

Electronic supplementary information

# **Cetyltrimethylammonium Chloride-Loaded Mesoporous Silica Nanoparticles as Mitochondrion- Targeting Agent for Tumor Therapy**

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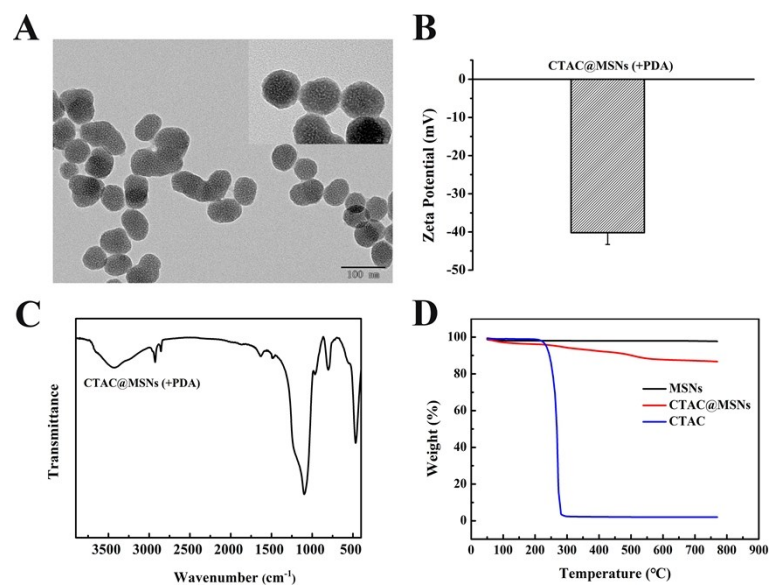
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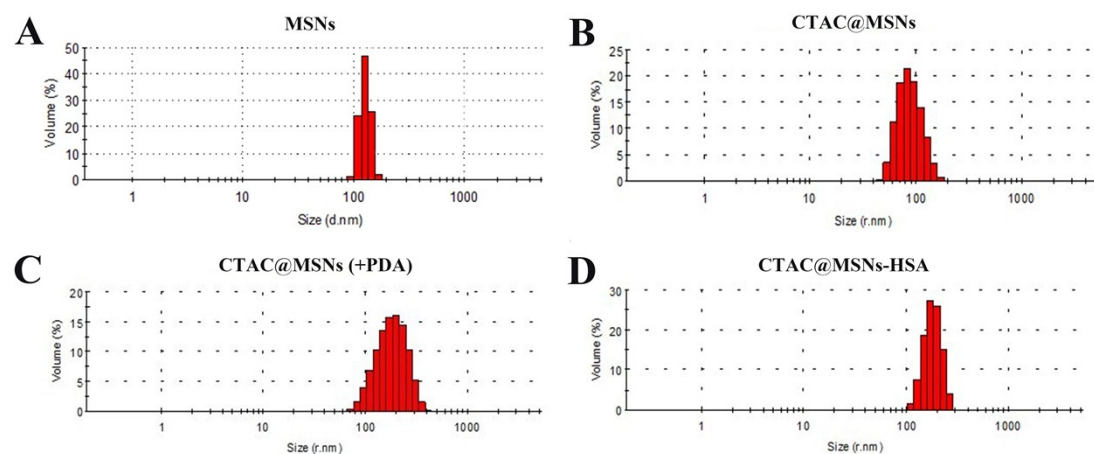
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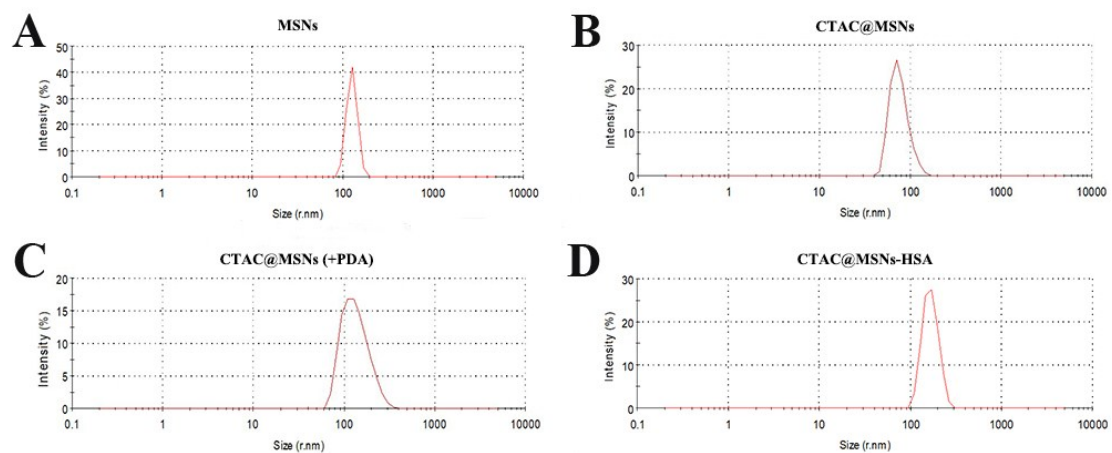
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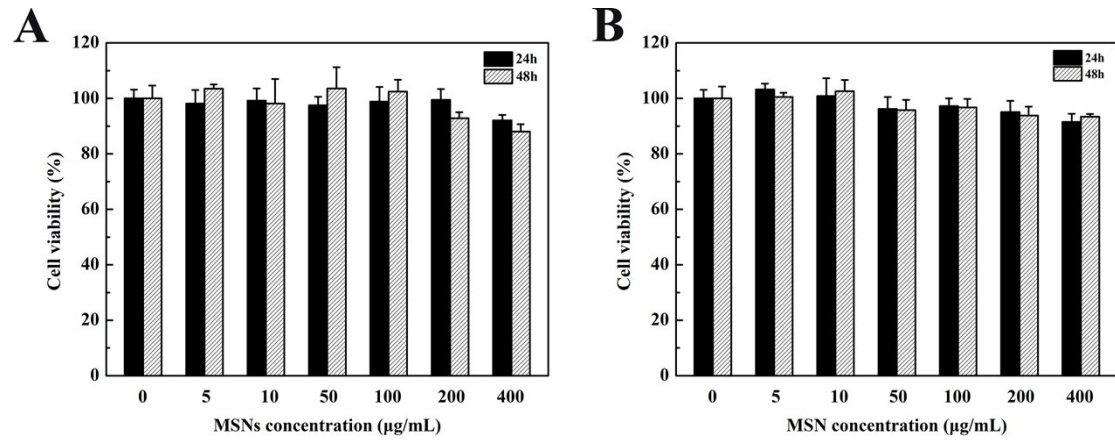
**Figure S1.** (A) TEM images, (B) Zeta potential, (C) FTIR spectra of MSNs@CTAC (+ PDA) NPs (D)TGA of CTAC, MSNs and CTAC@MSNs NPs



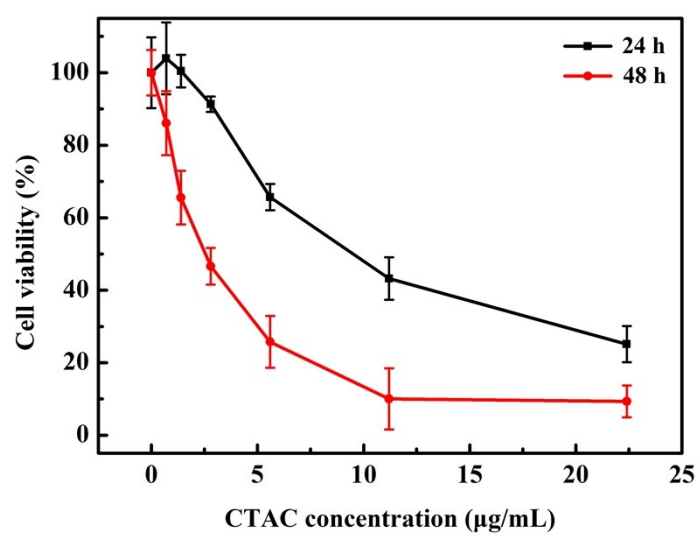
**Figure S2.** DLS measurements of (A) MSNs, (B) CTAC@MSNs, (C) CTAC@MSNs (+PDA) and (D) CTAC@MSNs-HSA NPs



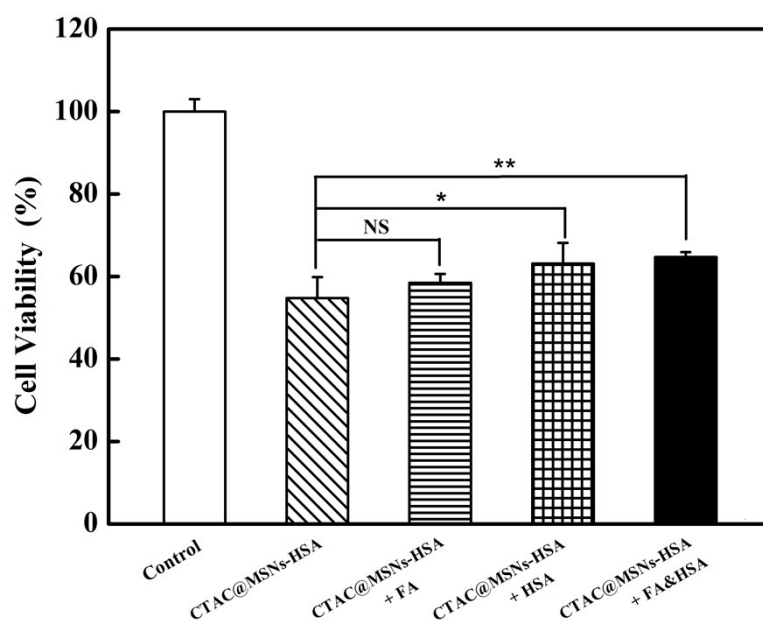
**Figure S3.** DLS measurements of (A) MSNs, (B) CTAC@MSNs, (C) CTAC@MSNs (+PDA) and (D) CTAC@MSNs-HSA NPs



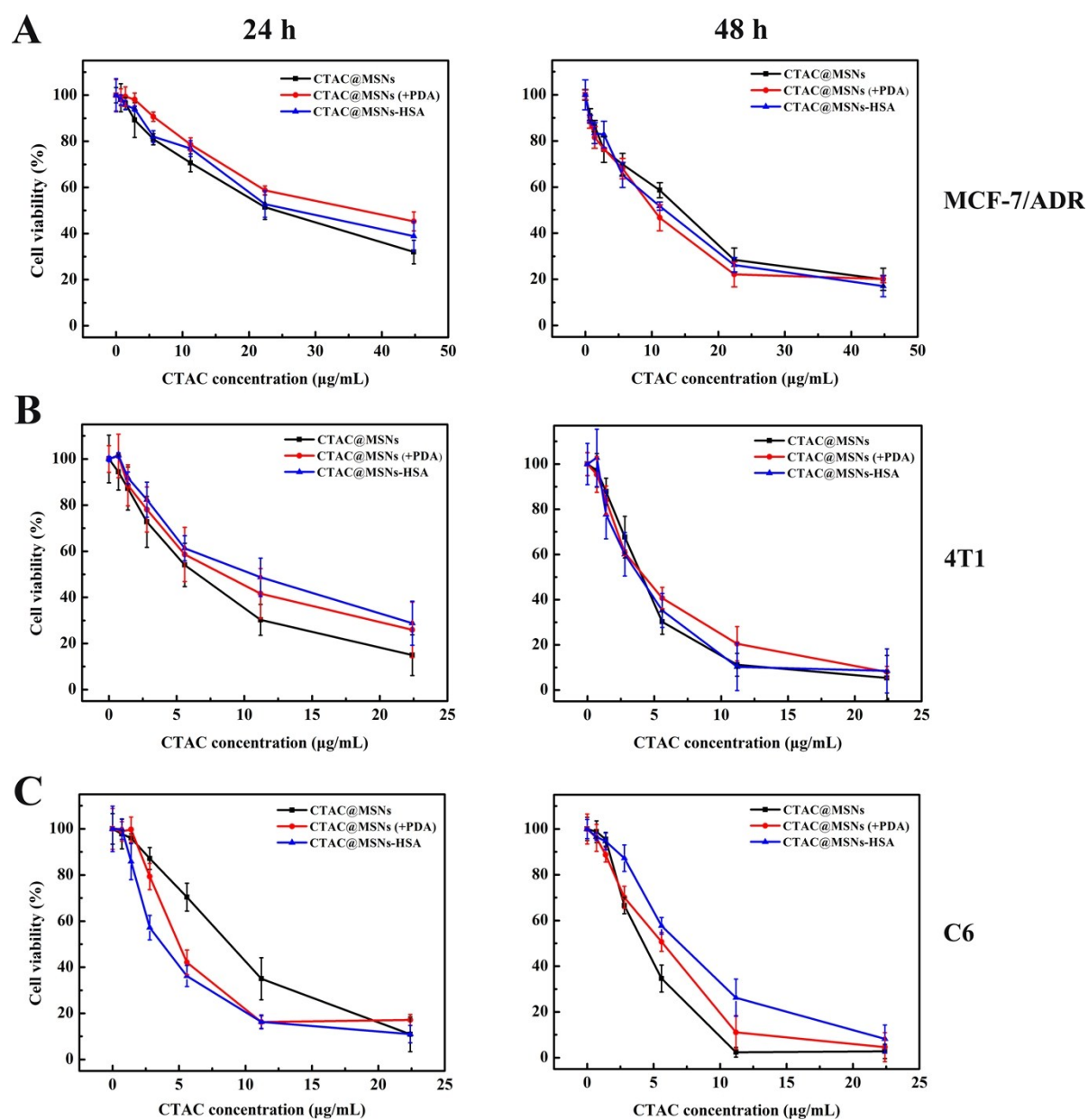
**Figure S4.** Cell viabilities of the (A) MCF-7 cells and (B) MCF-7/ADR treated with different concentration of MSNs for 24 h and 48 h. Data are represented as mean  $\pm$  SD (n = 3).



**Figure S5.** Cytotoxicity of CTAC@MSNs (+ PDA) against MCF-7 after incubating for 24 h and 48 h. Data are represented as mean  $\pm$  SD (n = 3).

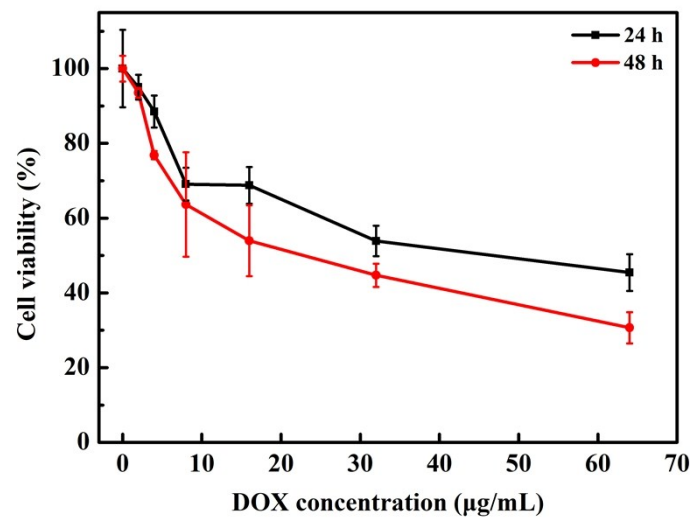


**Figure S6.** Cytotoxicity of CTAC@MSNs-HSA against MCF-7 cells with free FA (5  $\mu\text{g/mL}$ ) and free HSA (5  $\mu\text{g/mL}$ ) in 24 h. NS: not significant, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\* $p < 0.001$ , when compared with CTAC@MSNs-HSA group. Data are represented as mean  $\pm$  SD ( $n = 3$ )

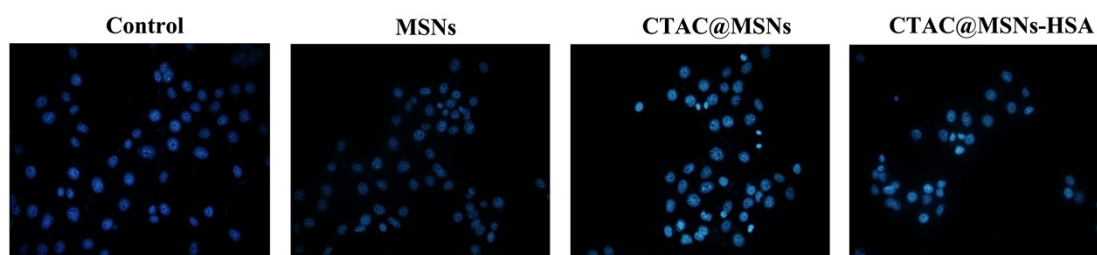


**Figure S7.** Cytotoxicity of NPs against (A) MCF-7/ADR, (B) 4T1 and (C) C6 after incubating for 24 h and 48 h. Data are represented as mean  $\pm$  SD (n = 3)

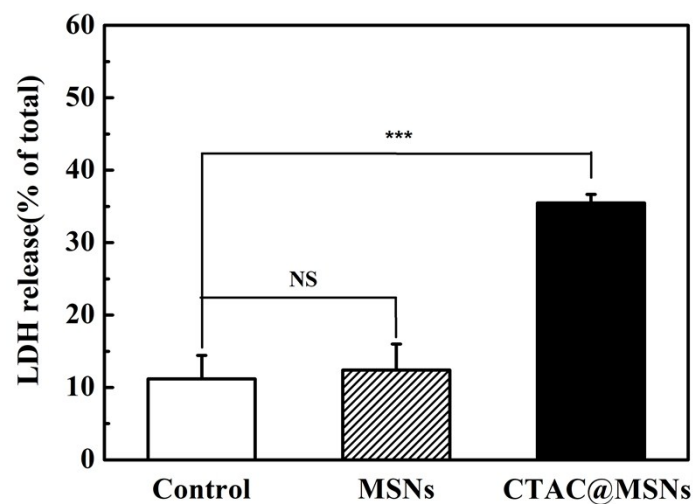




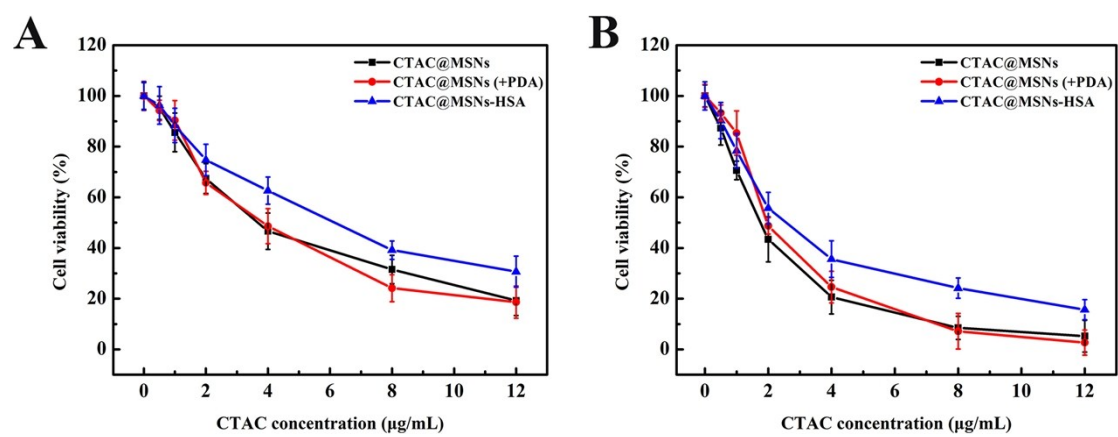
**Figure S8.** Cytotoxicity of DOX against MCF-7/ADR after incubating for 24 h and 48 h. Data are represented as mean  $\pm$  SD (n = 3)



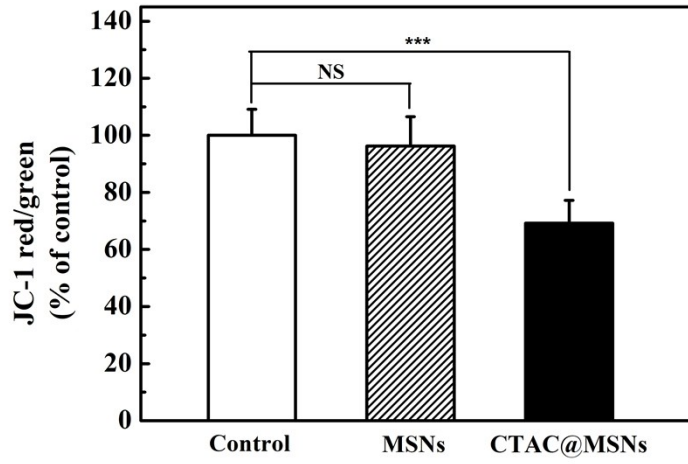
**Figure S9.** Fluorescence images of Hoechst staining in MCF-7 cells after treated with MSNs, CTAC@MSNs and CTAC@MSNs-HSA solution (2  $\mu\text{g/mL}$  of CTAC) for 48 h.



**Figure S10.** LDH assay of MCF-7 cells after incubating with MSNs and CTAC@MSNs NPs (2  $\mu\text{g/mL}$  of CTAC) for 24 h. NS: not significant, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\* $p < 0.001$ , when compared with the untreated cells (control). Data are represented as mean  $\pm$  SD ( $n = 3$ )



**Figure S11.** Cytotoxicity of NPs against MCF-10A after incubating for (A) 24 h and (B) 48 h. Data are represented as mean  $\pm$  SD ( $n = 3$ )



**Figure S12.** The effects of MSNs, CTAC@MSNs on the determination of  $\Delta\Psi_m$  loss through a spectral shift of JC-1-stained cells treated with NPs for 24 h. \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\* $p < 0.001$ , when compared with the untreated cells (control). Data are represented as mean  $\pm$  SD ( $n = 3$ )

**Table S1.** The size obtained from TEM and DLS and the PDI of NPs.

	Diameter (nm)	DLS size (nm)	PDI	$\zeta$ potential (mV)
<b>MSNs</b>	48.5 $\pm$ 6.4	121.5 $\pm$ 4.2	0.19	-23.7 $\pm$ 2.49
<b>CTAC@MSNs</b>	51.4 $\pm$ 4.9	111.4 $\pm$ 9.4	0.34	0.745 $\pm$ 0.12
<b>CTAC@MSNs (+PDA)</b>	52.3 $\pm$ 5.0	206.1 $\pm$ 17.4	0.41	-40.2 $\pm$ 3.10
<b>CTAC@MSNs-HSA</b>	59.2 $\pm$ 5.2	251.4 $\pm$ 17.7	0.45	-39.5 $\pm$ 1.66

**Table S2.** IC<sub>50</sub> values ( $\mu$ g/mL) of different nanoparticles against different cells after 24 h treatment.

	MCF-7	MCF-7/ADR	4T1	C6
<b>CTAC@MSNs</b>	6.06	17.70	6.08	8.76
<b>CTAC@MSNs (+PDA)</b>	11.06	34.59	8.33	5.20
<b>CTAC@MSNs-HSA</b>	9.74	28.04	9.97	3.86
<b>DOX</b>		43.8		

**Table S3.** IC<sub>50</sub> values ( $\mu$ g/mL) of different nanoparticles against different cells after 48 h treatment.

	MCF-7	MCF-7/ADR	4T1	C6
<b>CTAC@MSNs</b>	3.51	7.43	3.88	4.34
<b>CTAC@MSNs (+PDA)</b>	3.47	9.15	4.18	6.66
<b>CTAC@MSNs-HSA</b>	2.85	10.38	3.63	4.83
<b>DOX</b>		21.3		