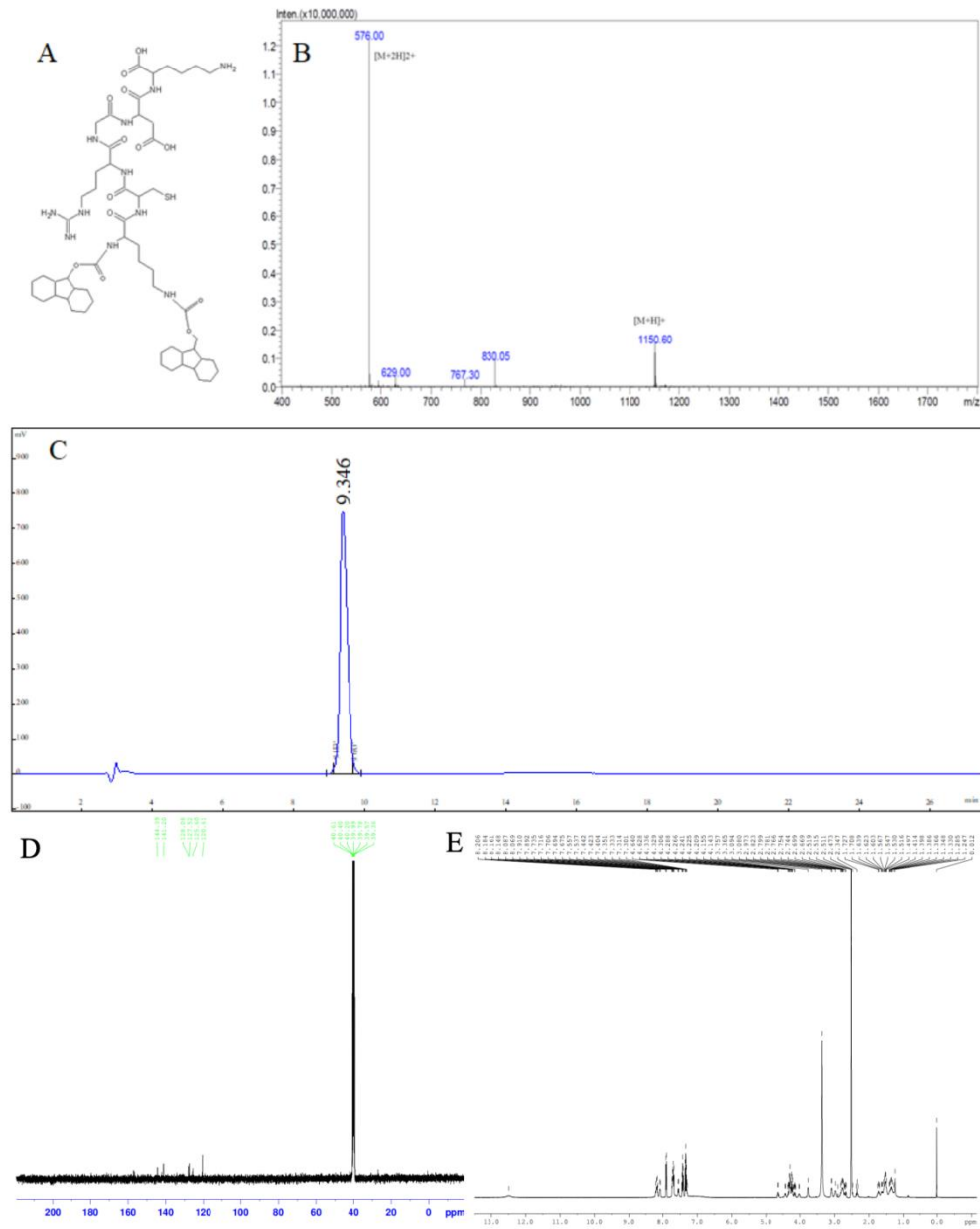


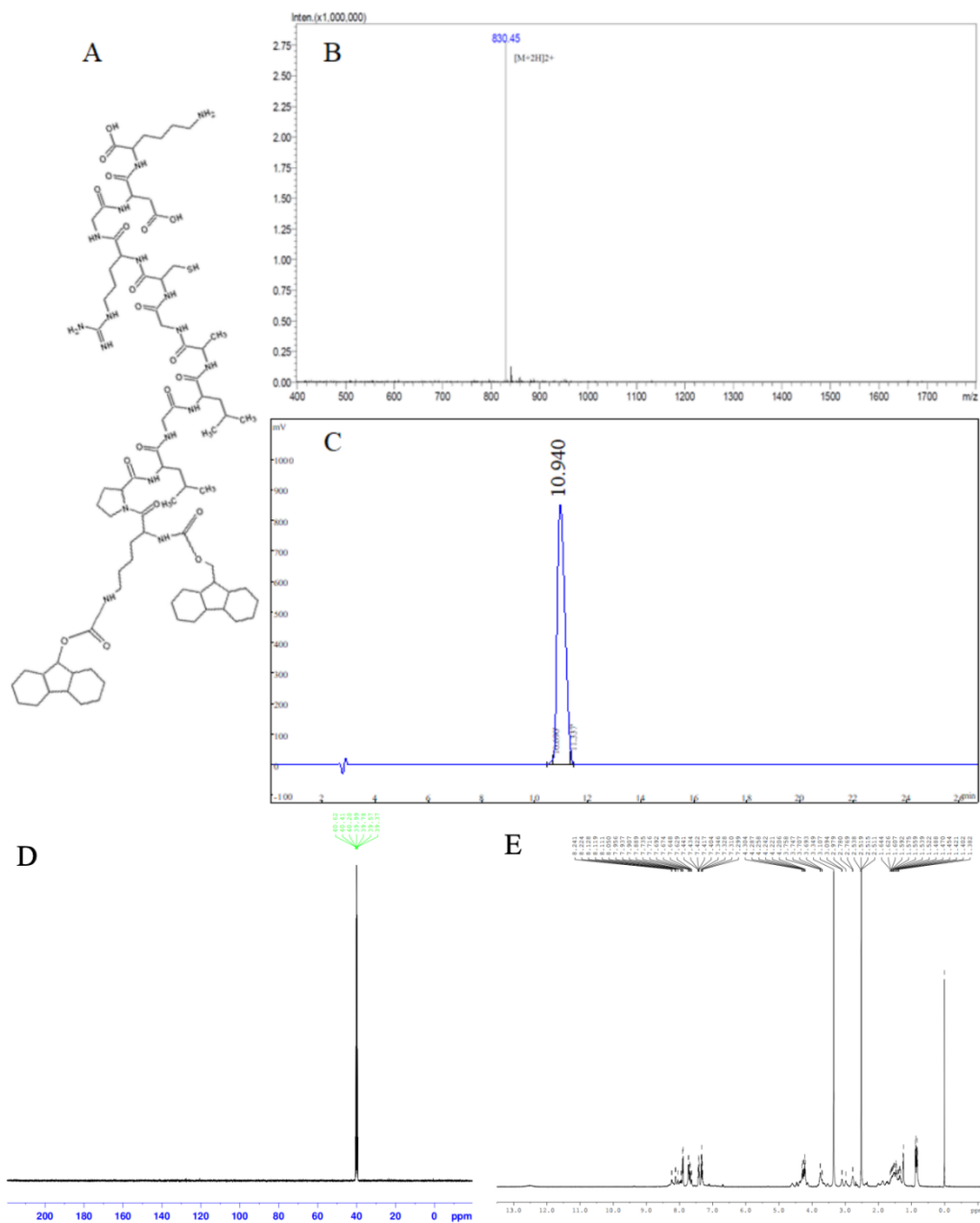
## Supplementary material



**Figure S1** Structural confirmation of Fmoc-KCRGDK (FK) peptide.

Notes: **(A)** Chemical structure; **(B)** Mass spectra; **(C)** HPLC examination of FK peptide; **(D)**

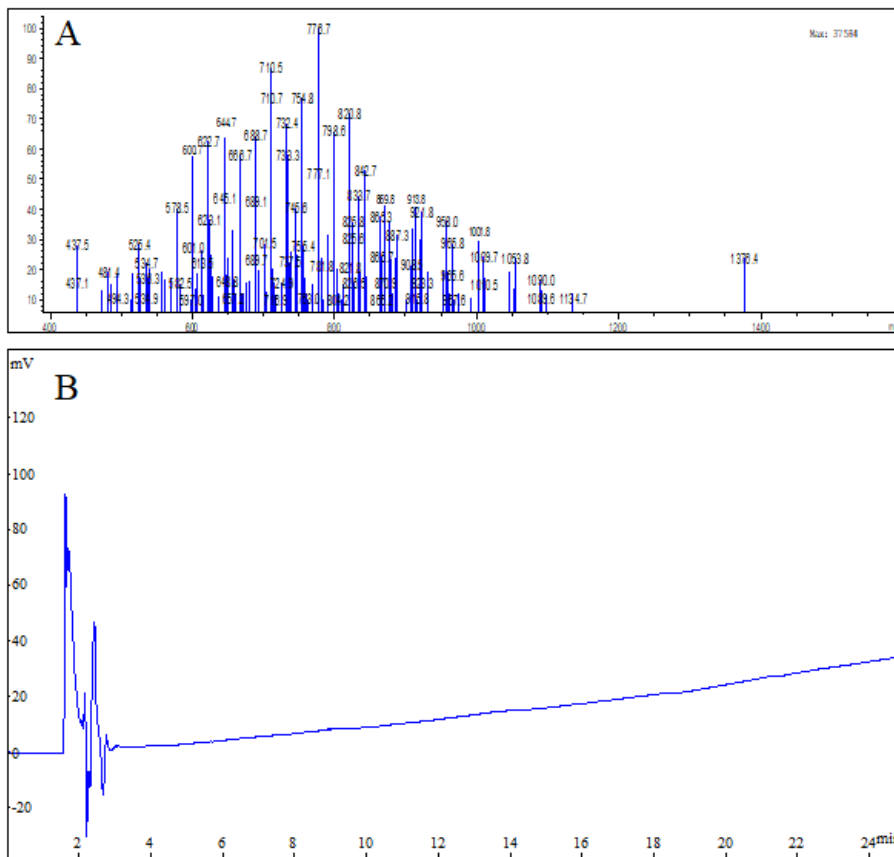
$^{13}\text{C}$ -NMR spectrum of FK peptide; **(E)**  $^1\text{H}$ -NMR spectrum of FK peptide.



**Figure S2** Structural confirmation of Fmoc KPLGLAGCRGDK (FMK) peptide.

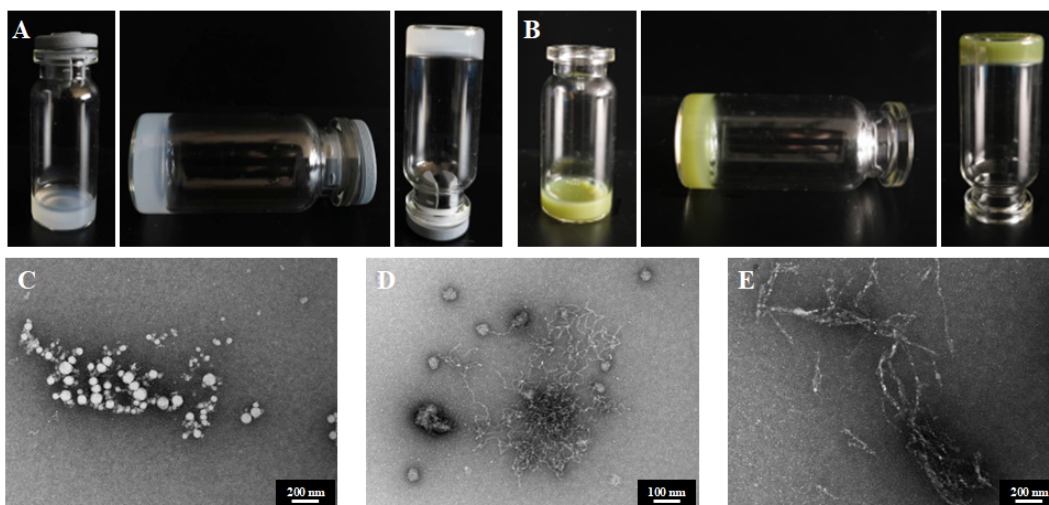
Notes: **(A)** Chemical structure; **(B)** Mass spectra; **(C)** HPLC examination of FMK peptide; **(D)**

$^{13}\text{C}$ -NMR spectrum of FMK peptide; **(E)**  $^1\text{H}$ -NMR spectrum of FMK peptide.



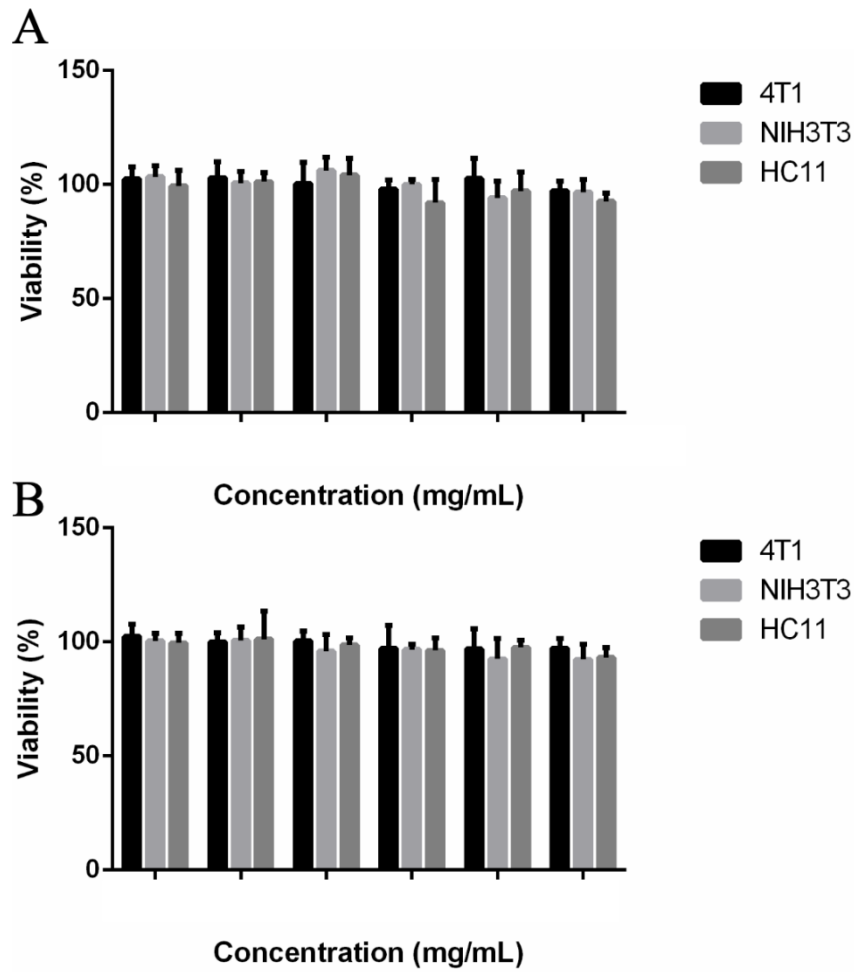
**Figure S3** MMP-2 enzyme sensitive confirmation of Fmoc KPLGLAGCRGDK (FMK) peptide.

Notes: **(A)** Mass spectra; **(B)** HPLC examination of FMK peptide incubated with MMP-2 enzyme.



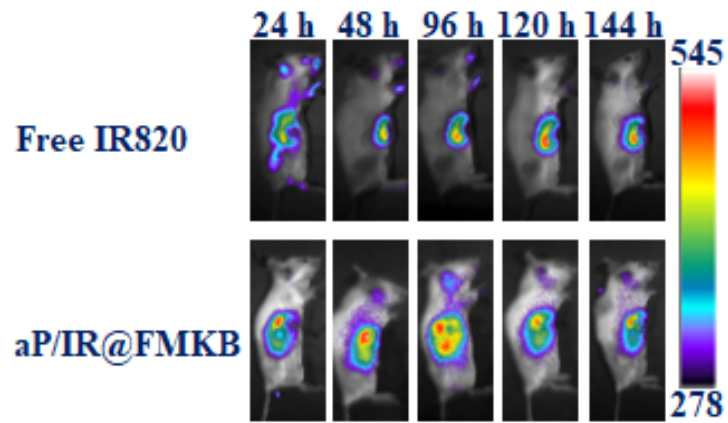
**Figure S4** Characterization of aP/IR@FMKB.

Notes: The appearance of blank hydrogel (@FMK) (**A**) and aP/IR@FMKB hydrogel (**B**); TEM images of aP/IR@FMKB micelles and hydrogels examined before (**C**), under (**D**) and after (**E**) incubation at 70 °C.

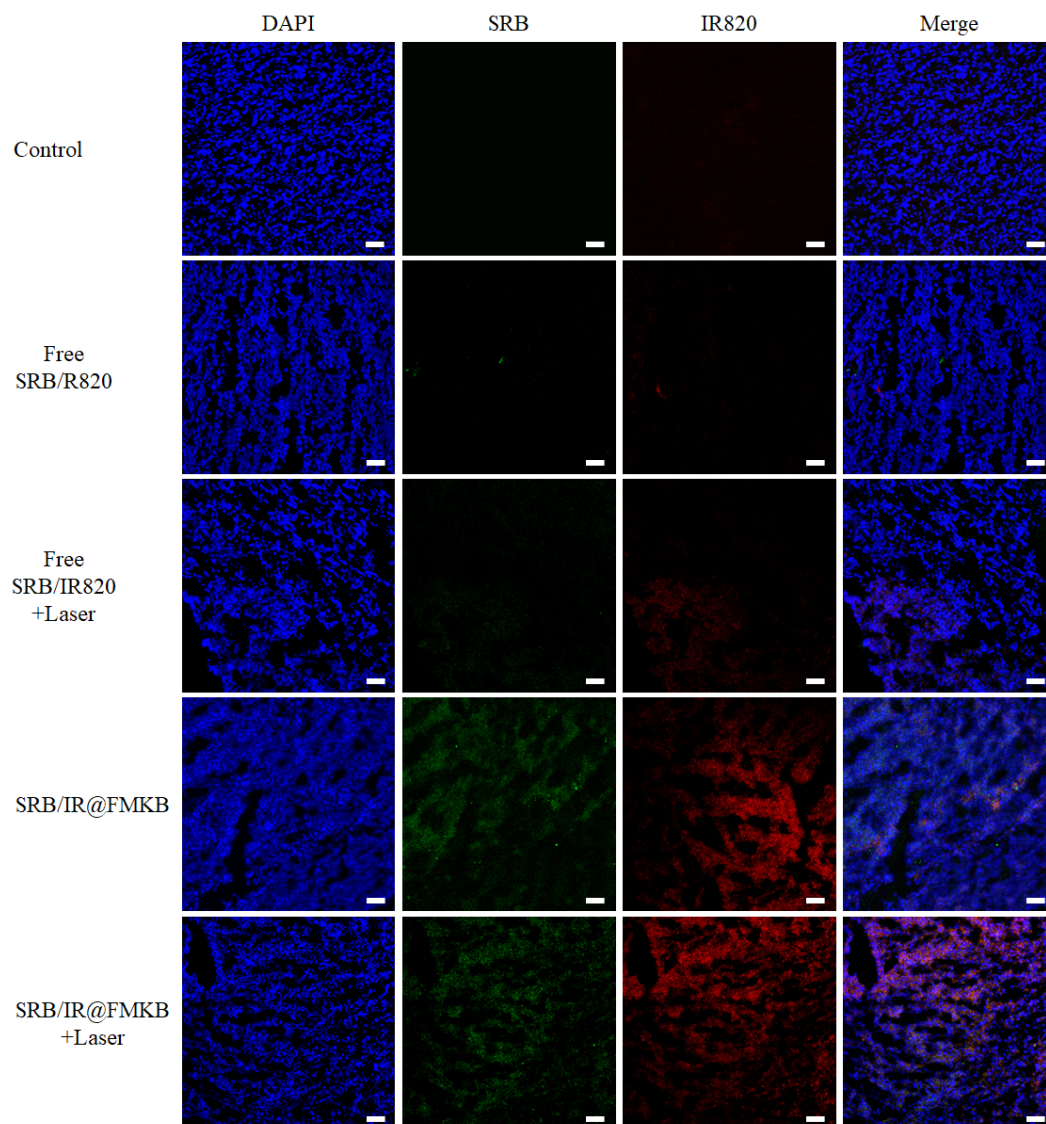


**Figure S5** The biosafety of aP/IR@FMKB against different cell lines at 24 h (**A**) and 36 h (**B**).

Notes: Data were presented as mean  $\pm$  standard deviation (n = 3).

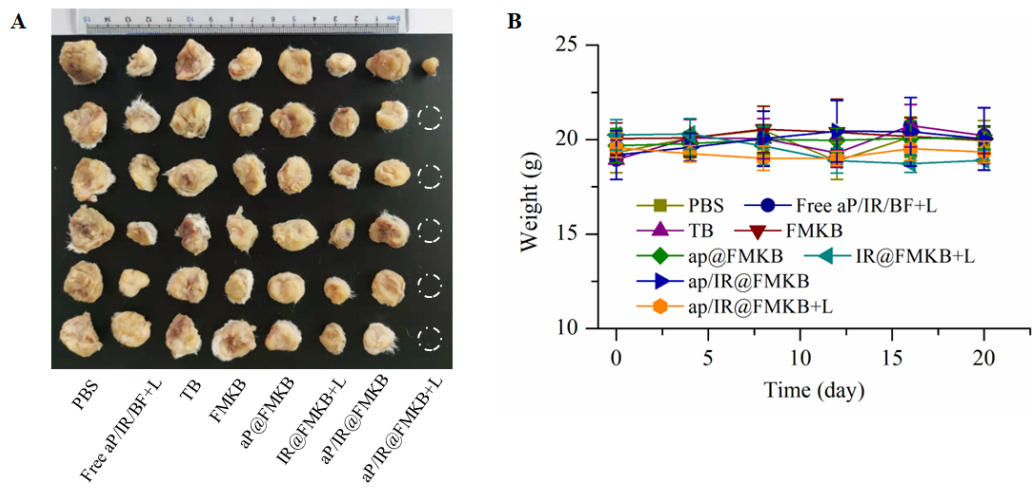


**Figure S6** The *in vivo* biodistribution in tumor bearing mice under *in vivo* imaging system at different time points after injection.



**Figure S7** The deep tumor penetration of SRB/IR@FMKB with or without laser irradiation.

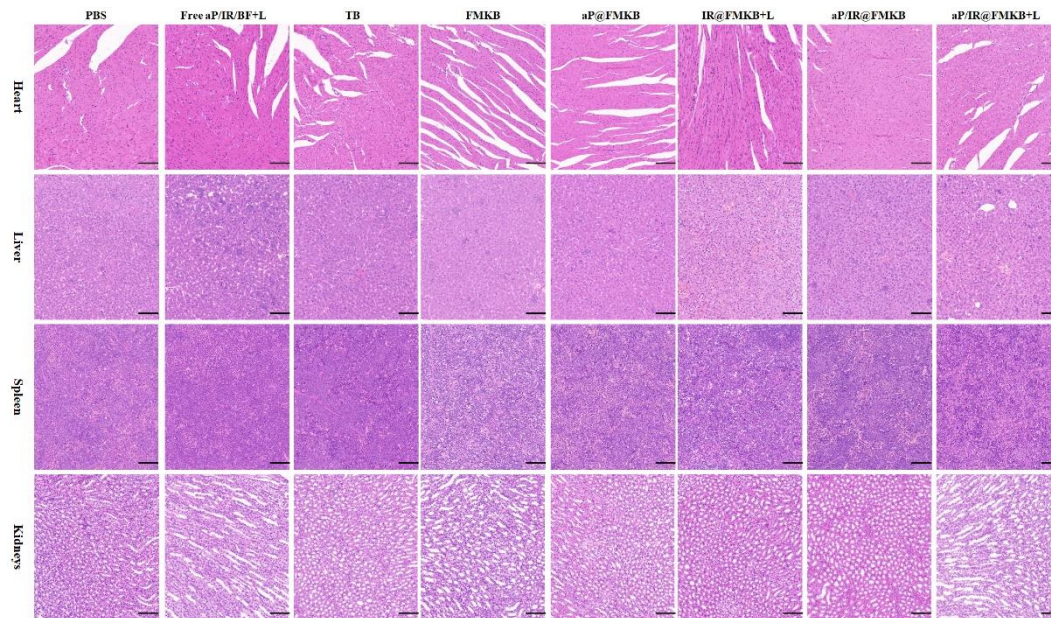
Notes: Scale bar =50  $\mu$ m.



**Figure S8** *In vivo* therapeutic efficacy of aP/IR@FMKB.

Notes: **(A)** The typical photograph of tumor from different treatments; **(B)** The body weight alteration of each group.





**Figure S9** The histological examinations of heart, liver, spleen and kidney from each group.

Notes: Scale bar =50  $\mu$ m.