

Supplementary data

Figure S1 . ¹H NMR spectrum of MS

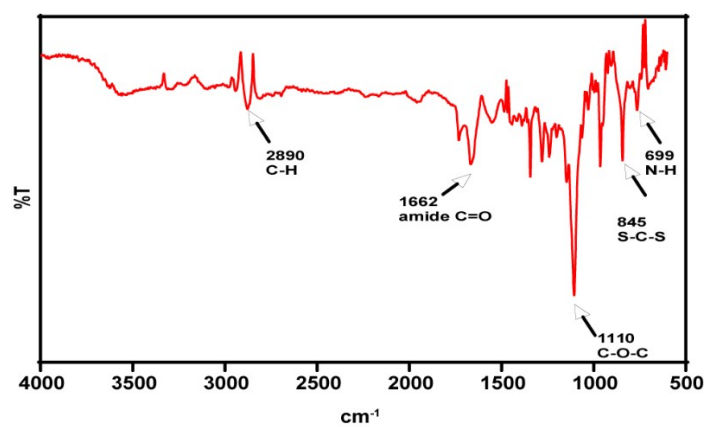
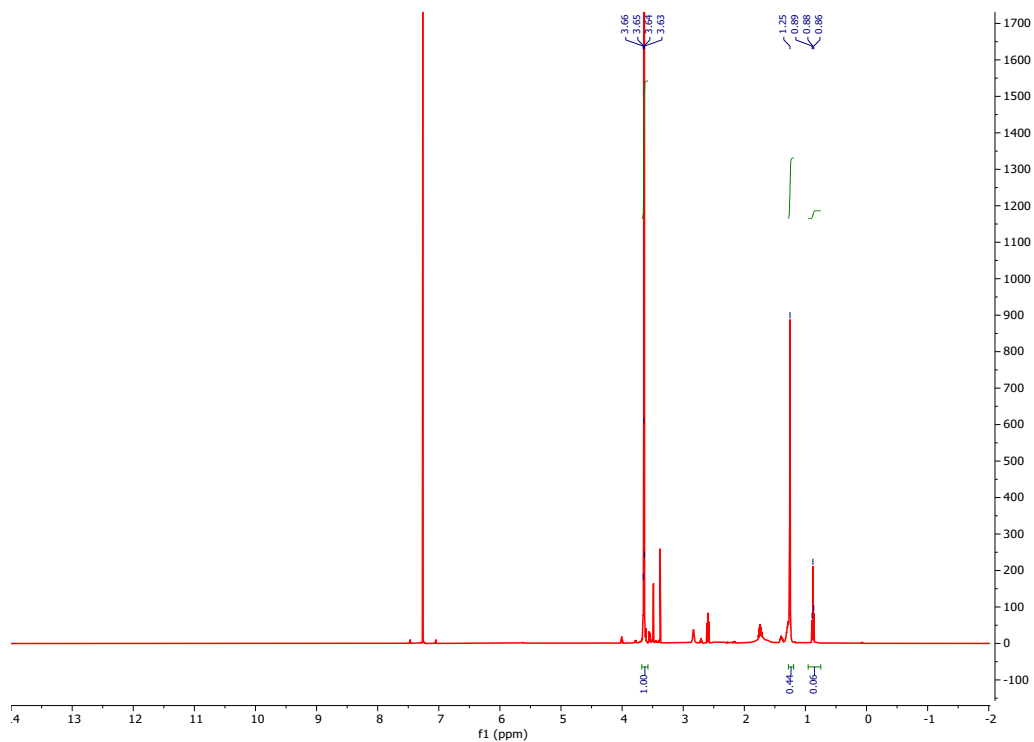


Figure S2. FT-IR Spectrum of MTS

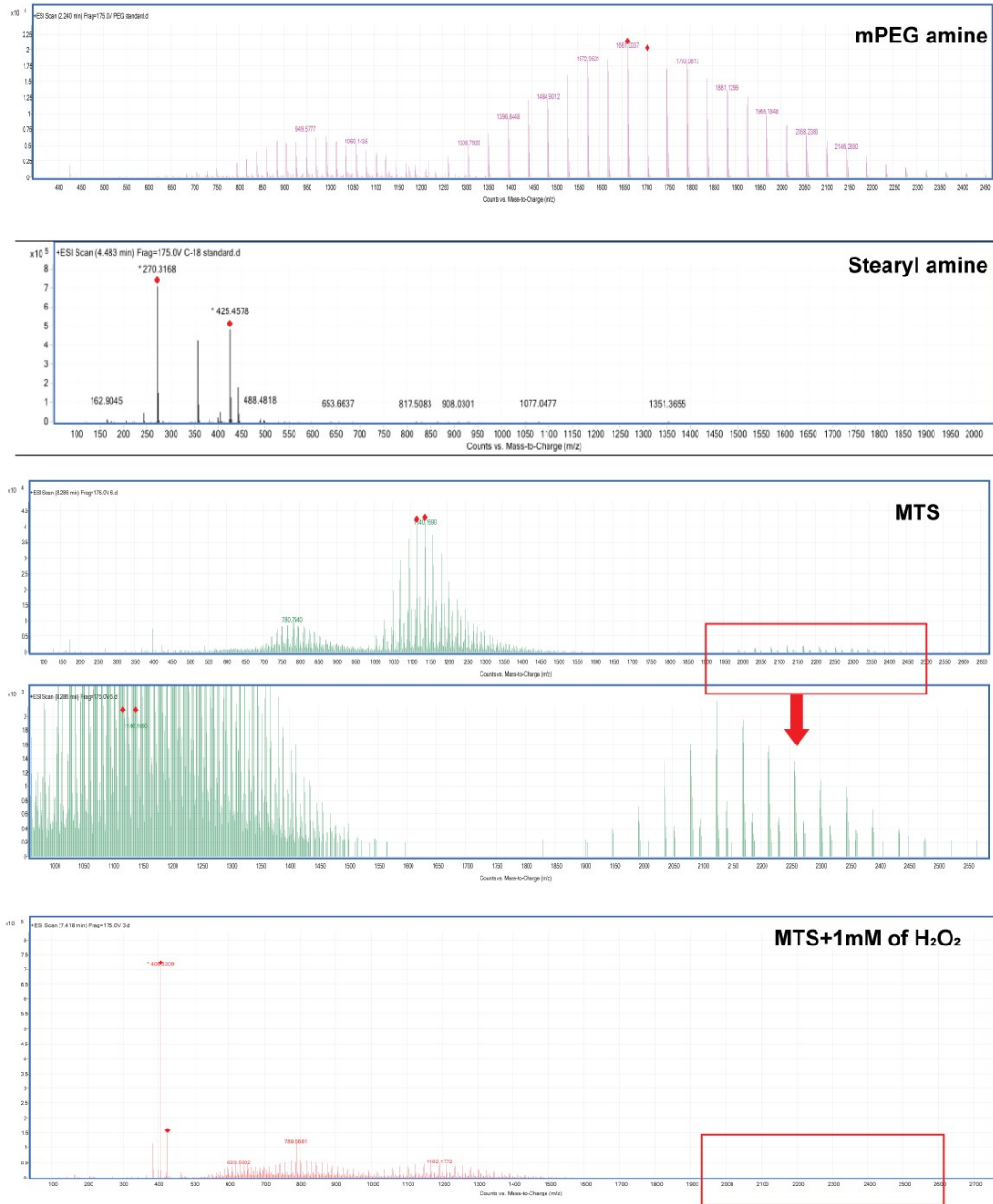


Figure S3 Mass spectrum analysis of MTS and ROS mediated degradation.

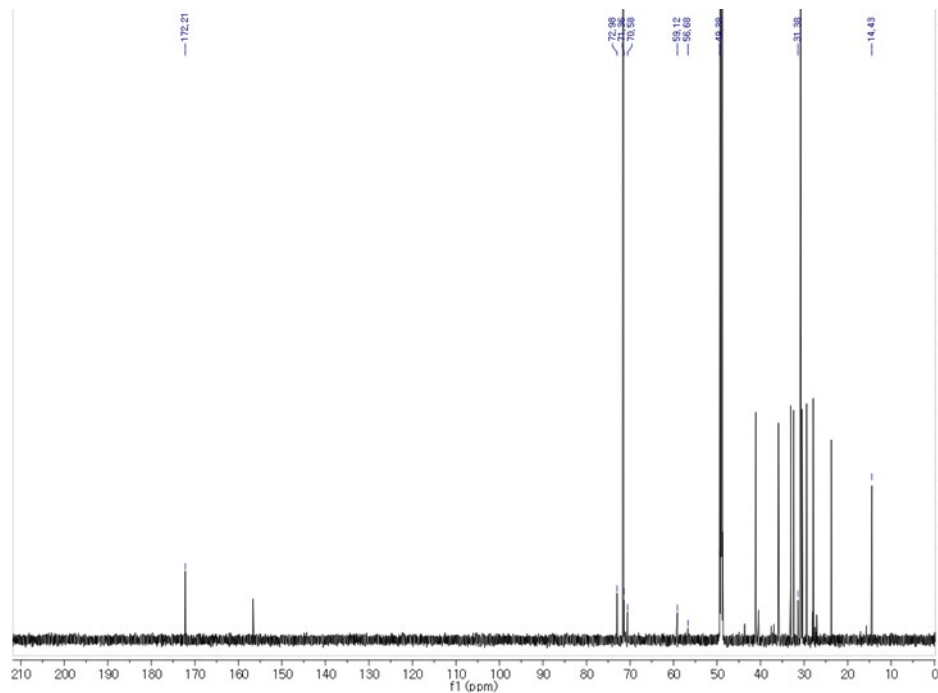
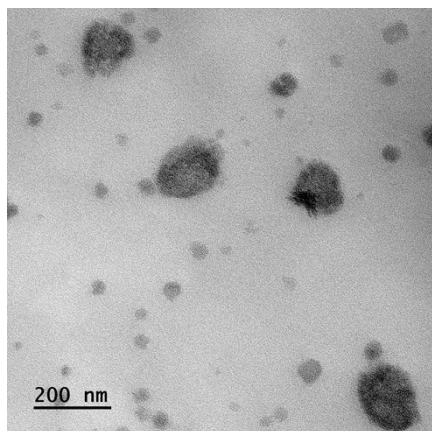


Figure S4. ¹³C-NMR spectrum of MTS at 225 MHz in CD₃OD-d₄

Figure S5 . FE-TEM image of MTS.



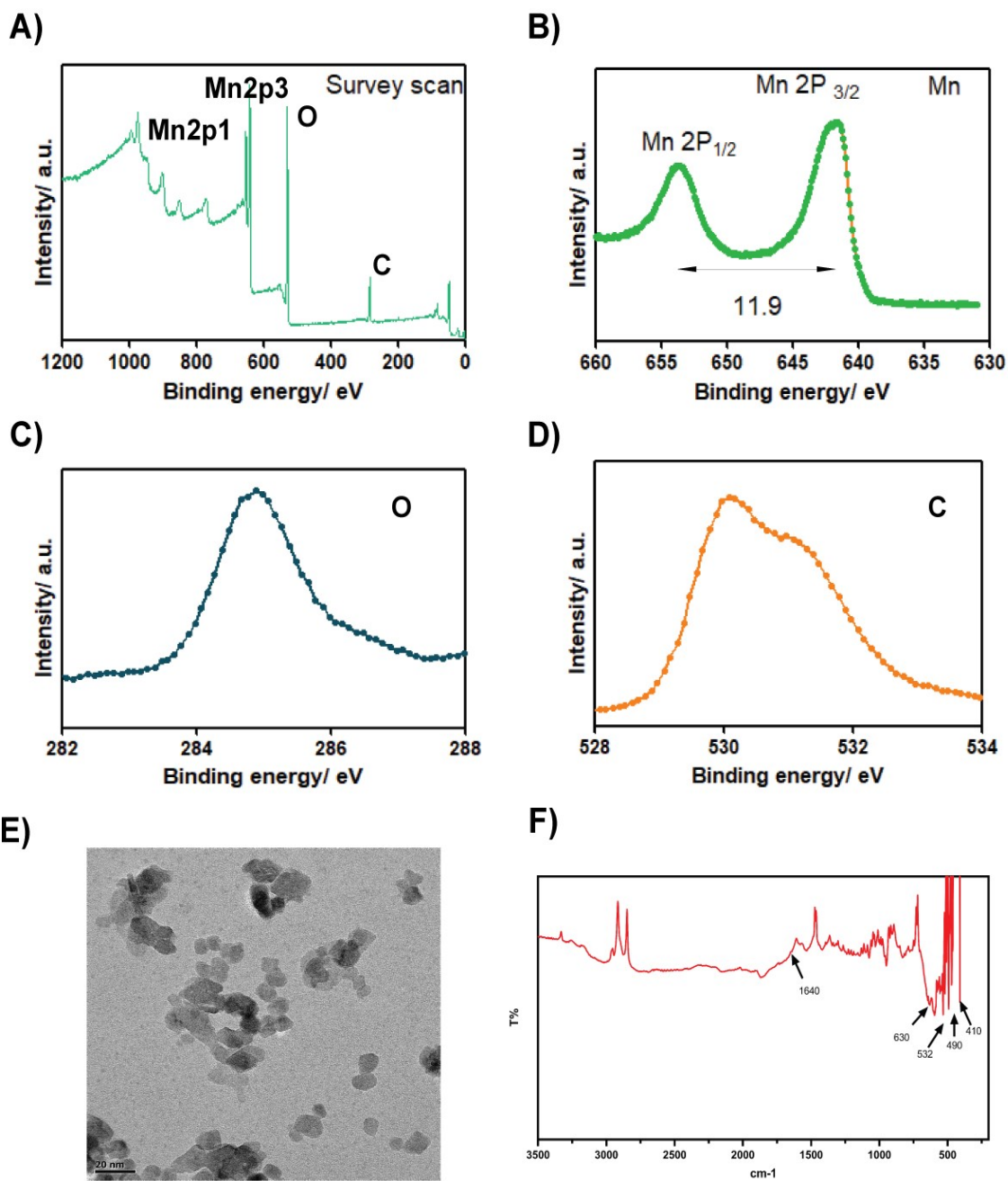
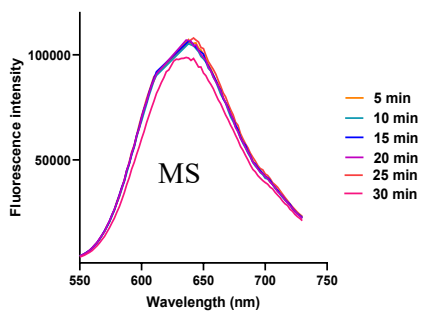
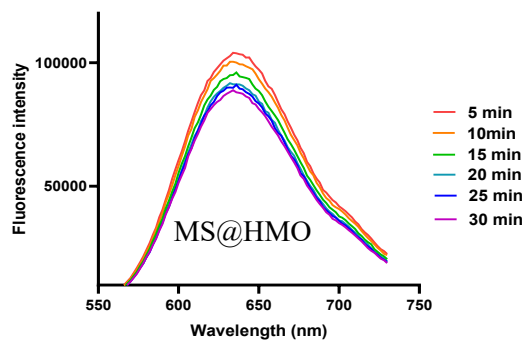
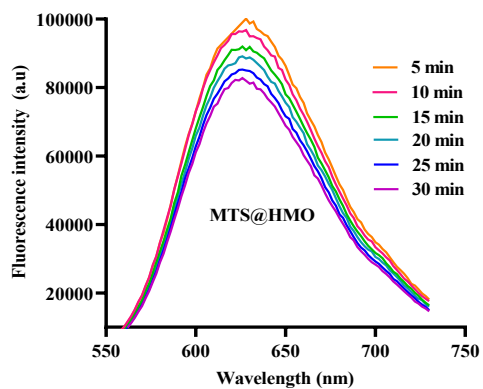
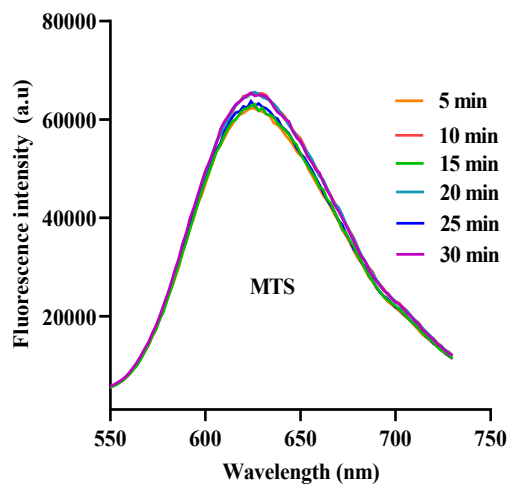


Figure S6. HMO material characterization. A) XPS survey scan spectrum of HMO . B) Mn .C) oxygen. D) Carbon. E) FE-TEM image and F) FT-IR spectrum.

Figure S7. Fluorescence intensity spectra of Ru(dpp) assay over time



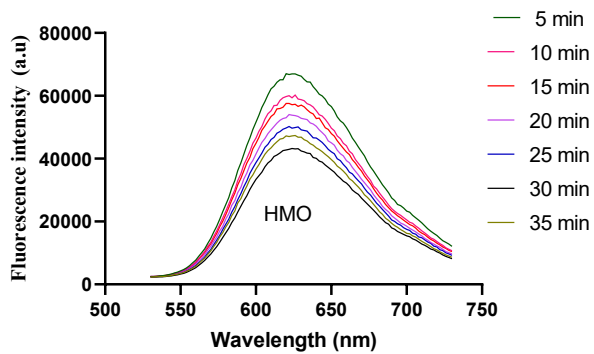


Figure S8. Cell viability of MS and MS@HMO at various concentrations under hypoxic and normoxic conditions;

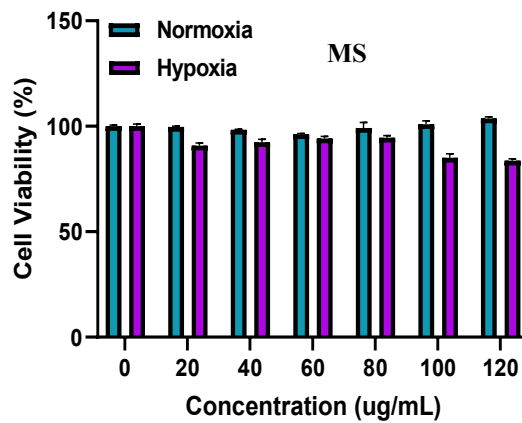
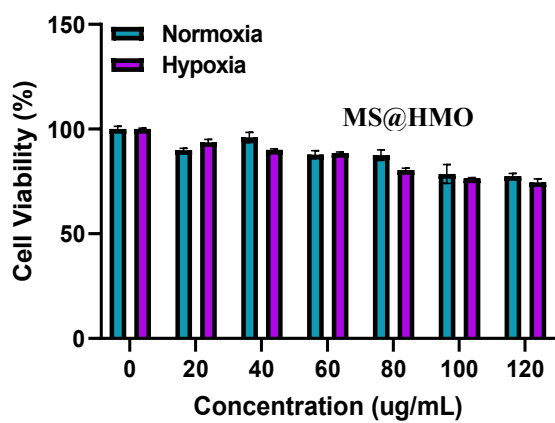


Figure S9. γ -H2AX in normoxic condition and its quantification

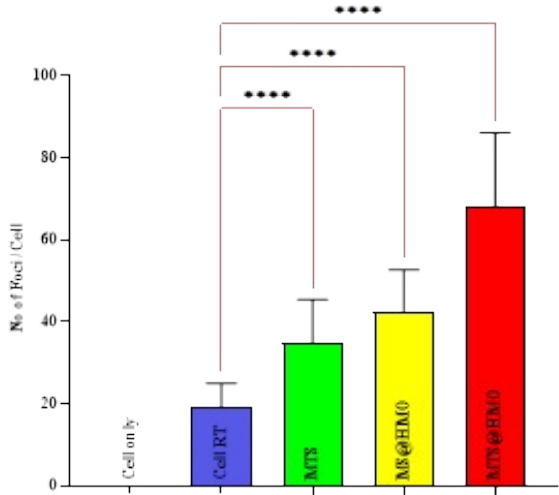
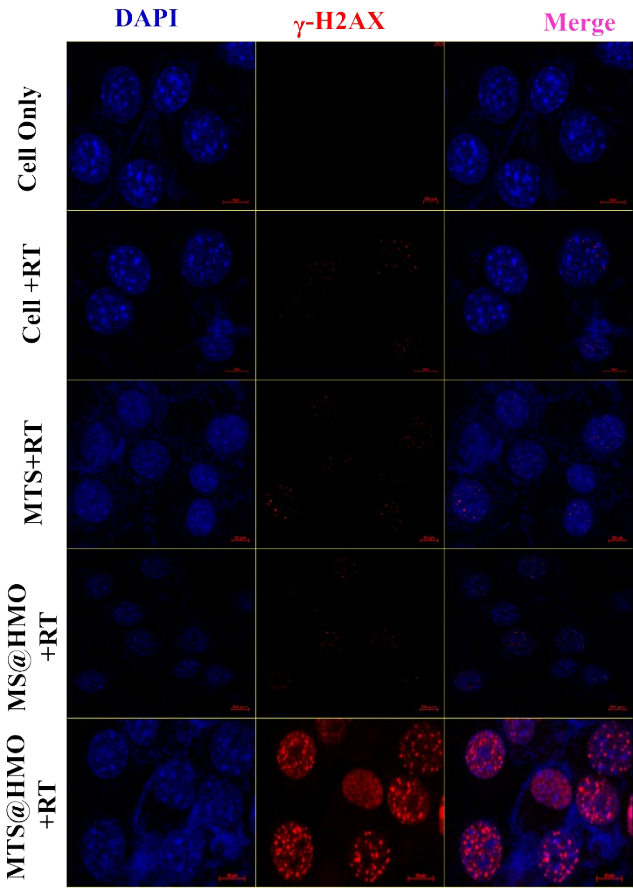


Figure S10. Plasma Mn concentration (n=3)

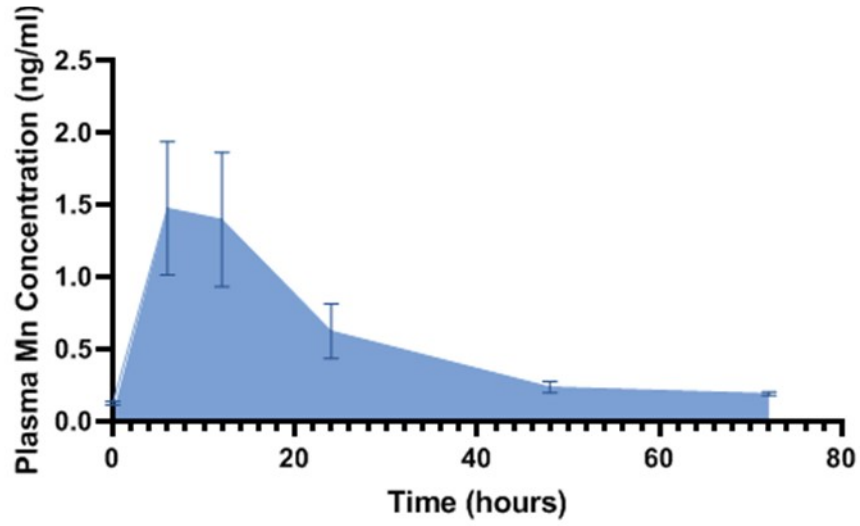


Figure S11. H&E staining in various major organs (heart, liver, spleen, lung, and kidney).

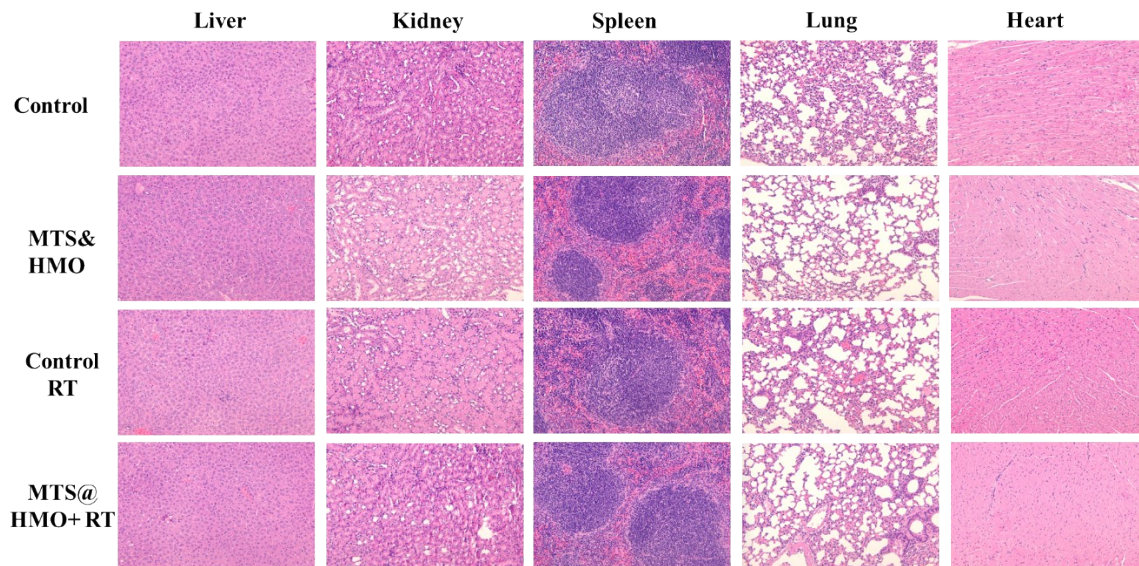


Table S1. Pharmacokinetic profiles

		1	2	3	AVG	STD
Lambda_z	1/h	0.04	0.03	0.03	0.03	0.01
t1/2	h	16.11	24.40	21.99	20.83	3.48
Tmax	h	6.00	6.00	6.00	6.00	0.00
Cmax	ng/ml	1.99	1.31	1.11	1.47	0.38
C0	ng/ml	0.11	0.13	0.24	0.16	0.06
Clast_obs/Cmax		0.07	0.19	0.15	0.14	0.05
AUC 0-t	ng/ml*h	52.47	35.58	41.94	43.33	6.97
AUC 0-inf_obs	ng/ml*h	55.71	44.51	47.33	49.18	4.76
AUC 0-t/0-inf_obs		0.94	0.80	0.89	0.88	0.06
AUMC 0-inf_obs	ng/ml*h ²	1378.37	1795.67	1614.56	1596.20	170.86
MRT 0-inf_obs	h	24.74	40.35	34.12	33.07	6.41
Vz_obs	(µg)/(ng/ml)	2086.02	3954.57	3351.31	3130.63	778.63
Cl_obs	(µg)/(ng/ml)/h	89.74	112.34	105.65	102.58	9.48
Vss_obs	(µg)/(ng/ml)	2220.25	4532.41	3604.28	3452.31	950.03

Table S2. Level of AST, ALT, BUN and Creatinine in blood

Parameters	Normal range	Experimental group			
		Control	PTCM	Control RT	PTCM RT
AST (U/L)	59-247	61 ± 2.65	66.33 ± 15.5	59 ± 12.17	62.33 ± 39.83
ALT (U/L)	28-132	17.33 ± 5.69	26 ± 7	24 ± 4.58	29 ± 7
BUN (mg/dl)	18-29	14.73 ± 2.02	19.6 ± 4.14	22.57 ± 2.4	22.57 ± 4.76
Creatinine (mg/dl)	0.2-0.8	0.32 ± 0.04	0.35 ± 0.07	0.44 ± 0.06	0.46 ± 0.03