

Supporting Information

**A Fluorenone-Based Conjugated Polymer Nanoparticle
Applied in Drug Delivery with Real-Time Detection (Color
Change) via the AILE Mechanism**

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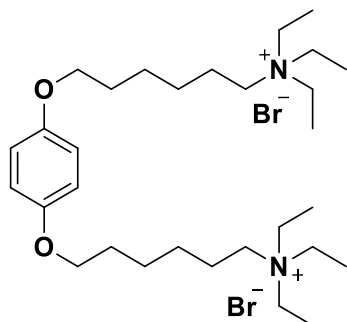
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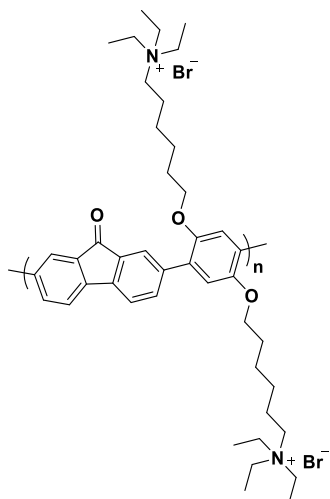
1. NMR Spectra



Monomer:

^1H NMR (400 MHz, MeOD) δ 6.91 (d, $J = 6.1$ Hz, 4H), 4.68 - 4.47 (m, 2H), 4.06 - 3.96 (m, 2H), 3.84 - 3.41 (m, 16H), 2.05 - 1.78 (m, 8H), 1.69-1.31 (m, 18H).

^{13}C NMR (101 MHz, MeOD) δ 153.34, 115.35, 115.28, 115.26, 115.22, 70.39, 68.43, 68.11, 66.74, 56.83, 52.70, 28.92, 25.90, 25.46, 21.39, 6.70.



Polymer PFOP-NEt₃(⁺): brown solid, yield: 89%. $M_n = 26.38$ kg/mol; $M_w = 30.947$ kg/mol; DPI = 1.86.

^1H NMR (400 MHz, MeOD) δ 7.89 (d, $J = 3.4$ Hz, 3H), 7.87 (d, $J = 3.1$ Hz, 1H), 7.85 (s, 4H), 4.18 (d, $J = 1.9$ Hz, 2H), 4.14 - 4.10 (m, 6H), 4.02 (d, $J = 0.7$ Hz, 4H), 3.96 (d, $J = 3.1$ Hz, 4H), 3.90 (d, $J = 3.4$ Hz, 4H), 3.56 (dd, $J = 5.3, 3.9$ Hz, 9H), 3.49 (dd, $J = 3.1, 1.9$ Hz, 9H).

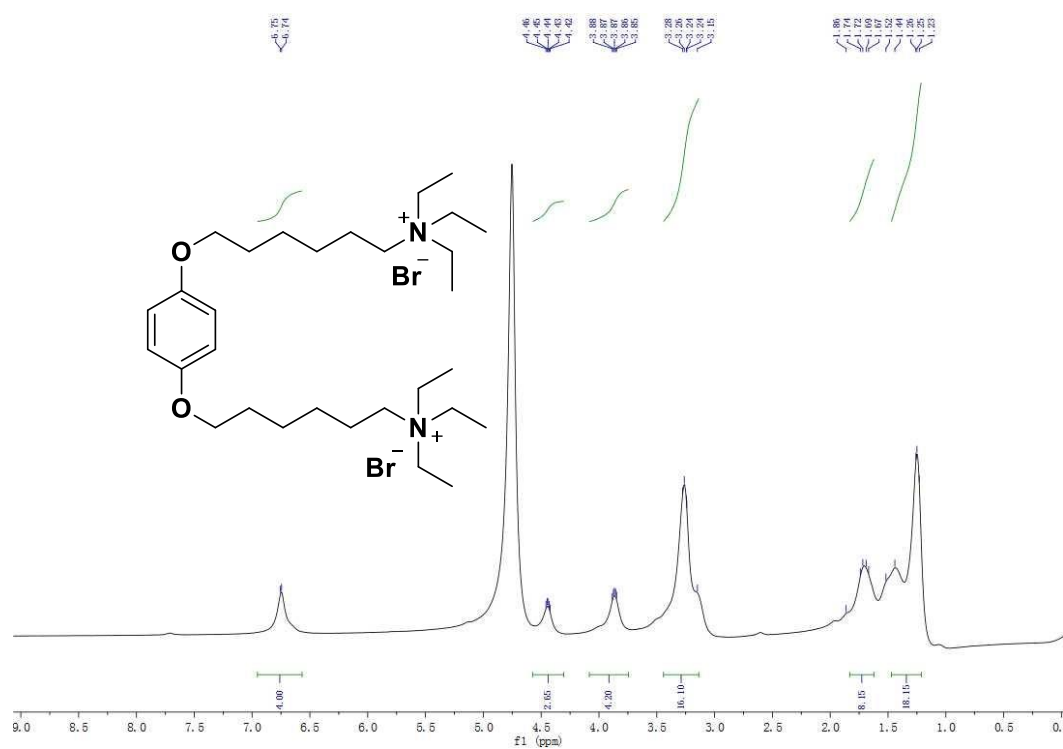


Fig. S1. ¹H NMR of the Monomer

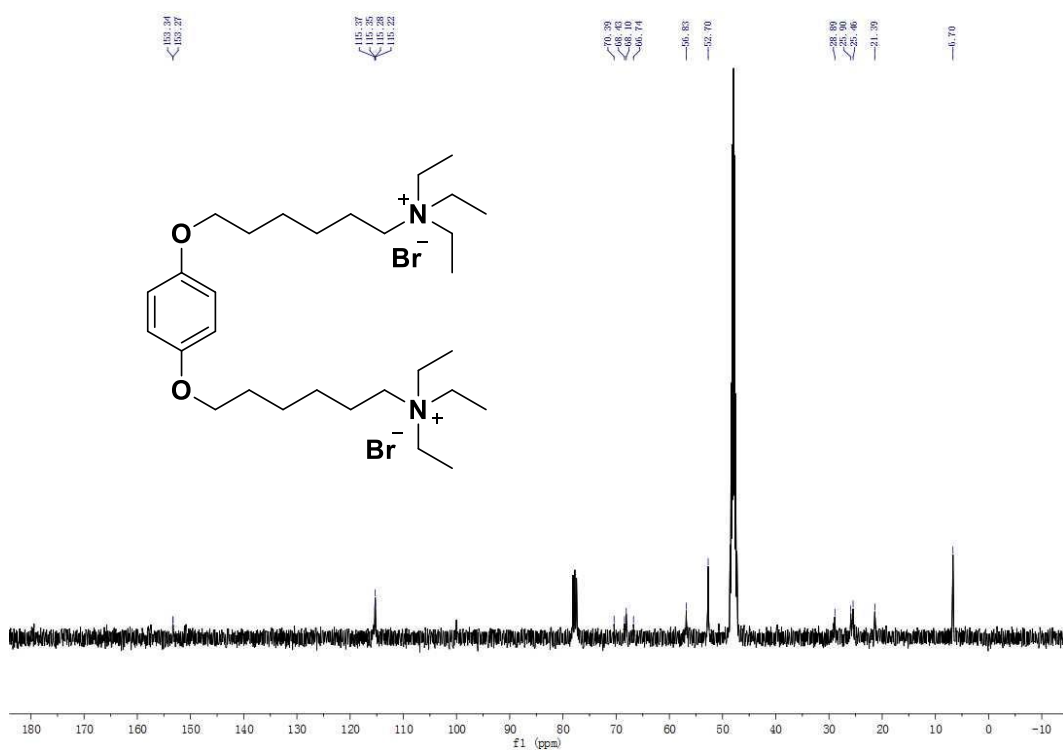


Fig. S2. ¹³C NMR of the Monomer

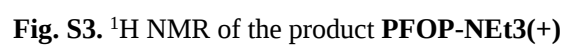


Fig. S3. ^1H NMR of the product **PFOP-NEt₃(+)**

2. Table S1. Drug Loading Content and Encapsulation Efficiency of NPs

NPs	drug loading content (%)	encapsulation efficiency (%)
PFOP-NEt3(+)-Gemcitabine (PFGEM)	36.24 ± 2.37	60.58 ± 1.33
PFOP-NEt3(+)-Oxaliplatin (PFOXP)	41.83 ± 1.23	61.36 ± 1.54
PFOP-NEt3(+)-Pemetrexed (PFPMT)	37.61 ± 1.85	56.19 ± 2.71
PFOP-NEt3(+)-Etoposide (PFEPS)	33.36 ± 4.32	78.65 ± 2.56
PFOP-NEt3(+)-Methotrexate (PFMTX)	35.99 ± 3.71	67.22 ± 0.42
PFOP-NEt3(+)-Paclitaxel (PFPTX)	43.79 ± 1.66	83.65 ± 3.99

DLC (%) = (weight of loaded drug/total weight of loaded drug and polymer) × 100%

EE (%) = (weight of loaded drug/weight of drug added) × 100%

3. TEM Images of PFOP-NEt(+) and PFPTX

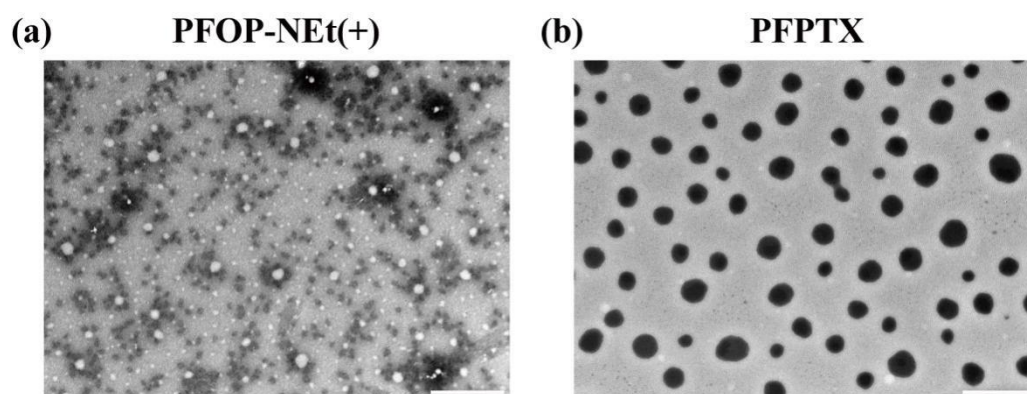


Fig. S4. TEM Images of **PFOP-NEt(+)** (a) and **PFPTX** (b). Scale bar is 1 μm

4. UV-vis spectra of PFOP-NEt(+)

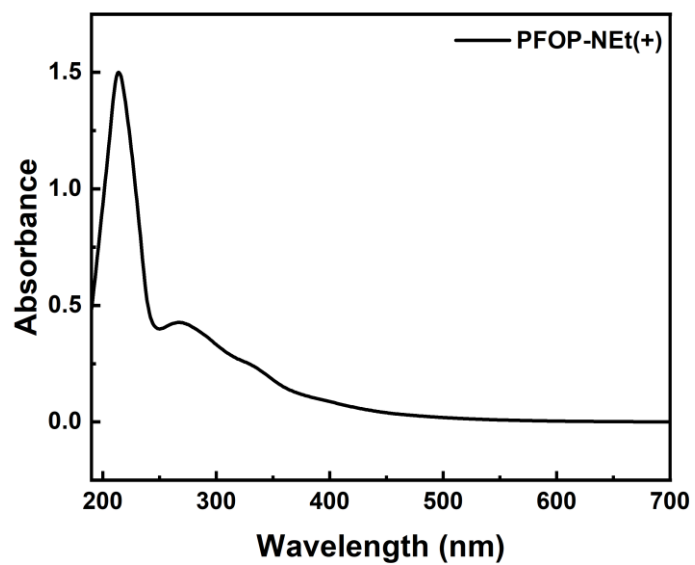


Fig. S5. UV-vis spectra of PFOP-NEt(+)

5. Table S2. Molecular docking parameters of interaction between a PFOP-NEt₃(+) with Chemotherapy drugs.

NPs	Affinity (kcal/mol) ^a
PFOP-NEt ₃ (+)-Gemcitabine (PFGEM)	-3.72 to -4.18 kcal/mol
PFOP-NEt ₃ (+)-Oxaliplatin (PFOXP)	-3.90 to -4.75 kcal/mol
PFOP-NEt ₃ (+)-Pemetrexed (PFPMT)	-6.06 to -6.68 kcal/mol
PFOP-NEt ₃ (+)-Etoposide (PFEPS)	-5.98 to -6.30 kcal/mol
PFOP-NEt ₃ (+)-Methotrexate (PFMTX)	-4.90 to -5.42 kcal/mol

^a The molecular docking process was carried out using the software package MolAICal.

6. Standard curve and HPLC of Gemcitabine

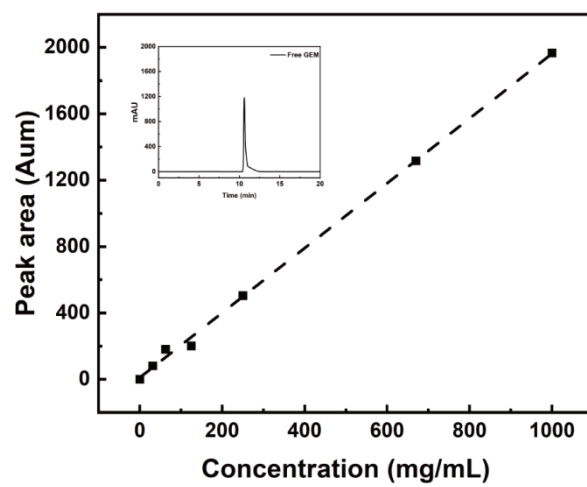


Fig. S6. Standard curve of Gemcitabine and HPLC of Free Gemcitabine (GEM).

7. Standard curve and HPLC of Oxaliplatin

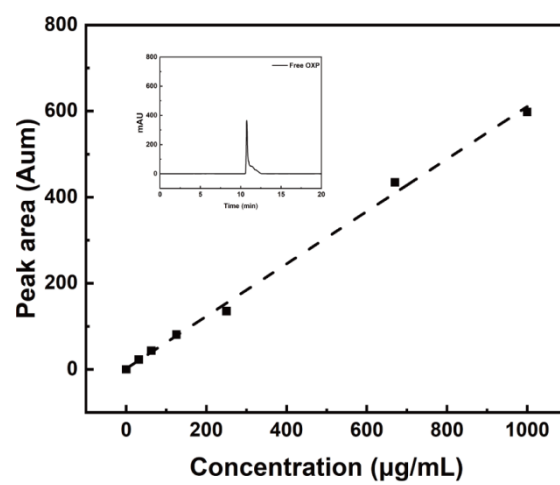


Fig. S7. Standard curve of Oxaliplatin and HPLC of Free Oxaliplatin (OXP).

8. Standard curve and HPLC of Pemetrexed

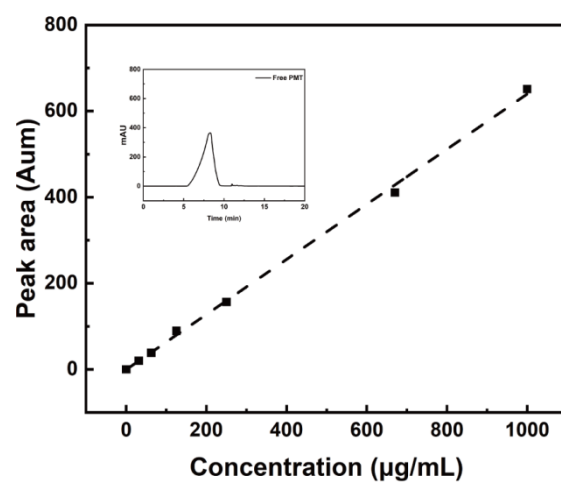


Fig. S8. Standard curve of Pemetrexed and HPLC of Free Pemetrexed (PMT).

9. Standard curve and HPLC of Etoposide

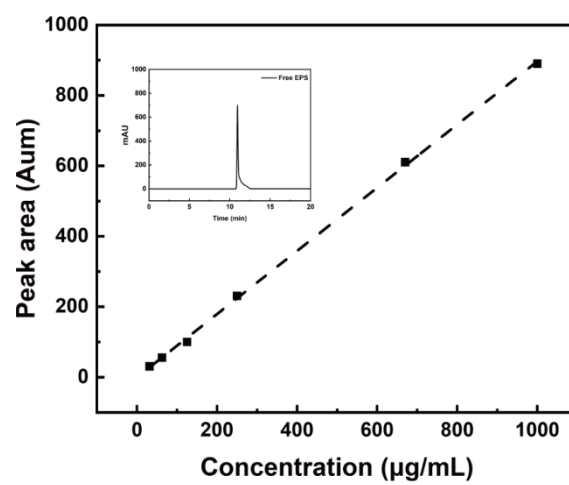


Fig. S9. Standard curve of Etoposide and HPLC of Free Etoposide (EPS).

10. Standard curve and HPLC of Methotrexate

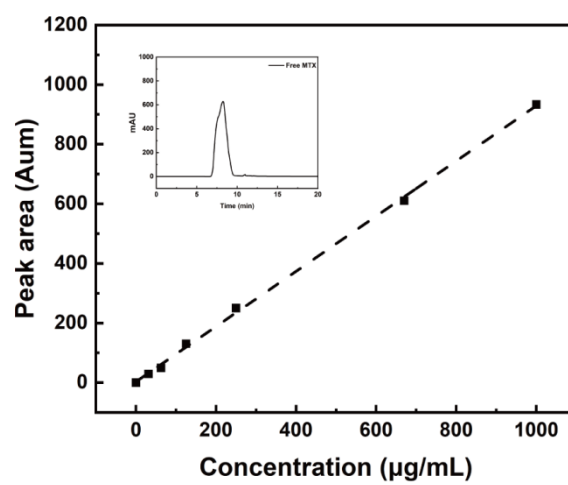


Fig. S10. Standard curve of Methotrexate and HPLC of Free Methotrexate (MTX).

11. Standard curve and HPLC of Paclitaxel

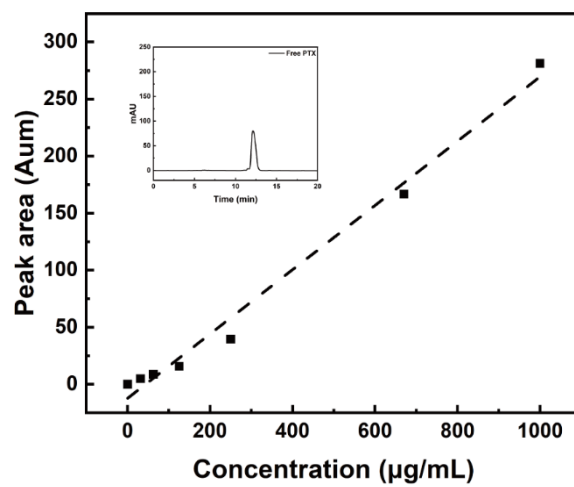


Fig. S10. Standard curve of Paclitaxel and HPLC of Free Paclitaxel(PTX).

12. Fluorescence imaging of HeLa

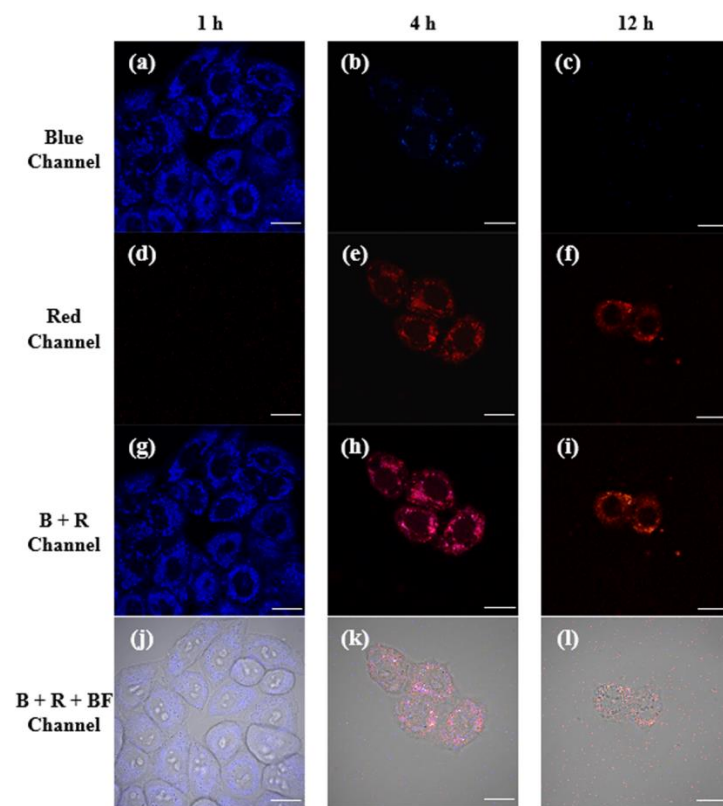


Fig. S11. Fluorescence imaging of HeLa. Scale bar is 20 μm

13. Fluorescence imaging of A549

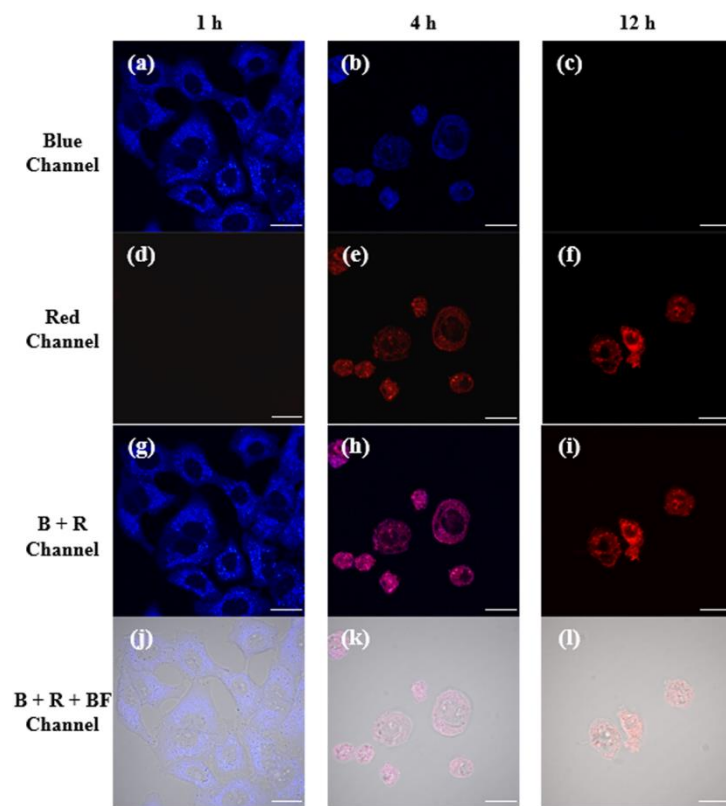


Fig. S12. Fluorescence imaging of A549. Scale bar is 20 μm

14. Fluorescence imaging of HepG2

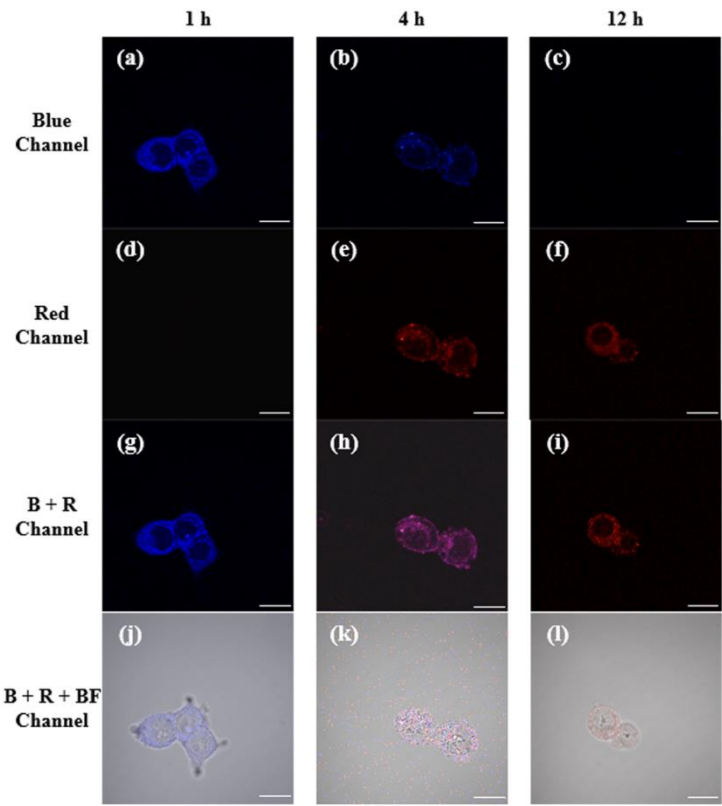


Fig. S13. Fluorescence imaging of HepG2. Scale bar is 20 μm

15. Particle size and zeta potential of PFPTX

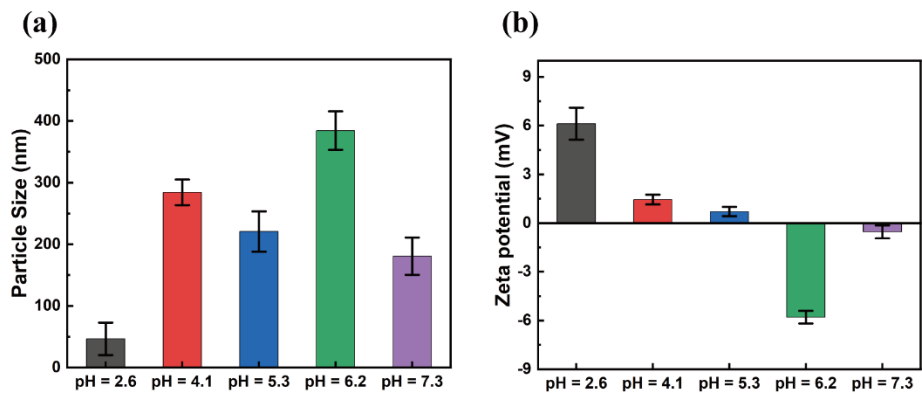


Fig. S14. Particle size (a) and zeta potential (b) of PFPTX with different pH values.

pH = 7.3

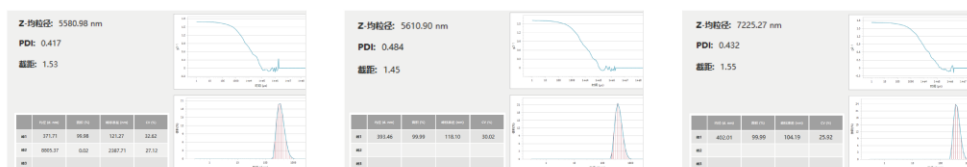
Nanoparticle size



Fig. S15. Particle size and zeta potential of PFPTX under pH = 7.3.

pH = 6.2

Nanoparticle size



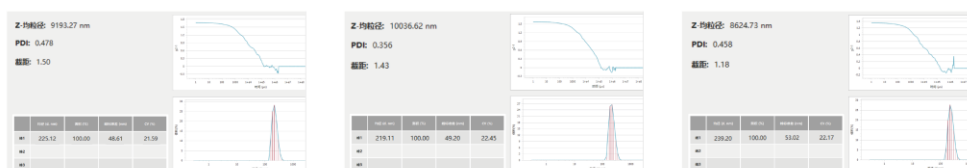
ζ-potential



Fig. S16. Particle size and zeta potential of PFPTX under pH = 6.2.

pH = 5.3

Nanoparticle size



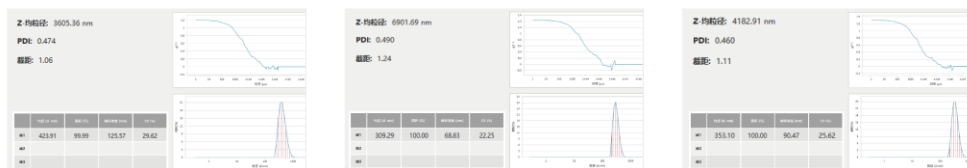
ζ-potential



Fig. S17. Particle size and zeta potential of PFPTX under pH = 5.3.

pH = 4.1

Nanoparticle size



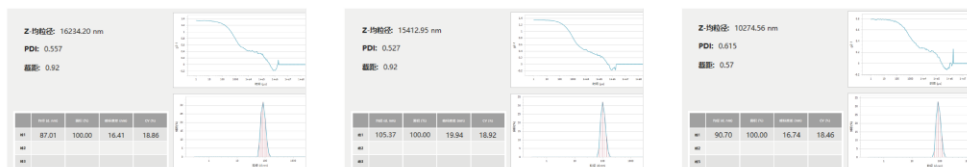
ζ-potential



Fig. S18. Particle size and zeta potential of PFPTX under pH = 4.1.

pH = 2.6

Nanoparticle size



ζ-potential



Fig. S19. Particle size and zeta potential of PFPTX under pH = 2.6.

16. Table S3. ζ -potential of NPs.(n = 10)

NPs	PFGEM	PFOXP	PFPMPT	PFEPS	PFMTX	PFPTX
Zeta potential (mV)	-0.20	-0.21	-1.19	-2.13	-0.11	-1.01
	-0.23	-2.54	-0.85	-5.20	-0.19	-0.60
	-3.89	-0.11	-0.16	-5.57	-1.12	-2.28
	-3.30	-0.90	-0.93	-5.31	-1.85	-0.73
	-1.27	-2.05	-2.63	-4.28	-2.58	-0.74
	-1.61	-2.32	-1.02	-3.89	-0.82	-3.45
	0.10	-1.16	-0.85	-5.21	-0.47	-1.47
	-3.64	-0.88	-0.75	-6.35	-0.67	-1.11
	0.17	-0.67	0.19	-1.97	-0.86	-1.60
	0.04	-0.12	-3.22	-3.05	-1.88	-0.82