Electronic Supplementary Information (ESI) For Dalton Transactions

Coordination Bonding Based pH-Responsive Albumin Nanoparticles for Anticancer Drug Delivery

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One-pot synthesis of MX-Zn-BSA nanoparticles and the in vitro release

10 mg BSA was dissolved in 1ml NaCl solution, a known amount of 0.1 M Zn^{2+} solution was dropwise added under stirring at ambient temperature, which resulted in the formation of white particles, the resulting solution was stirred for 1h. The precipitate product (Zn-BSA nanoparticles) was centrifuged, washed five times with ethanol and dispersed in 200 μg/ml MX solution to load MX. The MX-Zn-BSA nanoparticles synthesized via one-pot method were release in PBS(10 mM, pH 7.4 and 4.0) as shown in Figure S1(A-E).

6 ml 0.1 M Zn^{2+} solution was dropwise added to 3 ml PBS solution (50 mM) which resulted in the formation of white precipitate. The precipitate was used to absorb of MX and the release profiles was shown in Fig. S1(F).

Preparation of MX solution and mixture solution of MX and Zn

15 μg/ml MX solution of different pH was prepared by dissolved MX in aqueous solution and adjusted the pH value with dilute $HClO_4$ or NaOH. The mixture of equimolar MX and Zn was prepared by adding 10 μl 0.1 M zinc nitrate ethanol solution to 3 ml 15 μg/ml MX solution of different pH values.

XRD pattern of BSA nanoparticles and Zn-BSA nanoparticles

Figure S2 summarizes the XRD patterns of the pure BSA nanoparticles, Zn-BSA nanoparticles and those of other components from which the particles were formed. $ZnNO_3$ powder showed a sharp diffraction peak at 16°of 2θ,while BSA and all coordinated materials showed no diffraction peaks, indicating that zinc ions were involved in the Zn-BSA particles. This result also implies that there was no significant amount of free zinc nitrate left in the system after interaction with BSA. In addition, it means there was no long-range ordered structure in the Zn-BSA nanoparticles.

UV-vis spectra of the mixture of MX and Zn with different molar ratio

15 μg/ml MX solution of different pH was prepared by dissolved MX in aqueous solution and adjusted the pH value with dilute $HClO_4$ or NaOH. The mixture of MX and Zn was prepared by adding a certain amount of 0.1M zinc nitrate ethanol solution to 3 ml 15 μg/ml MX solution of different pH values. The UV-vis spectra of the mixture of MX and Zn with different molar ratio under different pH value were shown in Fig. S3.

From the four group spectra, we can find that the stability of the coordination bonding between MX and Zn increased along with the proportion increase of Zn.

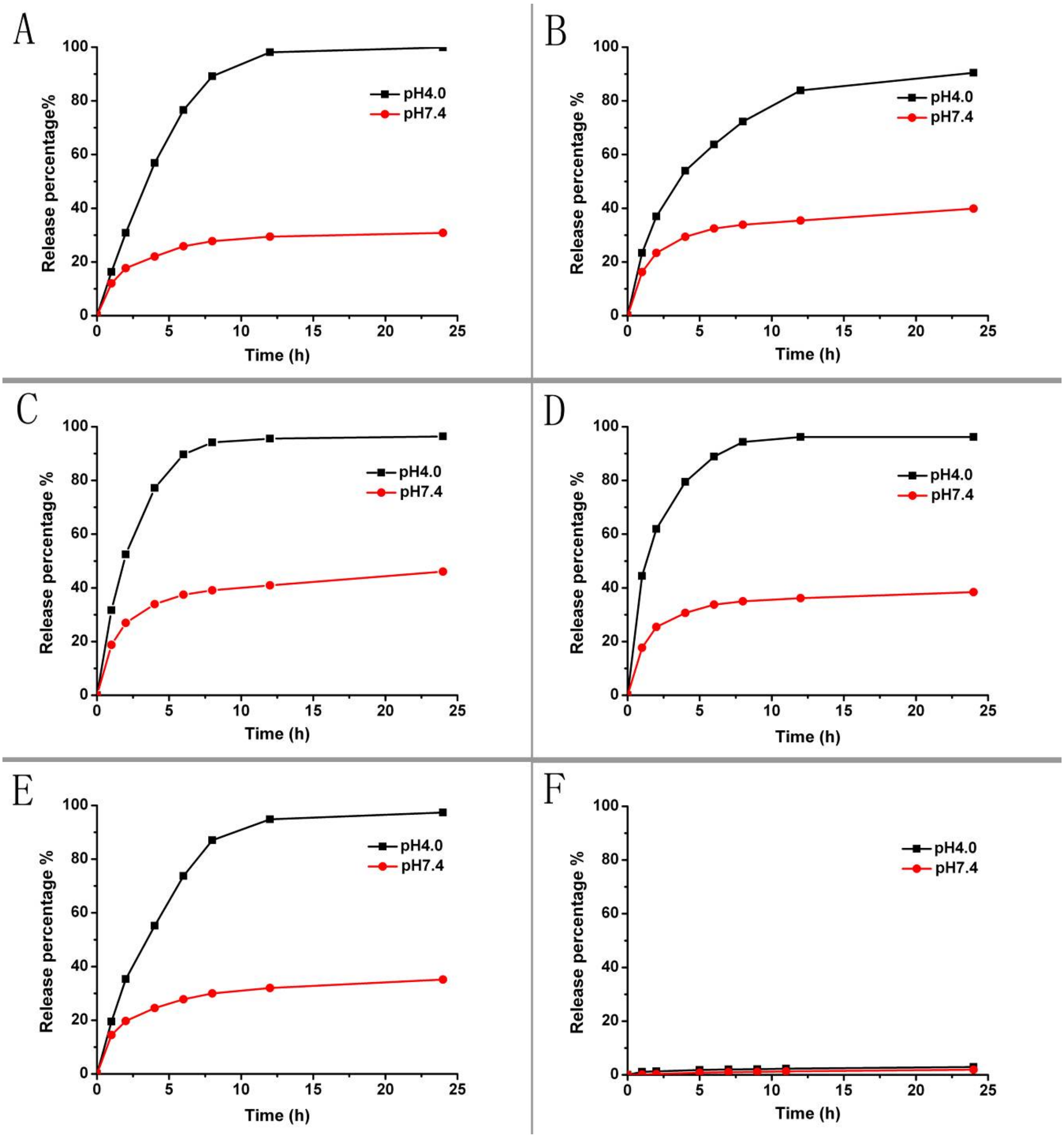

Fig.S1 The release profiles of MX-Zn-BSA nanoparticles synthesized via one-pot method (A-E). The weight ratio of BSA:Zn=1:x. (A). x=0.016; (B). x=0.032; (C). x=0.064; (D). x=0.128; (E). x=0.192. (F) The release profiles of MX loaded zinc phosphate.

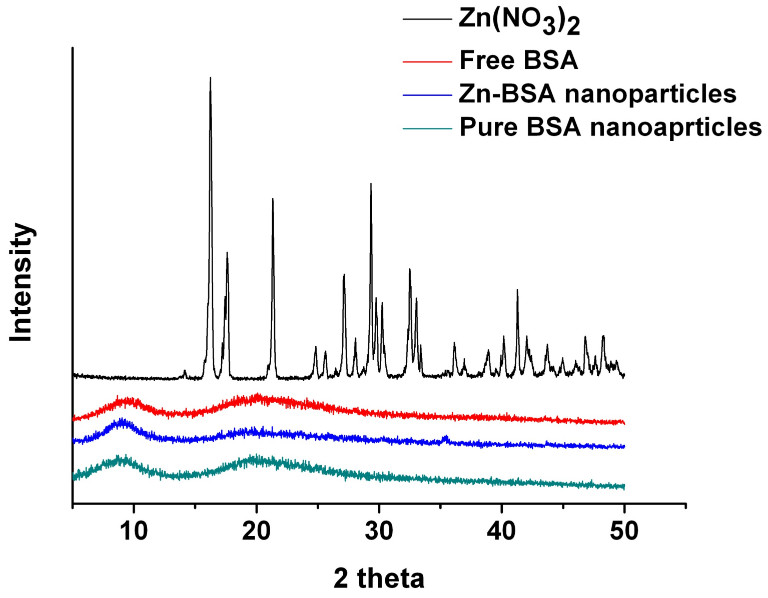

Fig.S2 XRD pattern of ZnNO3 solid, free BSA, pure BSA nanoparticles, and Zn-BSA nanoparticles

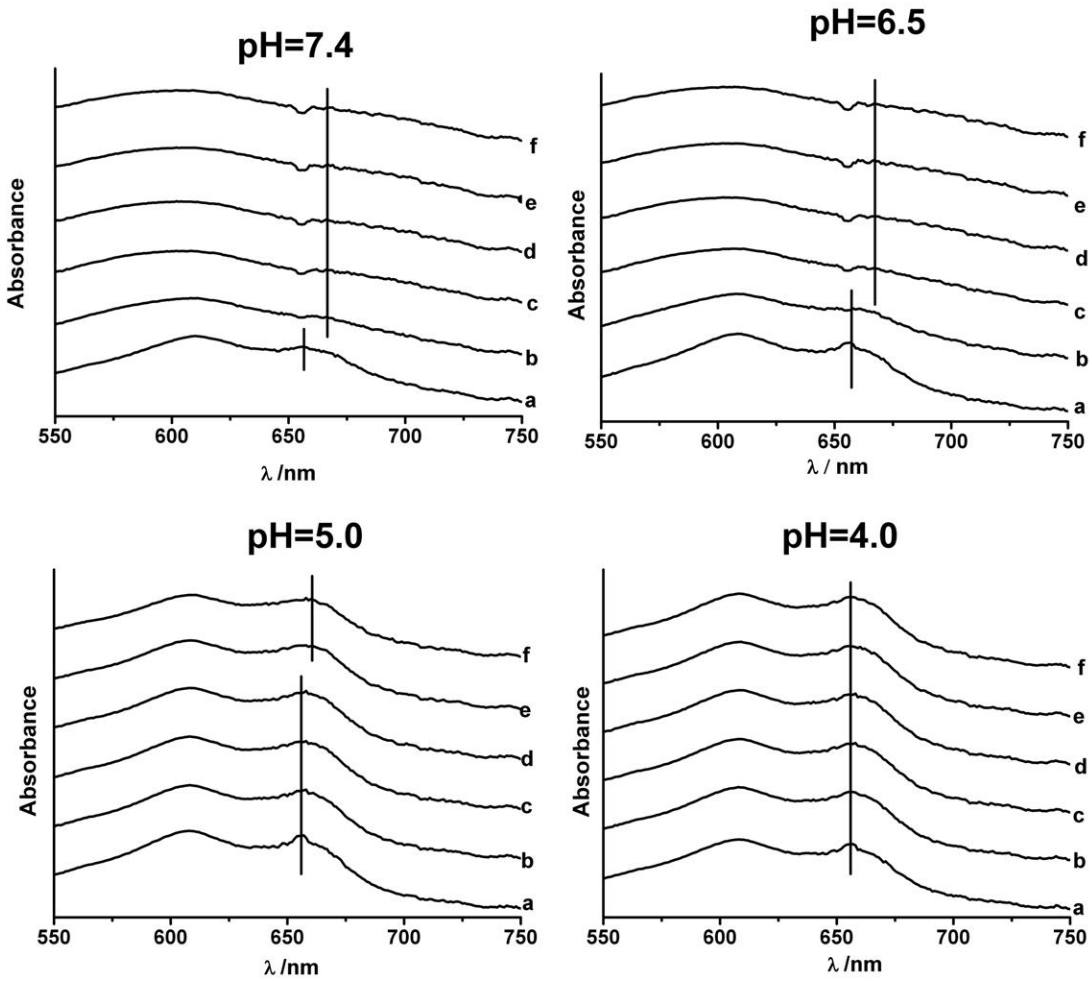

Fig.S3 The UV-vis spectra of the mixture of MX and Zn with different molar ratio under different pH values. Zn:MX= 0 (a), 2 (b), 3 (c), 4 (d), 5 (e), 6 (f)