

Supplementary Information

A bio reducible supramolecular nanoparticle gene delivery system based on cyclodextrin-conjugated polyaspartamide and adamantyl- terminated polyethylenimine

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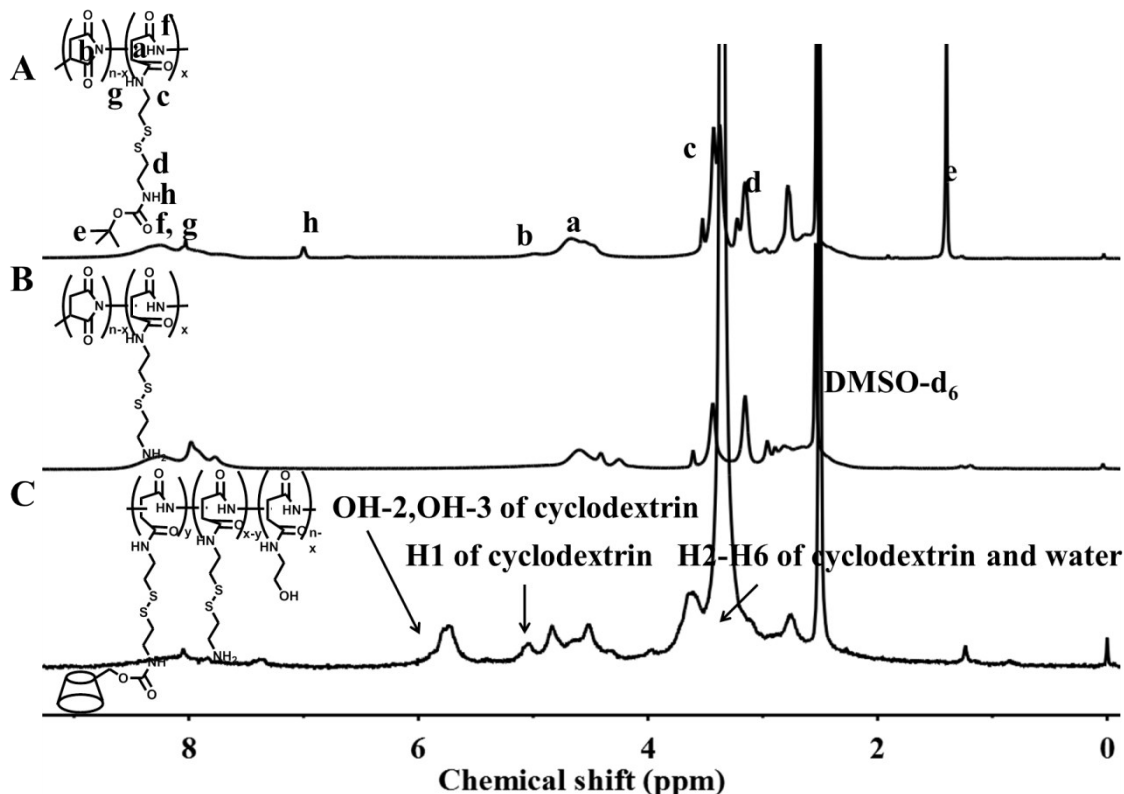


Fig. S1 ^1H NMR spectrum of (A) Pasp-Cyst-Boc, (B) Pasp-Cyst and (C) Pasp-SS-CD in DMSO-d_6 .

Quantification of β -cyclodextrin in Pasp-SS-CD.

Preparation of standard β -CD solution: An accurate amount of β -CD was dissolved in distilled water and the final concentration was 1.0 mg/mL.

Preparation of standard phenolphthalein solution: An accurate amount of phenolphthalein was dissolved in 60% ethanol and the final concentration was 1.0 mg/mL.

Method: Mix different volume of standard β -CD solution, 0.5 mL standard phenolphthalein solution and 10 mL buffer ($\text{Na}_2\text{CO}_3/\text{NaHCO}_3$, pH 10.5) in 100 mL volumetric flask, then dilute the solution with distilled water to 100 mL, then the mixed solution was incubated for 30 min at 25 $^\circ\text{C}$ and the color intensity was measured at 552 nm using UV-Vis spectrometer (PerkinElmer Lambda 35). The standard curve (Fig. S2) can be obtained with $C_{\beta\text{-CD}}$ (the concentration of β -CD, mg/100mL) as x-axis and A (the absorbance) as y-axis. From the calibration curve, it can be concluded that β -CD is linear correlated with A within the concentration of 0.5~2.5 mg/100 mL. Then we can quantify

the amount of CD in the polymer Pasp-SS-CD based on the calibration curve.

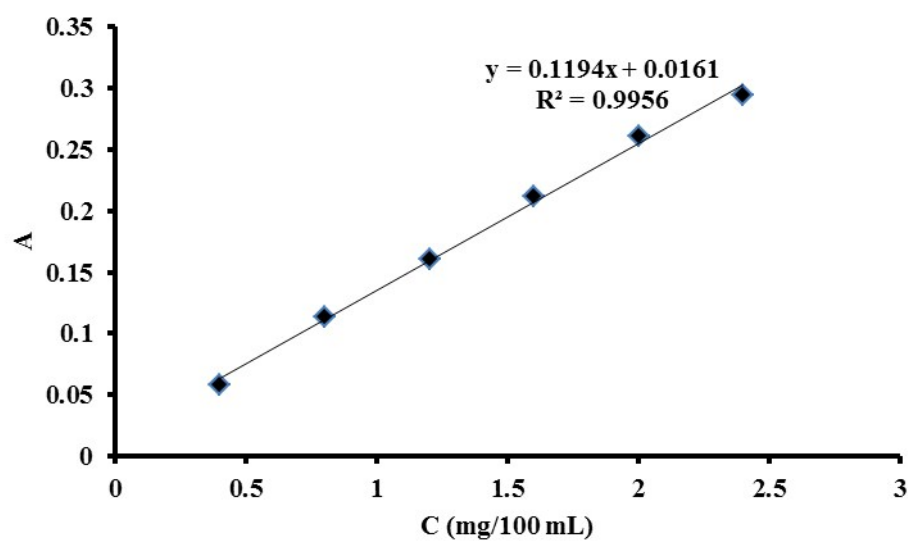


Fig. S2 Standard curve of β -CD by UV-Vis at 552 nm.

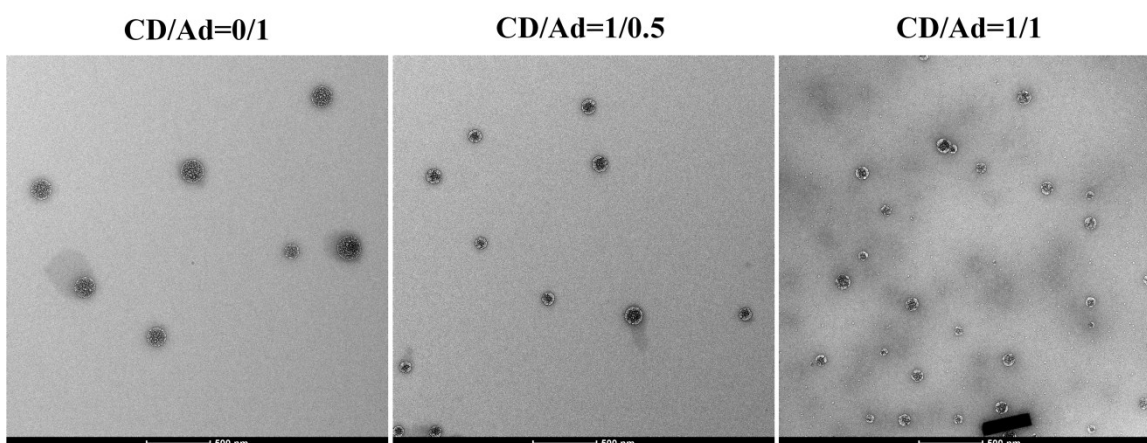


Fig. S3 Transmission electron microscopy (TEM) images of SNPs at N/P ratio of 30 with different CD/Ad ratios (scale bar, 500 nm).

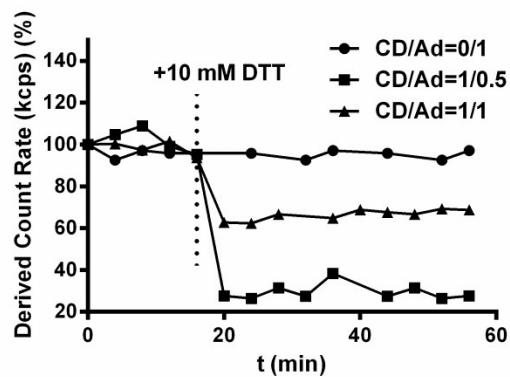


Fig. S4 The light scattering intensity of SNPs with different CD/Ad ratios at N/P ratio of 30 measured by DLS before and after the addition of 10 mmol DTT at room temperature.

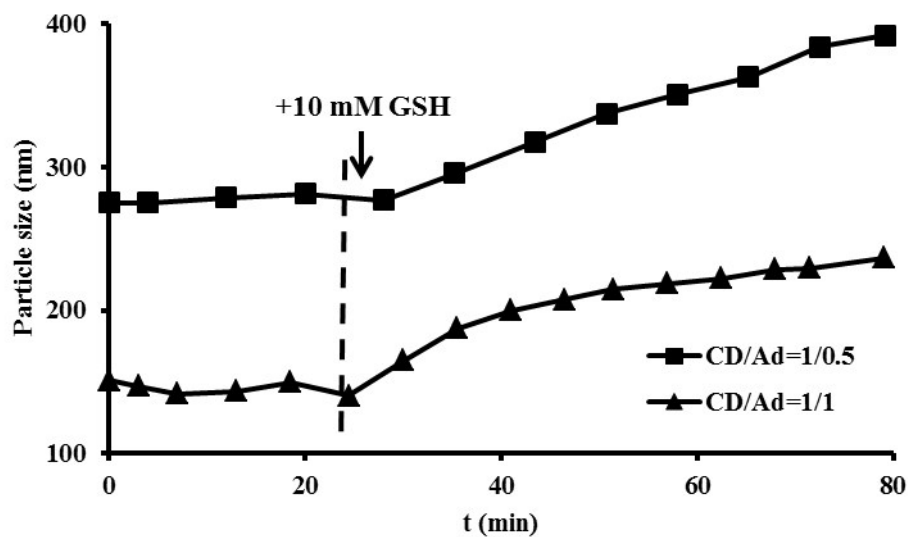


Fig. S5 Sizes change of SNPs with different CD/Ad ratios at N/P ratio of 30 measured by DLS before and after the addition of 10 mmol GSH at room temperature in PBS.

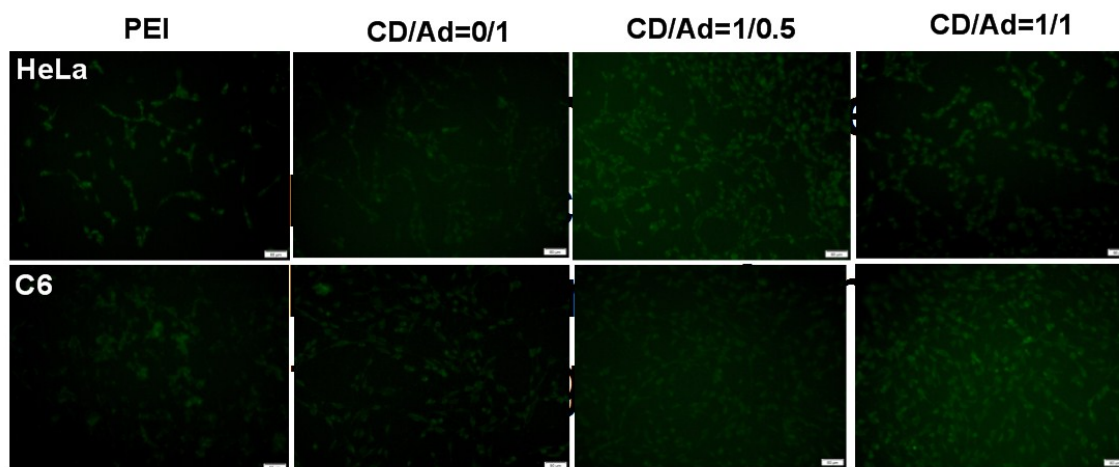


Fig. S6 In vitro EGFP expression of different CD/Ad ratio polycation/pDNA nanoplexes in serum media at N/P ratio of 30 in comparison with that mediated by PEI/pDNA nanoplexes in HeLa and C6 cells. Scale bar, 50 μ m.

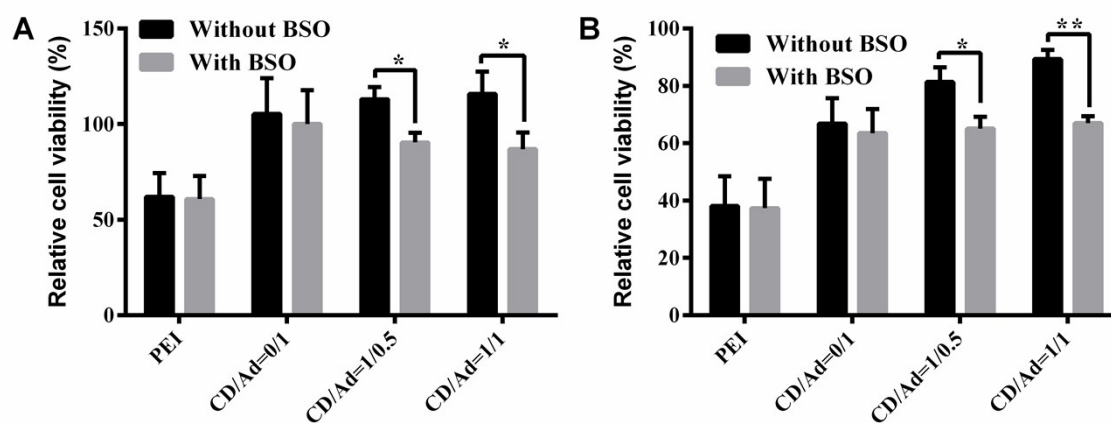


Fig. S7 Cell viability of HeLa (A) and C6 (B) cells treated by 25 kDa PEI/pDNA polyplexes (N/P ratio=30) and SNPs with different CD/Ad ratios(N/P ratio=30) in the presence or absence of 0.2 mM BSO. All data represent mean \pm SD (n = 3, student's t test, *P < 0.05, **P < 0.01).

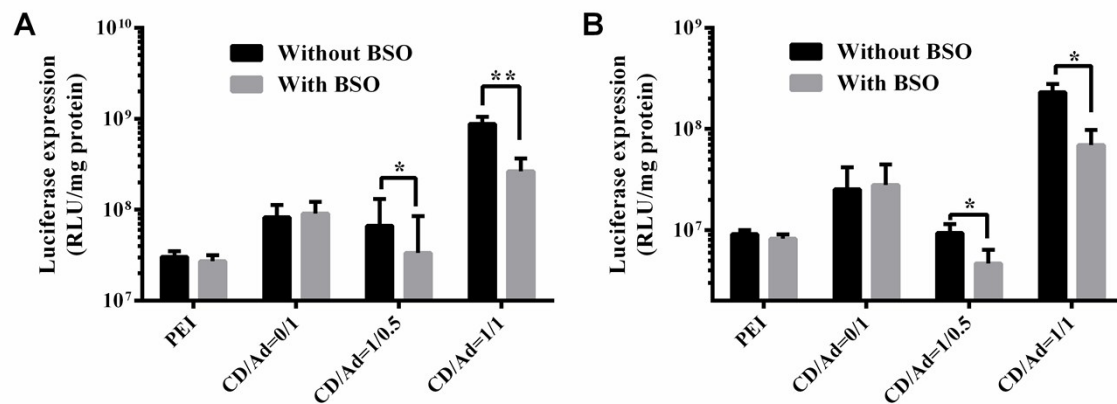


Fig. S8 In vitro luciferase gene expression in HeLa (A) and C6 (B) cells transfected with 25 kDa PEI/pDNA polyplexes (N/P ratio=10) and SNPs with different CD/Ad ratios (N/P ratio=30) in the presence or absence of 0.2 mM BSO. All data represent mean \pm SD (n = 3, student's t test, *P < 0.05, **P < 0.01).