

Supplementary Information

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Because of the problem in measuring molecular weights of copolymer with Gel Permeation Chromatography (GPC), we used ¹H NMR spectra to calculate the molecule weights of the vectors through the integral method.

The actual branched chain length of PDMAEMA and PMPDSAH conjugated onto ε-polylysine can be calculated according to the following equations:

$$n = \frac{S_b/6 - S_a/2}{S_b/6} \times x \quad (1)$$

$$p = \frac{S_d/6 - (S_c - S_a)/2}{S_d/6} \times y \quad (2)$$

Where the x and y is the theoretical degree of polymerization (DP) of each PDMAEMA and MPDSAH chain respectively; n and p is the actual DP of each PDMAEMA and PMPDSAH chain respectively; S_a is the integral area of the double bonds for the unreacted DMAEMA monomers; S_b is the integral area of the -N-(CH₃)₂ for both unreacted DMAEMA monomers and PDMAEMA chains conjugated onto ε-polylysine (Fig. S1(A)); S_c is the integral area of the double bonds for the unreacted DMAEMA and MPDSAH monomers; S_d is the integral areas of the -(CH₃)₂ for both unreacted MPDSAH monomers and PMPDSAH chains conjugated onto ε-polylysine (Fig. S1(B)).

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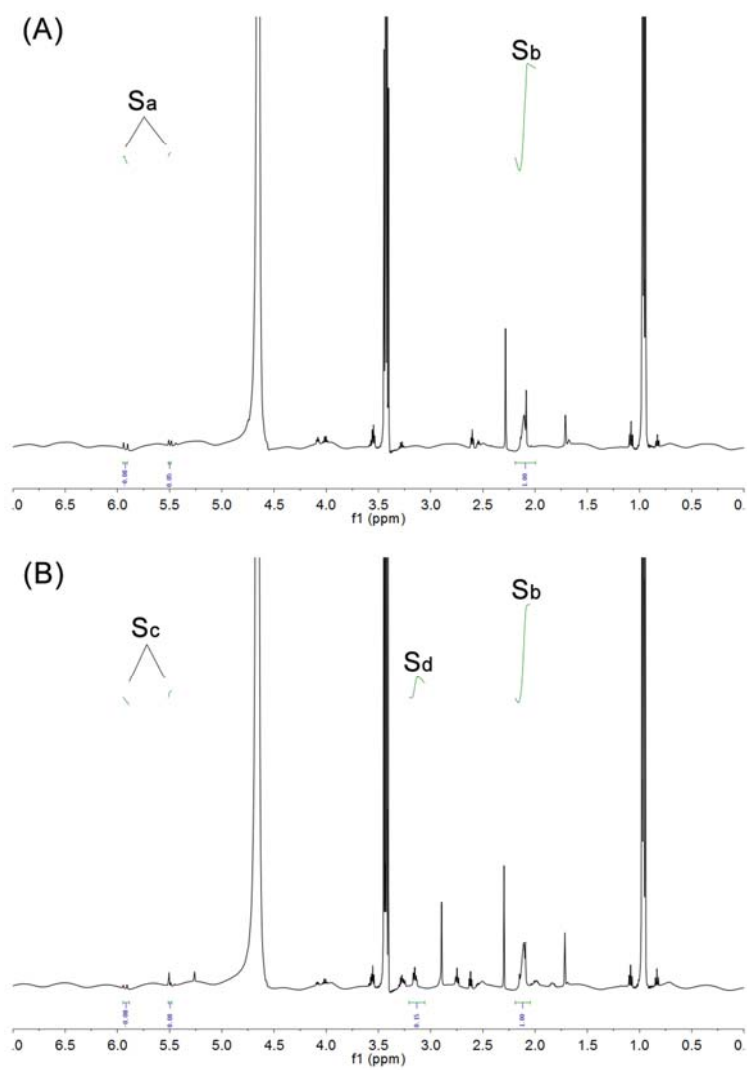


Figure S1. ^1H NMR spectra of (A) ϵ -Ply-DMA₇₀ without dialysis after 3 h reaction and (B) ϵ -Ply-DMA₇₀-MPD₂₀ without dialysis after reaction.

Table S1. Molecular weight of polymers estimated from integration of ^1H NMR spectra

| Sample | Theoretical value | | Actual value | | Molecular weight |
|--|-------------------|-----------|--------------|-----------|------------------|
| | DMAEMA(x) | MPDSAH(y) | DMAEMA(n) | MPDSAH(p) | |
| ϵ -Ply-DMA ₇₀ | 70 | — | 45 | — | 67670 |
| ϵ -Ply-DMA ₇₀ -MPD ₂₀ | 70 | 20 | 45 | 14 | 99268 |
| ϵ -Ply-DMA ₇₀ -MPD ₃₀ | 70 | 30 | 45 | 23 | 125495 |
| ϵ -Ply-DMA ₇₀ -MPD ₄₀ | 70 | 40 | 45 | 31 | 145608 |