Supplementary Information for:

ZIF-8-Based Core/Shell Nanocarriers for Relieving Multidrug Resistance in Cancer Therapy

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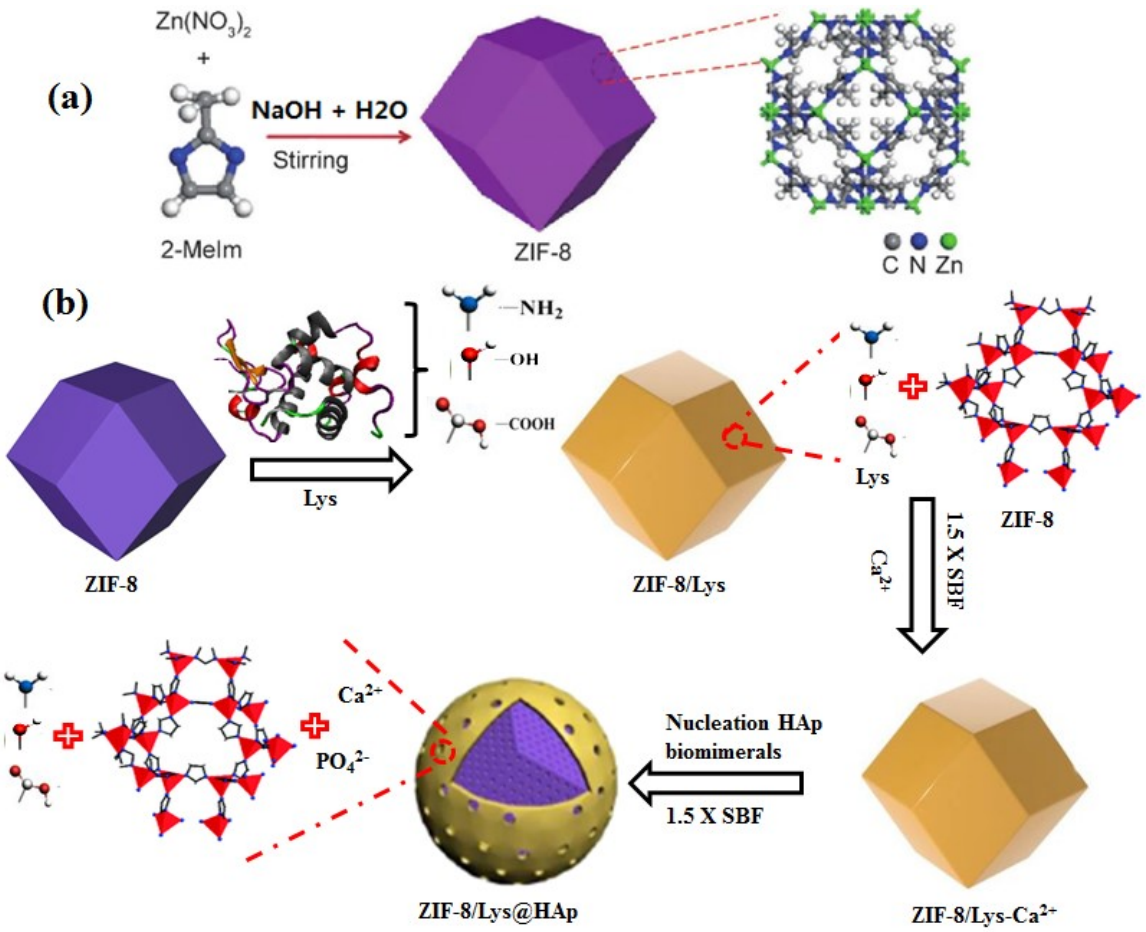

Fig.S1 Schematic illustration of a) the preparation process for the ZIF-8 and b) biomimetic mineralization of the shell HAp onto the surface of ZIF-8/Lys.

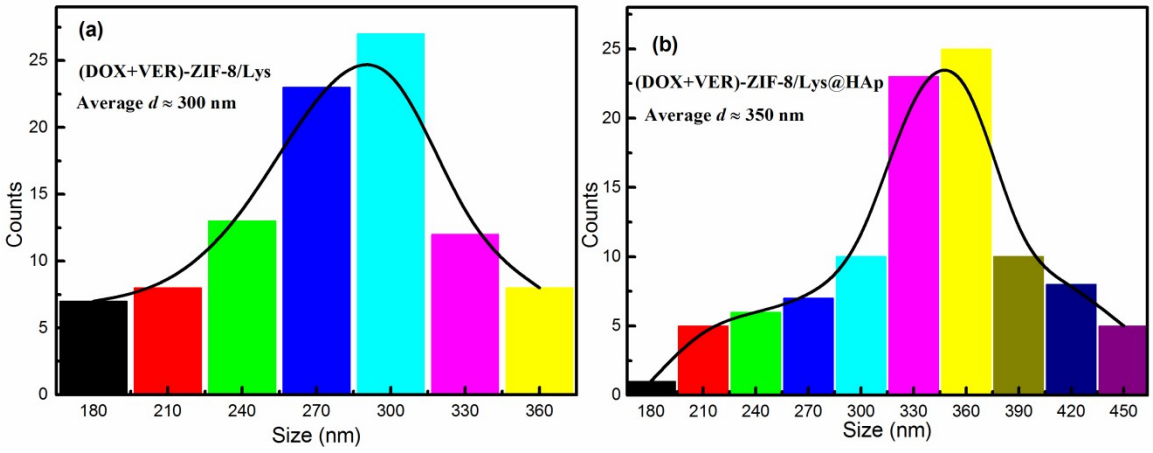

Fig.S2 Diameters of the histogram distribution for the a) (DOX+VER)-ZIF-8/Lys and b) (DOX+VER)-ZIF-8/Lys@HAp nanocomposites determined by DLS.

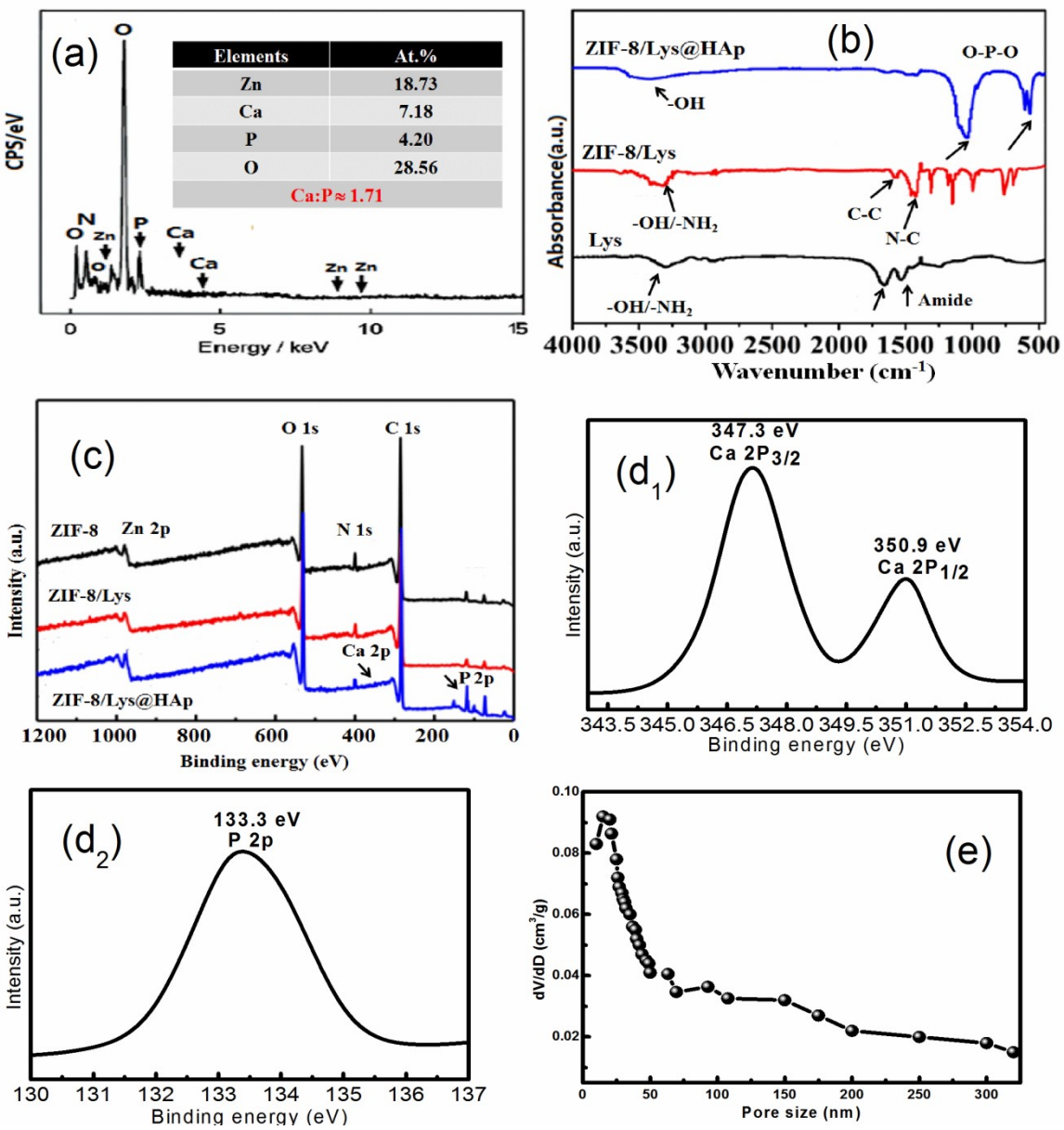

Fig.S3 a) EDX analysis and calculation results for the ZIF-8/Lys@HAp. b) FTIR curves. c) XPS survey curves. d_1 and d_2) High resolution XPS spectra for Ca 2p and P 2p in the ZIF-8/Lys@HAp. e) The pore size distribution of (DOX + VER)-ZIF-8/Lys@HAp *via* the BJH method.

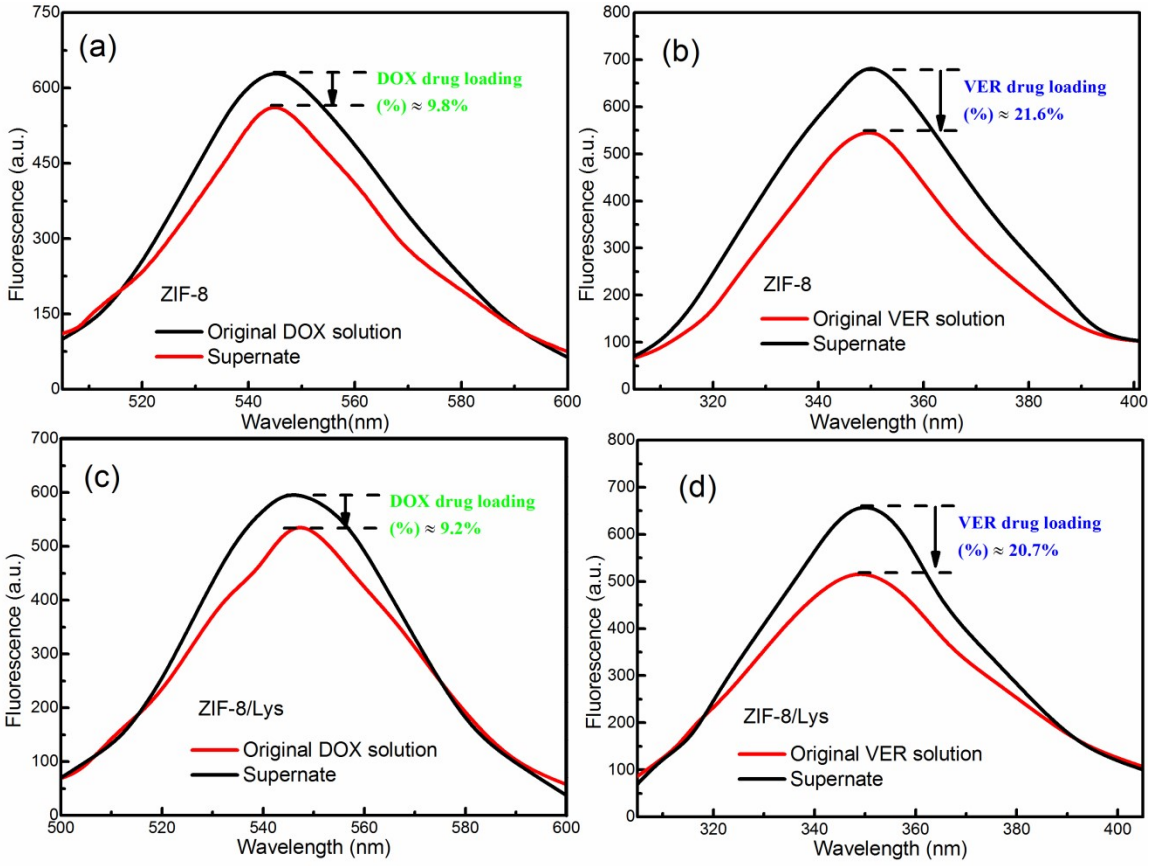

Fig.S4 The calculating for the loading efficiencies of drugs (DOX and VER) within the nanocarriers ZIF-8 (a, b) and ZIF-8/Lys (c, d) *via* the UV-vis spectrophotometry. The total loading amounts of the drugs in ZIF-8 and ZIF-8/Lys ≈ 31.4% and 29.9%, respectively.

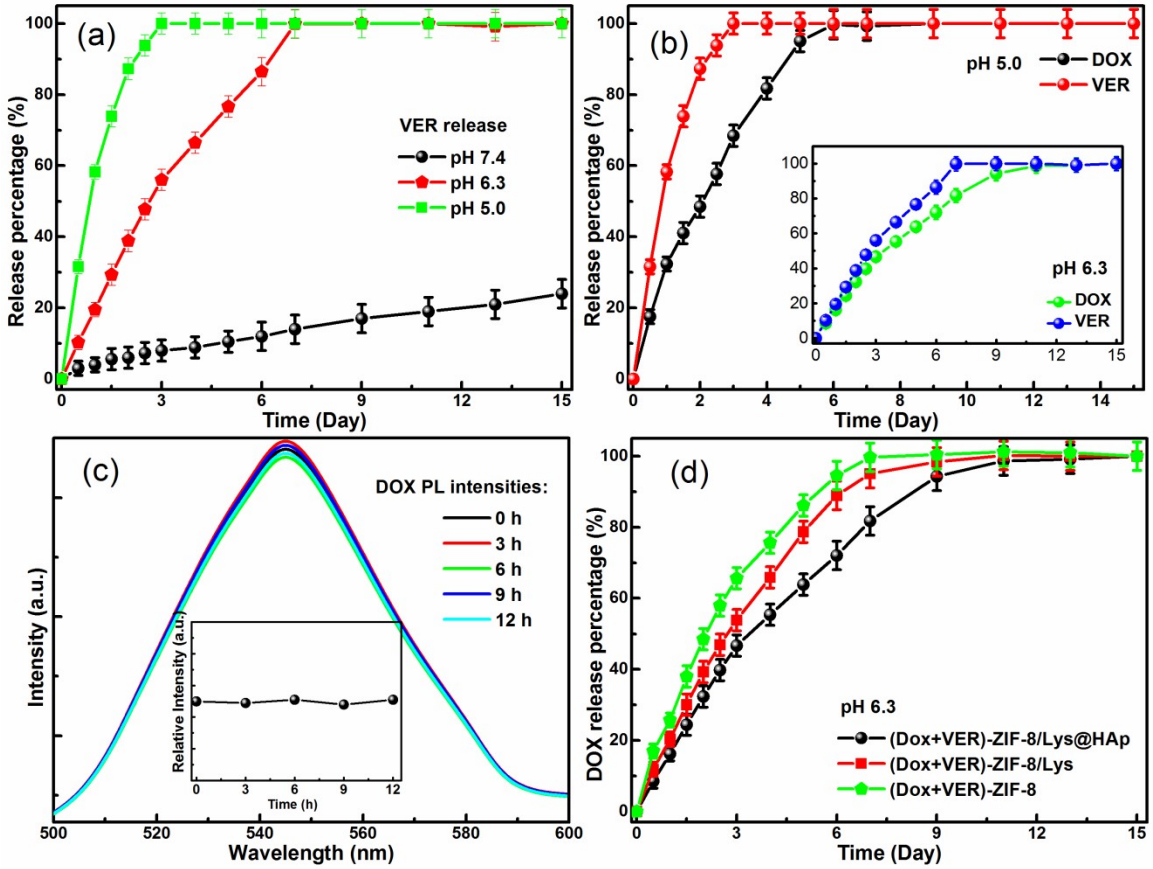

Fig.S5 a) The *in vitro* release profiles for the VER from the (DOX+VER)-ZIF-8/Lys@HAp in the different pH (7.4, 6.3 and 5.0, respectively) PBS. b) Comparison of the release rate of DOX and VER in the same conditions.. c) DOX fluorescence spectra of (DOX+VER)-ZIF-8/Lys@HAp after immersion in serum with different times, the inset showed the minor changes of the PL intensities. d) The pH-stimulated release behavior of DOX from the (DOX+VER)-ZIF-8/Lys@HAp, (DOX+VER)-ZIF-8/Lys and (DOX+VER)-ZIF-8, respectively. All data were given as mean ± SD (n = 3).

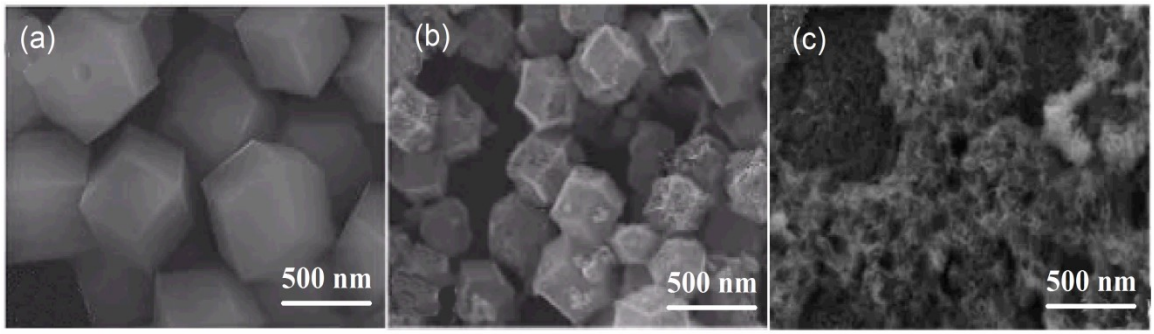

Fig.S6 The FESEM images of (DOX+VER)-ZIF-8/Lys@HAp with different incubation times in PBS buffer solution. a) pH 7.4; b) after 24 h, pH 6.3; and c) after 72 h, pH 5.0.

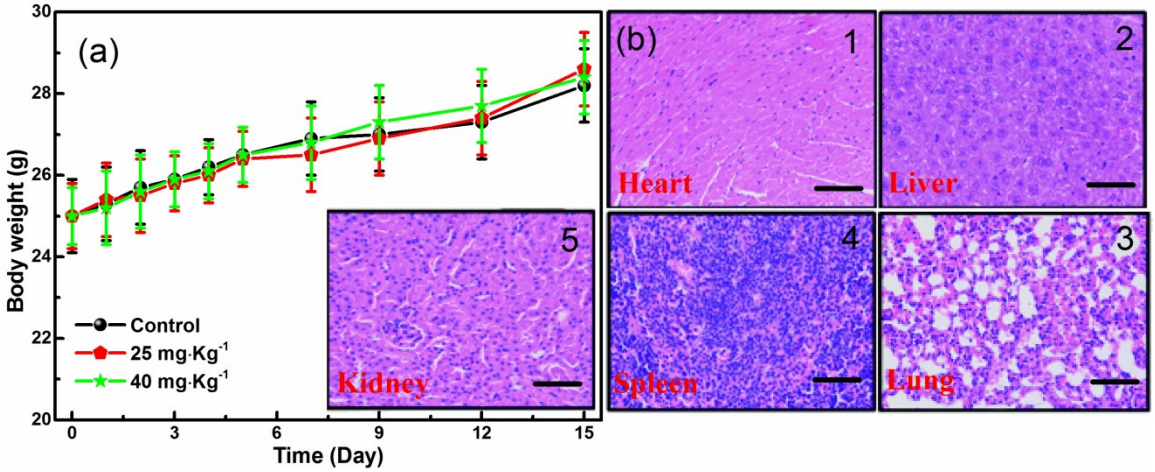

Fig.S7 a) Weight changes of the mice in acute toxicity test after injecting different doses of the ZIF-8/Lys@HAp nanocomposites. b) The H&E staining images of ZIF-8/Lys@HAp nanocomposites (40 mg·Kg^{-1}) for the main organs (Heart, liver, lung, spleen and kidney). The scale bar for each organ is 50 μm.

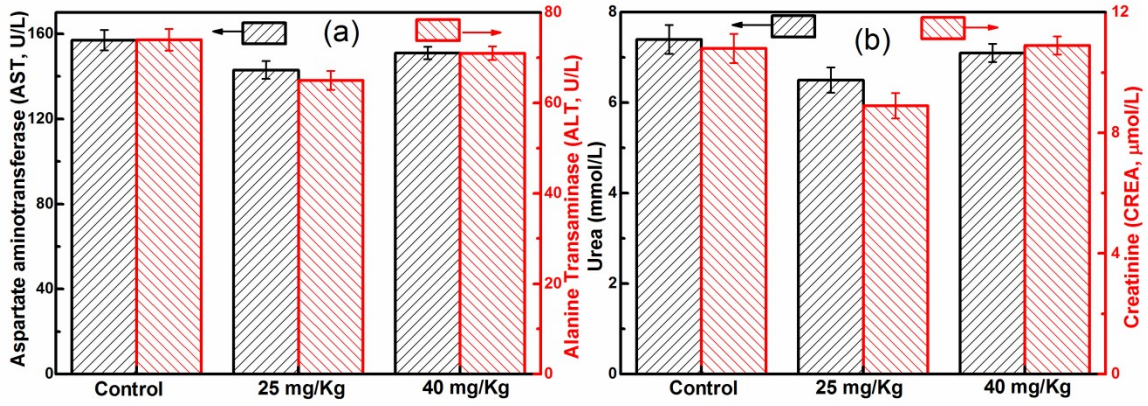

Fig.S8 a) The blood biochemical analysis tests for the ZIF-8/Lys@HAp nanocomposites with different doses (Control, 25 mg·Kg^{-1} and 40 mg·Kg^{-1}), including the a) Aspartate aminotransferase (AST) and Alanine transaminase (ALT); b) Urea and Creatinine (CREA).

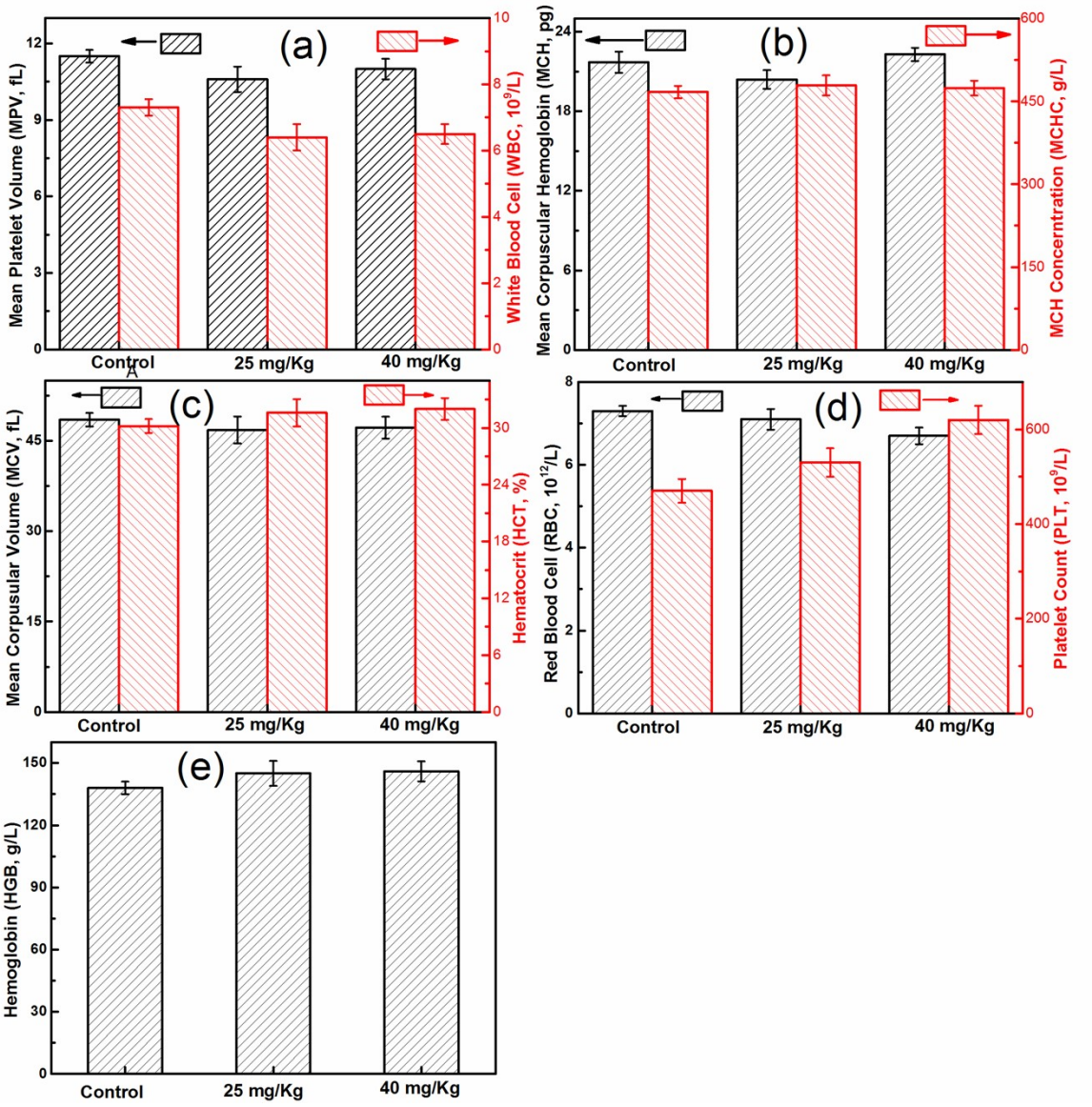

Fig.S9 The blood routine test results for the ZIF-8/Lys@HAp nanocomposites with different doses (Control, 25 mg·Kg^{-1} and 40 mg·Kg^{-1}), including the a) Mean platelet volume (MPL) and White blood cell (WBC); b) Mean corpuscular hemoglobin (MCH) and MCH concentration (MCHC); c) Mean corpuscular volume (MCV) and Hematocrit (HCT); d) Red blood cell (RBC) and Platelet count (PLT); e) Hemoglobin (HGB).

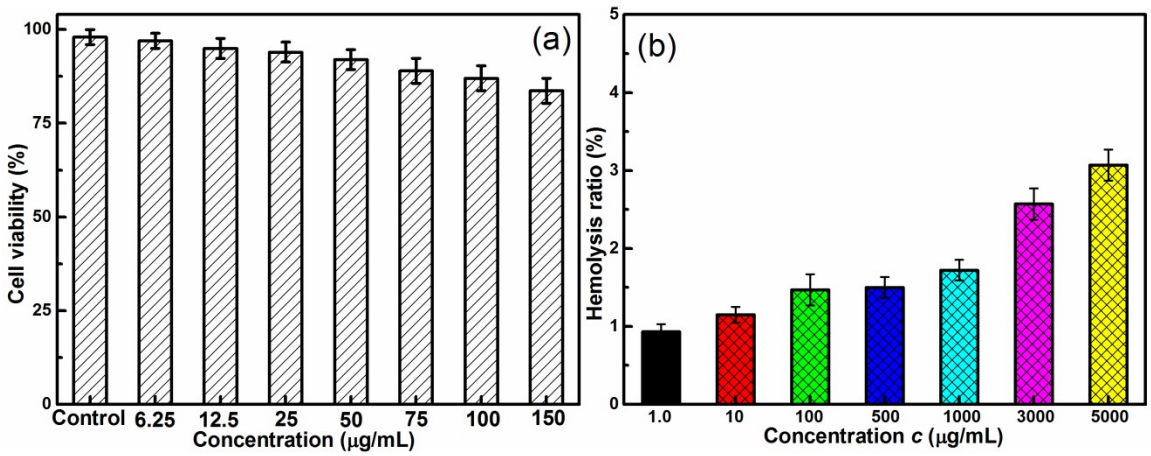

Fig.S10 a) Cytotoxicity of the ZIF-8/Lys@HAp incubated with HeLa cells for 24 h. b) The hemolysis ratio of the (DOX+VER)-ZIF-8/Lys@HAp at different concentrations. All data were given as mean ± SD (n = 3).