Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

A multifunctional self-dissociative polyethyleneimine derivative coating polymer for enhanced gene transfection efficiency of DNA/polyethyleneimine polyplexes in vitro and in vivo

Cheng Wang, Xiuli Bao, Xuefang Ding, Yang Ding, Sarra Abbad, Yazhe Wang,

Min Li, Yujie Su, Wei Wang *, Jianping Zhou *

State Key Laboratory of Natural Medicines, Department of Pharmaceutics, China Pharmaceutical University, 24 Tongjiaxiang, Nanjing 210009, China

* Corresponding authors. Tel./Fax: +86 25 83271102.

E-mail addresses: wangcpu2013@163.com (W. Wang), zhoujianpingcpu@126.com (J. Zhou).

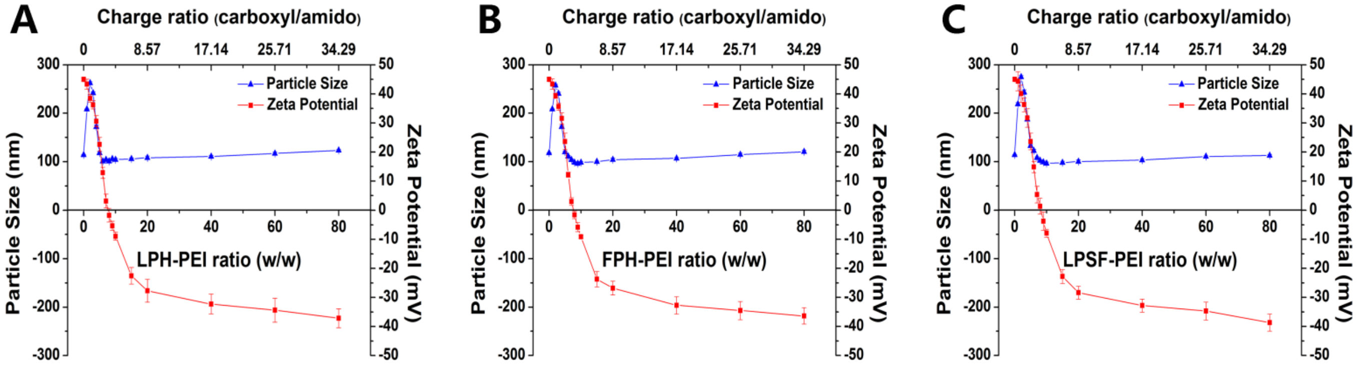


Fig. S1. Particle size and zeta potential of DPLPH ternary polyplexes (A), DPFPH ternary polyplexes (B) and DPLPSF ternary polyplexes (C) with different coating to PEI 25K ratio (w/w = 1-80, charge ratio = 0.43-34.29) in HEPES buffer (20 mM, pH 7.4). Charge ratio between coating polymer and DP binary polyplexes was presented in another x axis. Data were shown as mean ± S.D. (n = 3).

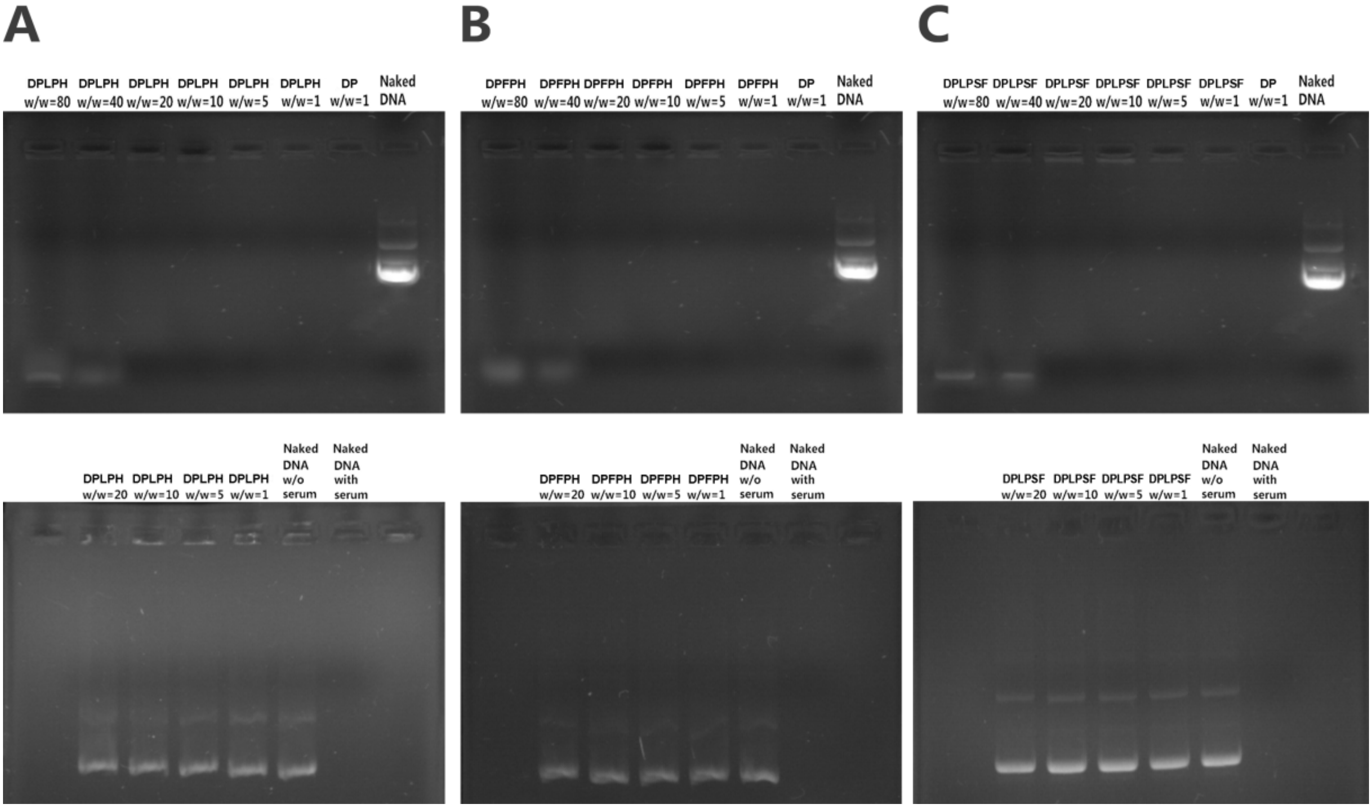


Fig. S2. The competitive dissociation potential of DNA in ternary polyplexes (coating/PEI 25K = 1-80, w/w, upper panel) and the protection effect of ternary polyplexes (coating/PEI 25K = 1-20, w/w) on DNA against the degradation of DNase in the serum (lower panel). (A), (B) and (C) represent DPLPH, DPFPH and DPLPSF ternary polyplexes, respectively.

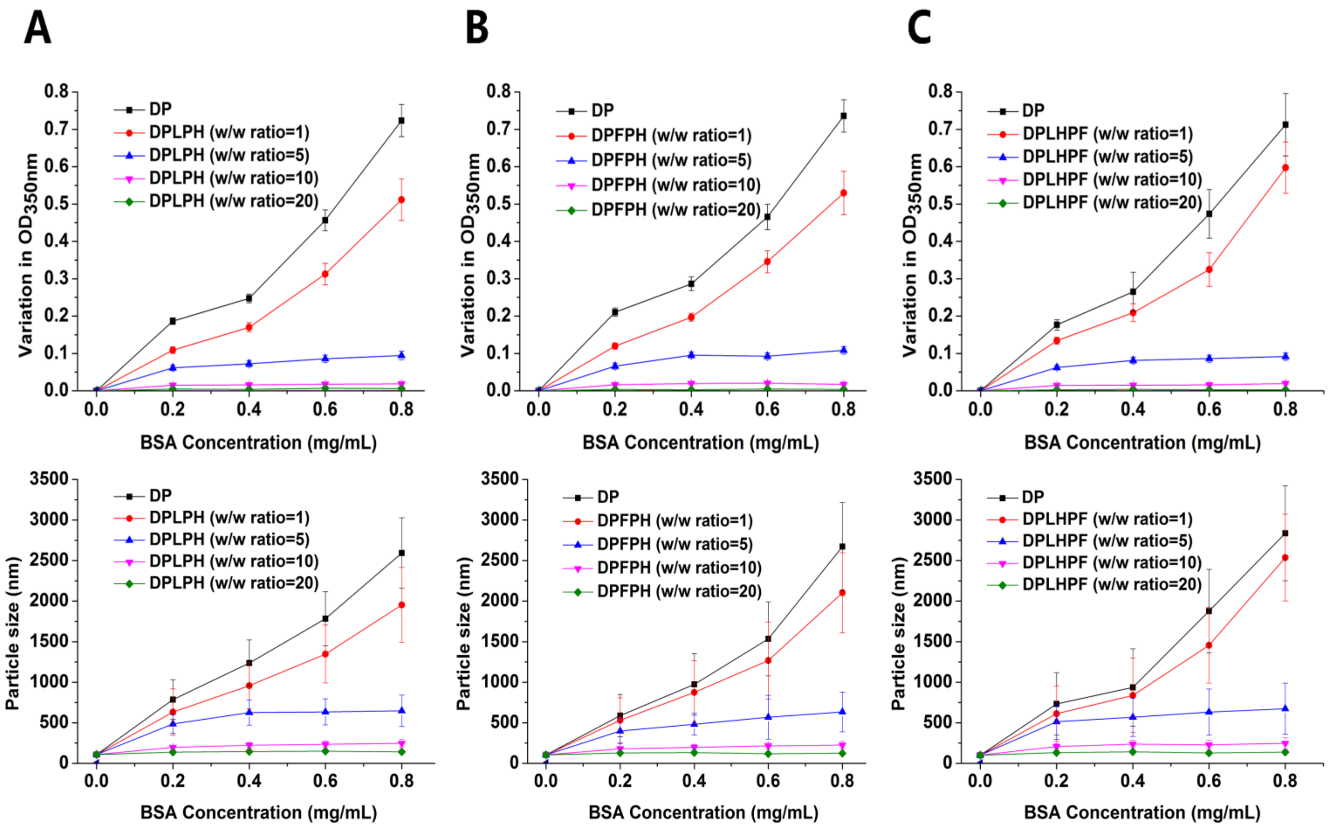


Fig. S3. Stability of DP binary polyplexes together with DPLPH (A), DPFPH (B) and DPLPSF (C) ternary polyplexes in BSA. The variation in turbidity (upper panel) and change in particle size (lower panel) were measured after incubation with BSA for 1 h. The DP binary polyplexes were prepared at the w/w ratio of 1 and ternary polyplexes were prepared at different w/w ratios of coating/PEI 25K ranging from 1 to 20 with a final DNA concentration of 50 µg/ml. Data were expressed as mean ± S.D. (n = 3).

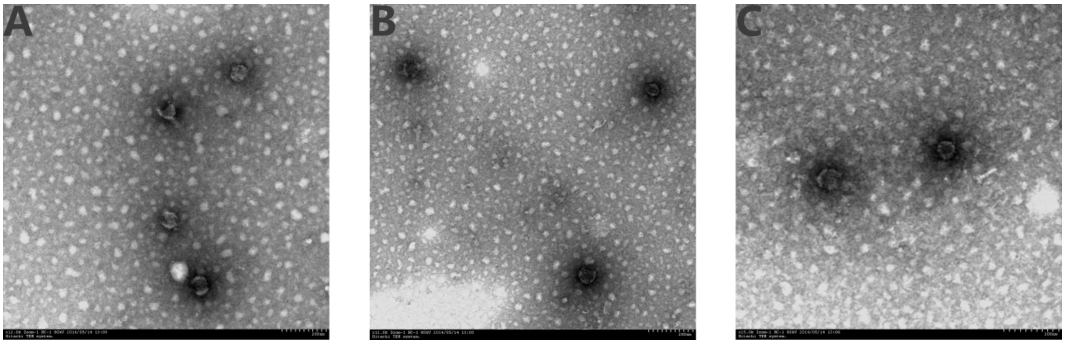
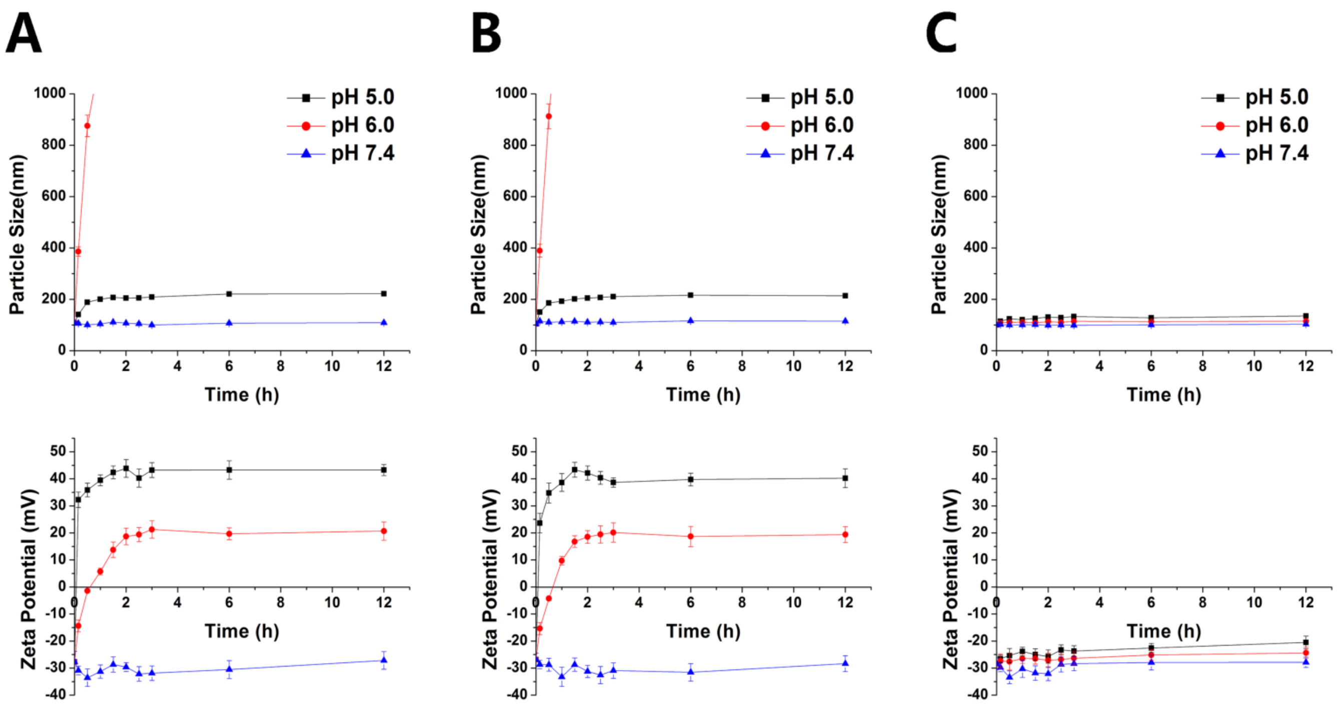


Fig. S4. TEM images of optimized DPLPH (A), DPFPH (B) and DPLPSF (C) ternary polyplexes (coating/PEI 25K = 20, w/w). Scale bars: 200 nm.



Sample	pH 7.4 (centrifuged)	pH 6.0 (centrifuged)	pH 5.0 (centrifuged)	pH 7.4 (untreated)
Remaining LPHF (%)	0	25.76	89.96	100

Sample	pH 7.4 (centrifuged)	pH 6.0 (centrifuged)	pH 5.0 (centrifuged)	pH 7.4 (untreated)
Remaining LPHF (%)	0	23.89	92.15	100

Sample	pH 7.4 (centrifuged)	pH 6.0 (centrifuged)	pH 5.0 (centrifuged)	pH 7.4 (untreated)
Remaining LPHF (%)	0	2.68	6.87	100

Fig. S5. The pH dependent behaviour of optimized DPLPH (A), DPFPH (B) and DPLPSF (C) ternary polyplexes. Particle size (upper panel), zeta potential (middle panel) and remaining LPHF ratio in the supernate (lower panel) of optimized ternary polyplexes were measured under different conditions. Data of particle size and zeta potential were expressed as mean ± S.D. (n = 3).