

## Supporting Information

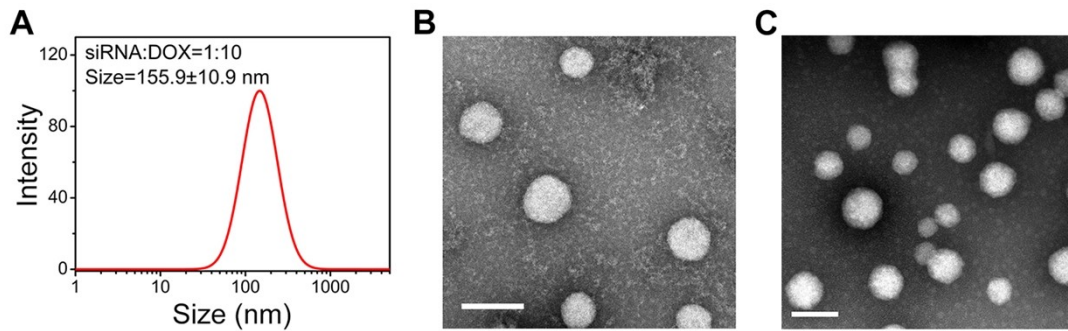
### **Erythrocyte membrane camouflaged siRNA/chemodrugs nanoassemblies for cancer combination therapy**

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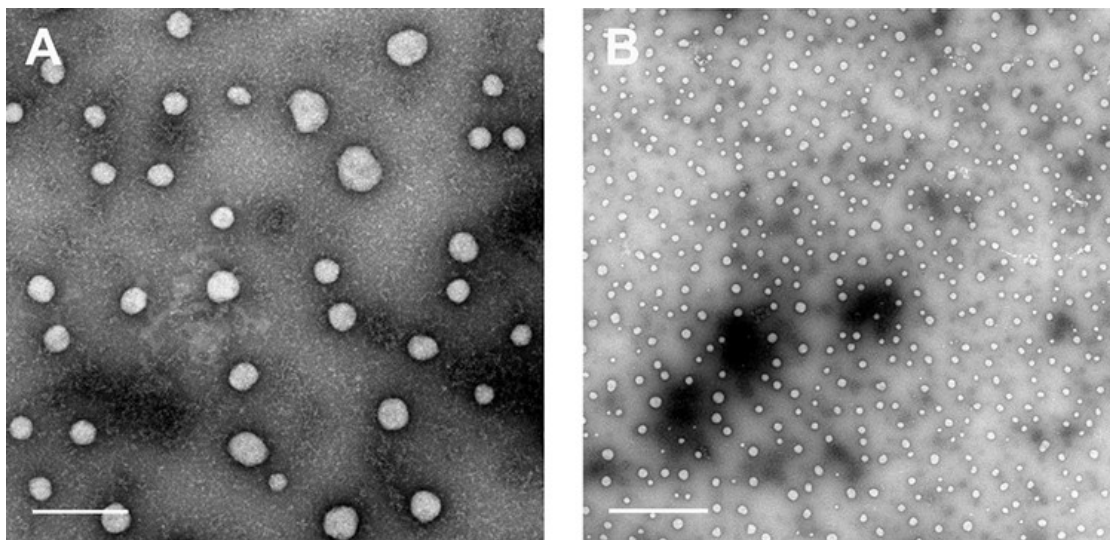
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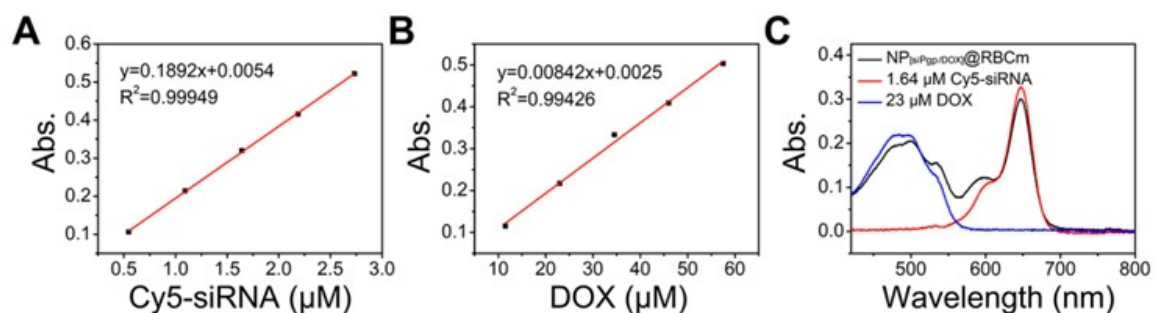
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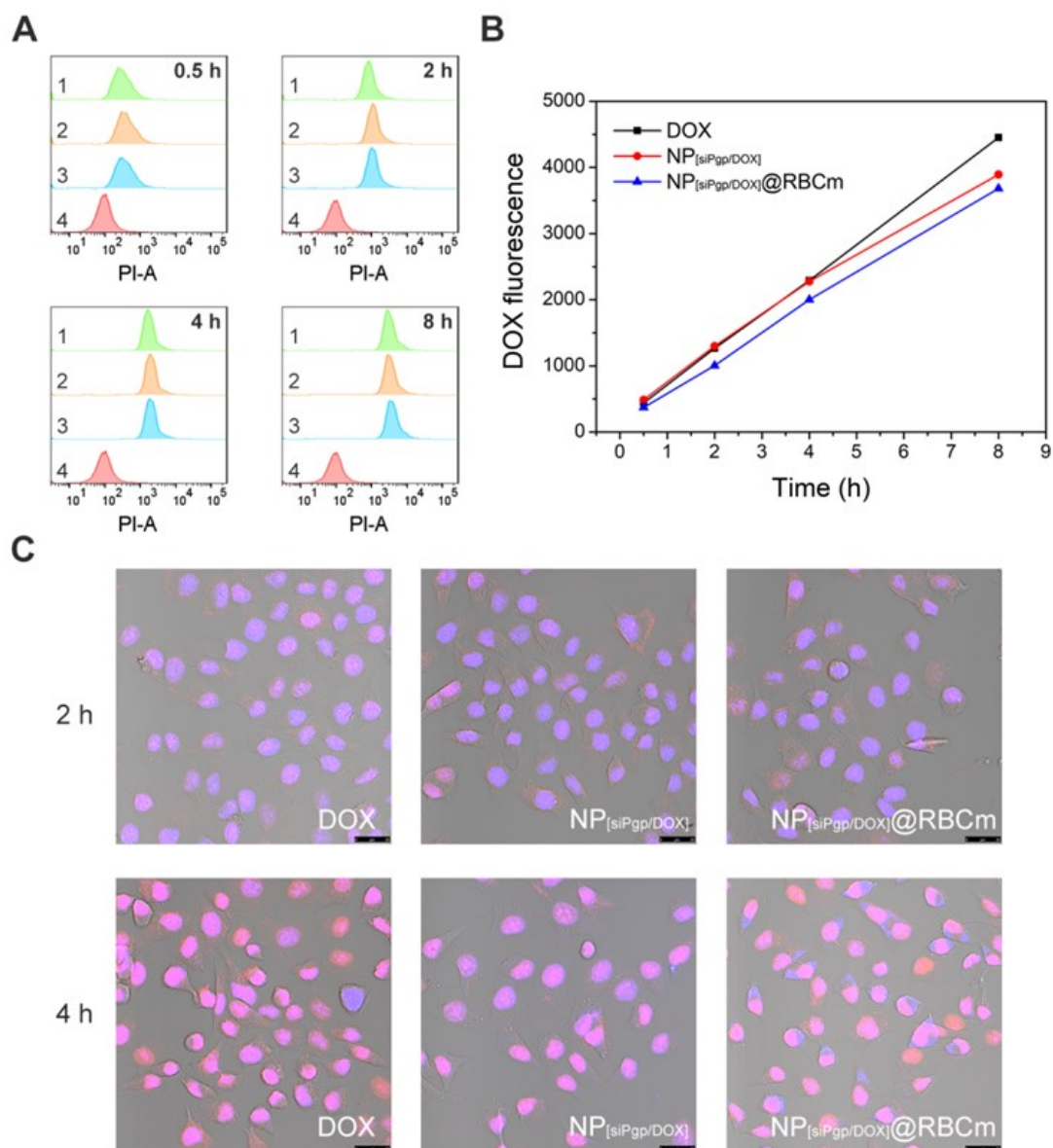
**Fig. S1** Dynamic light scattering (DLS) and transmission electron microscope (TEM) characterization of NP<sub>[siPgp/DOX]</sub> with siPgp and DOX molar ratio of 1:10. (A) Hydrodynamic diameter of NP<sub>[siPgp/DOX]</sub> by DLS. (B) TEM image of NP<sub>[siPgp/DOX]</sub> (Scale bar: 200 nm). (C) Large-view TEM image of NP<sub>[siPgp/DOX]</sub> (Scale bar: 200 nm).



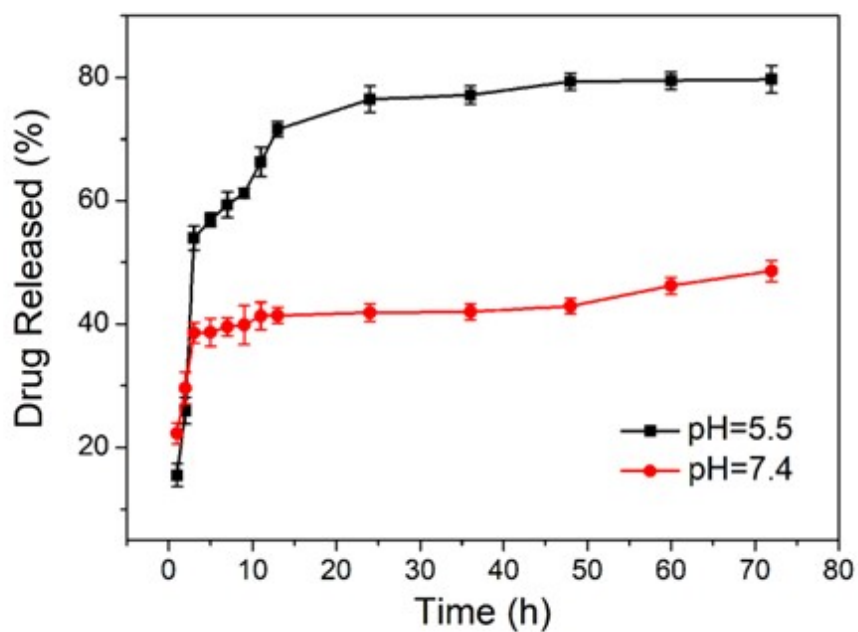
**Fig. S2** Large-view TEM pictures of negatively-stained NP<sub>[siPgp/DOX]</sub>. Scale bar: (A) 500 nm, (B) 2  $\mu$ m.



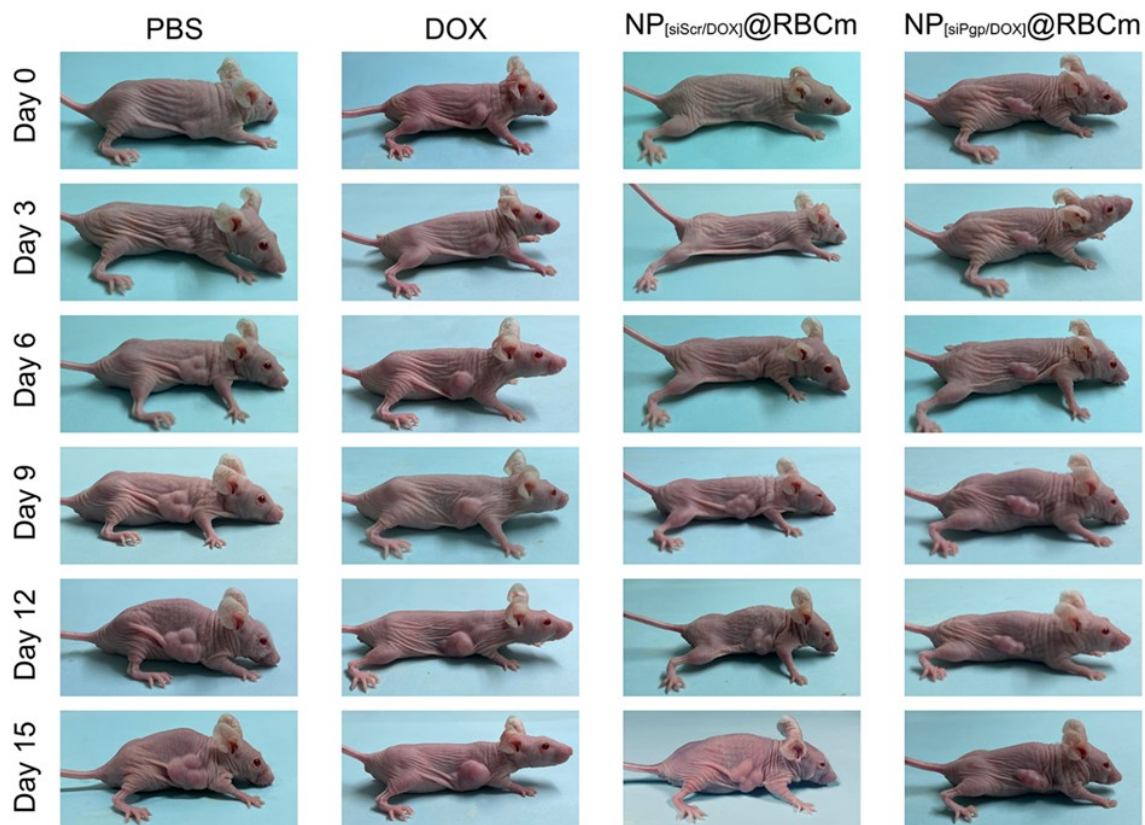
**Fig. S3** Encapsulation efficiency of NP<sub>[siPgp/DOX]</sub>@RBCm detected by UV-vis spectroscopy. (A) Standard curve of Cy5-siPgp in heparin solution,  $\lambda_{ex}$  = 643 nm. (B) Standard curve of free DOX in DMSO/heparin solution,  $\lambda_{ex}$  = 488 nm. (C) UV absorbance curve of 1.64  $\mu$ M of Cy5-siPgp and 23  $\mu$ M of DOX and NP<sub>[siPgp/DOX]</sub>@RBCm after treated with DMSO/heparin solution.



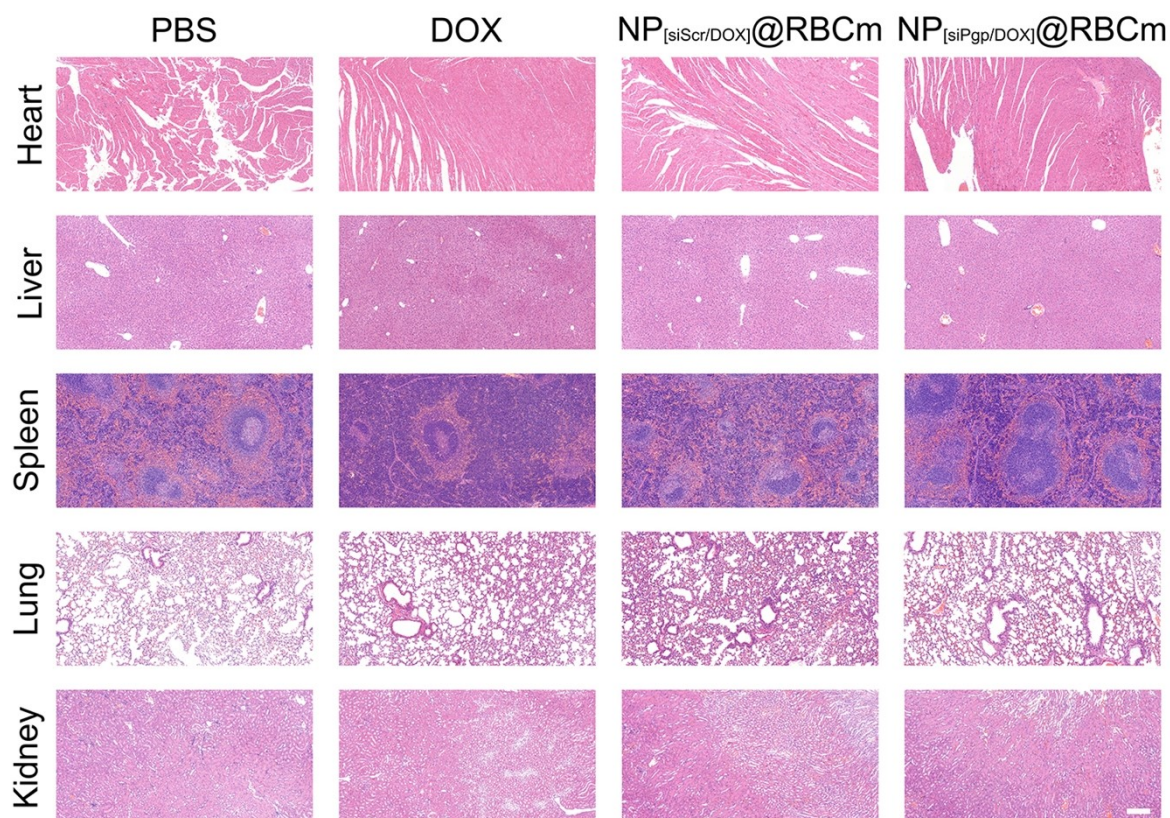
**Fig. S4** Cellular uptake of free DOX, NP<sub>[siPgp/DOX]</sub> and NP<sub>[siPgp/DOX]</sub>@RBCm. (A) Flow cytometry of HeLa/ADR cells incubated with free DOX, NP<sub>[siPgp/DOX]</sub> and NP<sub>[siPgp/DOX]</sub>@RBCm respectively (1. NP<sub>[siPgp/DOX]</sub>@RBCm, 2. NP<sub>[siPgp/DOX]</sub>, 3. free DOX, 4. PBS). (B) Quantitative analysis of flow cytometry of HeLa/ADR cells incubated with free DOX, NP<sub>[siPgp/DOX]</sub> and NP<sub>[siPgp/DOX]</sub>@RBCm for different time intervals (0.5 h, 2 h, 4 h and 8 h). (C) CLSM images of HeLa/ADR cells incubated with free DOX, NP<sub>[siPgp/DOX]</sub> or NP<sub>[siPgp/DOX]</sub>@RBCm for 2 h and 4 h (red: DOX, blue: Hoechst 33342). Scale bar: 25  $\mu$ m.



**Fig. S5** *In vitro* drug release profiles of NP<sub>[siPgp/DOX]</sub>@RBCm. UV spectroscopy detection of drug release at different pH values of acid environment (PBS, pH = 5.5) and neutral environment (PBS, pH = 7.4)



**Fig. S6** Photographs of HeLa/ADR tumor-bearing nude mice.



**Fig. S7** H&E staining images of heart, liver, spleen, lung and kidneys of mice after treatments (Scale bar: 100  $\mu\text{m}$ ).

**Table S1.** Repulsive parameters ( $a_{ij}$ ) between beads for DPD simulation used in this work.

	P	N	D	W
P	25.00			
N	35.00	25.00		
D	15.00	35.00	25.00	
W	26.00	40.00	50.00	25.00

**Table S2.** Encapsulation efficiency of DOX and mole ratio of encapsulated DOX and siPgp after  $\text{NP}_{[\text{siPgp}/\text{DOX}]}$  were wrapped by RBCm detected by UV-vis spectroscopy.

Molar ratio of DOX and siPgp	DOX Conc. ( $\mu\text{M}$ )	siPgp Conc. ( $\mu\text{M}$ )	Molar ratio of DOX and siPgp	DOX loading efficiency (%)
10	7.72	1.48	5.22	18.56
20	20.31	1.56	13.02	36.24

**Table S3.**  $\text{IC}_{50}$  values of DOX,  $\text{NP}_{[\text{siScr}/\text{DOX}]}$ ,  $\text{NP}_{[\text{siPgp}/\text{DOX}]}$ ,  $\text{NP}_{[\text{siScr}/\text{DOX}]}\text{@RBCm}$  and  $\text{NP}_{[\text{siPgp}/\text{DOX}]}\text{@RBCm}$ .

	DOX	$\text{NP}_{[\text{siScr}/\text{DOX}]}$	$\text{NP}_{[\text{siPgp}/\text{DOX}]}$	$\text{NP}_{[\text{siScr}/\text{DOX}]}\text{@RBCm}$	$\text{NP}_{[\text{siPgp}/\text{DOX}]}\text{@RBCm}$
$\text{IC}_{50}$ ( $\mu\text{g}/\text{mL}$ )	2.5	2.2	1.8	1.9	0.9