Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.
This journal is © The Royal Society of Chemistry 2017

Supporting Information

Vitamin E based micelles with charge-reversible property for tumor growth inhibition and anti-metastasis

*Yu Sun[1], Yuling Bao[1, 2], Xue Jiang[1], Songwei Tan[1, 3, *], Mingxing Yin[1, 2], Conglian Yang[1], Liping Zhou[1], Zhiping Zhang[1, 3, 4, *]*

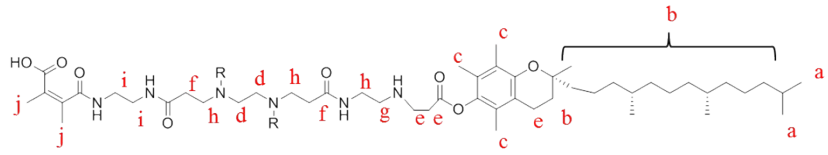
[1] Tongji School of Pharmacy

[2] Department of Pharmacy, Tongji Hospital, Tongji Medical School

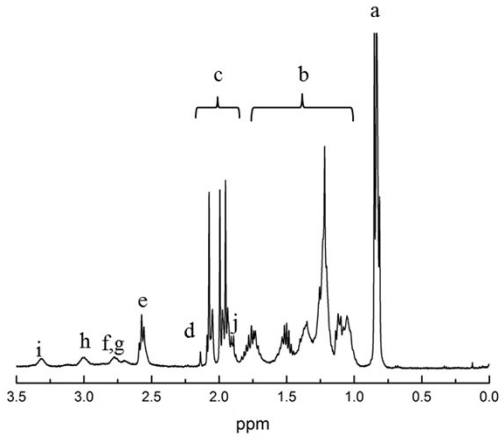
[3] National Engineering Research Center for Nanomedicine

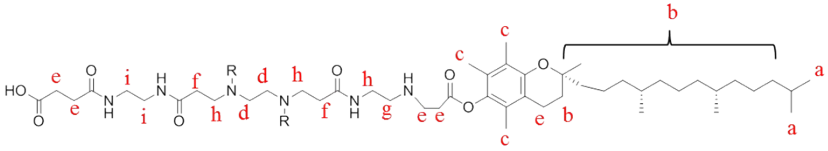
[4] Hubei Engineering Research Center for Novel Drug Delivery System, Huazhong University of Science and Technology, Wuhan 430030, China

* Corresponding author: tansongwei@gmail.com (S. Tan), zhipingzhang@mail.hust.edu.cn (Z. Zhang).

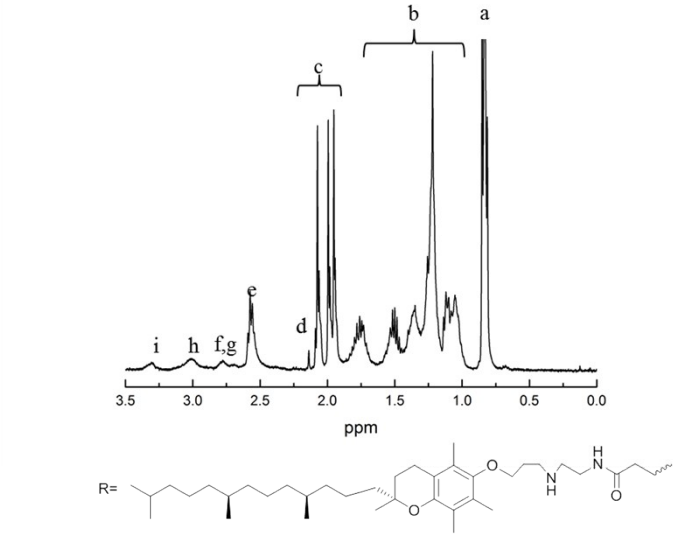


DPV

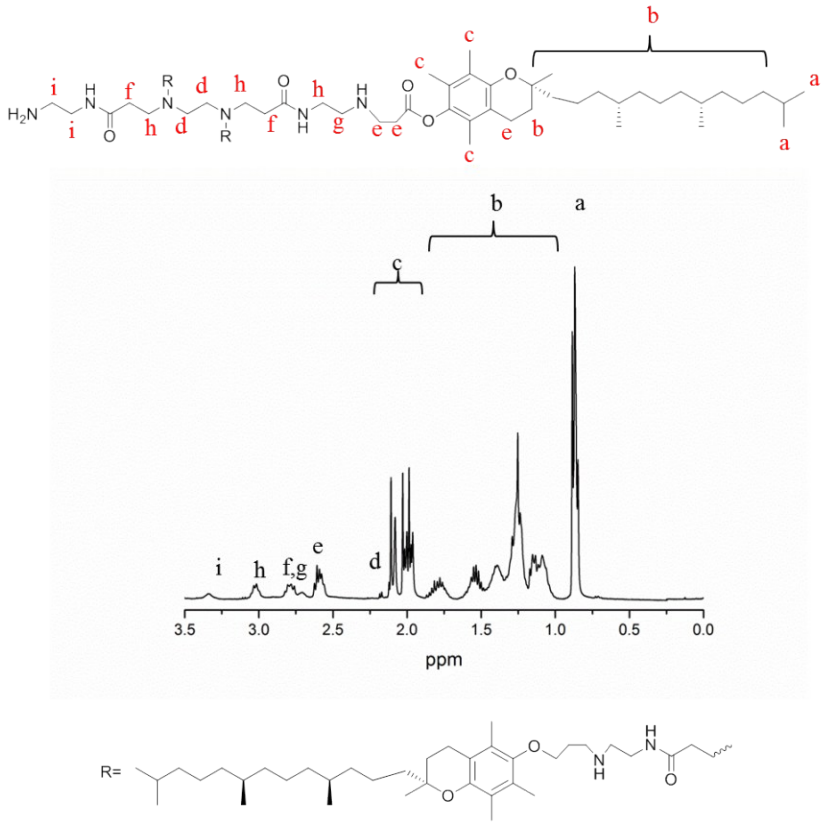




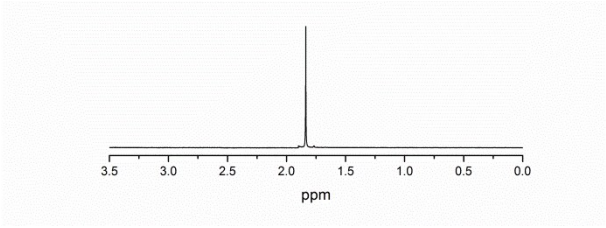
SPV



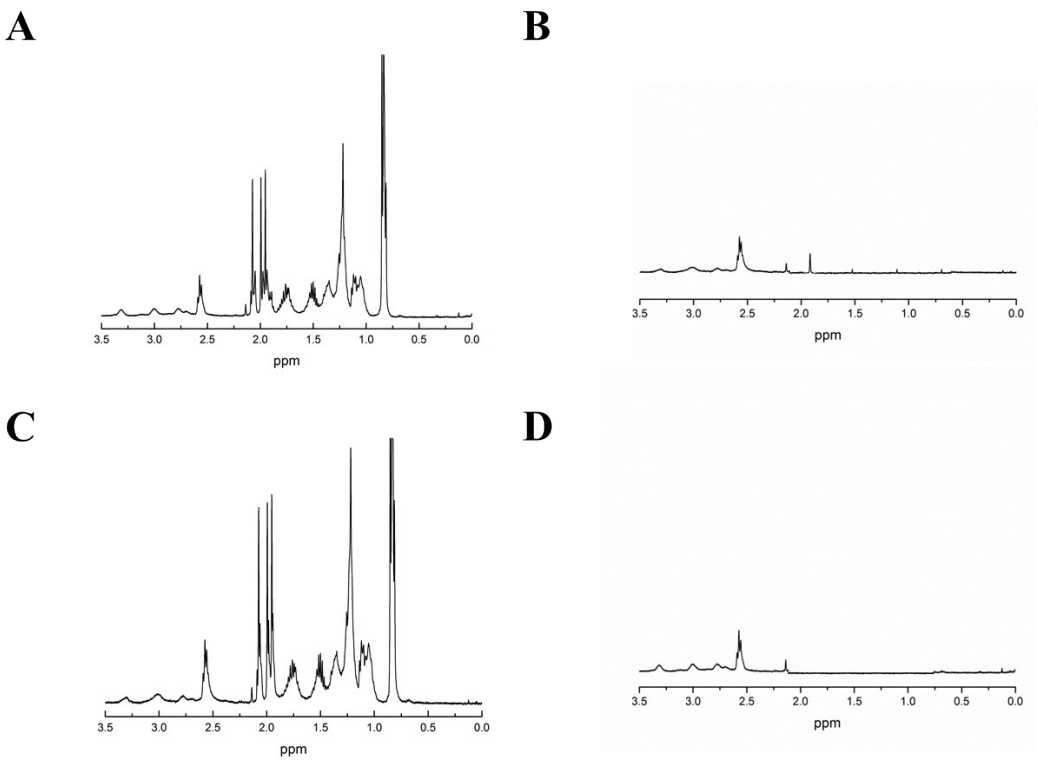
Scheme S1. ^{1}H NMR spectra of DPV and SPV.



Scheme S2. ^{1}H spectrum of the charge-reversal micelles after incubation under pH 5.5 for 4 h with the detachment of cleavable carboxylic amide.



Scheme S3. ^{1}H spectrum of the cleavable carboxylic amide.



Scheme S4. (A and B) ^{1}H NMR spectra of the DPV micelles in CCl_3D (A) and D_2O (B). (C and D) ^{1}H NMR spectra of the SPV micelles in D_2O (C) and CCl_3D (D).

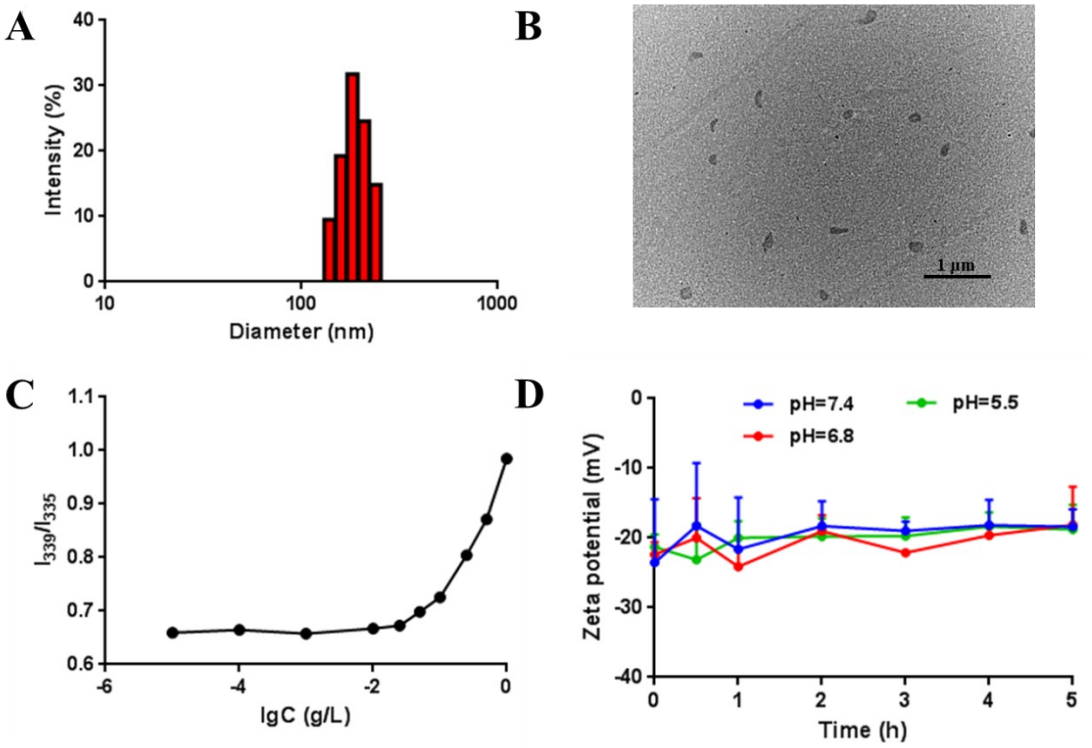


Figure S1. Characterization of SPVM. (A) The particle size distribution of SPVM. (B) TEM image of DPVM. (C) CMC of SPV. (D) Zeta potential of SPVM incubating at various pH (7.4, 6.8, 5.5) at 37 °C with the change of incubation time.

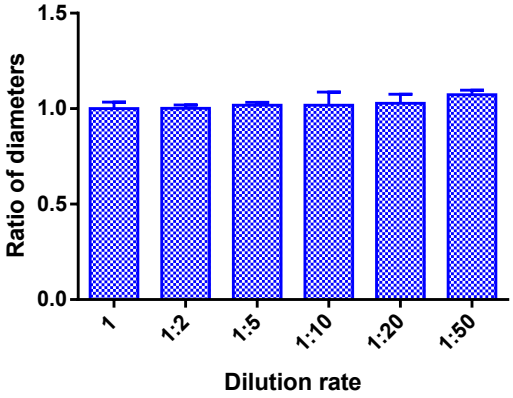


Figure S2. The stability of DPVM in FBS at pre-determined dilution factors.

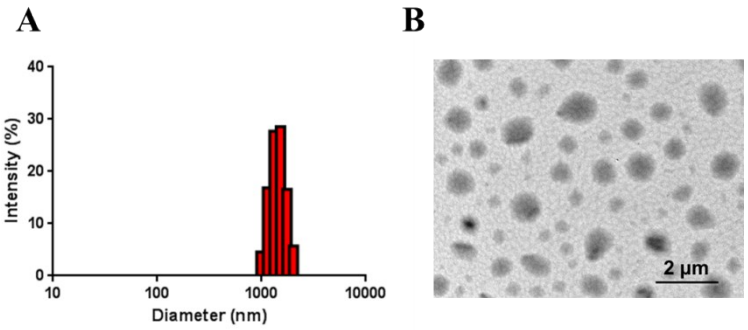


Figure S3. TEM image and DLS data of DPVM incubated at pH 5.5 after 1 h. (A) The particle size distribution of DPVM after incubation under pH 5.5 after 1 h. (B) TEM image of DPVM after incubated at pH 5.5 after 1 h.

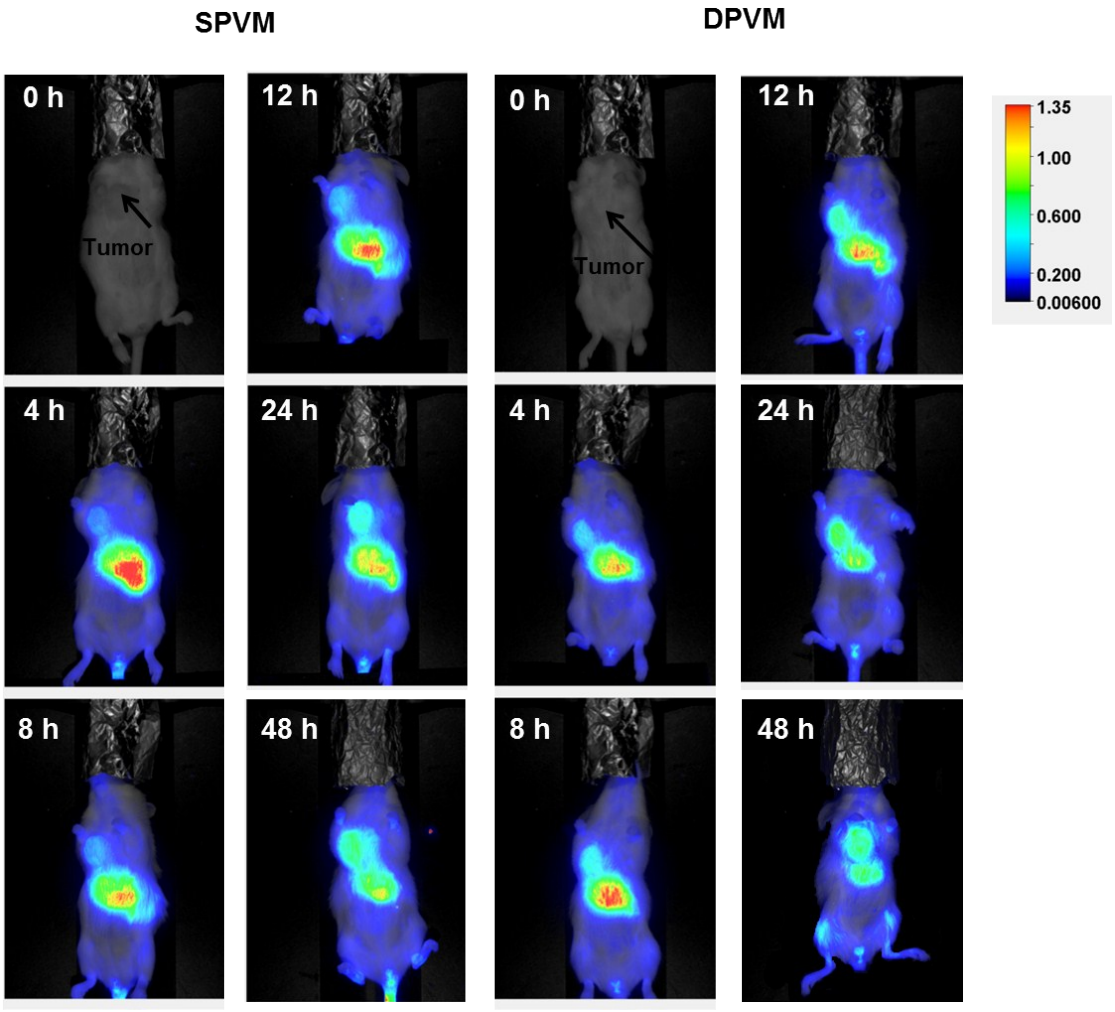


Figure S4. *In vivo* imaging studies of mice after injection *via* tail vein of DiR loaded SPVM and DPVM. Images of tumor-bearing mice were recorded at 0, 4, 8, 12, 24, and 48 h.

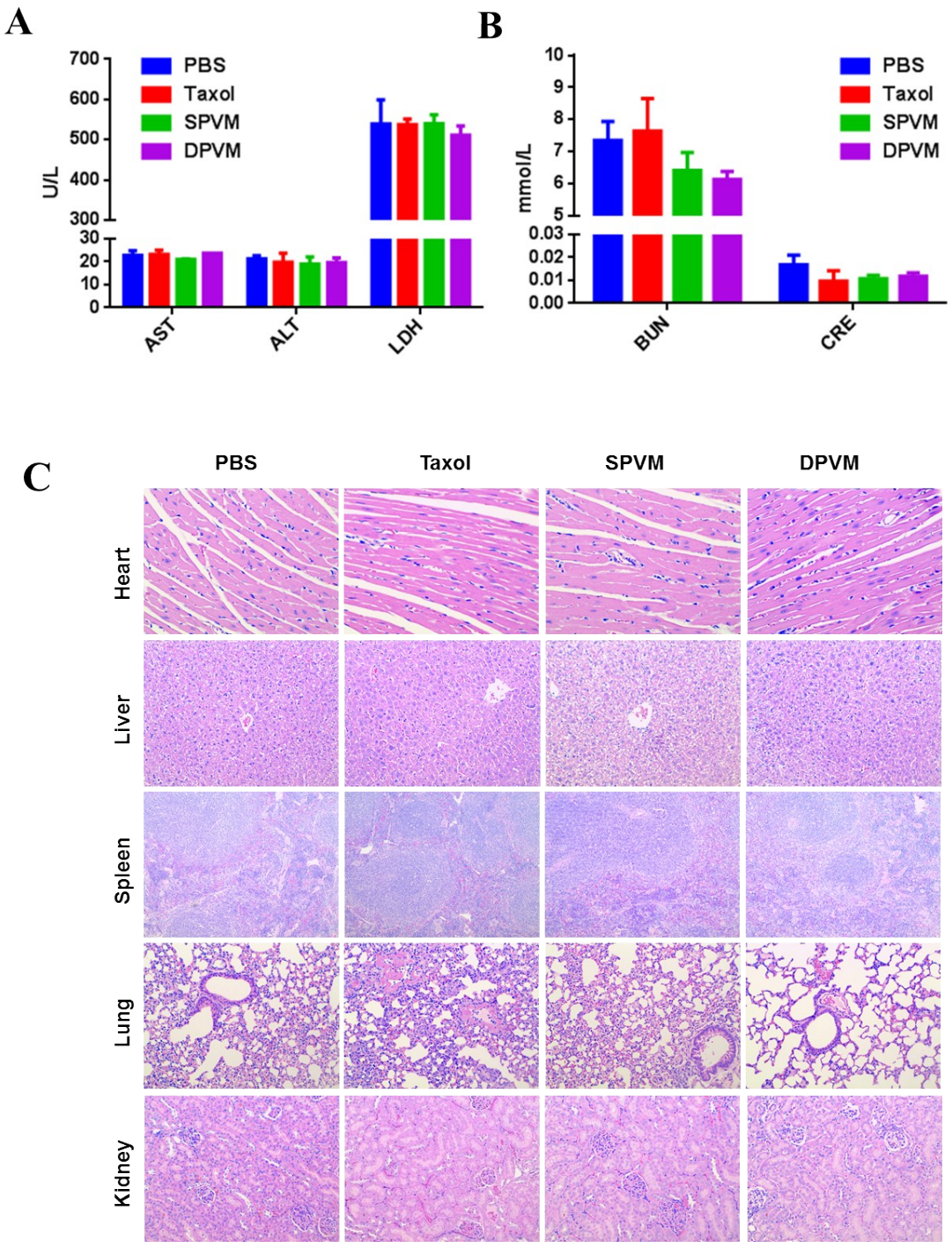


Figure S5. Safety evaluation in S180 tumor model. (A) AST, ALT and LDH levels of four groups at the end of the treatment. (B) BUN and CRE levels. (C) H&E staining of organs including heart, liver, spleen, lung and kidney.

Table S1. Particle size and PDI (polydispersity index) change of DPVM at pH 7.4, 6.8, 5.5 and 4.5 after 2 h.

pH	Average size (nm)	PDI
7.4	189.7±1.3nm	0.075±0.002
6.8	681.0±14.4nm	0.184±0.067
5.5	1081.0±35.2nm	0.378±0.078
4.5	1287.0±27.7nm	0.228±0.078

Table S2. IC_{50} values (μg/mL) of Taxol, SPVM and DPVM after incubation with 4T1 cells for 24 and 48 h under pH 7.4 and 6.8, respectively.

pH	Incubation time (h)	IC_{50} (μg/mL)		
		Taxol	SPVM	DPVM
7.4	24	6.54	8.50	7.73
	48	2.09	2.76	2.86
6.8	24	6.58	8.70	5.54
	48	2.08	3.00	0.76