

Supplementary Information

Radiation-activated PD-L1 aptamer-functionalized nanoradiosensitizer to potentiate antitumor immunity in combined radioimmunotherapy and photothermal therapy

Author contributions

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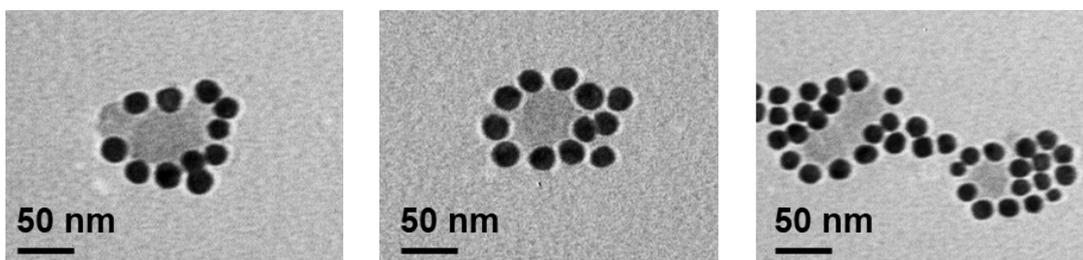


Figure S1. HR-TEM images of BAPBM NPs.

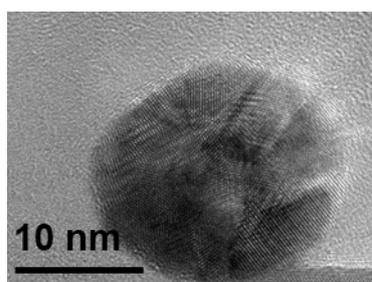


Figure S2. HR-TEM images of AuNPs.

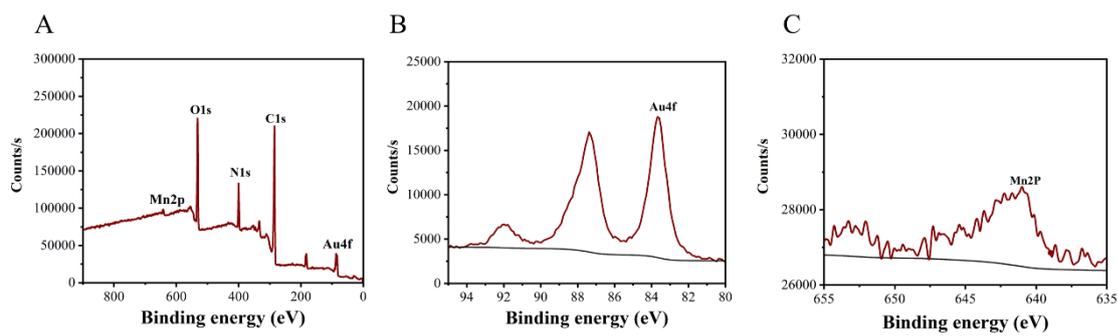


Figure S3. X-ray photoelectron spectroscopy (XPS) curve of BAPBM NPs.

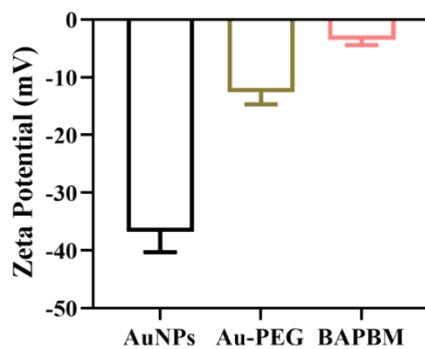


Figure S4. The zeta potentials of AuNPs, Au-PEG, and BAPBM NPs.

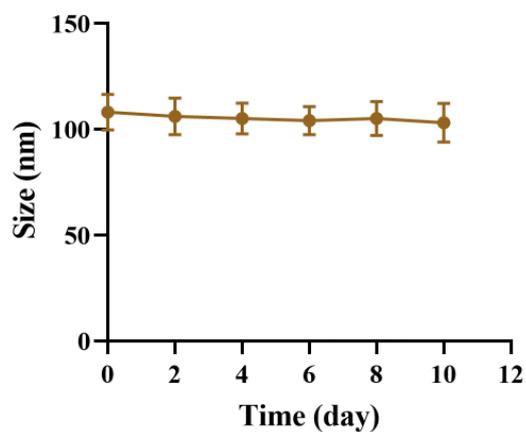


Figure S5. Hydrodynamic sizes of BAPBM NPs in PBS (pH=7.4).

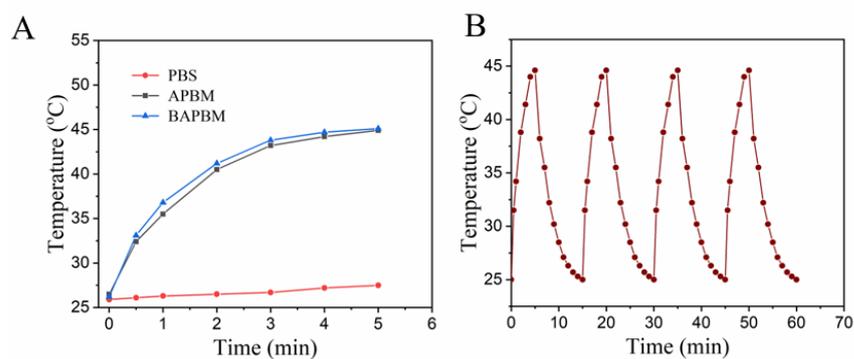


Figure S6. (A) Photothermal curves of APBM and BAPBM NPs under 808 nm laser irradiation (0.5 W/cm²). (B) Heating/cooling profiles of BAPBM NPs after four on-off laser irradiation.

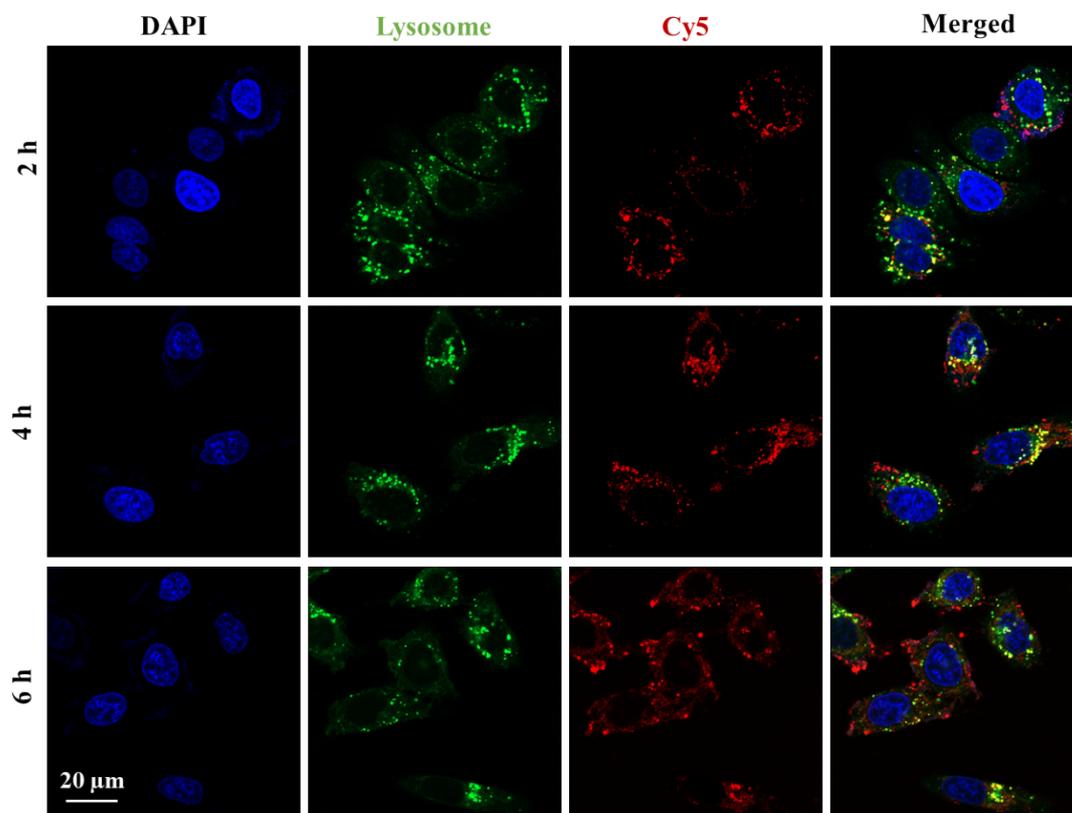


Figure S7. Intracellular localization of BAPBM NPs. Scale bar is 20 μm.

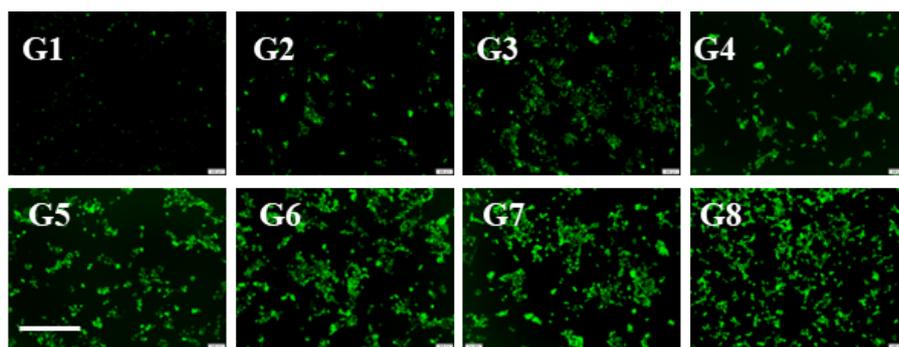


Figure S8. Fluorescence images of 4T1 cells treated with different treatments and stained with ROS probe (DCF-DA). The scale bar is 100 μm . G1: PBS; G2: PBS+X-ray; G3: BMS; G4: BMS+X-ray; G5: APBM+X-ray; G6: APBM+X-ray (4 Gy)+NIR (0.5 W/cm², 5 min); G7: BAPBM+X-ray; G8: BAPBM+X-ray+NIR.

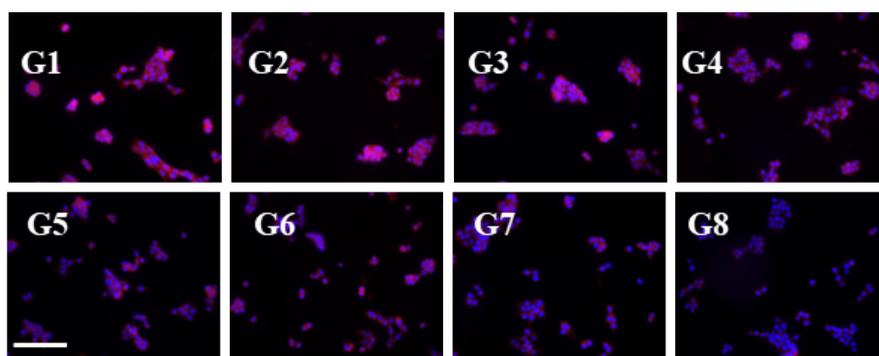


Figure S9. Evolution of O₂ in 4T1 cells treated with different treatments and stained with [Ru(dpp)₃]Cl₂. Blue fluorescence of DAPI and red fluorescence of [Ru(dpp)₃]Cl₂. The scale bar is 100 μm .

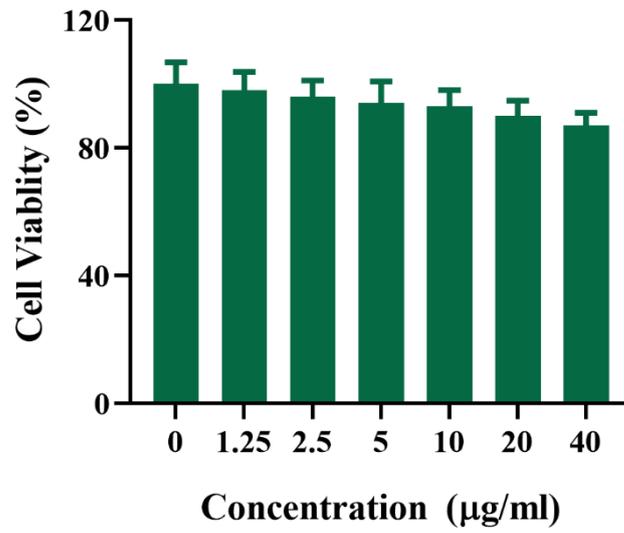


Figure S10. The cell viability of BAPBM on HUVECs.

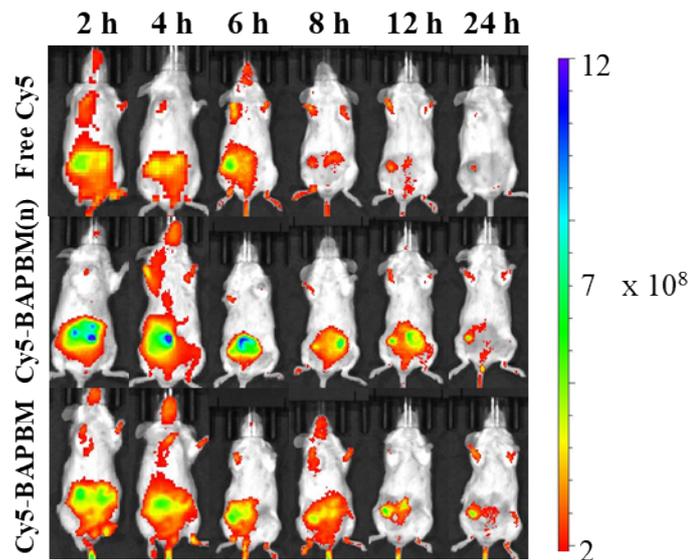


Figure S11. *In vivo* biodistribution of different nanoparticles in 4T1-bearing mice. Cy5-BAPBM(n) : Cy5-labeled BAPBM NPs without PD-L1 aptamer; Cy5-BAPBM: Cy5-labeled BAPBM NPs with PD-L1 aptamer.

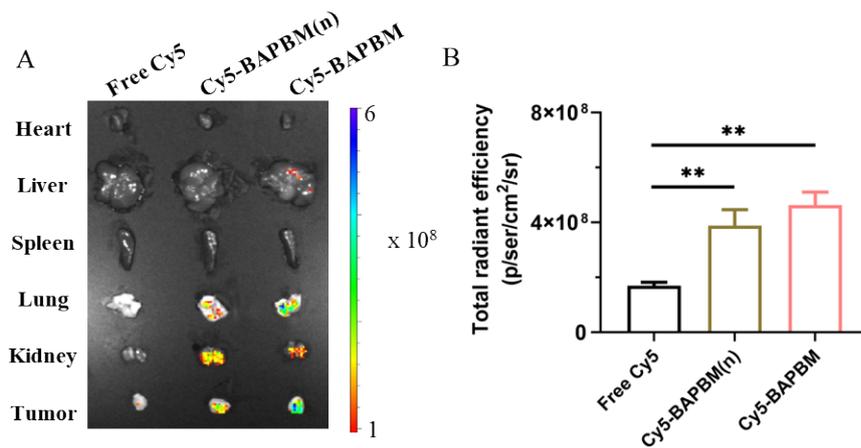


Figure S12. (A) *Ex vivo* fluorescence images of major organs. (B) Total radiant efficiency of tumor tissues. Cy5-BAPBM(n): Cy5-labeled BAPBM NPs without PD-L1 aptamer; Cy5-BAPBM: Cy5-labeled BAPBM NPs with PD-L1 aptamer. $p < 0.05$, $**p < 0.01$, $***p < 0.001$.

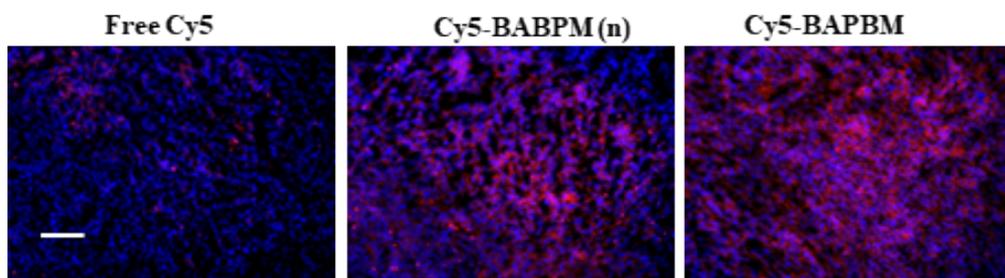


Figure S13. CLSM images of excised tumors. Cy5-BABPM(n): Cy5-labeled BAPBM NPs without PD-L1 aptamer; Cy5-BAPBM: Cy5-labeled BAPBM NPs with PD-L1 aptamer. The scale bar is 100 μ m.

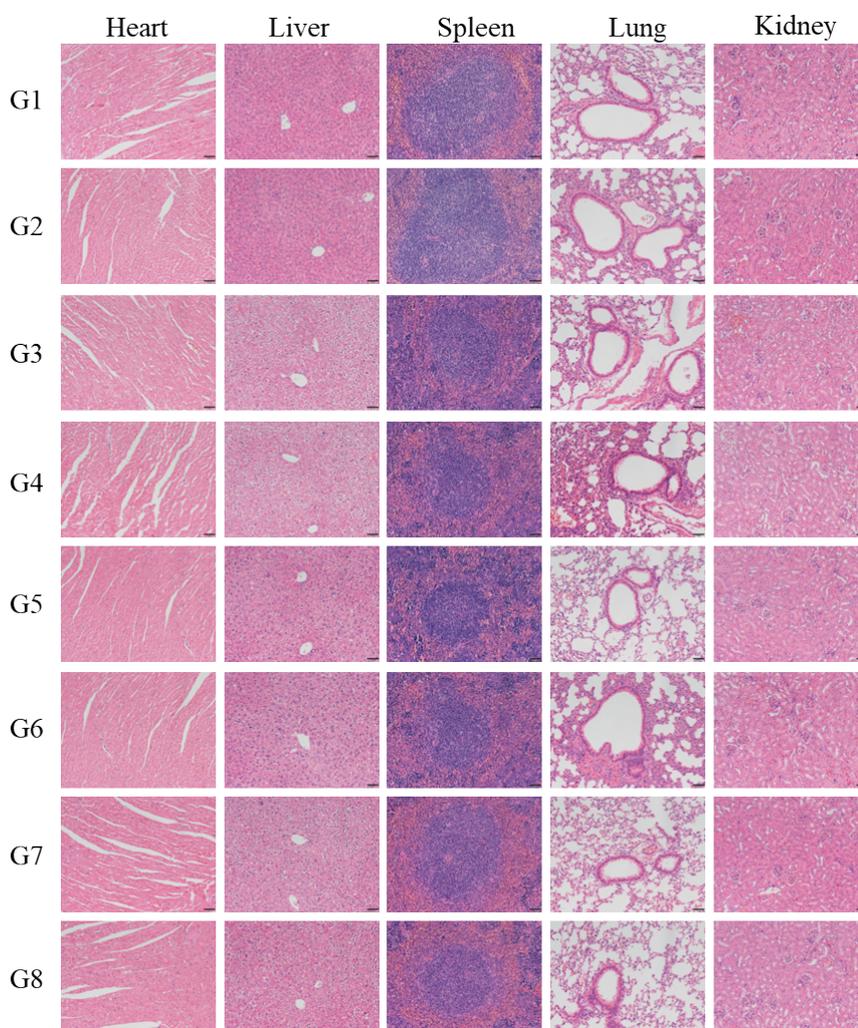


Fig. S14 H&E staining of the major organs (heart, liver, spleen, lung, kidney, and tumor). The scale bar is 100 μ m. G1: PBS; G2: PBS+X-ray; G3: BMS; G4: BMS+X-ray; G5: APBM+X-ray; G6: APBM+X-

ray (4 Gy) +NIR (0.5 W/cm², 5 min); G7: BAPBM+X-ray; G8: BAPBM+X-ray+NIR.

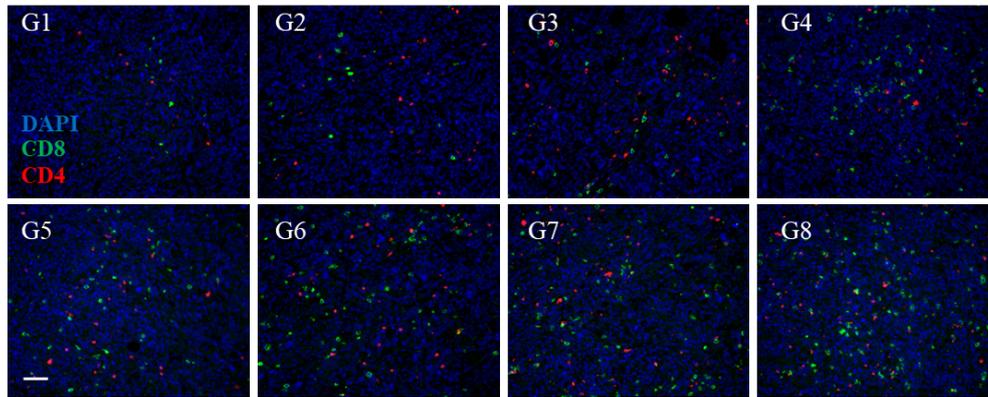


Figure S15. Immunofluorescence images (CD4⁺ and CD8⁺ T cells) of tumor tissues. Green fluorescence of CD8⁺ T cells and red fluorescence of CD4⁺ T cells. The scale bar is 100 μ m. G1: PBS; G2: PBS+X-ray; G3: BMS; G4: BMS+X-ray; G5: APBM+X-ray; G6: APBM+X-ray (4 Gy) +NIR (0.5 W/cm², 5 min); G7: BAPBM+X-ray; G8: BAPBM+X-ray+NIR.