

Supporting Information

Dual Chemodrug-Loaded Single-Walled Carbon Nanohorns for Multimodal Imaging-Guided Chemo-Photothermal Therapy of Tumors and Lung Metastases

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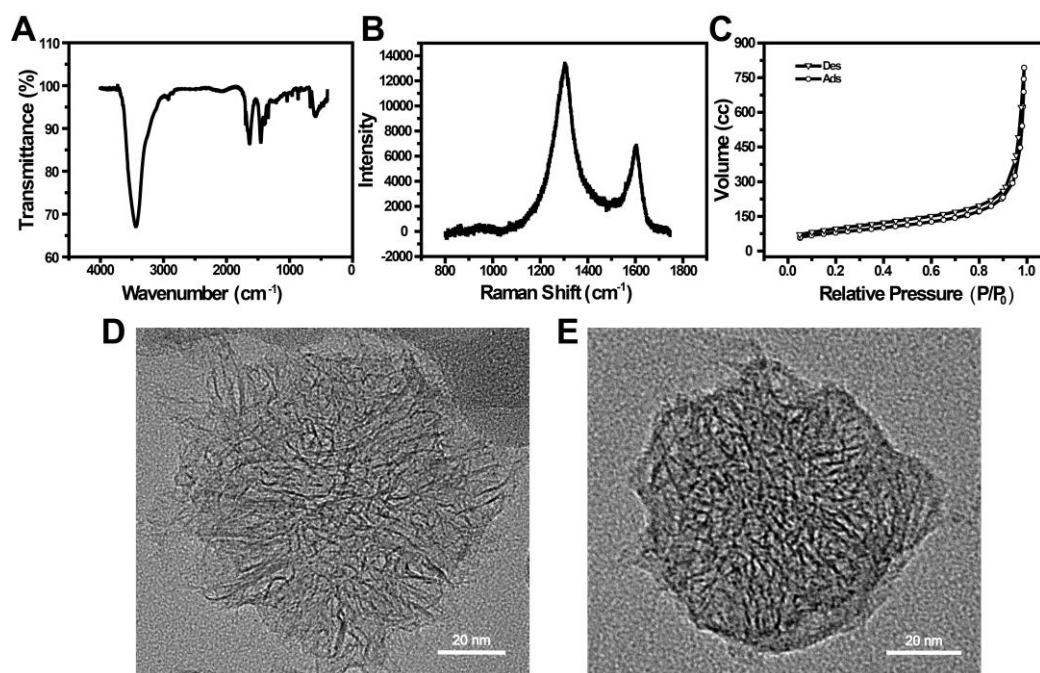


Figure S1. Characterization of the SWNHs. A) FTIR spectrum of SWNHs. B) Raman spectrum of SWNHs. C) BET isotherm measurements of nitrogen adsorption-desorption. D, E) TEM image of pristine SWNHs (D) and dual drug-loaded onto modified SWNHs (SWNHs/C₁₈PMH/mPEG-PLA-DOX-Pt) (E) dropped on holey formvar carbon coated grids.

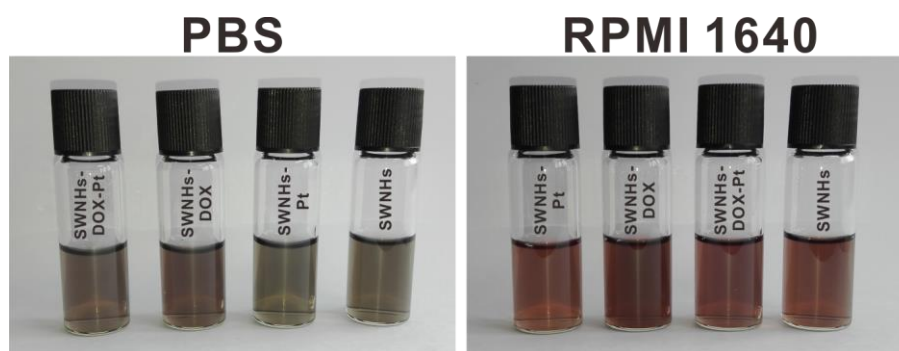


Figure S2. Photographs of the drug-free and drug-loaded SWNHs in PBS and RPMI-1640 after centrifugation at a speed of 12,857 $\times g$ for 1 h. SWNHs represent SWNHs/C₁₈PMH/mPEG-PLA in the photographs.

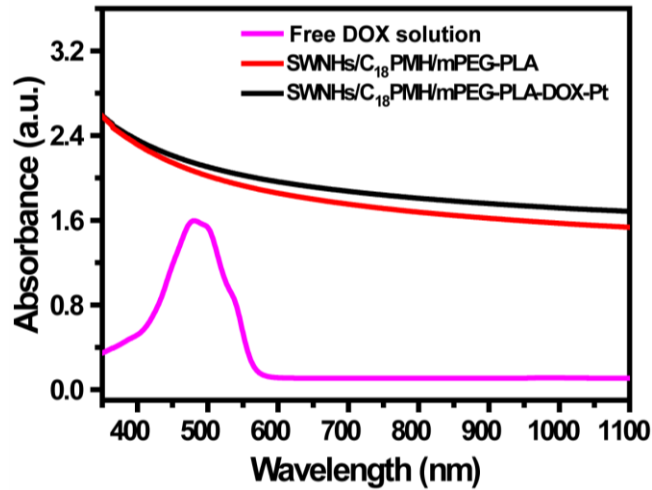


Figure S3. UV–VIS–NIR spectra of free DOX, SWNHs/C₁₈PMH/mPEG-PLA and SWNHs/C₁₈PMH/mPEG-PLA-DOX-Pt.

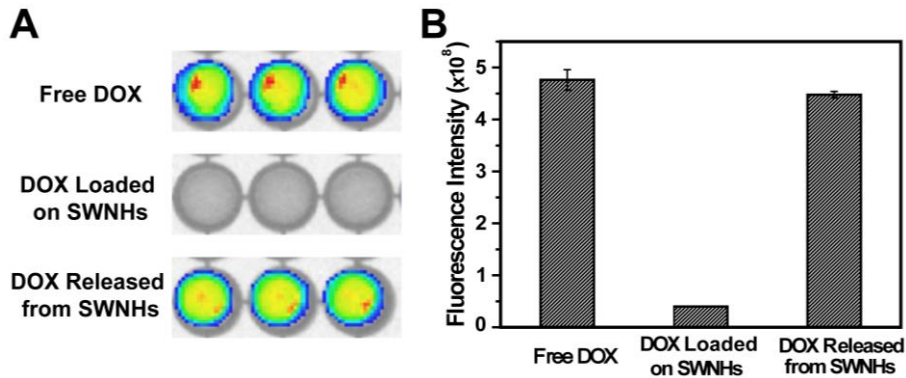


Figure S4. A, B) Fluorescence images and intensity of DOX before and after released from SWNHs.

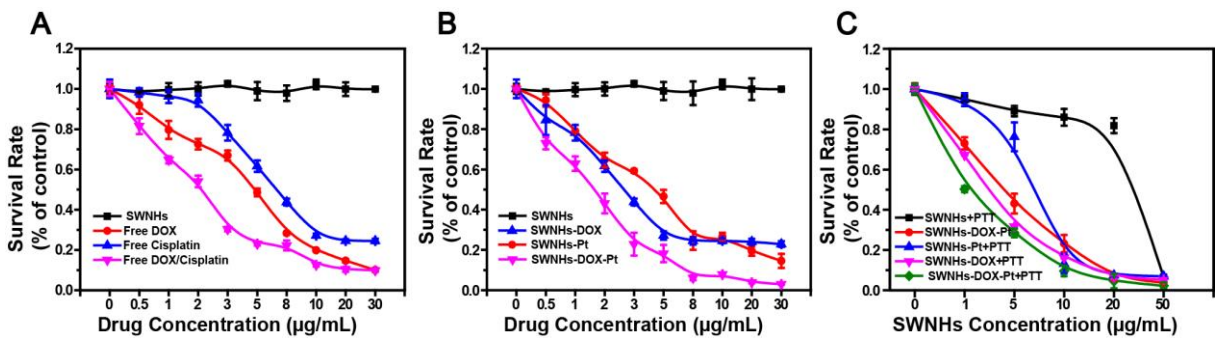


Figure S5. Viability of 4T1 cells after treated with free DOX, cisplatin, and DOX/cisplatin combination before (A) and after (B) loaded on the modified SWNHs. (C) 4T1 cells treated with single chemotherapeutic DOX, cisplatin or combination DOX/cisplatin (2.9:1 molar ratio) loaded SWNHs under 808 nm laser at power density of 0.4 W/cm² for 3 min. After treatment,

cells were further maintained for 24 h and cell viability was evaluated by CCK-8 assay. SWNHs represent SWNHs/C₁₈PMH/mPEG-PLA, PTT represent photothermal treatment.

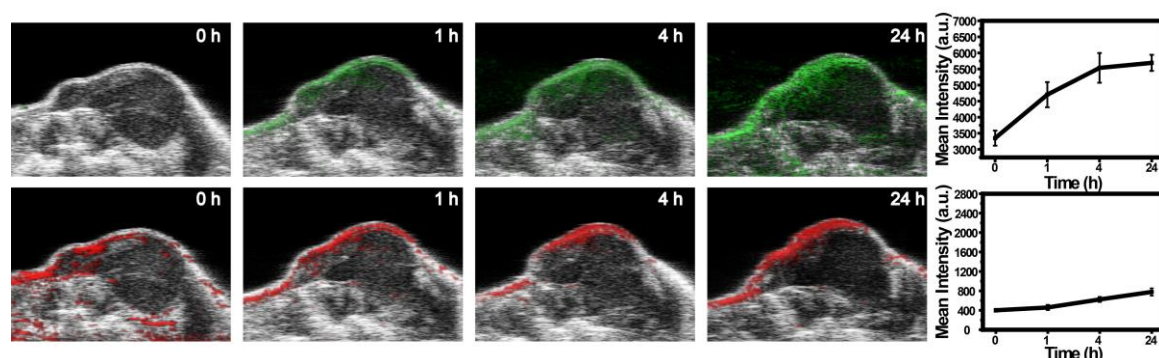


Figure S6. Photoacoustic imaging and its mean signal intensity of tumors after the tumor-bearing mice were intravenously injected with SWNHs/C₁₈PMH/mPEG-PLA-DOX-Pt (10 mg SWNHs/kg body weight, upper line). PAI was conducted using the Vevo 3100 system (Visualsonics Fujifilm, Tokyo, Japan). Lower line: photoacoustic imaging_F and the mean signal intensity of hemoglobin.

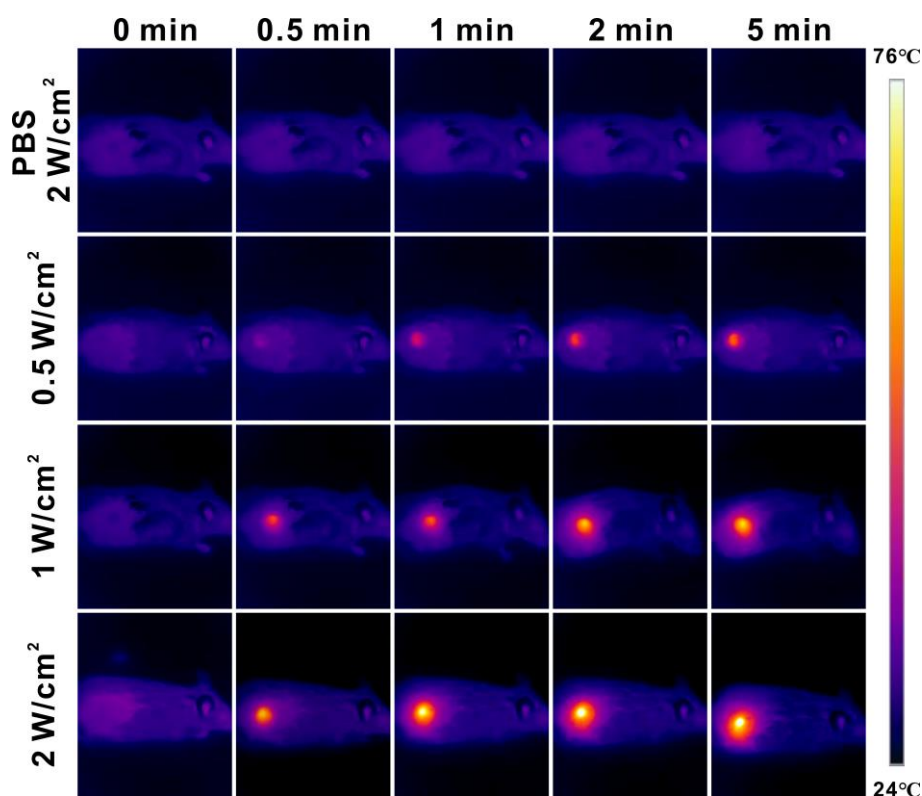


Figure S7. In vivo photothermal therapy. Infrared thermographic maps of 4T1 tumor-bearing mice were examined when the mice exposed to the NIR laser 808 nm irradiation at different laser density after 24 h post intravenous injection with SWNHs/C₁₈PMH/mPEG-PLA-Mal-DOX-Pt (10 mg SWNHs/kg body weight) and PBS solution as the control.

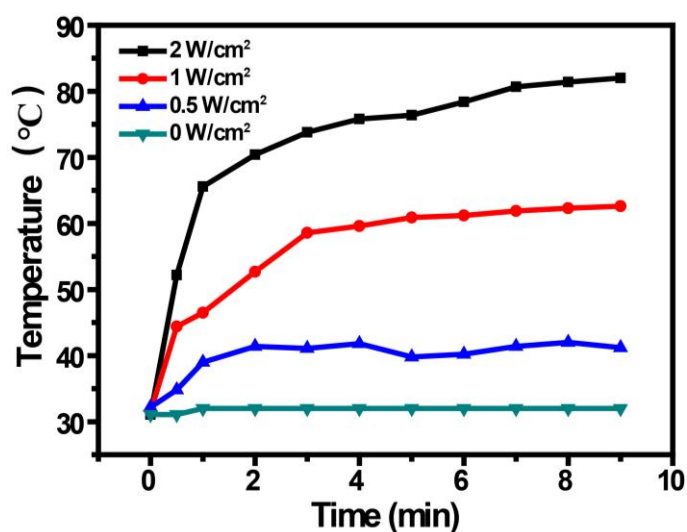


Figure S8. Change of temperature on tumor site monitored by the IR thermal camera during laser irradiation (0, 0.5, 1 and 2 W/cm²) after 24 h post intravenous injection with SWNHs/C₁₈PMH/mPEG-PLA (10 mg/kg body weight in SWNHs).

Table S1. Zeta potentials of the drug-free and drug-loaded SWNHs.

Nanoparticles	Zeta potential (mV)
Pristine SWNHs	-3.43 ± 0.76
SWNHs/C ₁₈ PMH/mPEG-PLA	-34.7 ± 1.8
SWNHs/C ₁₈ PMH/mPEG-PLA-DOX	-26.8 ± 2.43
SWNHs/C ₁₈ PMH/mPEG-PLA-Pt	-13.7 ± 1.21
SWNHs/C ₁₈ PMH/mPEG-PLA-DOX-Pt	-14.0 ± 1.11

Table S2. Drugs loading on the modified SWNHs (0.5 mg).

Code	DOX (mg/mL)	Cisplatin (mg/mL)	DOX		Cisplatin		D _{DLS} (nm)	PDI
			DLE(%)	DLC(%)	DLE(%)	DLC(%)		
1	0.25	0	87.9	30.5			160.4	0.091
2	0.5	0	84.4	45.8			168.4	0.105
3	1.0	0	83.8	62.6			213.8	0.182
4	1.5	0	83.6	71.5			304.9	0.420
5	0.25	0.30			42.5	20.0	180.2	0.105
6	0.25	0.62			33.4	28.9	182.5	0.151
7	0.25	1.23			27.0	39.6	181.9	0.184
8	0.25	1.8			18.0	40.6	184.7	0.188