Supporting Information

Cascade catalysis-coordinated nanorobot toward synergistic cancer chemoimmunotherapy

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Figure S1. SEM images of magnetic Fe₃O₄ core.



Figure S2. Standard curve of glucose oxidase concentration labeled with RhB.



Figure S3. (a) The N_2 adsorption-desorption isotherm of Cu@MPS. (b) Pore size distribution of Cu@MPS.



Figure S4. TEM images of Cu@MPS after biodegradation in neutral (pH = 7.4) simulated body fluid (SBF) for varied durations: 1, 3, 5, and 7 days.



Figure S5. The diagram of experimental setup. (a) Helmholtz coil. (b) A controllable voltage source. (c) The optical imaging system. (d) Monitor. (e) Control program.



Figure S6. The K-shaped trajectory of Cu@MPS guided by the magnetic field.



Figure S7. UV-vis absorption spectrum of the catalytic product produced by TMB after the addition of H_2O_2 and Cu@MPS-GOD.



Figure S8. The TMB color change diagram of Cu@MPS-GOD in the presence of different concentrations of H_2O_2 .



Figure S9. Statistical analysis of the mean fluorescent intensity of DCFH-DA stained confocal images with the assistance of ImageJ software.



Figure S10. Statistical analysis of the mean fluorescent intensity of Calcein AM and PI-stained confocal images with the assistance of ImageJ software.



Figure S11. Statistical analysis of the mean fluorescent intensity of Nucleus and CRT-stained confocal images with the assistance of ImageJ software.



Figure S12. Histological assessments for the major organs (heart, liver, spleen, lung, and kidney) of mice after treatment with Cu@MPS-GOD in 1, 30 days post-injection. Scale bar: 100 μm.



Figure S13. Photographs of different experimental groups of mice during the 15-day treatment period.

Movie S1. Movement of Cu@MPS in S-shaped channels under 3D magnetic field.

Movie S2. K-shaped trajectory of Cu@MPS under 3D magnetic field.

Movie S3. The translational velocity of Cu@MPS under different pitch angle of magnetic fields.

Movie S4. The moving speed of Cu@MPS under different magnetic field frequencies.

Movie S5. The moving speed of Cu@MPS under different magnetic field strengths.