Supplementary Materials

Intelligent Photosensitive Mesenchymal Stem Cells and Cell-Derived Microvesicles for Photothermal Therapy of Prostate Cancer

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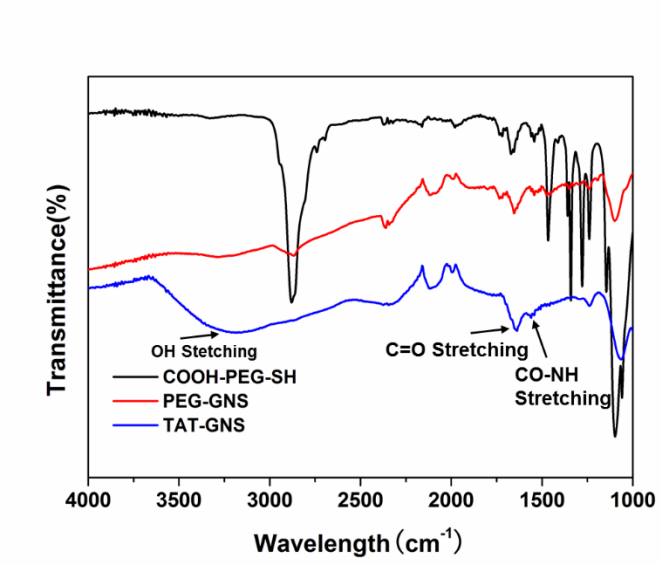

Fig. S1 The Fourier transform infrared (FT-IR) spectra of the naked PEG (black curve), PEG-GNS (red curve) and TAT-GNS (blue curve). The appearance of a weak and broad band at 3200-3400 cm^{-1} is attributed to the presence of -OH groups on the surface of PEG-GNS. The 1638.1 $cm^{-1}$and 1577.1 cm^{-1}peaks are assigned to the C=O stretching (amide I) and the asymmetric stretching mode in the CO-NH group.

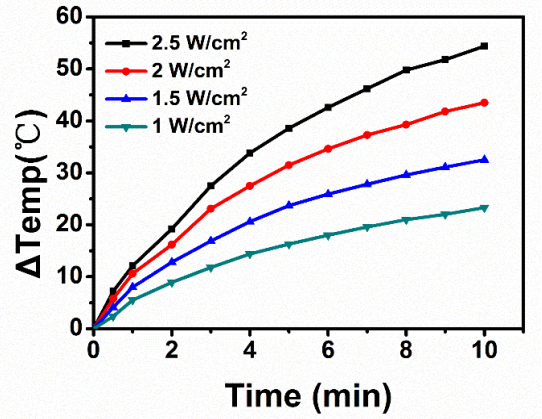

Fig. S2 △T-t curves of TAT-GNS (160 pM) with various laser irradiation intensity.

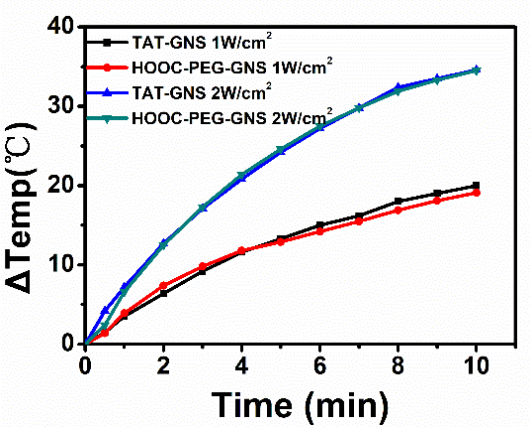

Fig. S3 △T-t curve of TAT-GNS with different surface modification. Laser irradiation intensity of 2 W/cm^2.

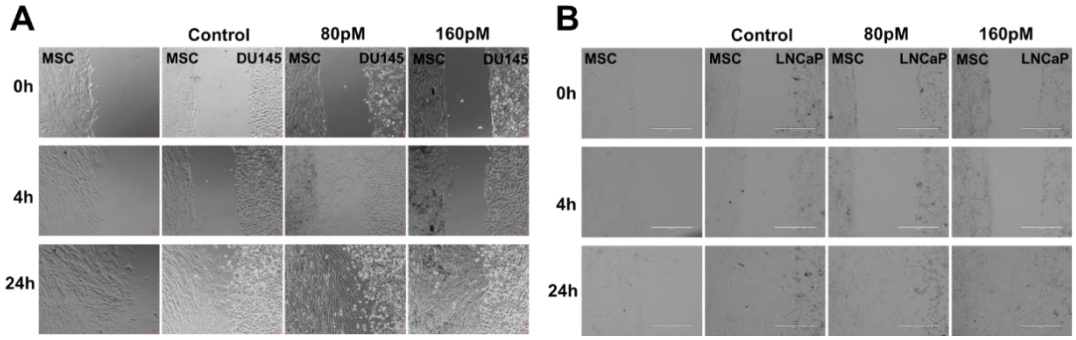

Fig. S4 Migration of GNS-loaded MSCs to DU145 and LNCaP cells.

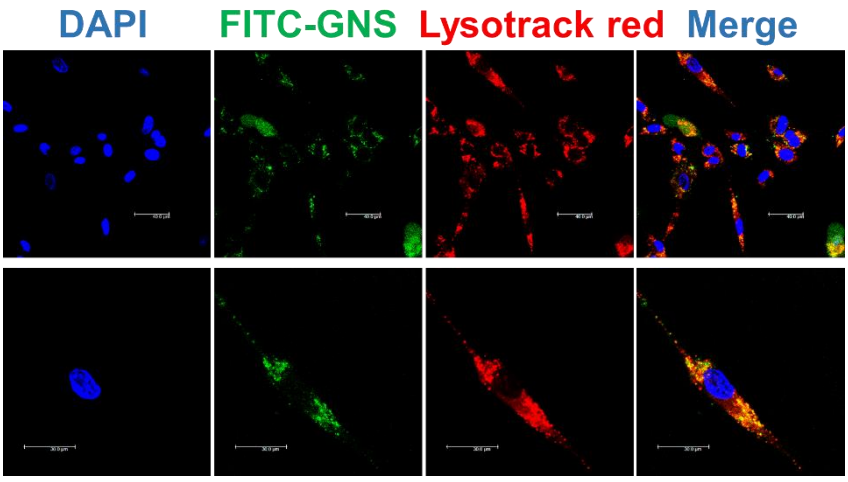

Fig. S5 Laser scanning confocal microscopy images of the FITC-TAT-GNS loaded MSCs.

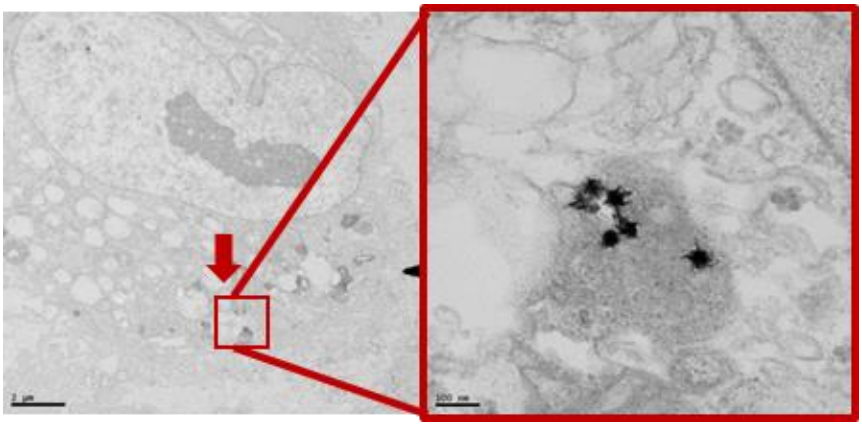

Fig. S6 TAT-GNS inside the lysosomes of MSCs was further studied by TEM. Representative TEM images of MSCs incubated with TAT-GNS for 4 hours. Only some sporadic gold nanostars were observed in intracellular vesicles after 4 h incubation.

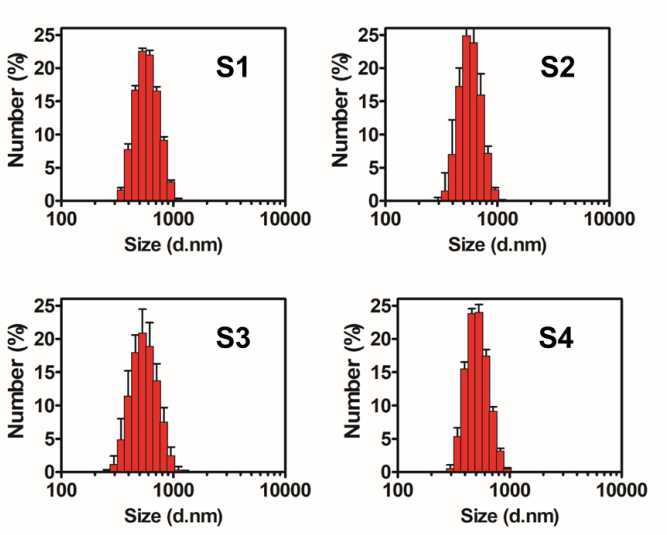

Fig. S7 DLS of different samples of GNS loaded MSCs supernatant.

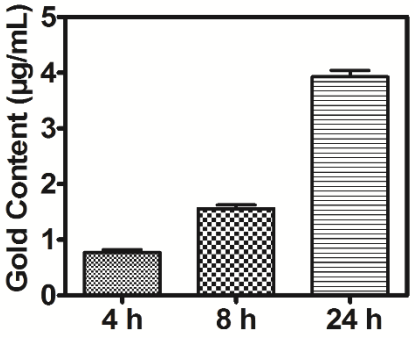

Fig. S8 ICP-MS of the time dependence gold content released in the supernatant.

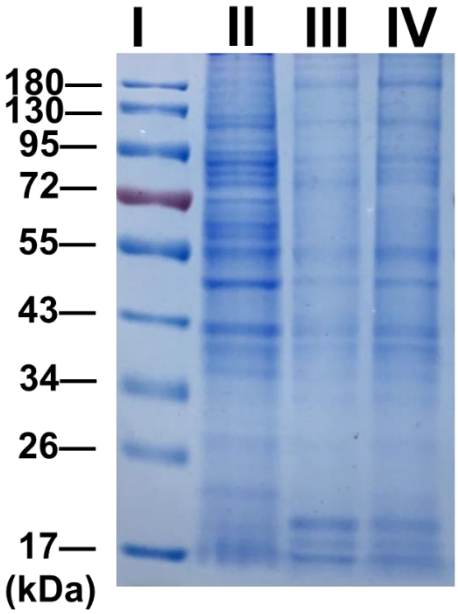

Fig. S9 SDS-PAGE protein analysis of microvesicles containing GNS clusters. Samples were stained with Coomassie brilliant blue. I, markers. II, the cell membrane proteins of MSCs. III, MSCs extracellular vesicles as control. IV, GNS-loaded MSCs extracellular vesicles.

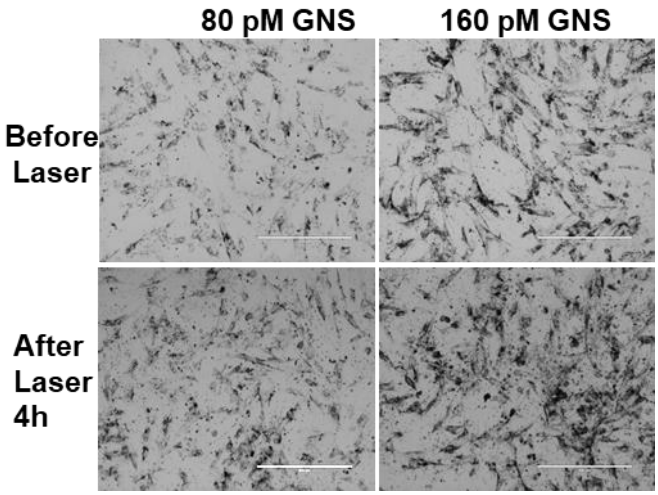

Fig. S10 Light triggered the GNS clusters released from MSCs (more dark spots could be seen 4 h after light exposure, 2 W/cm^2, 3 min).

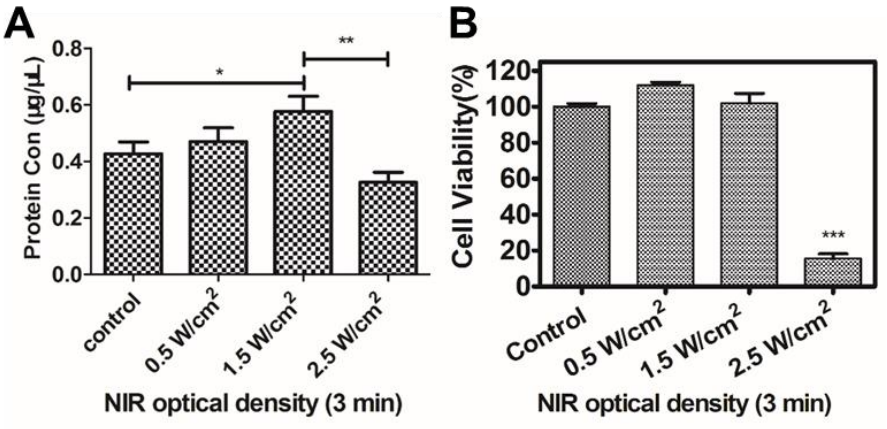

Fig S11 A, Protein quantification of supernatant in GNS loaded MSCs by BCA assay 4 h after NIR exposure (range from 0.5 W/cm^2 to 2.5 W/cm^2, 3 min). The concentration of TAT-GNS was 160 pM. **B**, the cell viability of MSCs under the NIR exposure (range from 0.5 W/cm^2 to 2.5 W/cm^2, 3 min).

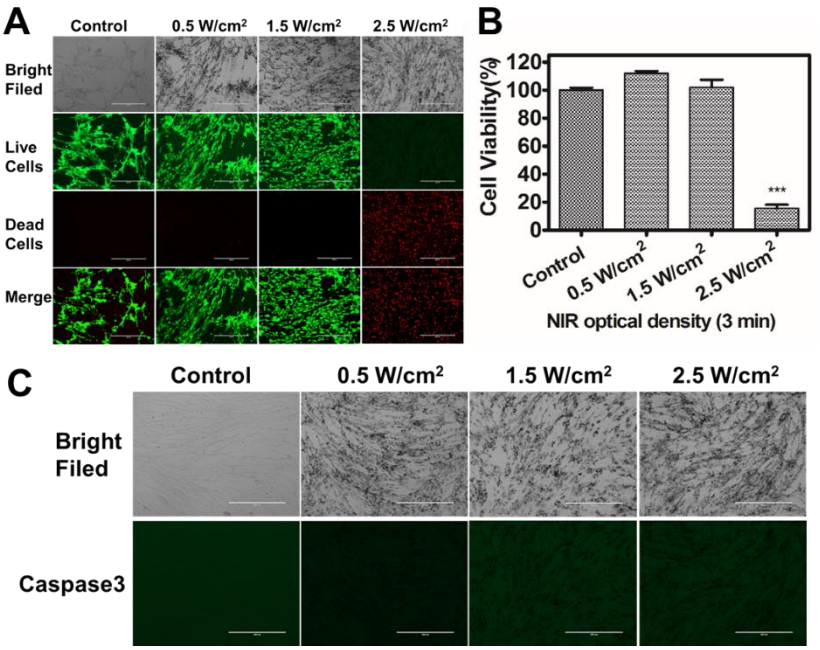

Fig. S12 *In vitro* PTT effect of GNS-loaded MSCs in a NIR optical density dependence manner. A. PTT effects on GNS-loaded MSCs with different optical density (ranging from 0.5 W/cm^2 to 2.5 W/cm^2). Representative 10× images obtained 4 hours after laser exposure (Live−dead staining with PI and calcein-AM); B, Cell viability of GNS-loaded MSCs post light irradiation; C, Caspase3 staining 4 hours after laser exposure.

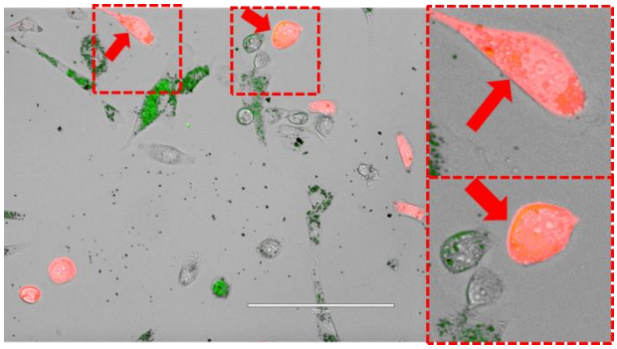

Fig. S13 FITC labeled GNS clusters released from MSCs to PC-3. The PC-3 cells were labeled by RFP.

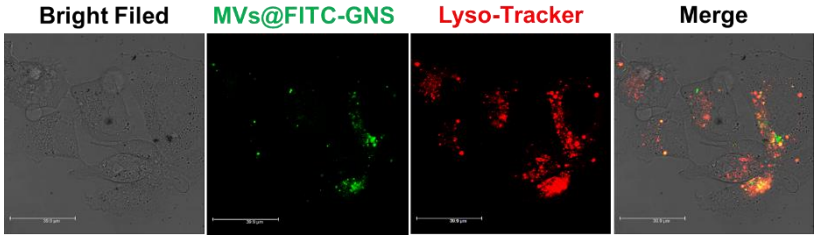

Fig. S14 Confocal laser scanning microscopy of isolated MVs@FITC-GNS in PC-3 cells. MVs@FITC-GNS could be uptake by PC-3 cells.

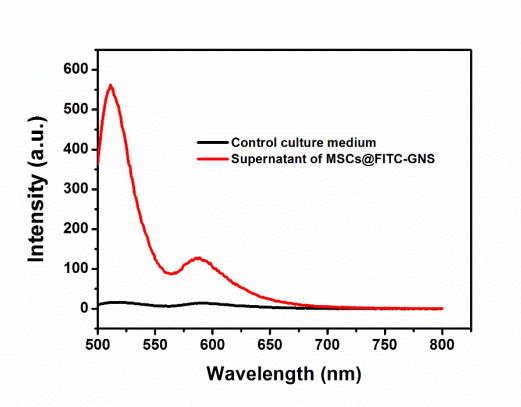

Fig. S15 The fluorescence of the supernatant in MSCs@FITC-TAT-GNS incubated with serum free medium.

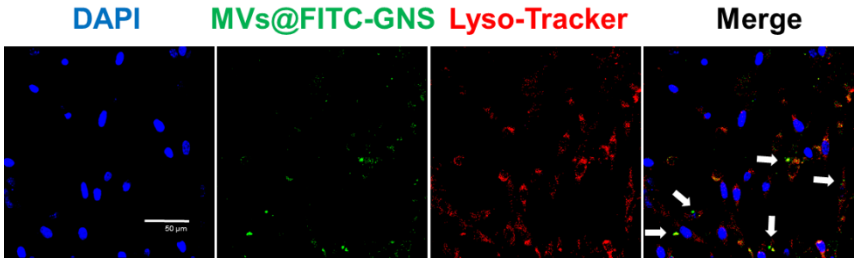

Fig. S16 Confocal laser scanning microscopy of supernatant in MSCs@FITC-TAT-GNS in 3T3 cells. The white arrow shows a majority of the MVs@FITC-GNS were outside of the 3T3 cells.

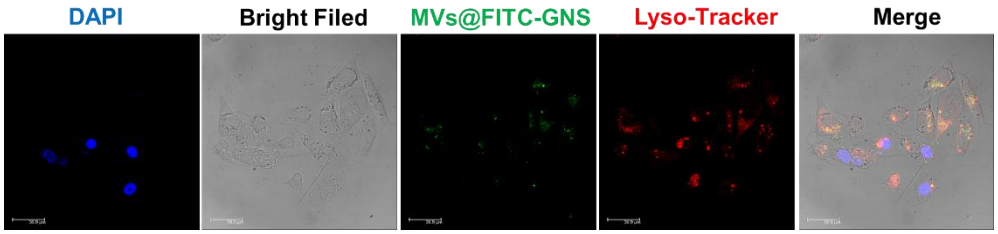

Fig. S17 Confocal laser scanning microscopy of supernatant in MSCs@FITC-TAT-GNS in PC-3 cells. MVs@FITC-GNS could be uptake by PC-3 cells

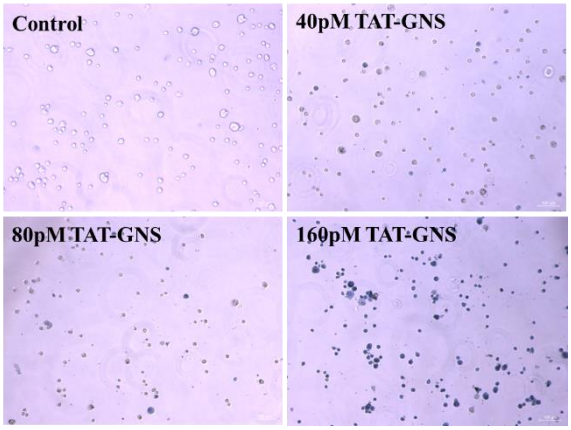

Fig. S18 Trypan blue staining of the GNS-loaded MSCs after the NIR laser exposure.

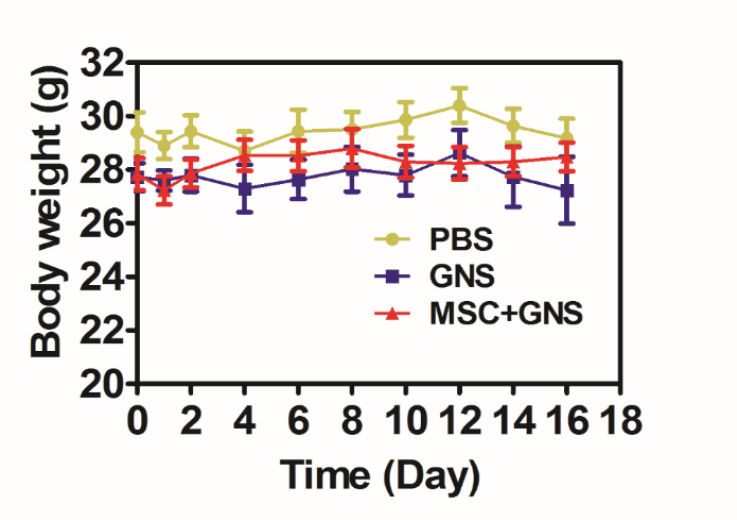

Fig. S19 The body weight variations of PC-3 tumor-bearing mice during treatment (n=5).

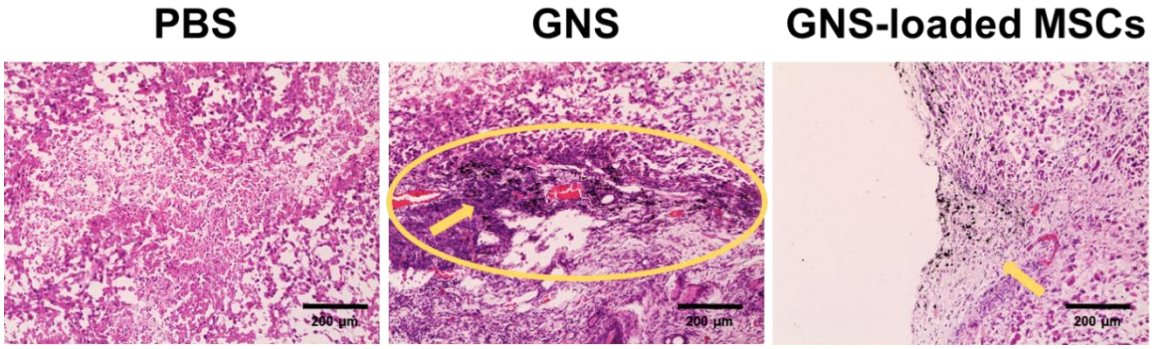

Fig. S20 Representative H&E and silver staining section of the tumor after treatment for 16 days. All scale bars are 200 μm.

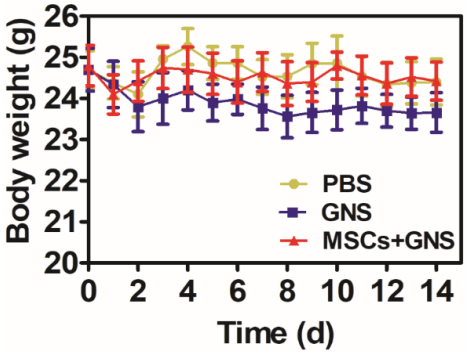

Fig. S21 The body weight variations of PC-3 tumor-bearing mice during treatment (n=5).

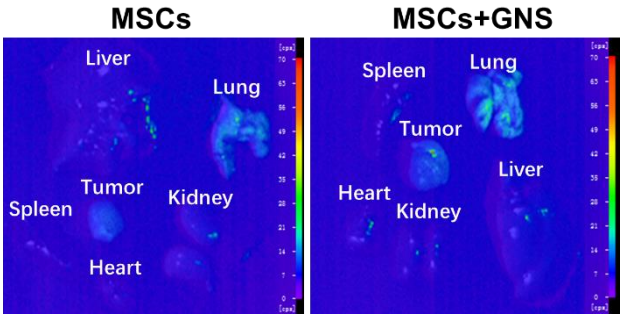

Fig. S22 Ex vivo fluorescence imaging of the biodistribution of MSCs *in vivo*.