

Supporting Information

**Au Hollow Nanorods-Chimeric Peptide nanocarrier
for NIR- II Photothermal therapy and Real-time
Apoptosis Imaging for Tumor Theranostic**

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Figure S1. TEM imaging of AuHNRs. Scale bar: 200 nm

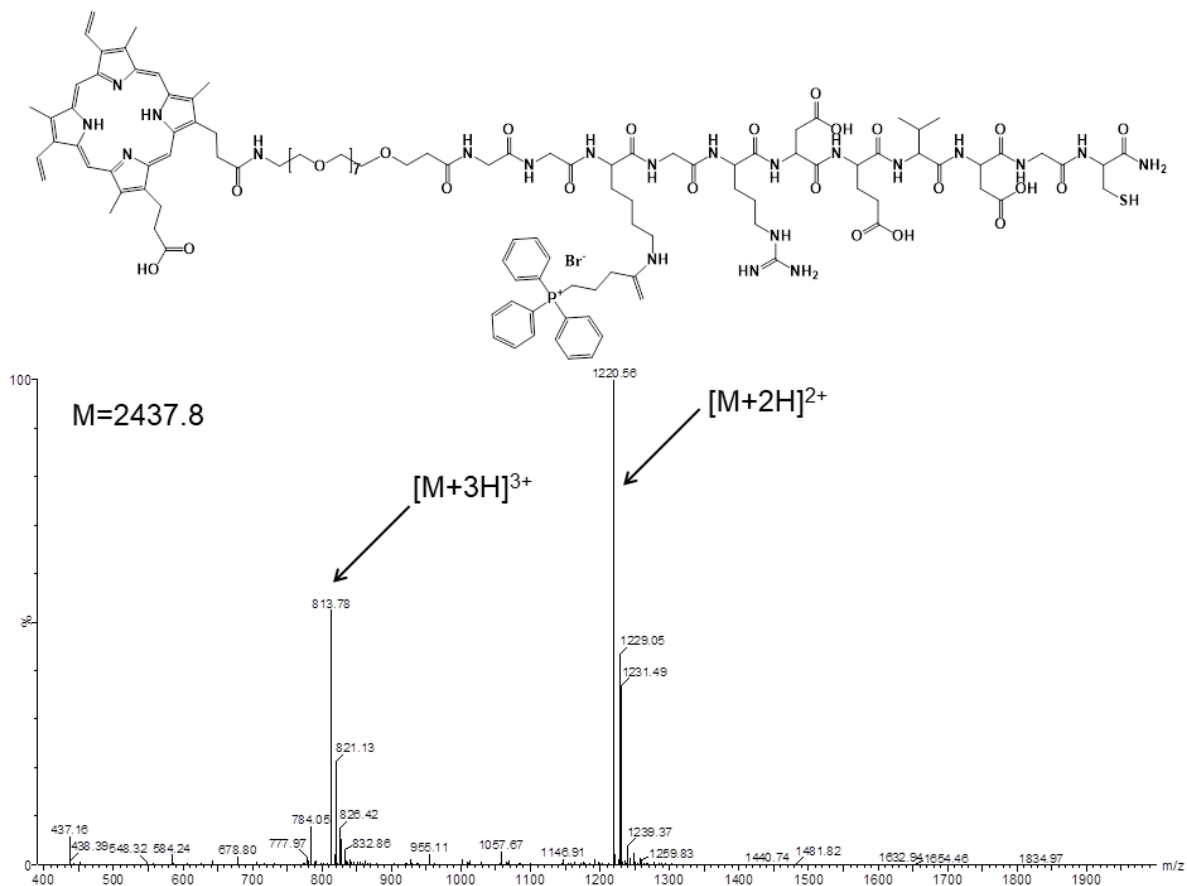


Figure S2. Molecular structure and ESI-MS of the chimeric peptide DTTP.

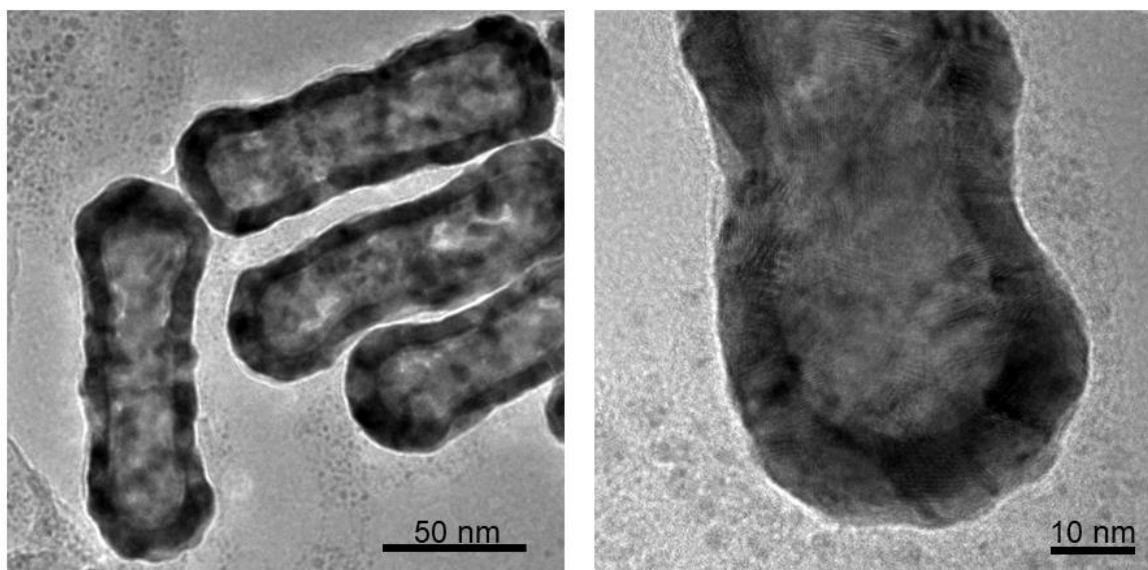


Figure S3. High resolution transmission electron microscope image of AuHNRs-DTPP.

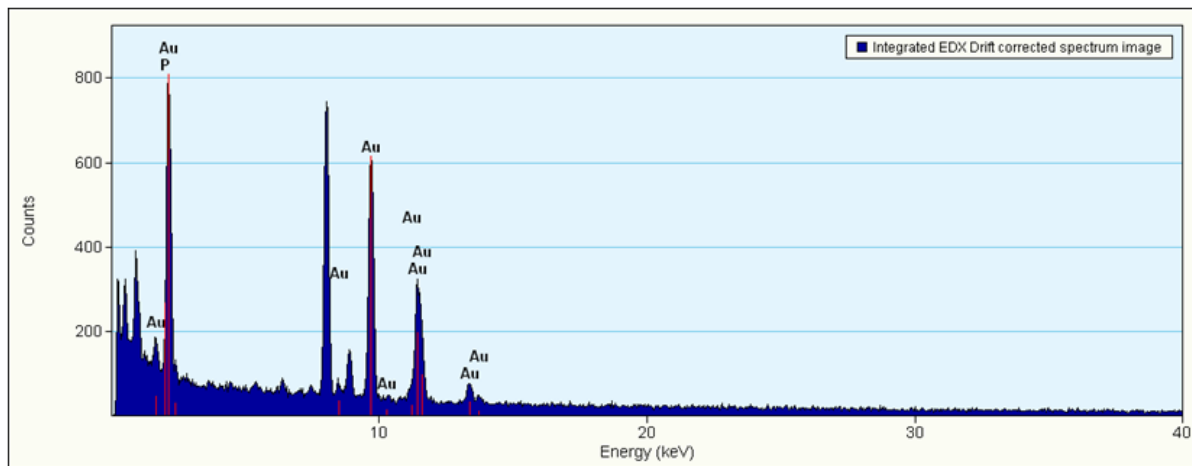


Figure S4. EDX spectrum of AuHNRs-DTPP.

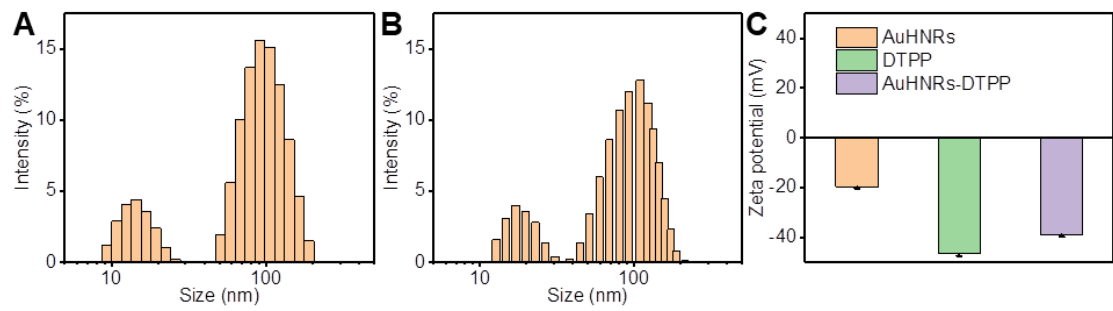


Figure S5. DLS of A) AuHNRs and B) AuHNRs-DTPP. C) Zeta potential of AuHNRs, AuHNRs-DTPP and DTPP.

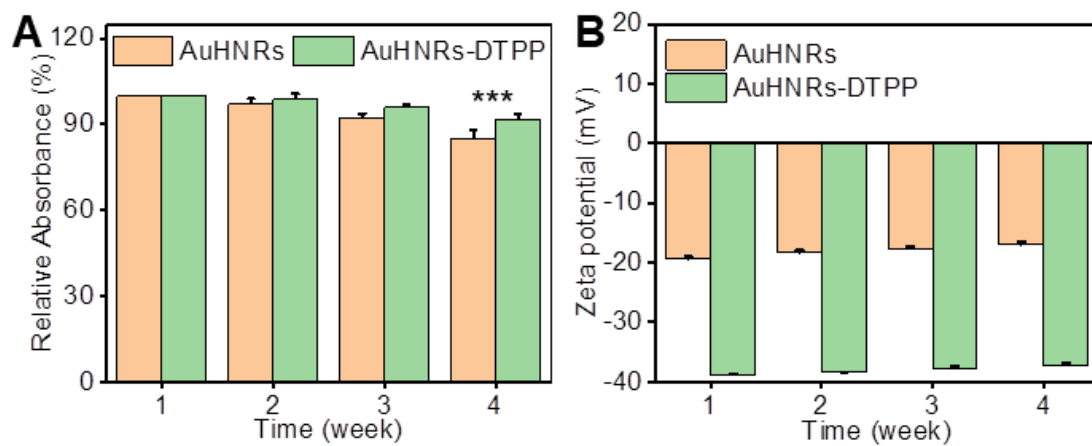


Figure S6. Stability of AuHNRs and AuHNRs-DTPP.

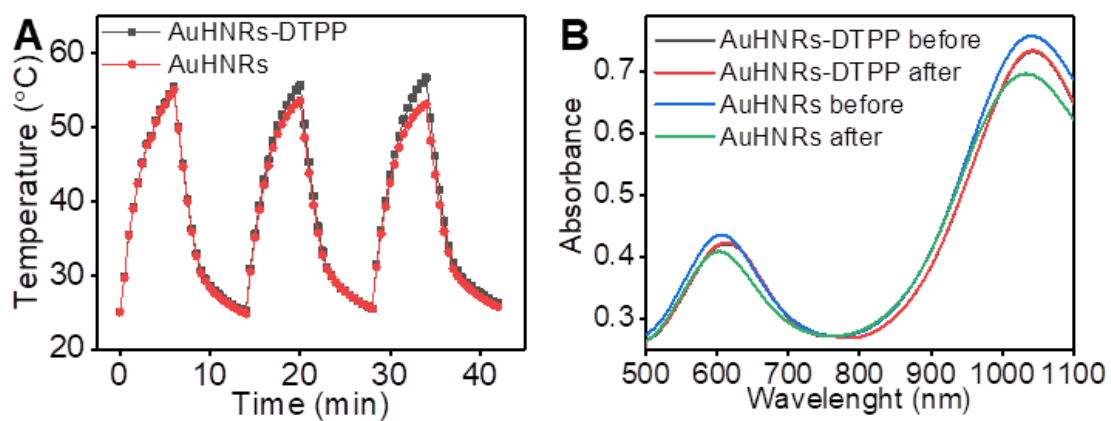


Figure S7. Photothermal stability of AuHNRs and AuHNRs-DTPP. A) Heat and cooling cycle of AuHNRs-DTPP and AuHNRs. B) UV-Vis absorbance of AuHNRs and AuHNRs-DTPP before or after the heat and cooling cycles.

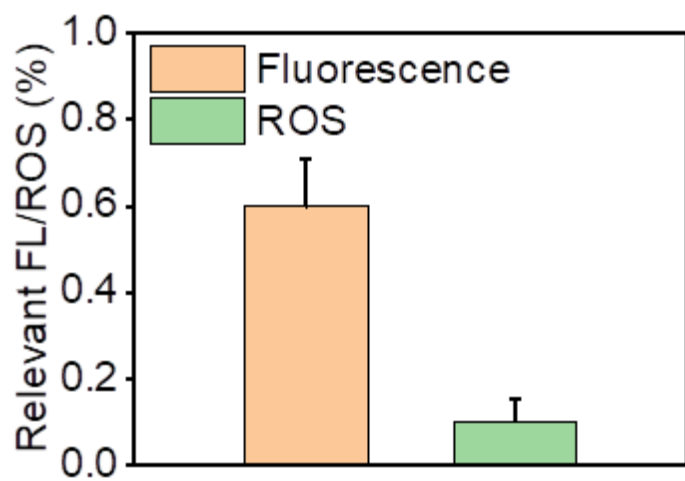


Figure S8. Relevant fluorescence intensity and ROS convert-ability of AuHNRS-DTPP. Free DTPP was set as 100%.

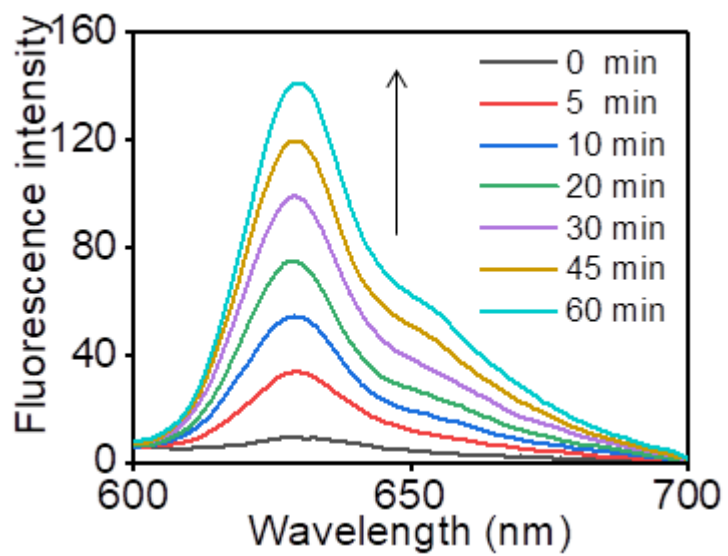


Figure S9. Fluorescence recovery of PpIX after incubated with caspase-3.

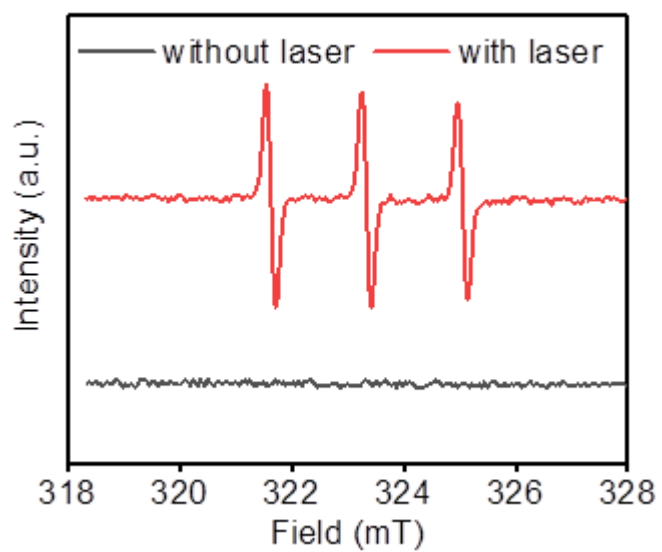


Figure S10. ESR spectra of DTPP treated with or without laser irradiation. DMPO was use as sensor.

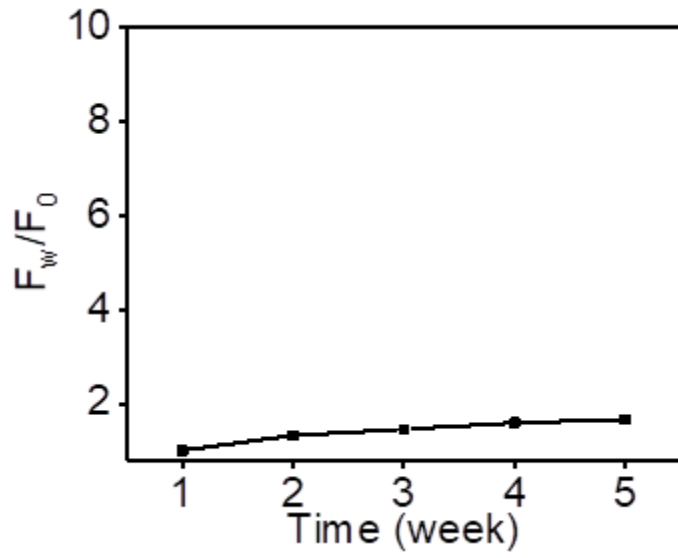


Figure S11. Relative fluorescence intensity of AuHNRs-DTPP in PBS. Fluorescence intensity of AuHNRs-DTPP in the first day is set as F_0 .

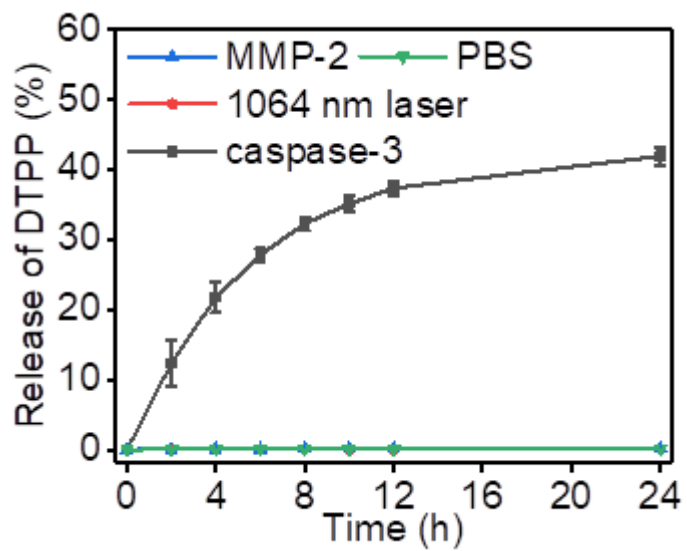


Figure S12. Release profile of AuHNRs-DTPP.

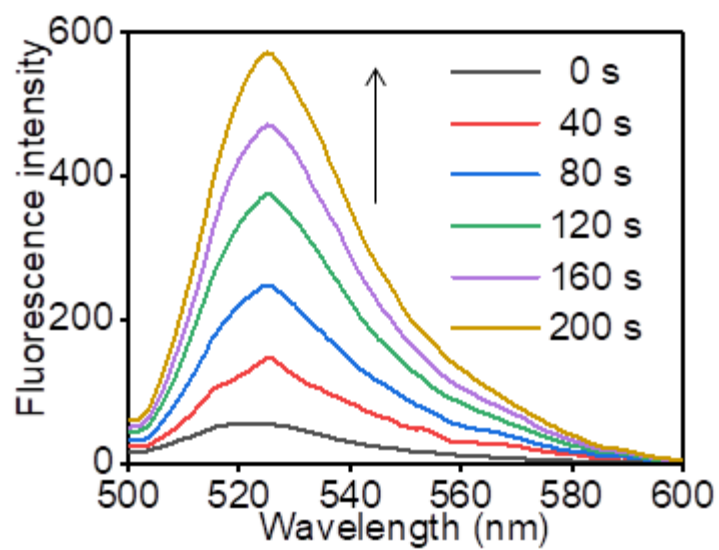


Figure S13. ROS convert ability of AuHNRs-DTPP, DCFH-DA is used as the ROS sensor.

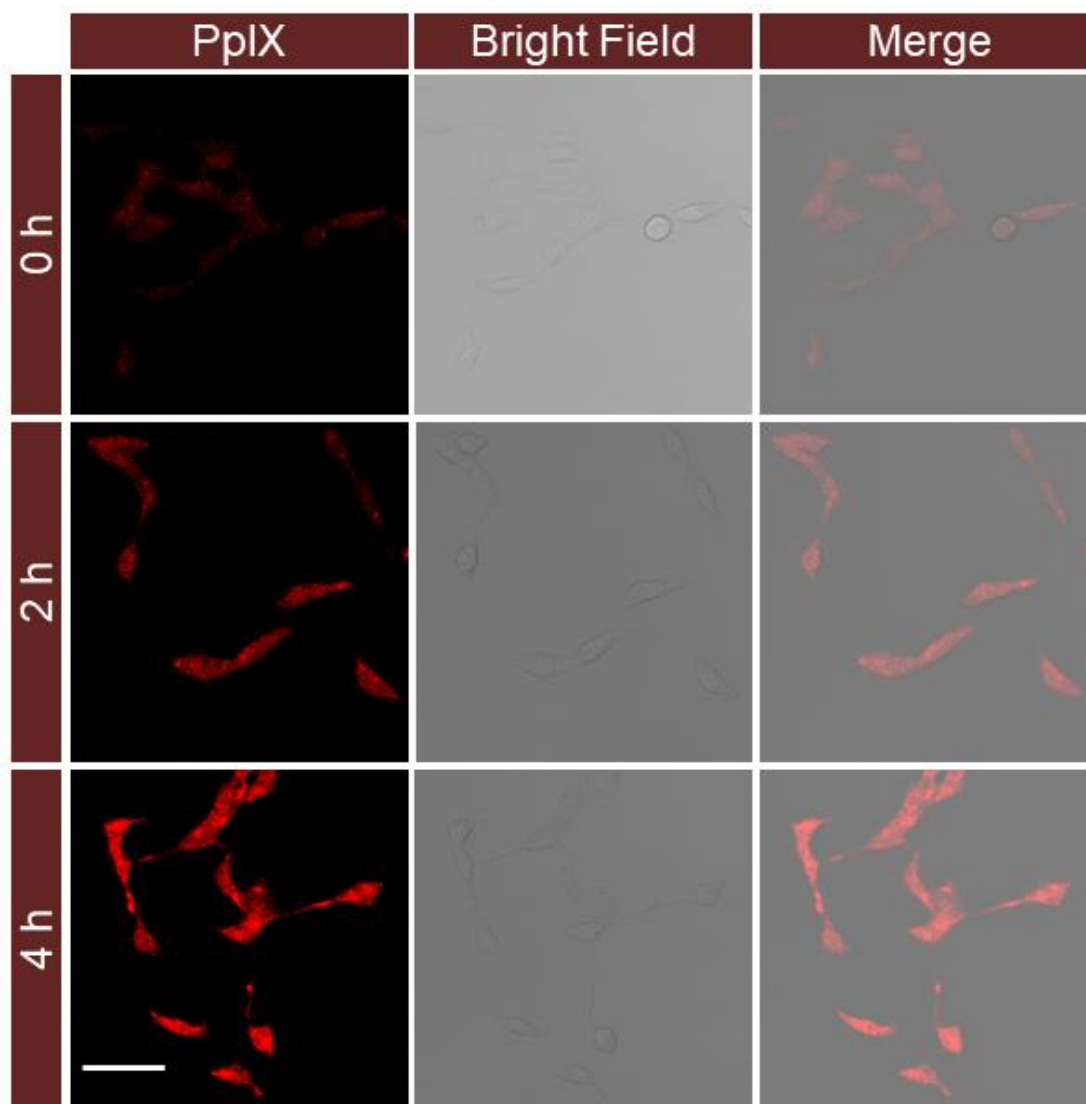


Figure S14. CLSM imaging of fluorescence recovery of PpIX in cells under 1064 nm laser irradiation. The scale bar is 75 μm .

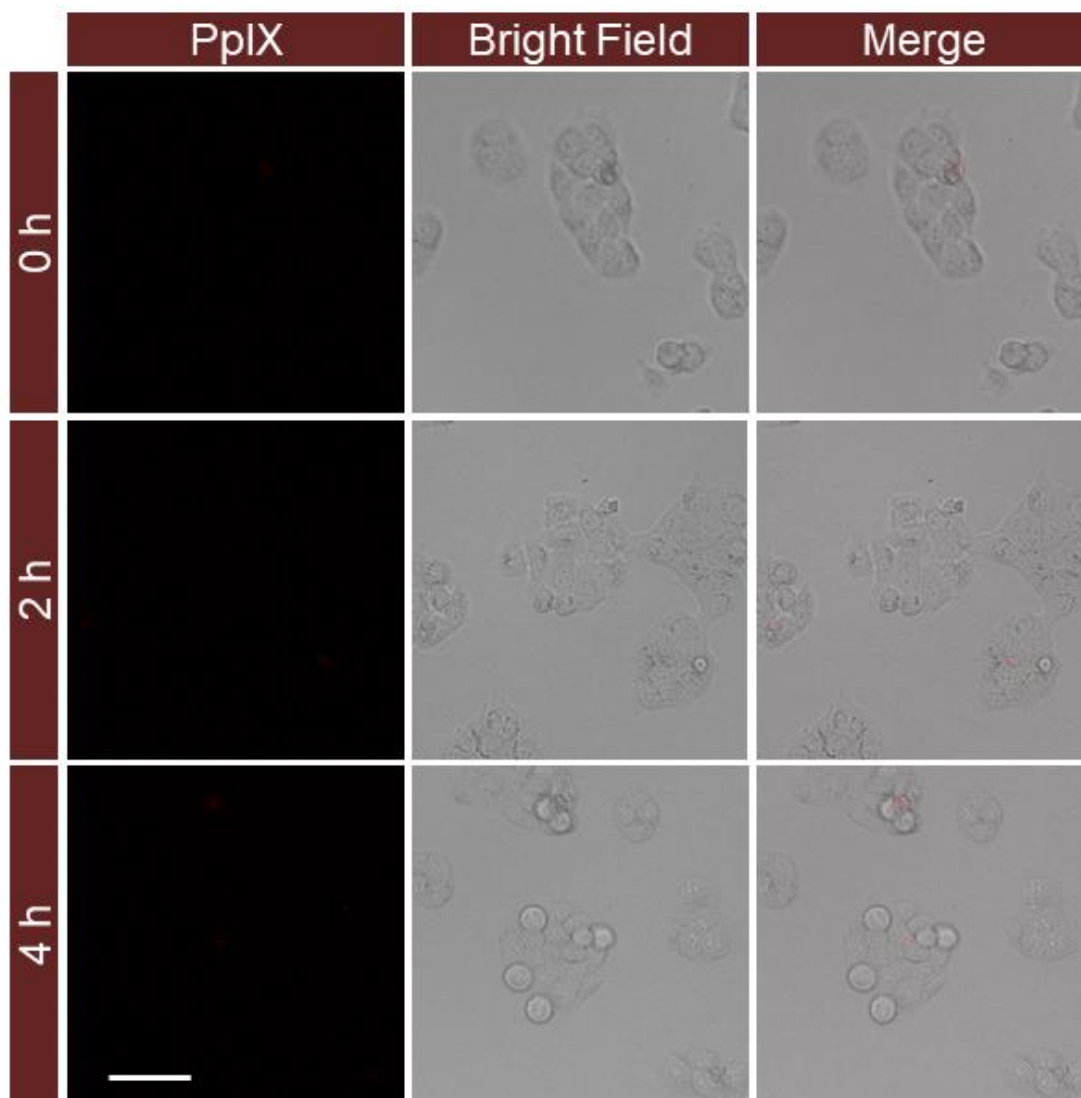


Figure S15. CLSM imaging of fluorescence recovery of PpIX in cells without 1064 nm laser irradiation. The scale bar is 75 μm .

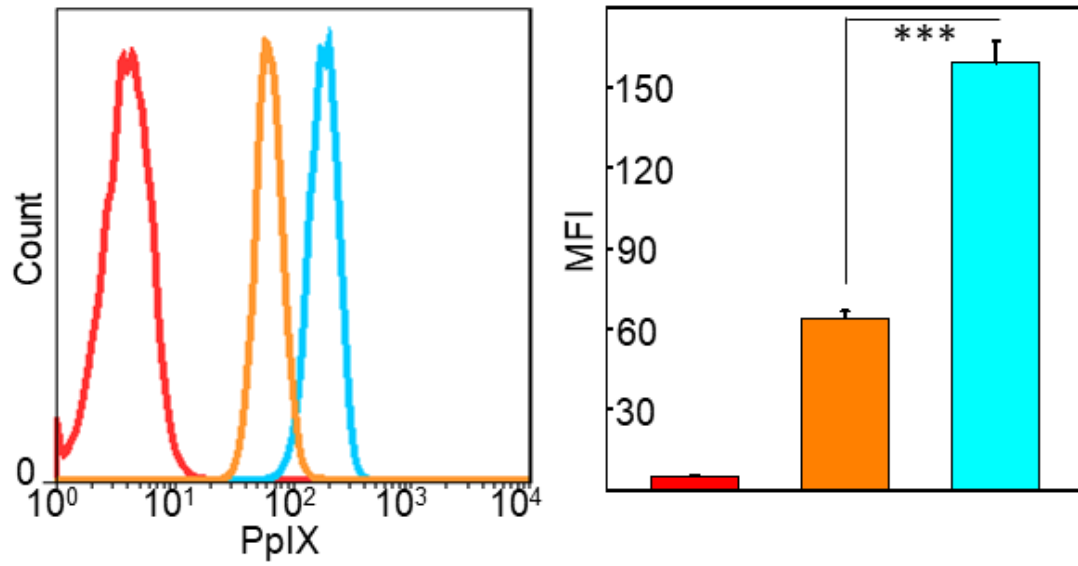


Figure S16. Quantitative results (left) and Mean fluorescence intensity (MFI, right) of PpIX under 1064 nm laser irradiation determined by flow cytometry. Red: 0 h, orange: 1 h and cyan: 2 h. P value was calculated by Tukey's post-test (** $p < 0.01$, or * $p < 0.05$), *** $p < 0.001$).

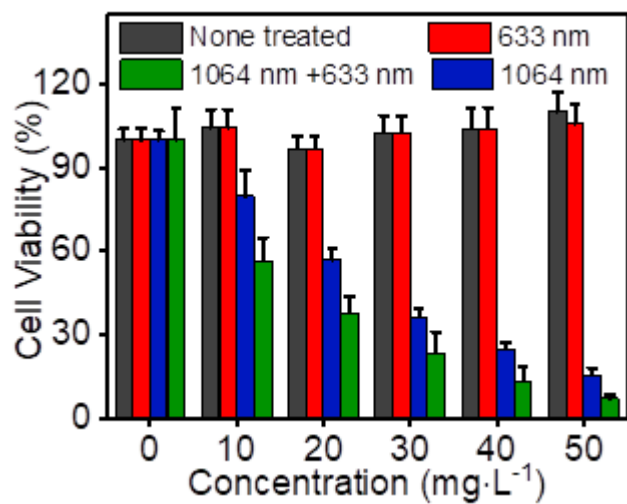


Figure S17. Cell viability under 1064 nm laser irradiation at power density of 0.96 W cm⁻². HeLa cell line was used.

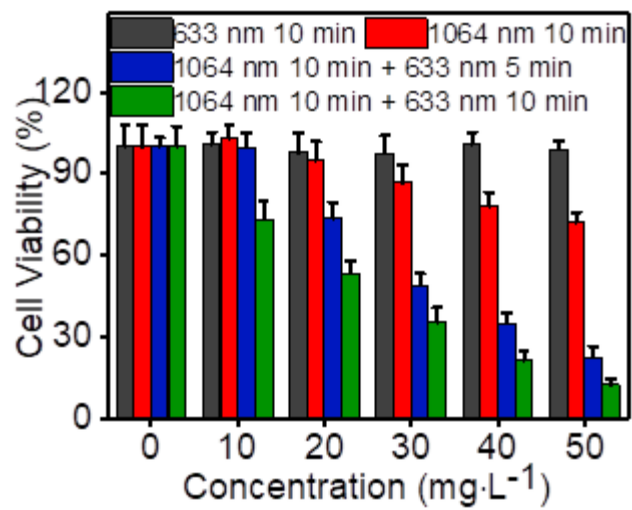


Figure S18. Cell viability under 1064 nm laser irradiation at power density of 0.69 W cm^{-2} . HeLa cell line was used.

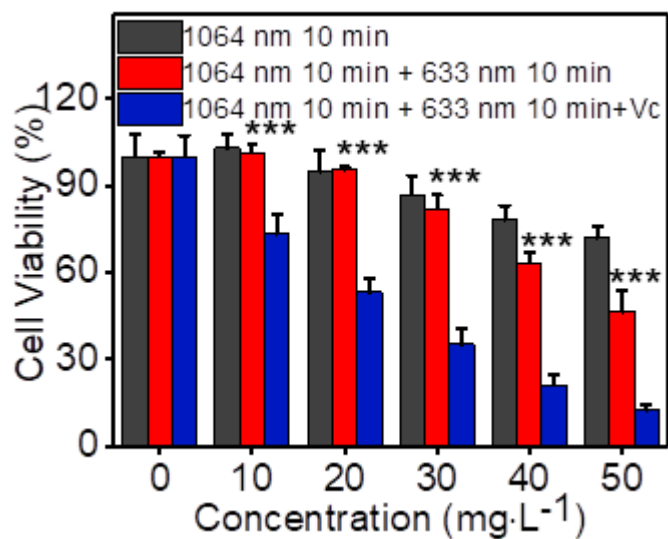


Figure S19. Cell viability of AuHNRs-DTPP when Vc was used as ROS scavenger. Related data of AuHNRs-DTPP with only 1064nm laser irradiation or AuHNRs-DTPP with both 1064 nm and 633 nm laser irradiation were taken from Figure S17 as comparison.

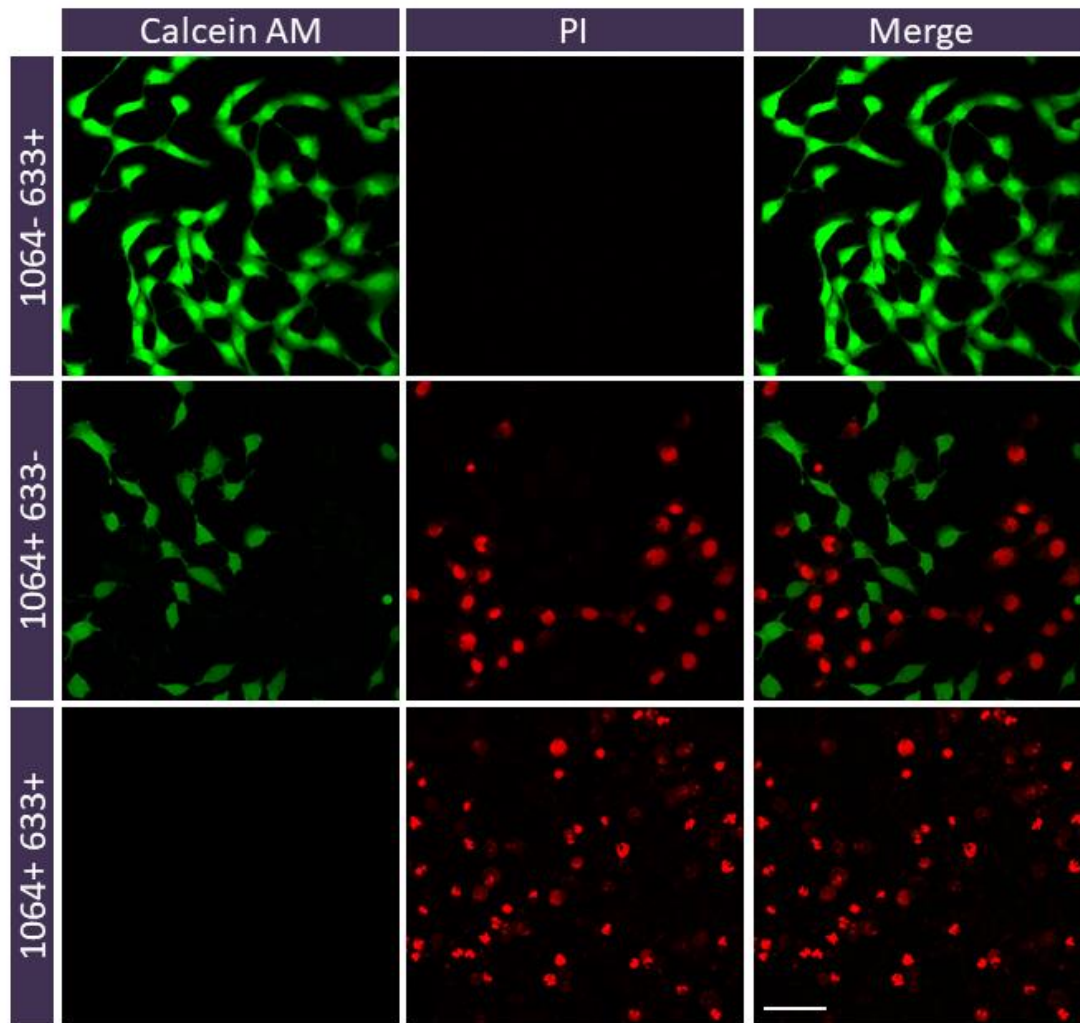


Figure S20. CLSM imaging of live and death cells by Calcein AM/ PI fluorescence stain. The scale bar is 75 μm .

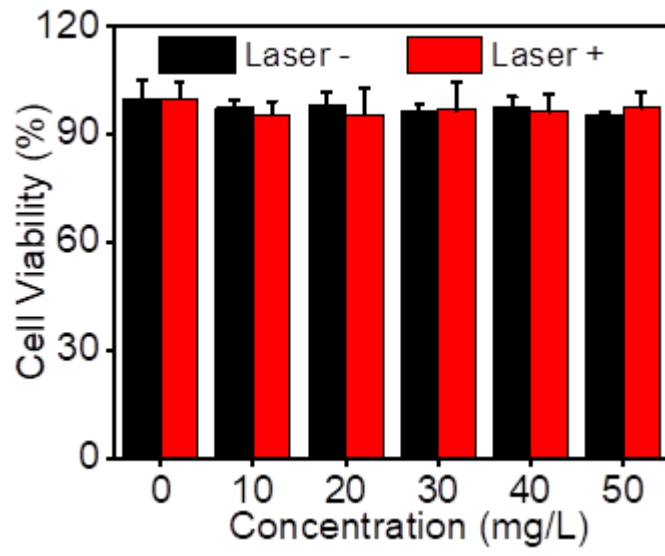


Figure S21. Cytotoxicity to COS-7.

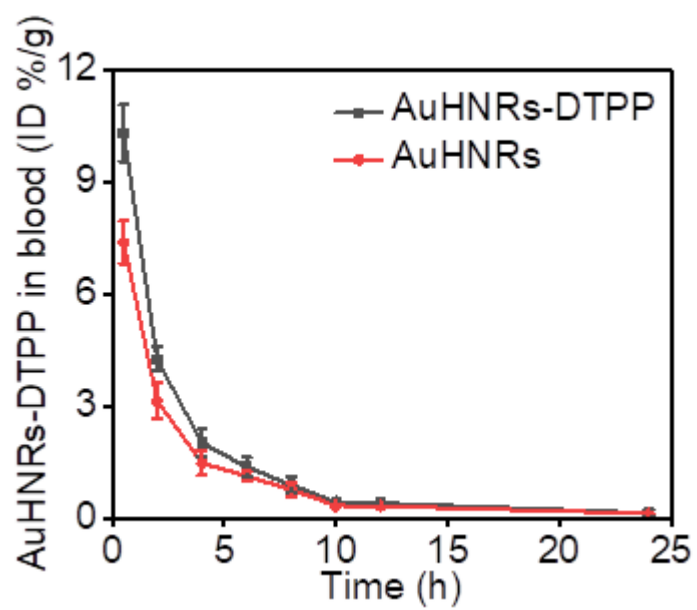


Figure S22. Pharmacokinetics of AuHNRs-DTPP and AuHNRs.

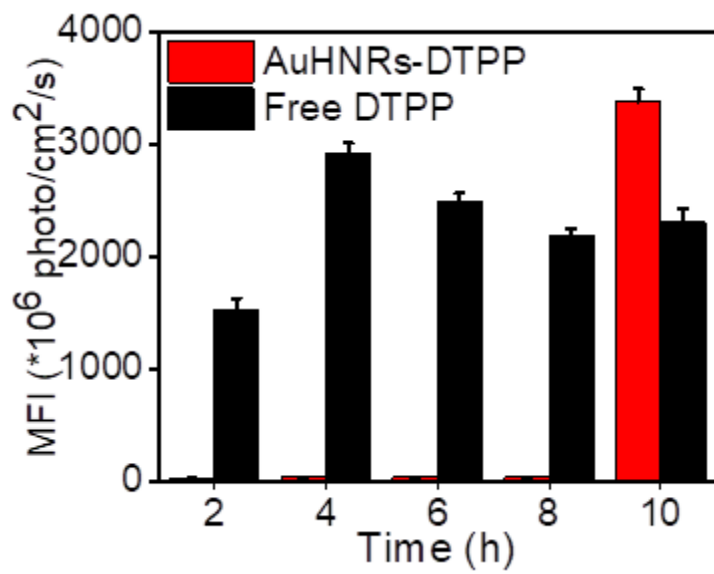


Figure S23. MFI values of tumor area after intravenous injection.

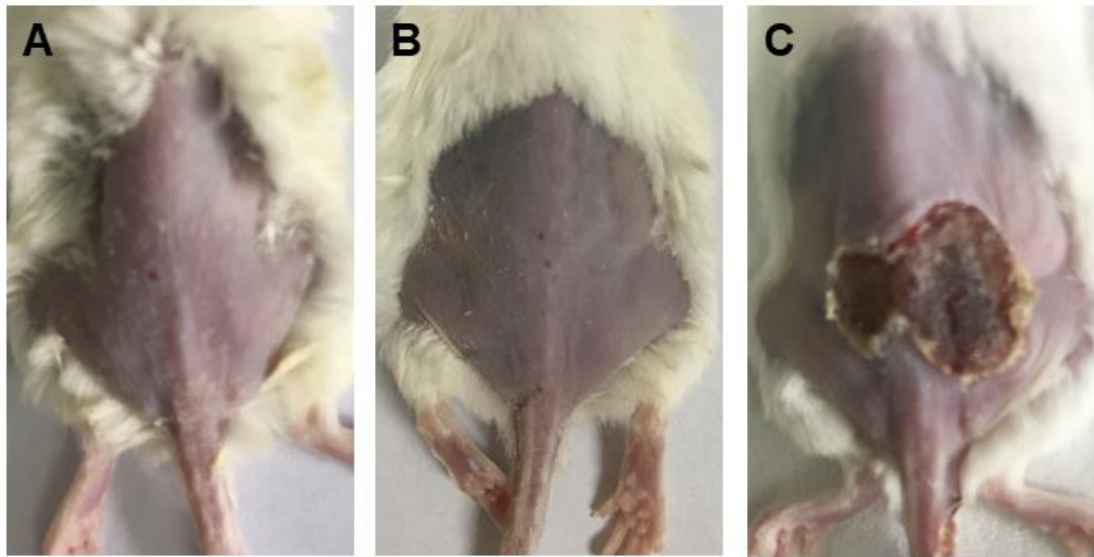


Figure S24. Laser simulated photo-toxicity of A) PBS, B) AuHNRs-DTPP and C) Free DTPP.

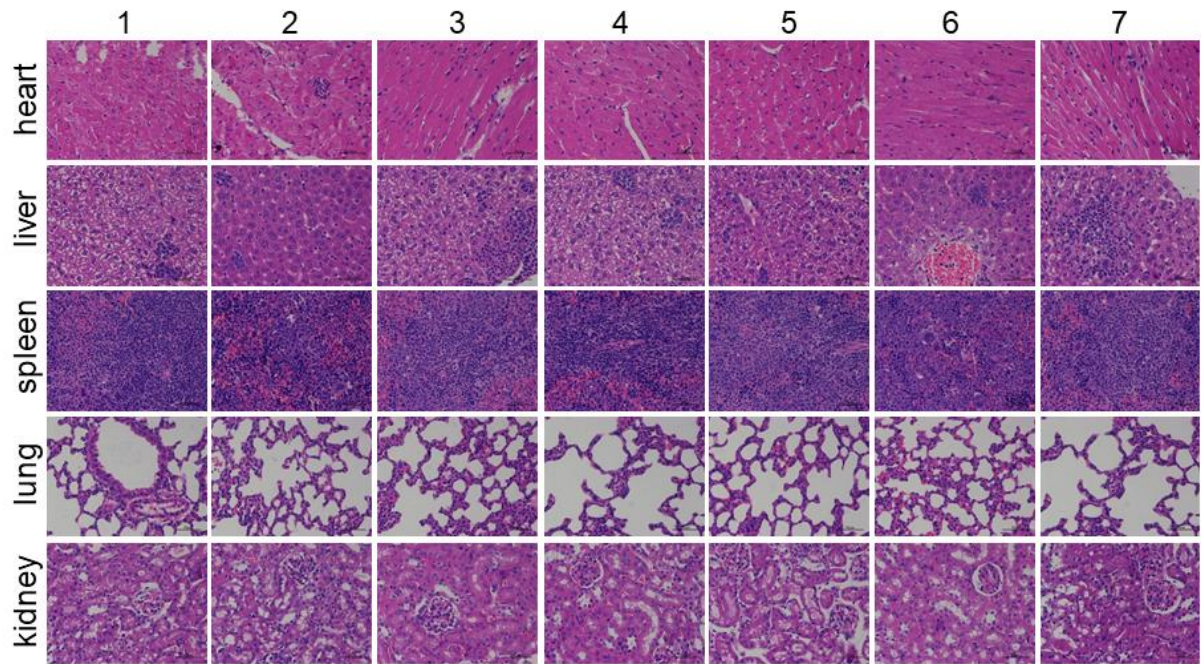


Figure S25. H&E stained images of spleen, lung, kidney, heart, and liver after different treatments. Group 1) PBS, 2) AuHNRs-DTPP, 3) AuHNRs-DTPP with 633 nm laser irradiation, 4) AuHNRs with 633 nm laser irradiation, 5) AuHNRs with dual laser (1064 and 633 nm) irradiation, 6) AuHNRs-DTPP with 1064 nm laser irradiation, and 7) AuHNRs-DTPP with dual laser (1064 and 633 nm) irradiation.

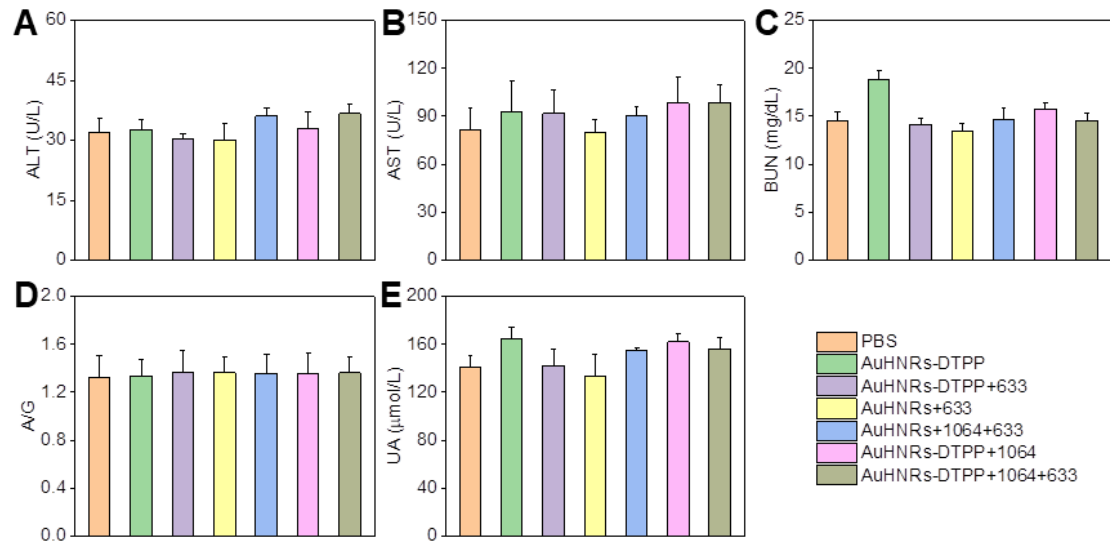


Figure S26. Liver function markers and kidney function markers in serum.

Parameter	Group1	Group2	Group3	Group4	Group5	Group6	Group7	Unit	Reference Range
WBC	4.8	4.2	3.7	3.3	3.9	3.3	2.9	10 ⁹ /L	0.8-6.8
Lymph#	3.8	3.2	2.1	2.7	3.2	2.5	2.5	10 ⁹ /L	0.7-5.7
Mon#	0.1	0.1	0.2	0.1	0.1	0.1	0.1	10 ⁹ /L	0.0-0.3
Gran#	0.9	0.9	1.4	0.5	0.6	0.7	0.3	10 ⁹ /L	0.1-1.8
Lymph%	78	76.6	56.4	82.2	83.3	73.9	86.8	%	55.8-90.6
Mon%	2.9	2.4	5.9	2.2	2.1	3.7	1.8	%	1.8-6.0
Gran%	19.1	21	37.7	15.6	14.6	22.4	11.4	%	8.6-38.9
RBC	5.29	6.31	6.71	6.39	6.26	5.37	7.12	10 ¹² /L	6.36-9.42
HGB	80	94	102	95	94	80	109	g/l	110-143
HCT	26.8	31.8	33.2	31.4	30.8	26.7	36.1	%	34.6-44.6
MCV	50.8	50.4	49.5	49.2	49.3	49.9	50.8	fl	48.2-58.3
MCH	15.1	14.8	15.2	14.8	15	14.8	15.3	pg	15.8-19
MCHC	298	295	307	302	305	299	301	g/l	302-353
RDW	14.2	13.6	14.1	12.1	15.4	13.5	14.5	%	13-17
PLT	300	222	391	319	191	268	304	10 ⁹ /L	450-1590
MPV	4.9	5.1	4.7	4.7	4.8	4.7	4.9	fl	3.8-6.0
PDW	16.3	16.6	16.1	15.9	16	16.4	16.1		
PCT	0.147	0.113	0.183	0.149	0.091	0.125	0.148	%	

Table S1. Routine of mice whole blood after relative treatment. Group 1) PBS, 2) AuHNRs-DTPP, 3) AuHNRs-DTPP with 633 nm laser irradiation, 4) AuHNRs with 633 nm laser irradiation, 5) AuHNRs with dual laser (1064 and 633 nm) irradiation, 6) AuHNRs-DTPP with 1064 nm laser irradiation, and 7) AuHNRs-DTPP with dual laser (1064 and 633 nm) irradiation.