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COMMUNICATION

Supplementary information

Table S1 Molecular weights of ALG and ALG-g-Lys

Sample	Mn	Mw	Polydispersity (Mw/Mn)
ALG	262600±900	643900±22000	2.45±0.09
ALG-g-Lys	242000±3300	667300±13100	2.75±0.02

Table S1: Compared with ALG, ALG-g-Lys had smaller Mn but bigger Mw, which resulted in the molecular weight polydispersity being broader. The reason may be that during the preparation of ALG-g-Lys, especially during the activation process by EDC and NHS, the pH is adjusted to 5.5, which promotes the degradation of ALG chain. Therefore, part of the molecular chain of ALG was ruptured and the small molecule was increased to some degree, which led to the decrease of Mn, while at the same time, the increase of Mw revealed that Lys was grafted onto ALG successfully during this process.

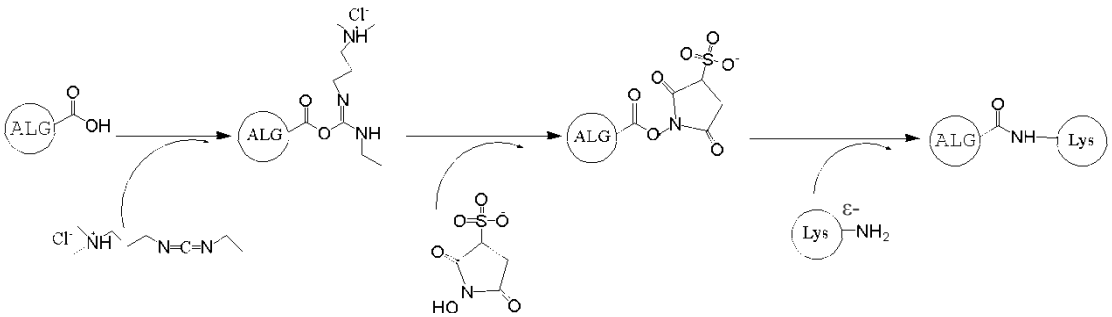

Fig. S1 Synthetic schematic diagram of ALG-g-Lys mediated by EDC and NHS

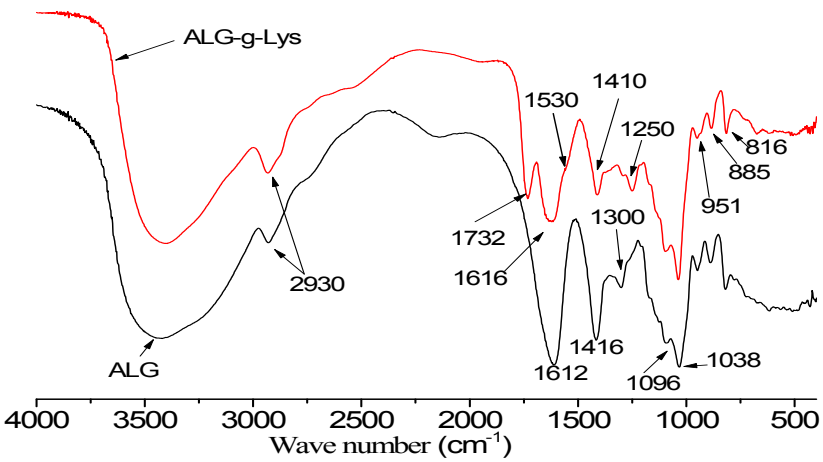

Fig. S2 FTIR spectra of ALG and ALG-g-Lys

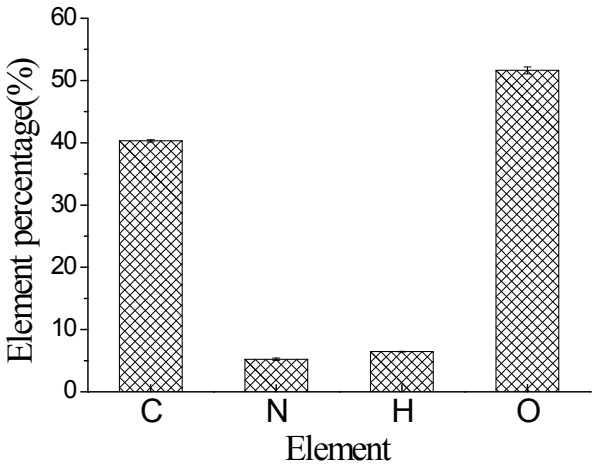

Fig. S3 Histogram of CHON elemental analysis of ALG-g-Lys

Figure S3: From CHON elementary analysis, we were able to calculate the grafting efficiency of Lys onto ALG (the grafting efficiency was 50.9%). ALG contained three elements: C, H, O. Lys contained four elements: C, H, O, N. From FTIR spectra, Lys was successfully grafted onto ALG. The resulting ALG-g-Lys also contained the N element. Therefore, grafting efficiency (GE) of Lys onto ALG could be calculated according to the equation below:

$$GE(\%) = \frac{n_{Lys}}{n_{ALG}} \times 100\%$$

where n_{Lys} and n_{ALG} represented the corresponding molar mass of ALG-g-Lys.

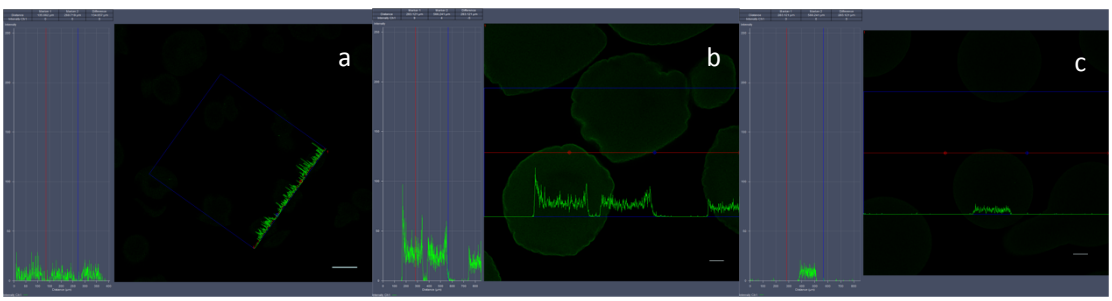

Fig.S4 CLSM of crosslinked ALG-g-Lys microspheres (a) 0.1% GA; (b) 0.1% GP; (c) blank (scale bar=100 μm)

Figure S4: The excitation wavelength (λex) and the emission wavelength (λem) of GP-ALG-Lys microspheres were 396 nm and 477 nm respectively according to the fluorescence spectrophotometer. The fluorescence intensity was carried out by CLSM. Compared with the microspheres crosslinked with GA (Figure S3a) and the uncrosslinked blank sample (Figure S3c), GP-ALG-Lys microspheres presented much stronger fluorescence. In addition, from Figure S3b, we can see that the surface fluorescence intensity was stronger than that of the interior, and the interior fluorescence intensity was well distributed, which indicates that GP successfully penetrated into the microsphere interior and the crosslinking extent was relatively even.