Electronic Supplementary Information

All-in-One Theranostic Nanoplatform Based on Upconversion Dendritic Mesoporous Silica Nanocomposites for Synergistic Chemodynamic/Photodynamic/Gas Therapy

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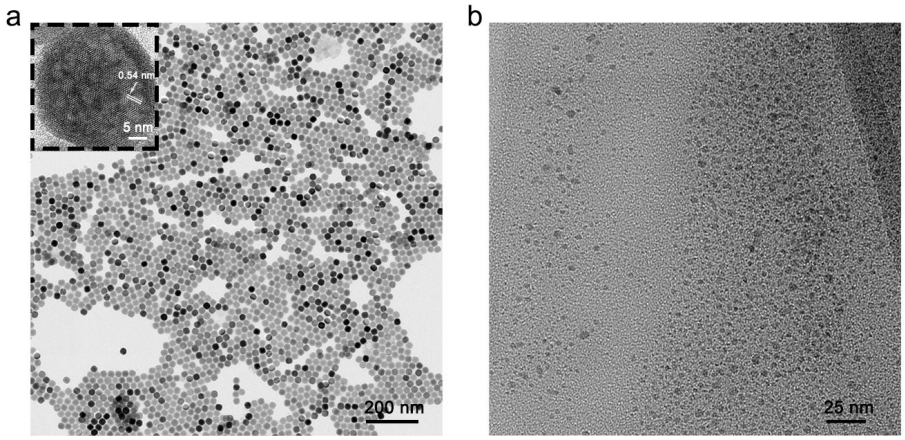

Fig. S1. TEM images of a) UCNPs and b) CuO_2 at different magnifications.

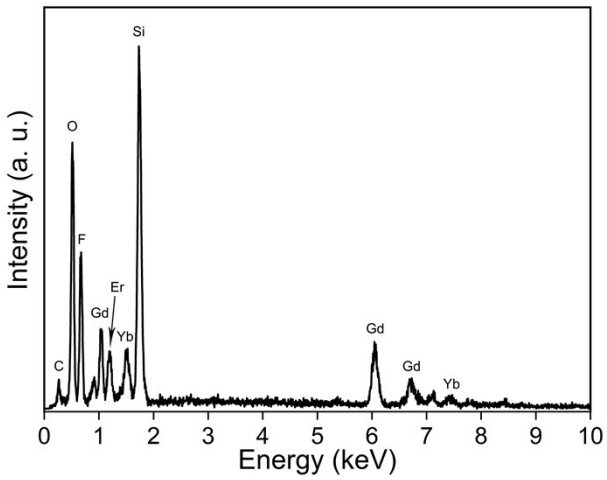

Fig. S2. EDS spectrum of UMNO nanoparticles.

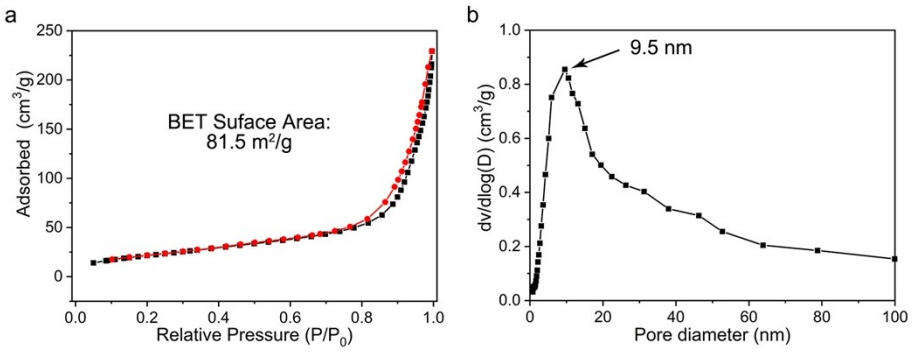

Fig. S3. a) N_2 absorption-desorption isotherms and b) corresponding pore-size distribution of UMNOCC-PEG.

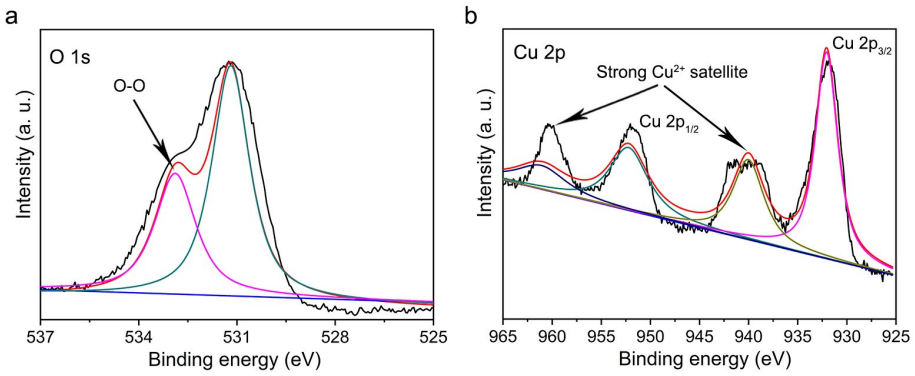

Fig. S4. The high resolution a) O 1s and b) Cu 2p XPS spectra of UMNOCC-PEG.

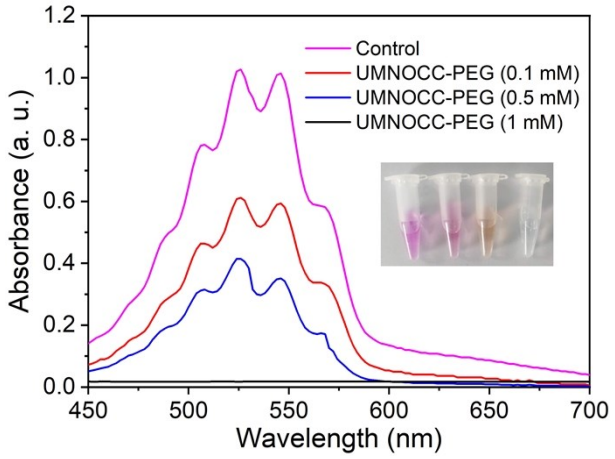

Fig. S5. Colorimetric analysis demonstrating the presence of peroxo groups in UMNOCC-PEG. Peroxo groups can reduce MnO_4^- to colorless Mn^{2+} in strong acidic media (0.1 M H_2SO_4).

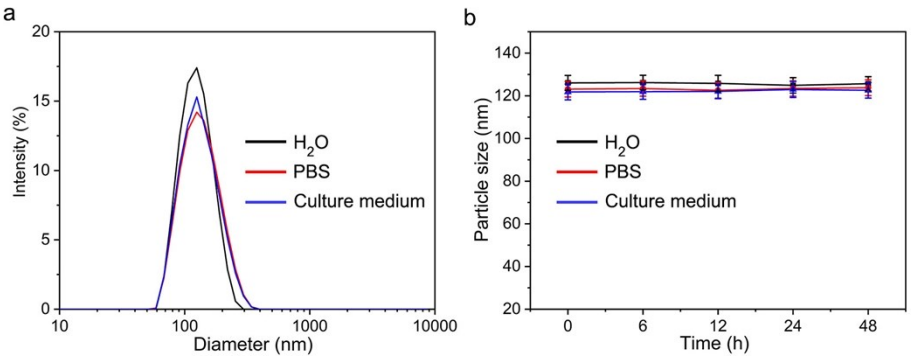

Fig. S6. a) The particle size distributions of UMNOCC-PEG NPs in different solvents (including H_2O, phosphate buffered solution (PBS) and culture medium) measured by dynamic light scattering (DLS) and b) the supernatant obtained from the UMNOCC-PEG solutions in H_2O, PBS (pH 7.4) and culture medium after two days standing.

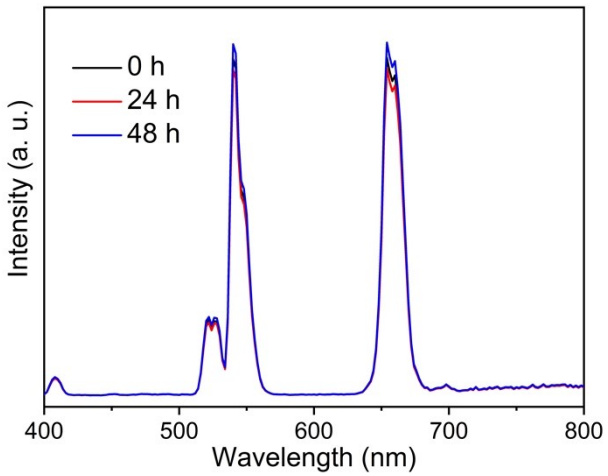

Fig. S7. Upconversion emission spectra of UMNOCC-PEG in aqueous solutions at different time periods.

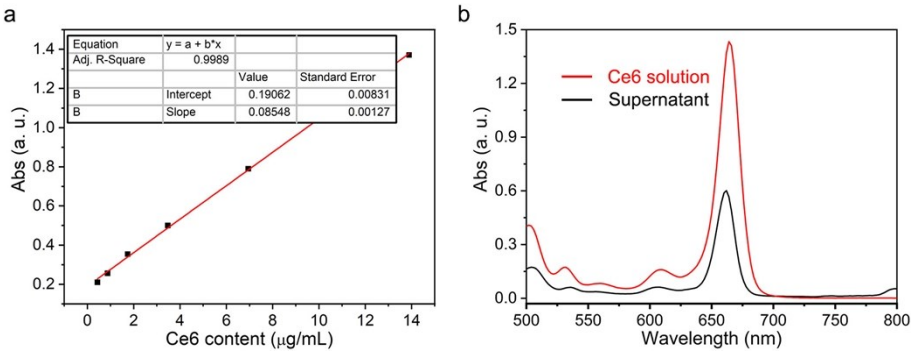

Fig. S8. a) The standard curves for Ce6. b) The absorbance spectra of the initial Ce6 solution and the supernatant obtained after UMNOCC-PEG preparation.

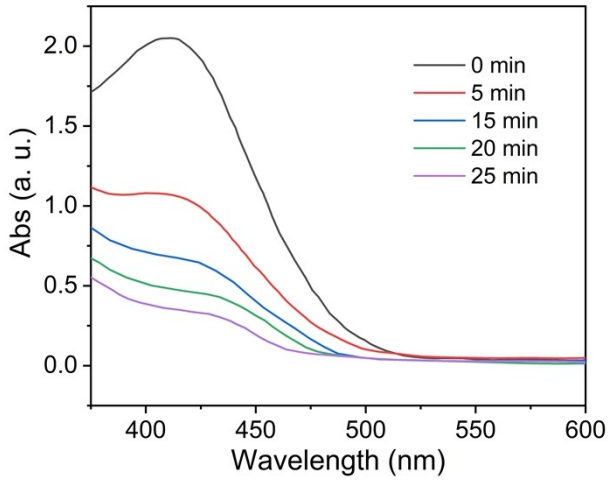

Fig. S9. GSH consumption after treating with UMNOCC-PEG nanoparticles (100 μg mL^{-1}) at pH 6.5.

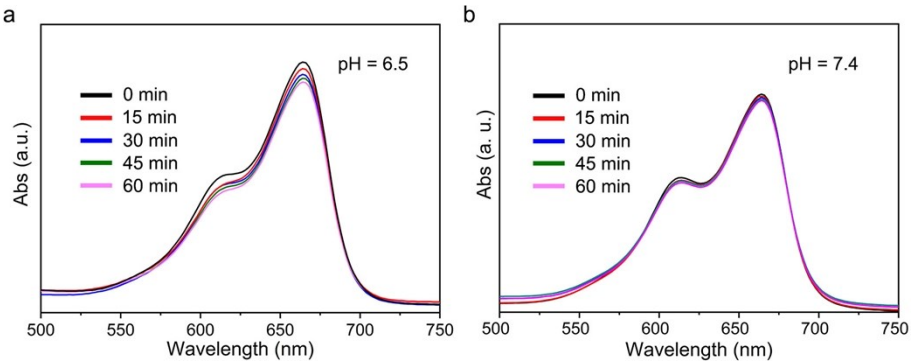

Fig. S10. Time-dependent UV−vis absorption spectra of MB contained UMNOCC-PEG solution at pH 6.5 a) and 7.4 b), respectively.

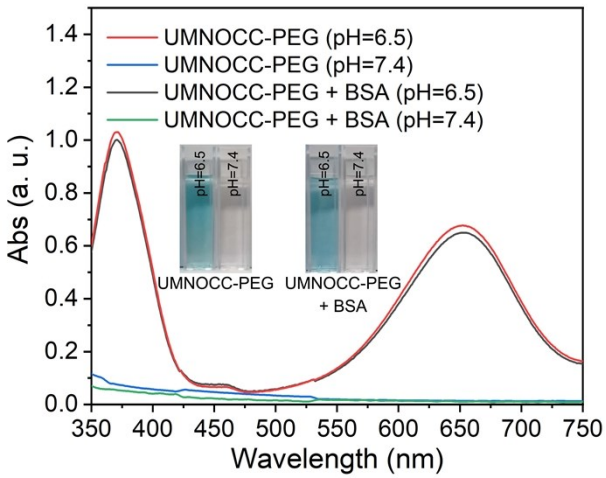

Fig. S11. Hydrogen peroxide generation capability of UMNOCC-PEG with BSA added at pH 7.4 and 6.5 (inset: digital photos, 200 μg mL^{-1} of UMNOCC-PEG, 1 mM of GSH and BSA in 3 mL solution).

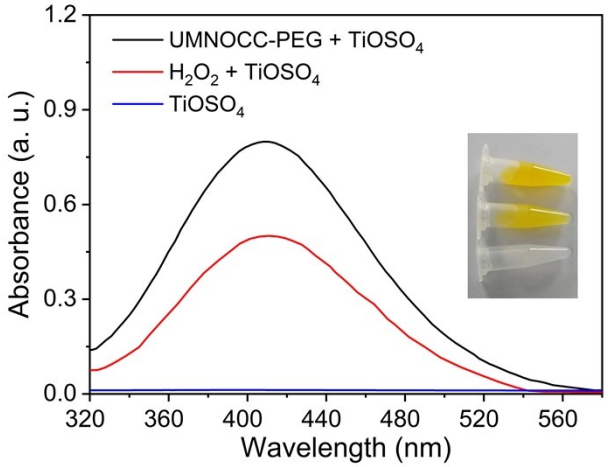

Fig. S12. Absorbance spectrum of the titanium peroxide complex in the presence of UMNOCC-PEG or H_2O_2.

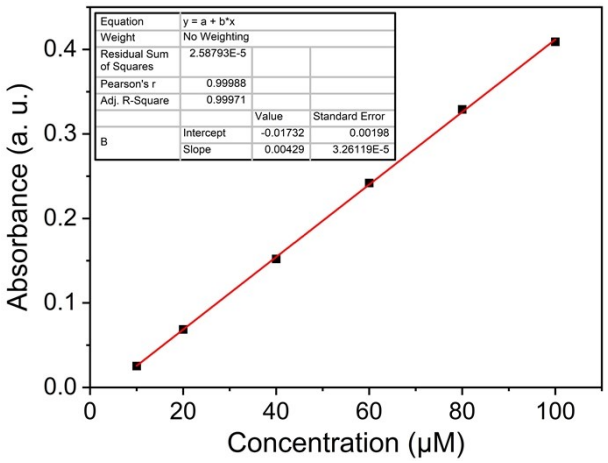

Fig. S13. The standard curves of NO and measured the UV–vis absorption spectra at 540 nm.

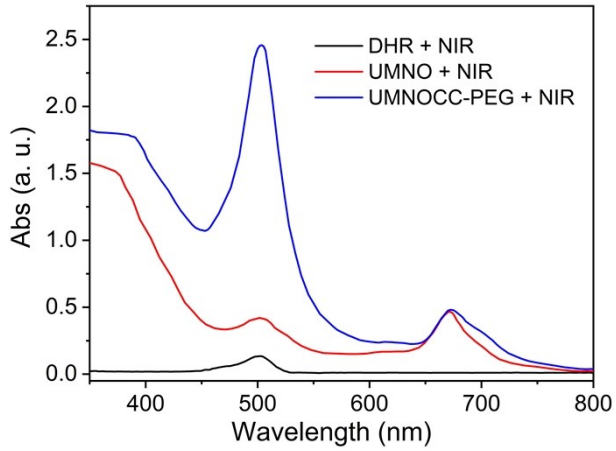

Fig. S14. Rhodamine 123 (RH) UV−vis absorbance spectrum after various treatments.

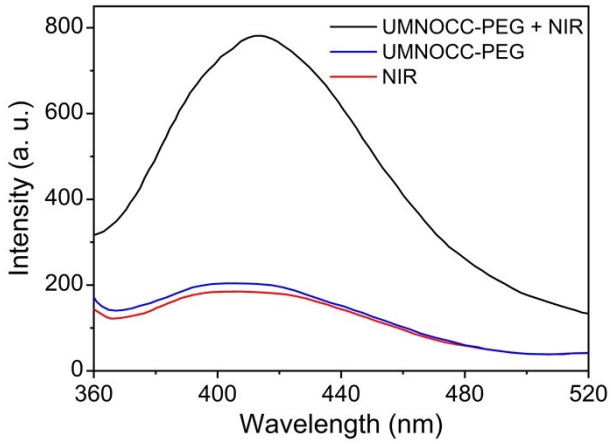

Fig. S15. Fluorescence of L-Tyrosine in the system before and after adding UMNOCC-PEG and illuminated with NIR for 10 min.

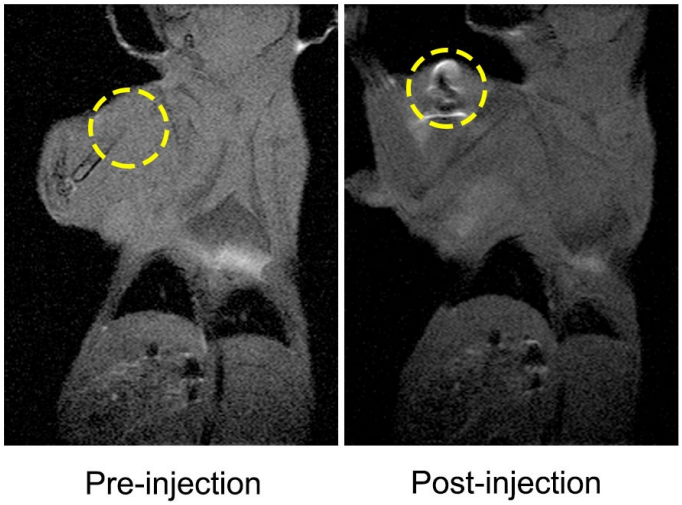

Fig. S16. *In vivo* T_1-weighted MRI of tumor-bearing mice before and after *in situ* injection.

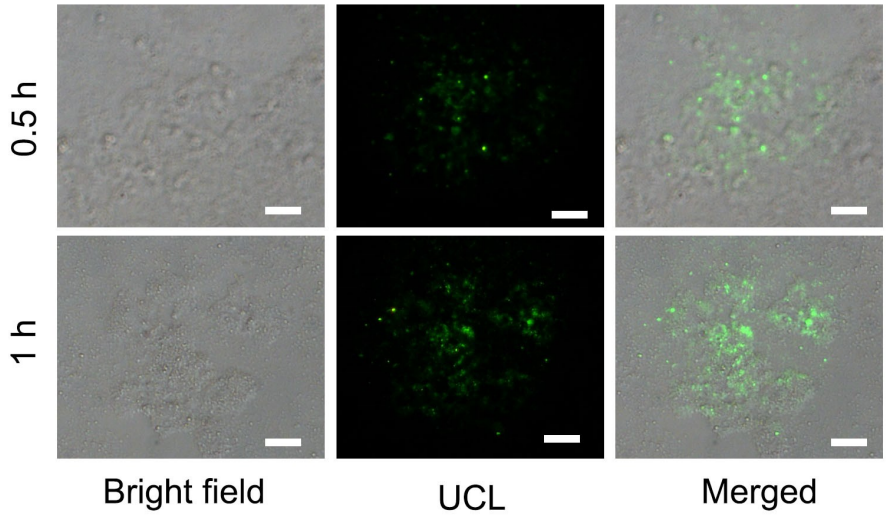

Fig. S17. Microscopy images of HeLa cells incubated with UMNOCC-PEG NPs at 37 °C for 0.5 h, and 1 h, respectively. Scale bar: 100 μm.

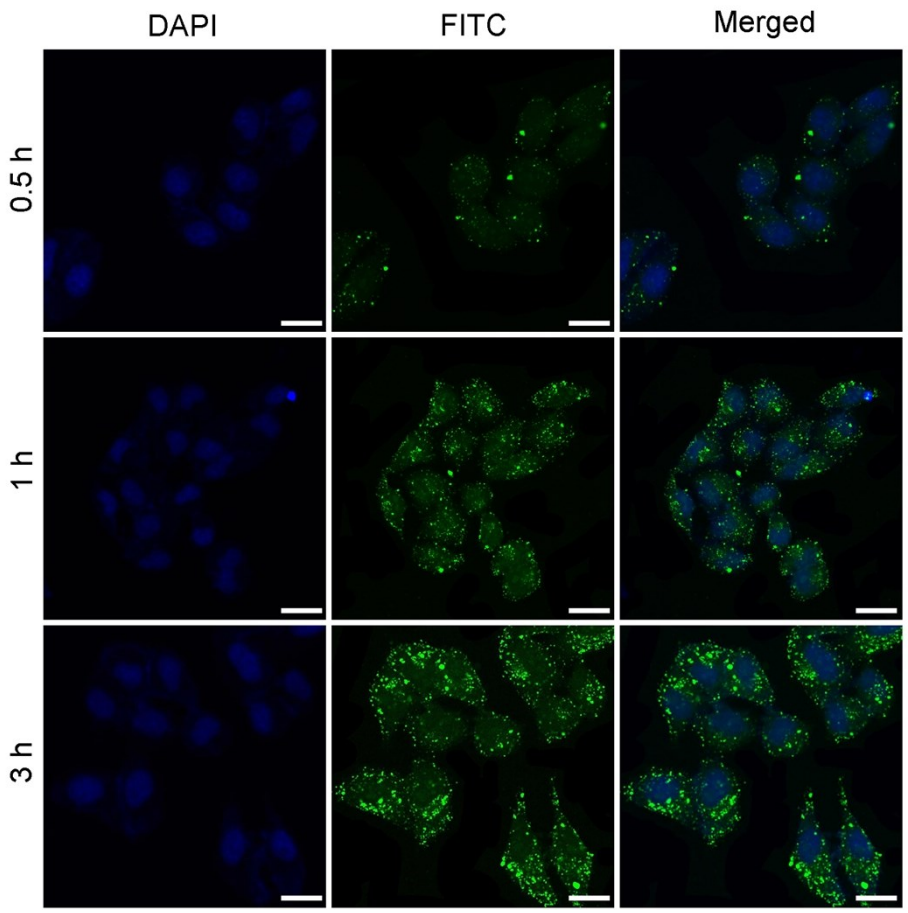

Fig. S18. CLSM images of HeLa cells incubated with UMNOCC-PEG-FITC for 0.5, 1 and 3 h at 37 °C. Scale bar: 50 μm.

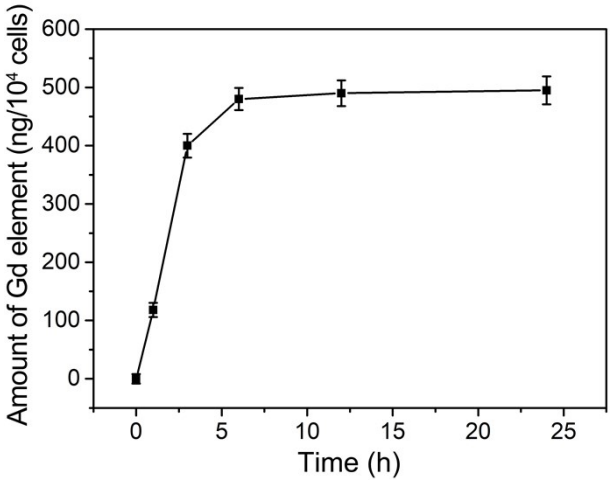

Fig. S19. Time-dependent cellular uptake of UMNOCC-PEG (50 μg mL^{-1}) determined by ICP-MS after incubation.

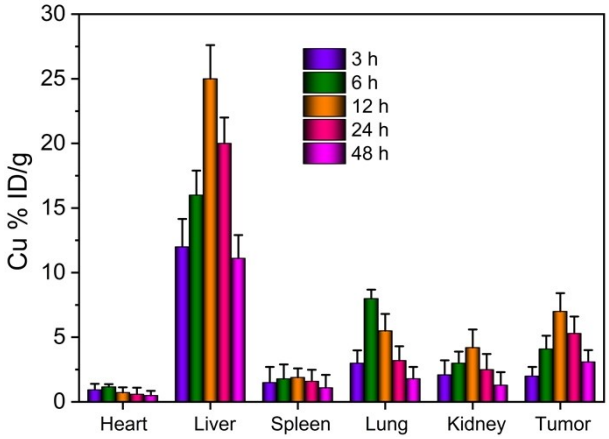

Fig. S20. Time-dependent concentrations of Cu in the major organs measured by ICP-MS.

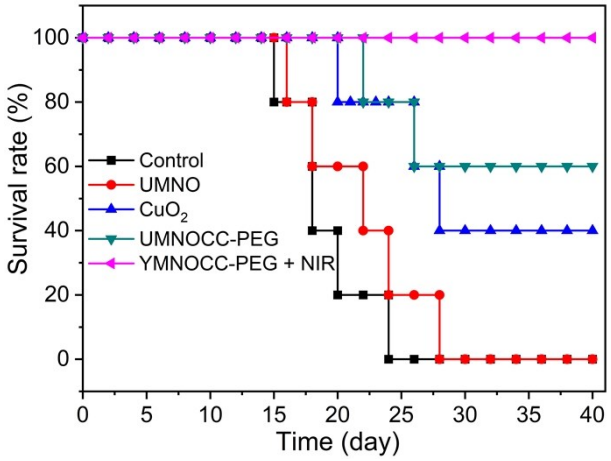

Fig. S21. Survival curves of different groups of mice after various treatments.

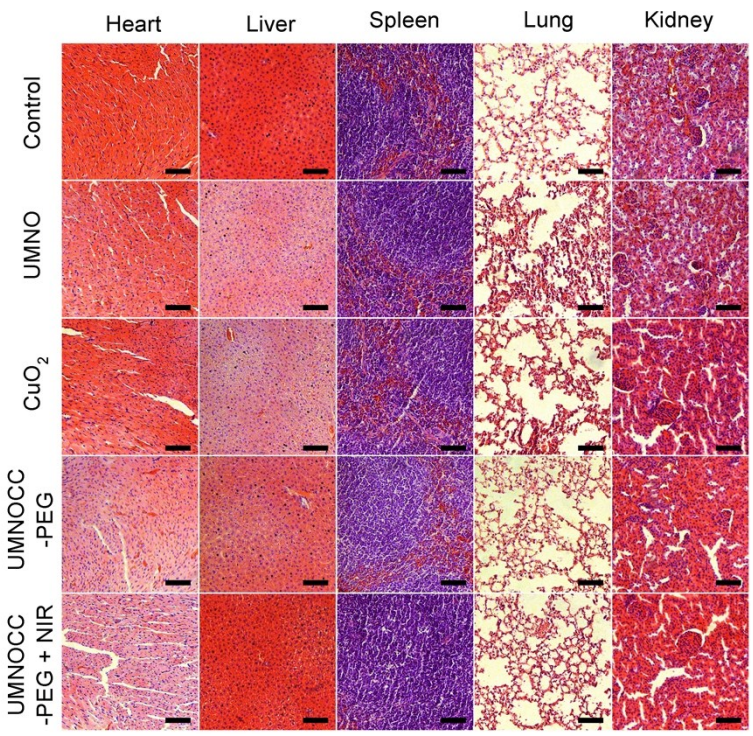

Fig. S22. The H&E stained images of heart, liver, spleen, lung and kidney obtained from different groups after 20 days treatment. Scale bar: 50 μm.

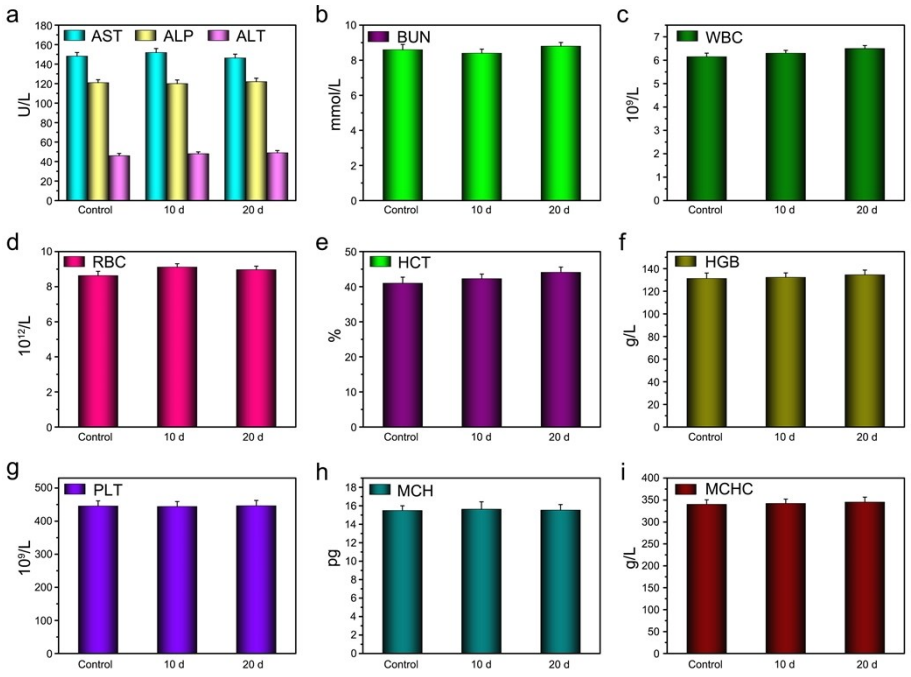

Fig. S23. The Blood biochemistry and hematology data of female Kunming mice treated with UMNOCC-PEG nanocomposites in different times were as follow: liver function indicators a), BUN b), WBC c), RBC d), HCT e), HGB f), PLT g), MCH h), and MCHC i).