Electronic Supplementary Material (ESI) for Biomaterials Science.

Supporting Information

Fibrous Capsule-resistant, Controllable Degradable and Functionalizable Zwitterion-albumin Hybrid Hydrogels

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TNBS reaction and amino determination

Unless otherwise stated, the TNBS reaction was carrird out as follows: 0.25 mL of a sample, containing between $0.25*10^{-3}$ and $2.5*10^{-3}$ amino equiv/L, is mixed in a test tube with 2.00 mL of phosphate buffer at pH 8.2. 2 mL of 0.1% TNBS solution is added and placed in a water bath at 50℃ for 1 hour in a dark environment. After incubation, 4 mL of 0.1 M HCl is added to terminate the reaction, and the solution is allowed to stand at room temperature for 30 min before the absorbance is read against water at 340 nm. Using L-leucine as the free amino substrate, the standard curve was made according to the above method. At the same time, the number of amino groups on the modified albumin surface was calculated. (Table S2. and Fig. S2)

Table S1. Formula of synthetic hydrogel and modification of a protein surface

Hydrogel	Proportion (final)	Degree of acrylic modification
PCB-H20	20% CBAA, 2% H20;(w/v)	80.8%
PCB-H10	20% CBAA, 2% H10;(w/v)	57.8%
PCB-H5	20% CBAA, 2% H5;(w/v)	28.9%
PCB-H3	20% CBAA, 2% H3;(w/v)	12.0%
PEG	7% PEGDA	--
PCB-PEG	20% CBAA, 2% 4arm-PEG-AC	--
PCB-H20S	20% CBAA, 2% H20;(w/v) 2mM TCEP	80.8%

Notes: all gelatinization processes use 4‰ APS initiator and catalyst TEMED; (w/v)

Table S2. Double bond modification scheme of serum albumin calculated by standard curve.

200 mg HSA Pure HAS	200mg HSA 3 mg NAS H3	200 mg HSA 5 mg NAS H5	200 mg HSA 10 mg NAS H10	200 mg HSA 20 mg NAS H20
0%	12.0%	28.9%	57.8%	80.8%
23	20	16	10	4
0	3	7	13	19

Notes: the first line represents Proportion of feeding components; The second line represents amino reaction rate on protein surface; The third line represents the number of amino groups remaining on each albumin; The fourth line represents the average number of amino groups that react on each protein. The above data were tested using TNBS reagents by previously methods reported.

Fig. S1 Photographs of the hydrogel disc implants. Size: diameter 5 mm, thickness 1 mm.

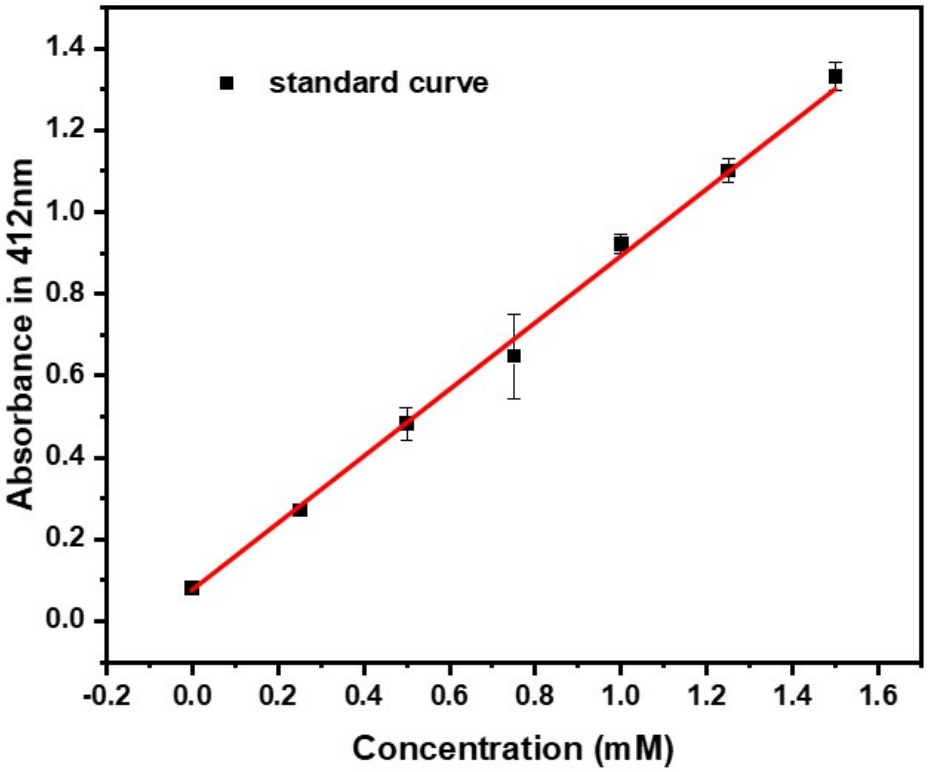

Fig. S2 Standard curve of amino concentration and absorbance. The absorbance of different concentrations of lysine was tested after incubation with TNBS, and the relationship between amino group and absorbance was characterized, which was used as a reference curve to characterize the degree of protein surface modification.