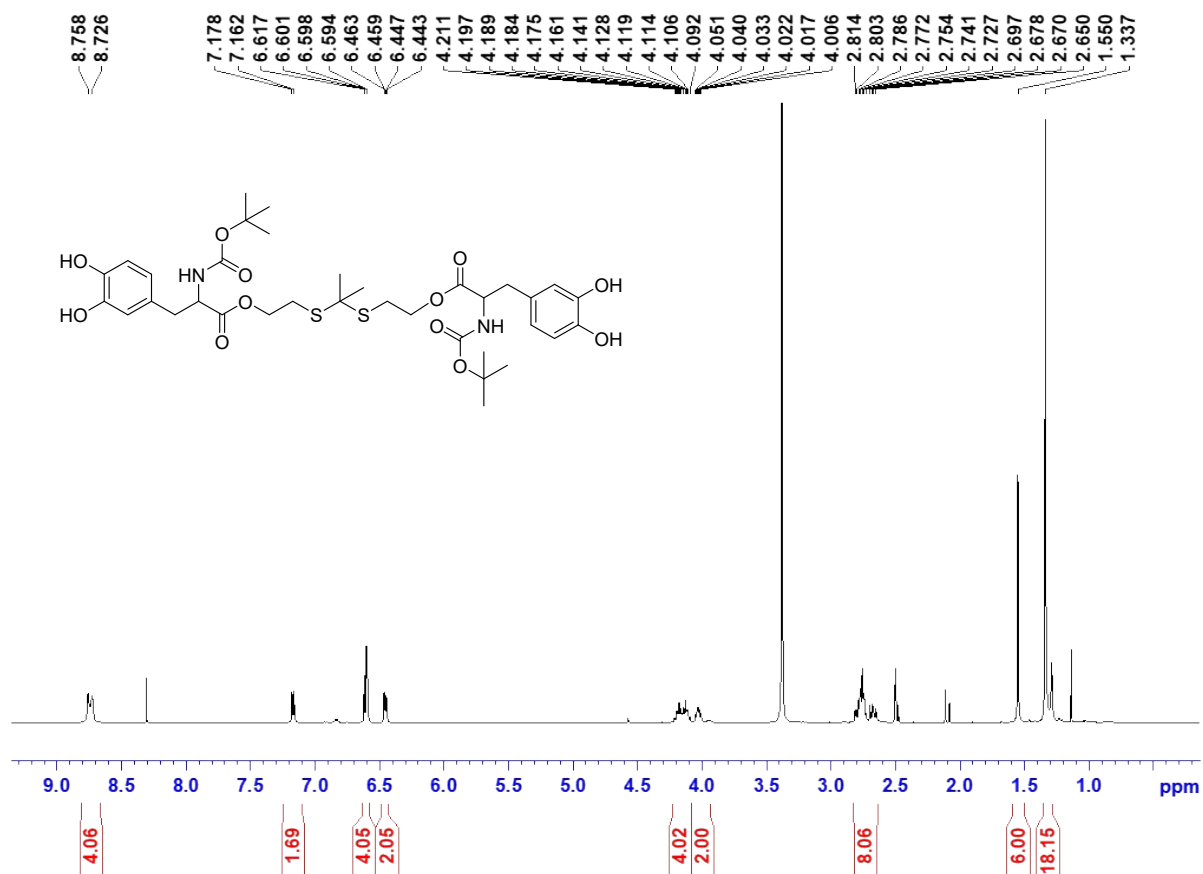


Fig. S14 ¹H NMR spectrum of 4 in DMSO-d₆.

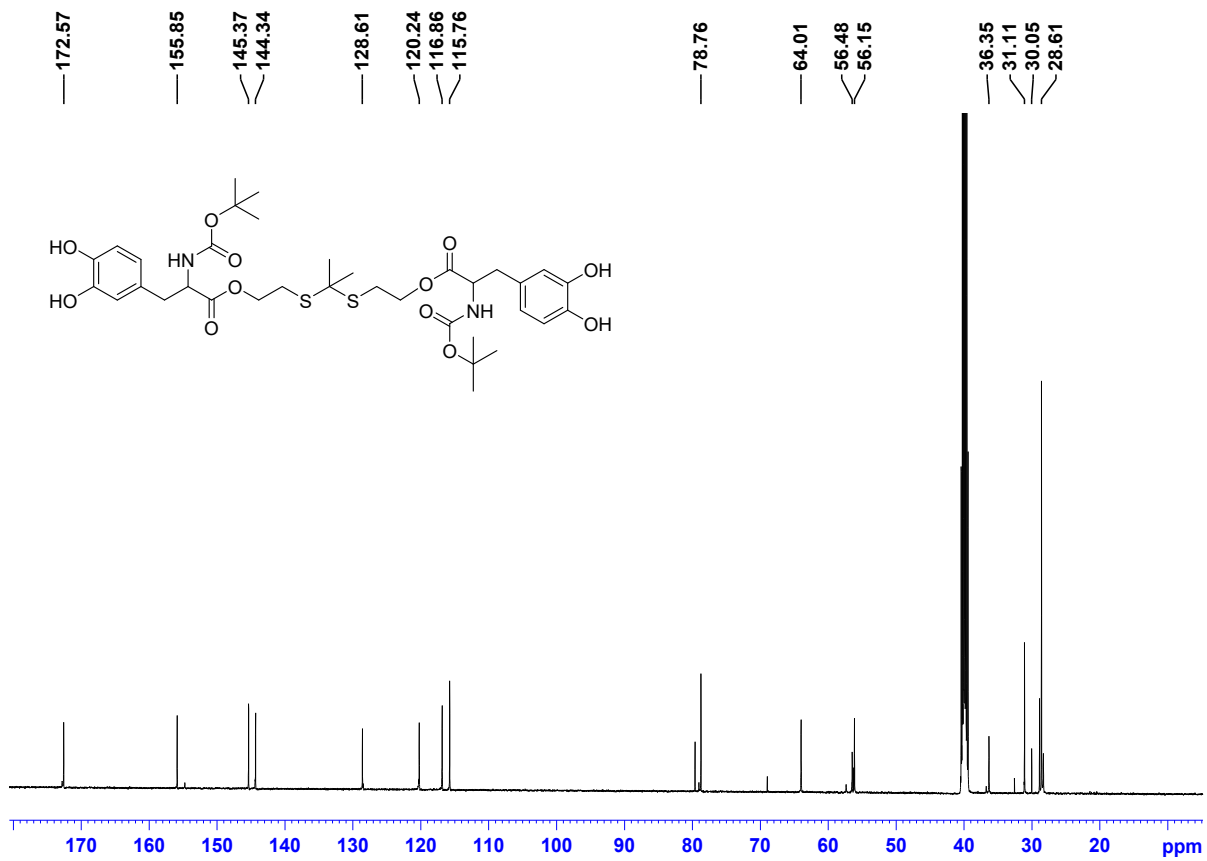


Fig. S15 $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of **4** in DMSO-d_6 .

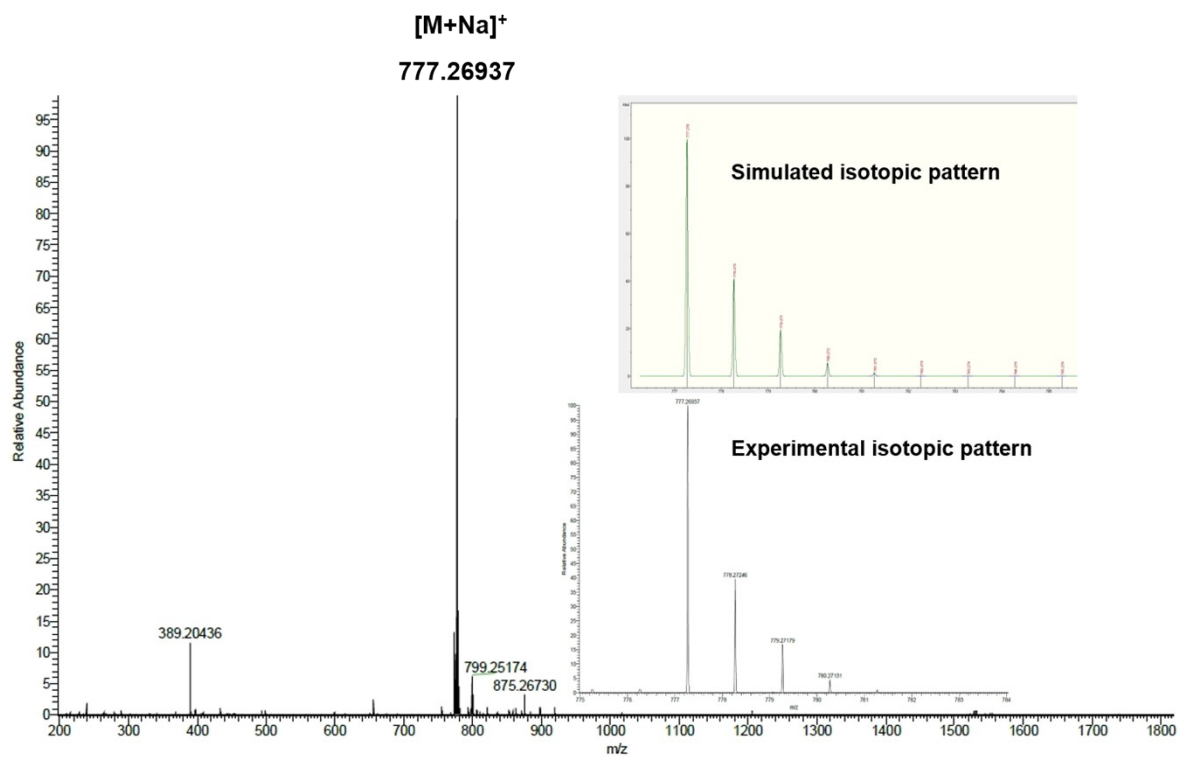


Fig. S16 ESI mass spectrum of **4**. The isotopic cluster for the $[M+Na]^+$ ion and the corresponding simulated pattern are given in the insets.

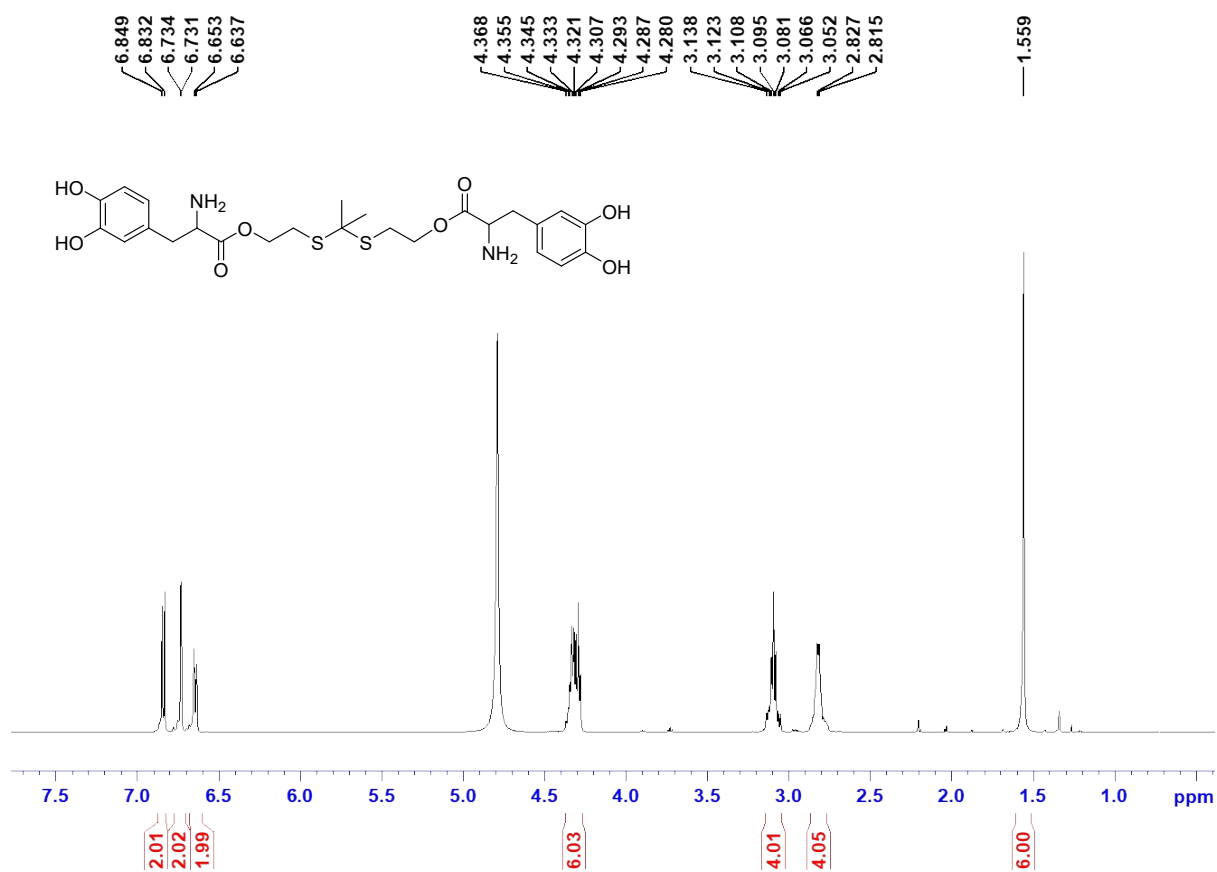


Fig. S17 ^1H NMR spectrum of **5** in D_2O .

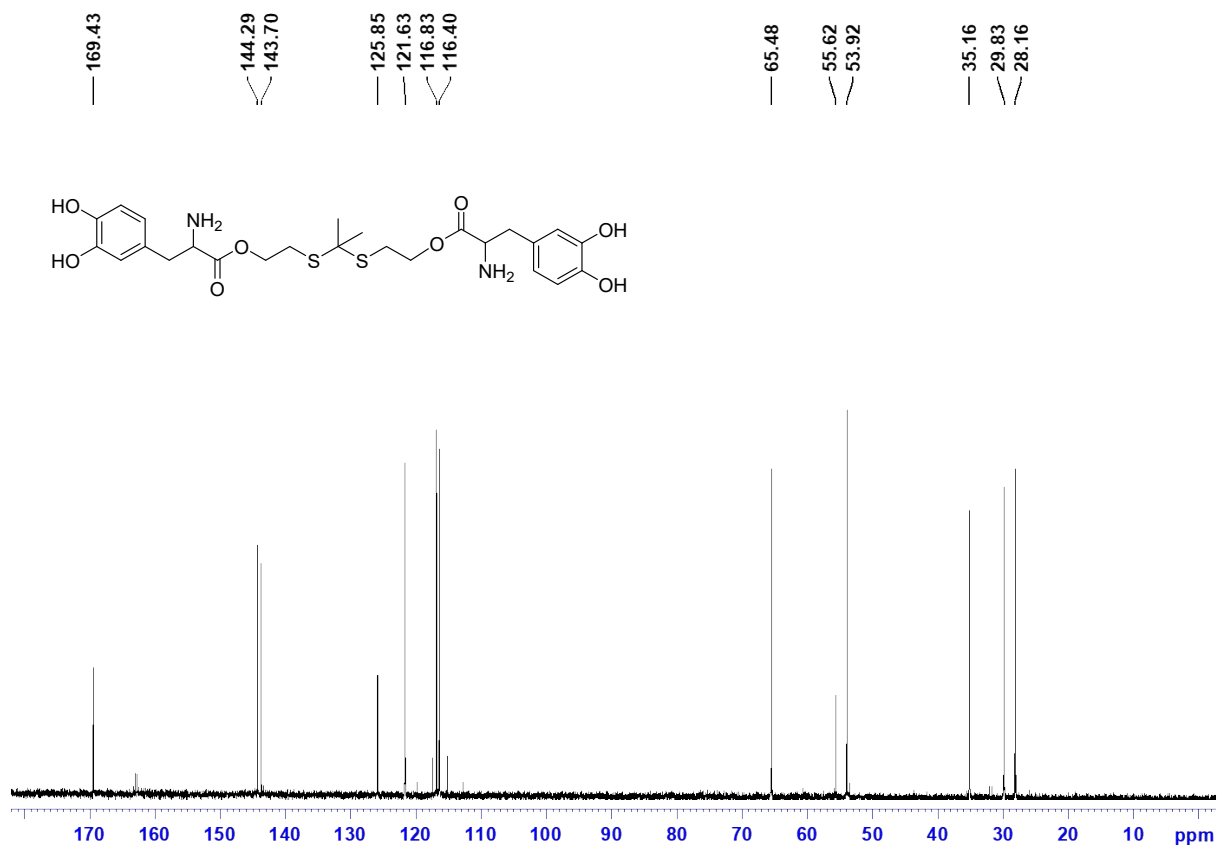


Fig. S18 $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of **5** in D_2O .

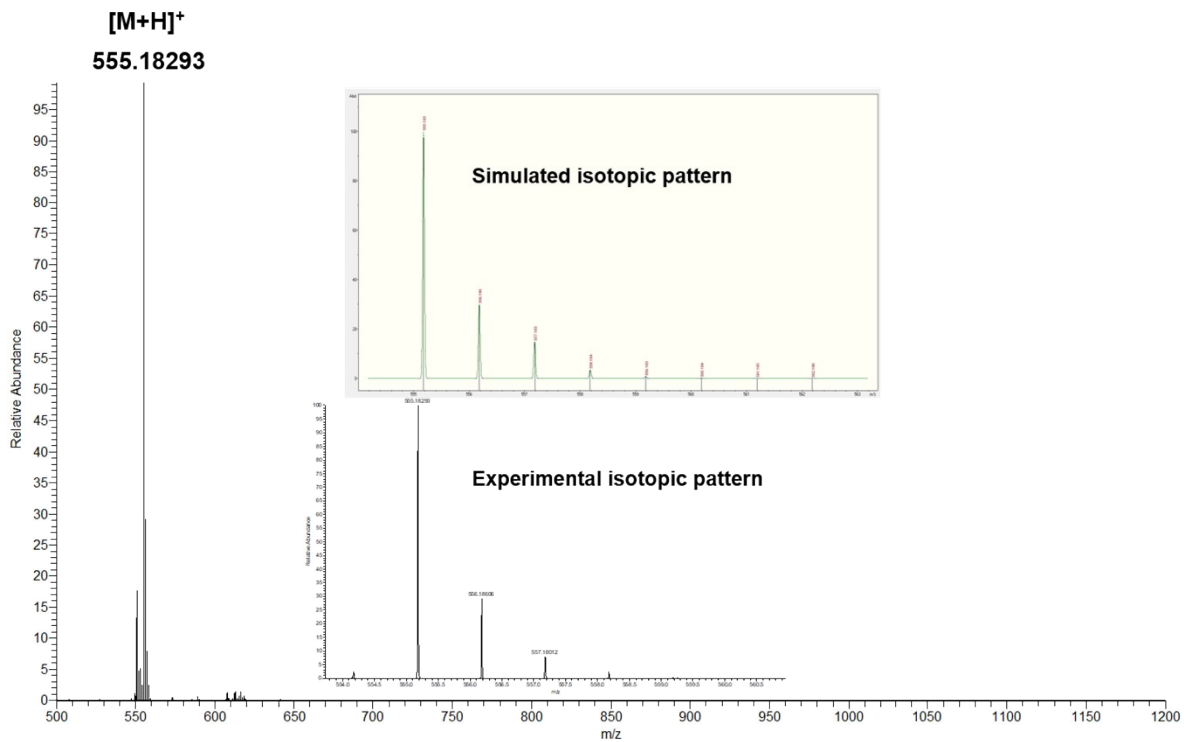


Fig. S19 ESI mass spectrum of **5**. The isotopic cluster for the $[M+H]^+$ ion and the corresponding simulated pattern are given in the insets.