

Electronic Supplementary Information (ESI)

Redox/ATP switchable theranostic nanoparticles for real-time fluorescence monitoring of doxorubicin delivery.

Yi Lin,^a Yidi Yang,^a Jianqin Yan,^a Jun Chen,^a Jun Cao,^a Yuji Pu,^a Li Li^{*a} and Bin He^a

^aNational Engineering Research Center for Biomaterials, Sichuan University, Chengdu
610064, China

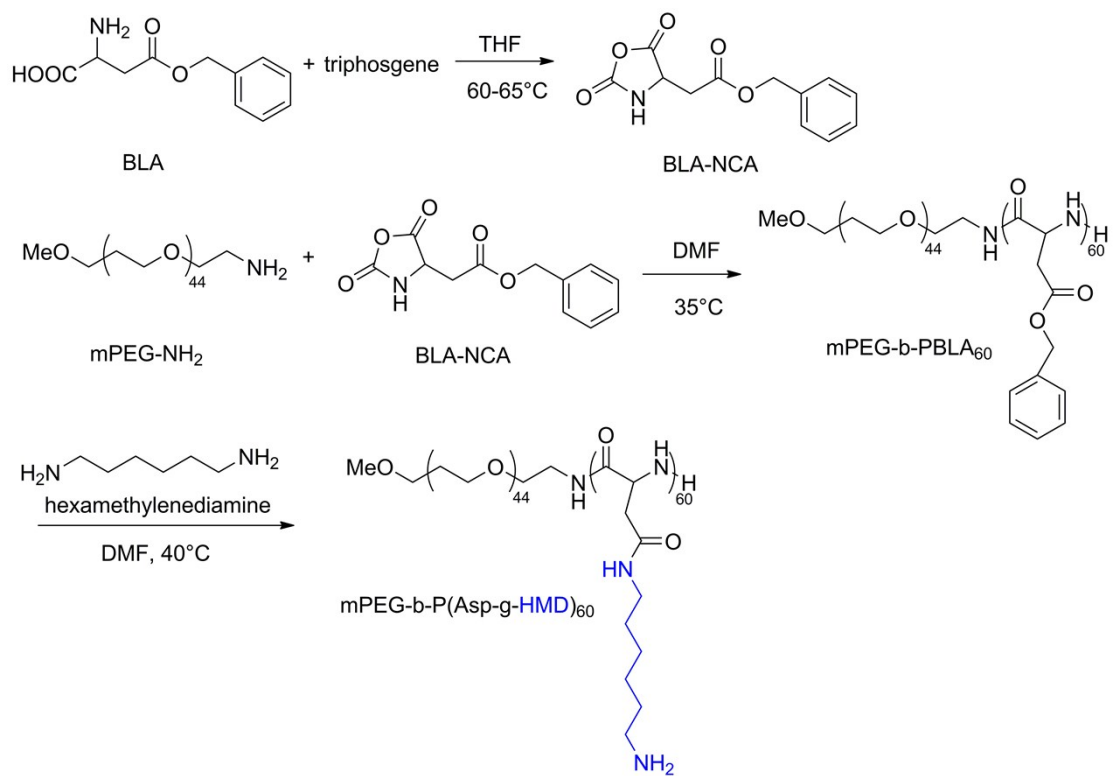
Corresponding authors:

Associate Prof. Li Li

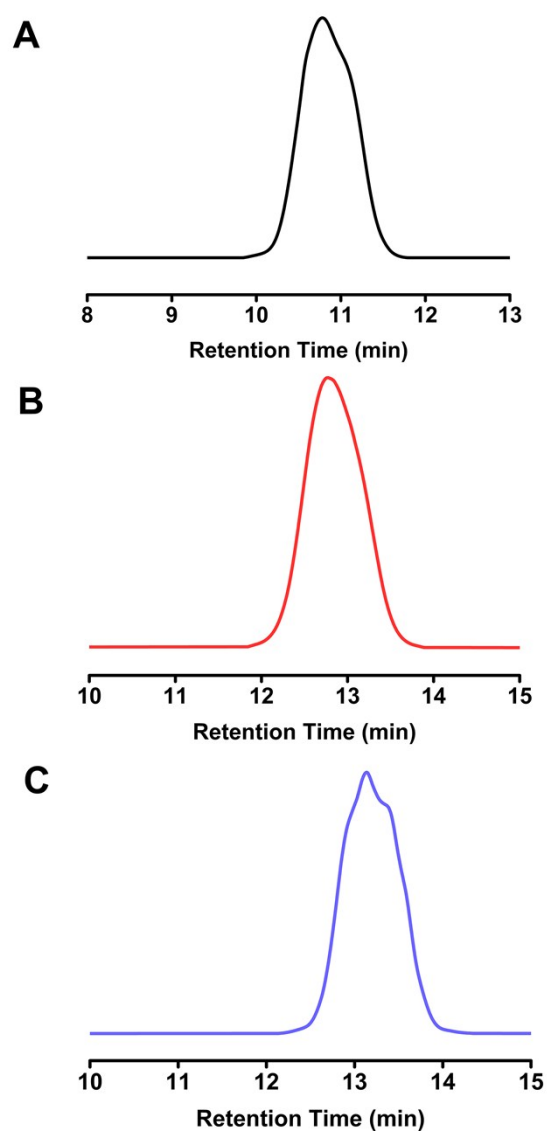
Tel: +86 28 8547 0770

Fax: +86 28 8541 2848

Email: li_li@scu.edu.cn



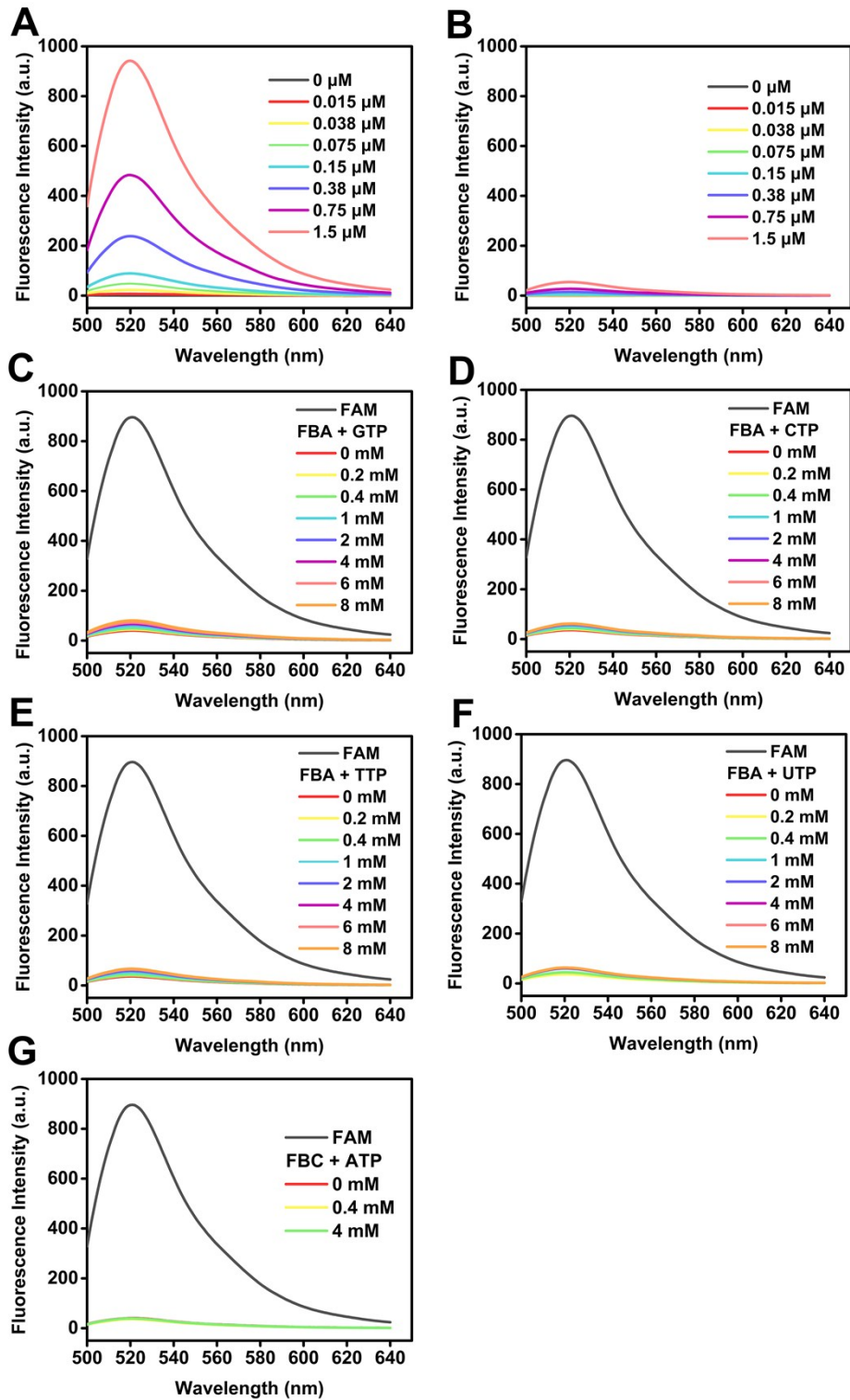
Supplementary Scheme 1. The synthesis for non-responsive cationic polymers mPEG-*b*-P(Asp-*g*-HMD)₆₀.



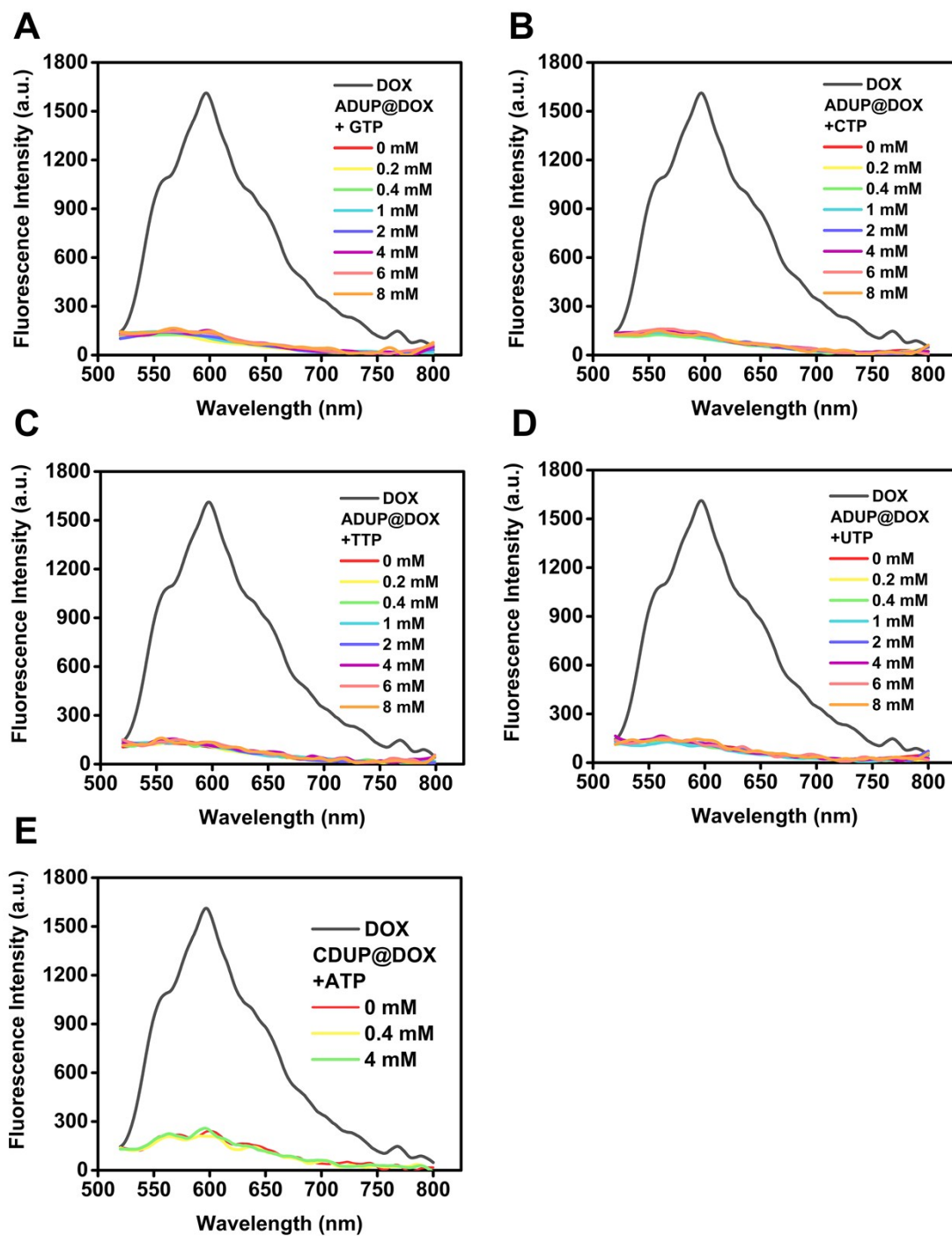
D

polymer	Mn	PD
(A) mPEG- <i>b</i> -PBLA ₆₀	17166	1.14
(B) mPEG- <i>b</i> -P(Asp- <i>g</i> -CYS) ₆₀	19940	1.09
(C) mPEG- <i>b</i> -P(Asp- <i>g</i> -HMD) ₆₀	18143	1.12

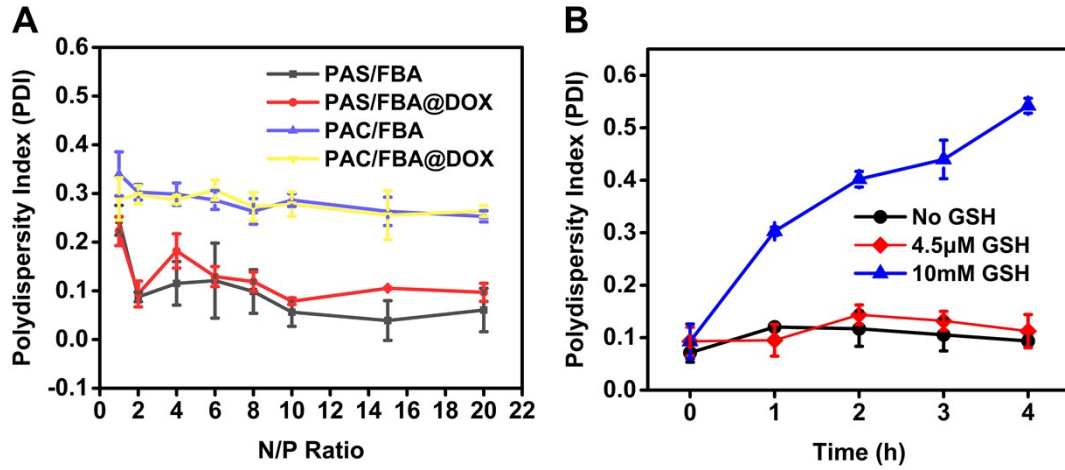
Supplementary Fig. 1 (A-C) GPC chromatograms of mPEG-*b*-PBLA₆₀ (A), mPEG-*b*-P(Asp-*g*-CYS)₆₀ (B), and mPEG-*b*-P(Asp-*g*-HMD)₆₀ (C). (D) The number average molecular weight and polydispersity of polymers.



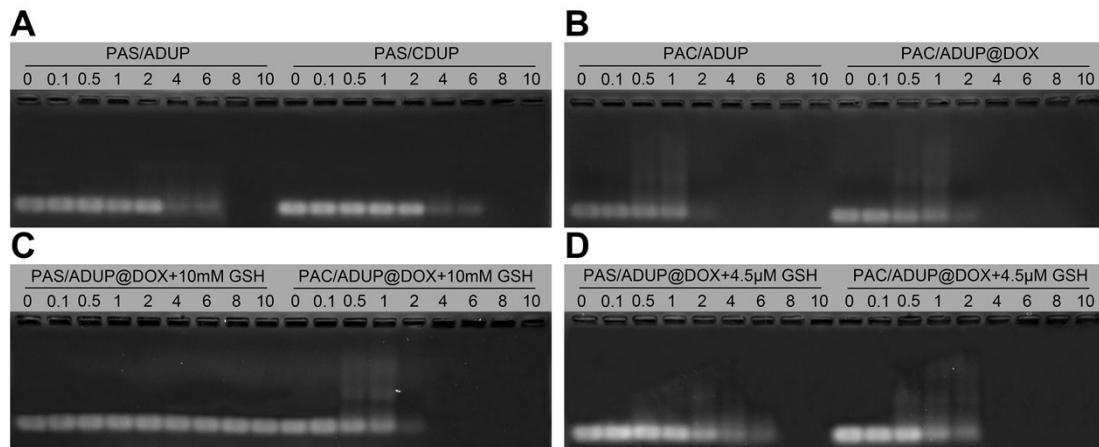
Supplementary Fig. 2 (A-B) The fluorescence spectra of unquenched FAM-labelled ATP-sensitive DNA duplex (A) and FBA (B) at various concentrations. (C-F) The fluorescence of FBA (0.5 μM) in the presence of 4 mM GTP (C), CTP (D), TTP (E), or UTP (F) for 15 min. (G) The fluorescence of FBC (0.5 μM) in the presence of 4 mM ATP for 15 min.



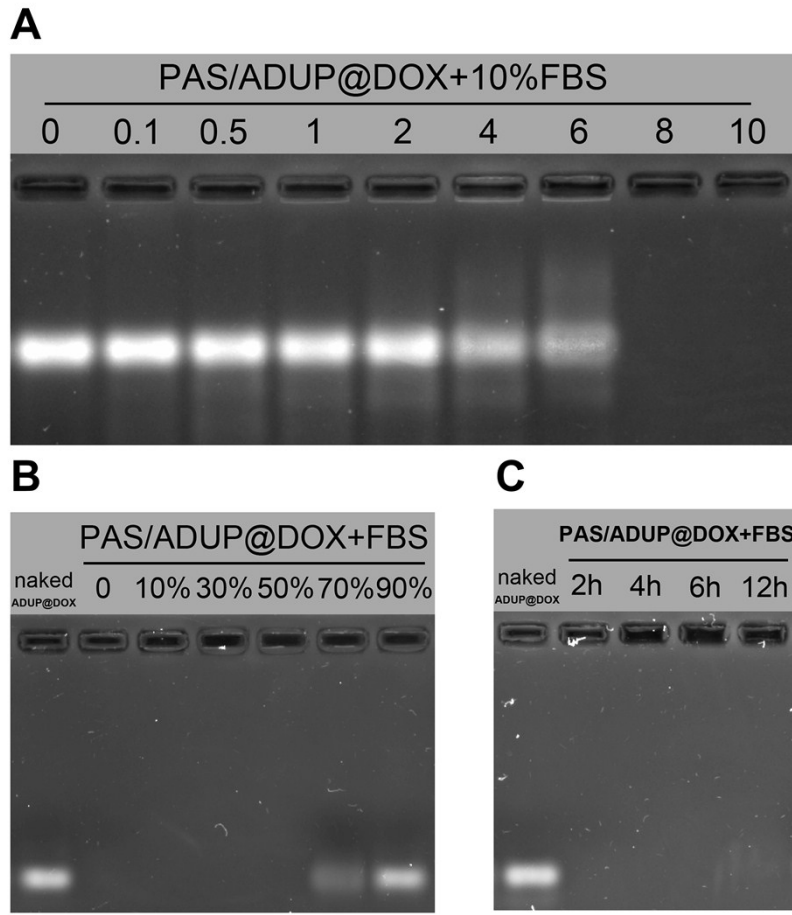
Supplementary Fig. 3 (A-D) The fluorescence spectra of ADUP@DOX in the presence of 4 mM GTP (A), CTP (B), TTP (C), or UTP (D) for 15 min. (E) The fluorescence spectra of CDUP@DOX in the presence of 4 mM ATP for 15 min.



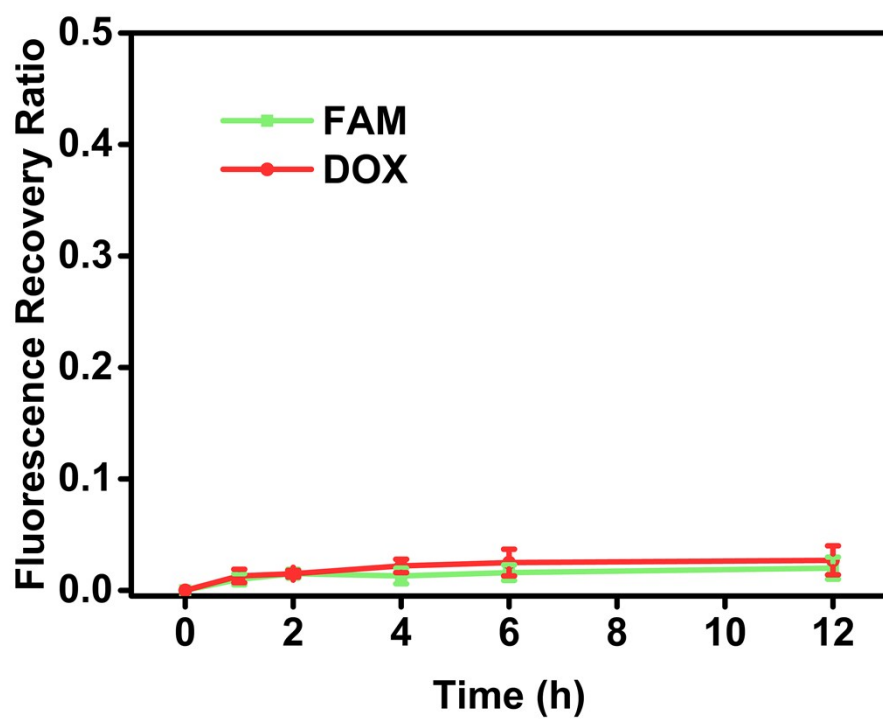
Supplementary Fig. 4 (A) The polydispersity index (PDI) of PAS/FBA, PAC/FBA, PAS/FBA@DOX and PAC/FBA@DOX TNs at various N/P ratio from 1 to 20. Error bars indicate SD (n=3). (B) The polydispersity index (PDI) of PAS/ADUP@DOX TNs in the presence of 10 mM GSH at different time (0, 1, 2, 3, and 4 h). Error bars indicate SD (n=3).



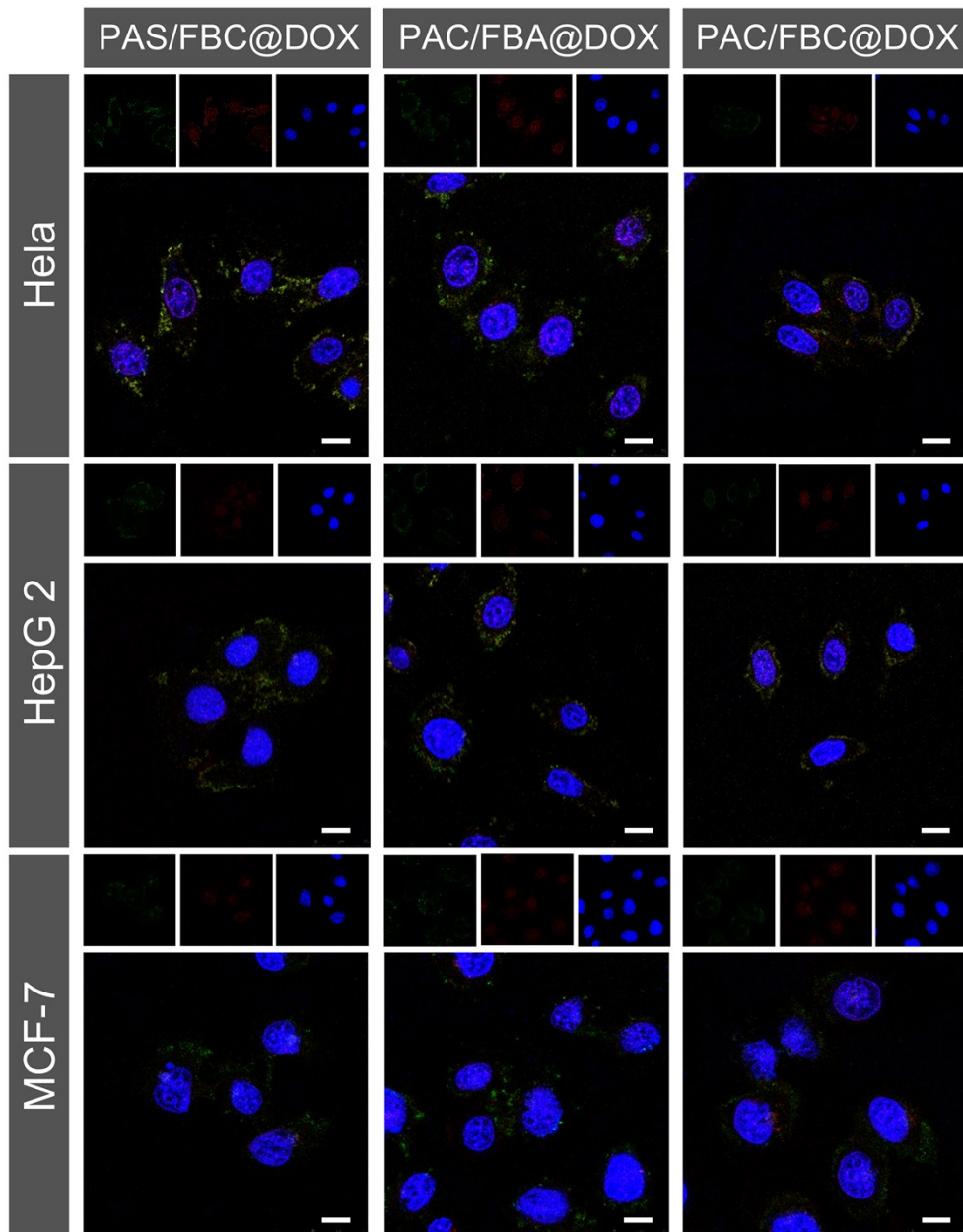
Supplementary Fig. 5 (A) Agarose gel electrophoresis retardation of PAS/ADUP and PAS/CDUP at various N/P ratio from 0.1 to 10. (B) Agarose gel electrophoresis retardation of PAC/ADUP and PAC/ADUP@DOX TNs at various N/P ratio from 0.1 to 10. (C-D) Agarose gel electrophoresis retardation of PAS/ADUP@DOX and PAC/ADUP@DOX TNs after incubation with 10 mM GSH (C) or 4.5 μM GSH (D) for 2 h.



Supplementary Fig. 6 (A) Agarose gel electrophoresis retardation of PAS/ADUP@DOX in 10% FBS at various N/P ratio from 0.1 to 10. (B) Agarose gel electrophoresis retardation of PAS/ADUP@DOX at an N/P ratio of 10 in a series of content of FBS from 0 to 90%. (C) Agarose gel electrophoresis retardation of PAS/ADUP@DOX at an N/P ratio of 10 after incubation with 10% FBS at various time from 2 h to 12 h.



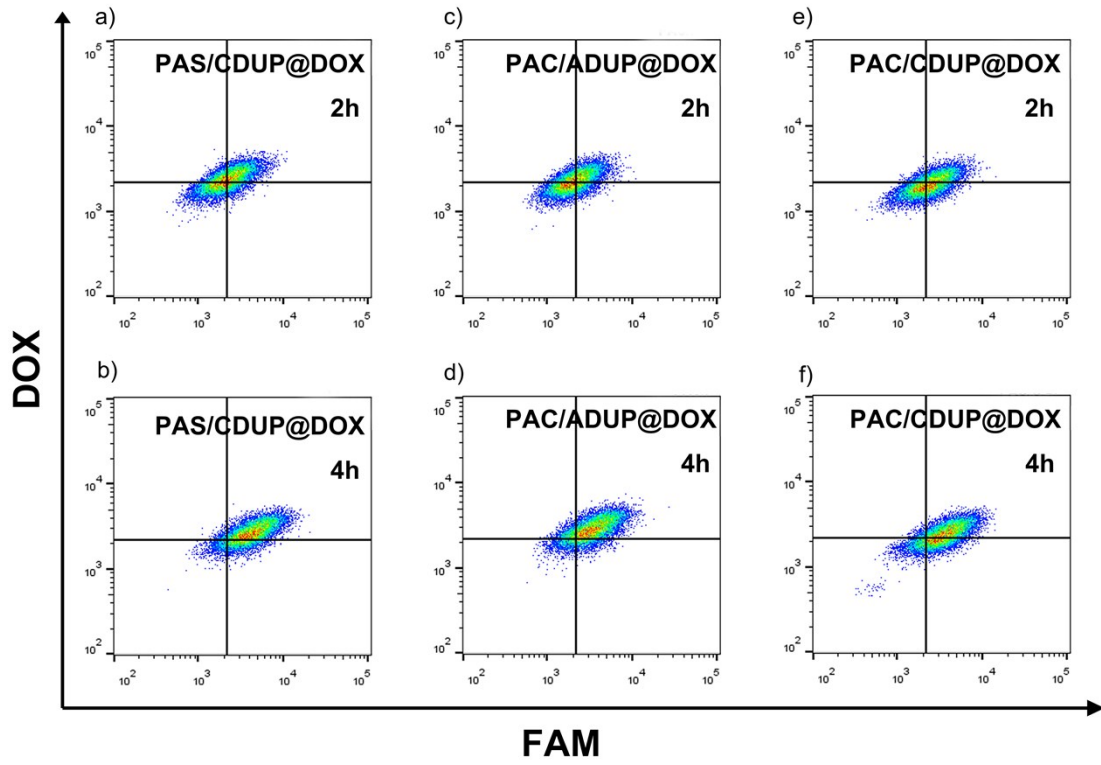
Supplementary Fig. 7 Fluorescence recovery ratios of FAM and DOX of PAS/FBA@DOX TNs in the presence of 10% FBS at various time from 1 h to 12 h. Error bars indicate SD (n =3).



Supplementary Fig. 8 Cellular uptake and intracellular FAM imaging and DOX distribution of control

TNs HeLa, HepG 2 and MCF-7 cells after 4 h incubation observed by CLSM. Blue: the nuclei stained by

Hoechst 33342; Green: FAM; Red: DOX. Scale bars are 10 µm.



Supplementary Fig. 9 The fluorescent intensity of FAM and DOX of control TNs in HeLa cells at 2 h and 4 h by flow cytometry.