Supporting information

POSS-based Hybrid Cationic Copolymers With Low Aggregation Potential for Efficient Gene Delivery

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Experimental

The particle sizes and zeta potentials of the polymer/pDNA complexes were measured using a Zetasizer Nano ZS (Malvern Instruments, Southborough, MA) with a laser of wavelength 633 nm at a 173° scattering angle. Complex solutions (100 μL) containing 3 μg of pDNA were prepared at various polymer/pDNA weight ratios from 0.05 to 25. The mixture was vortexed for 20 s, incubated for 30 min at room temperature, and diluted with 1 mL of filtered distilled water before being analyzed. The size measurement was performed at 25 °C in triplicate. The Z-average hydrodynamic diameters of the particles were given by the Zetasizer. The zeta potential measurements were performed using a capillary zeta potential cell in automatic mode.

The polymer/pDNA complexes were also observed with a field-emission scanning electron microscope equipped with a scanning transmission electron microscopy (STEM) detector (JEOL JSM-6700F). The polymer/pDNA complex solutions (20 μL) at polymer/pDNA weight ratios of 0.5 and 15 were placed on the TEM copper grids. The complexes were visualized by transmitted electrons (STEM-in-SEM mode) at a low voltage of 15 kV, in comparison to about 200 kV for the conventional TEM. Such low voltage can minimize damage to the polymer/pDNA complex, and allow visualizing of the complex in the TEM mode at high spatial resolution.

Figure 1. GPC profiles of the polymers

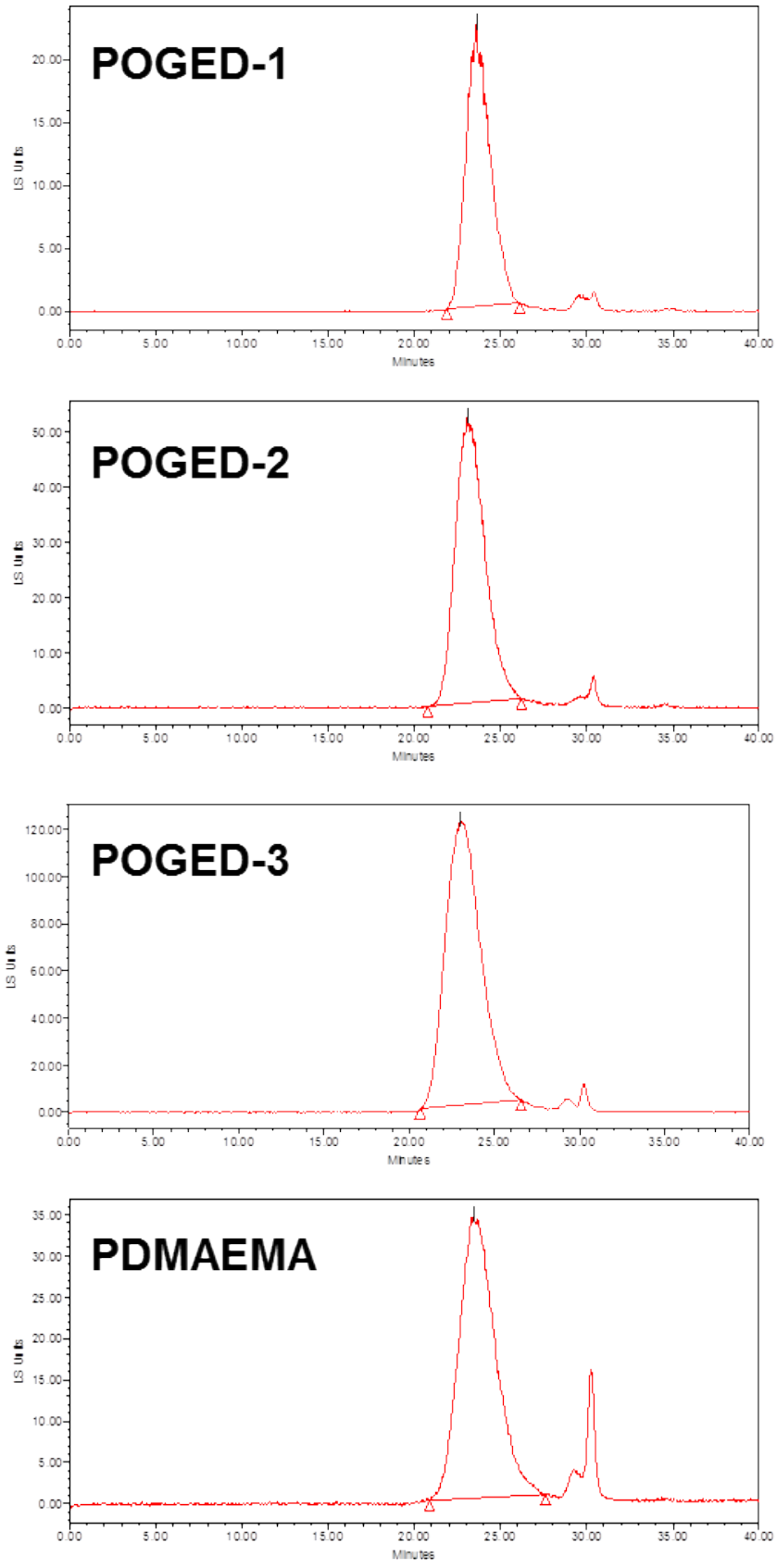

Figure 2. TEM micrographs of polyplexes (N/P ratio = 50) A: POGED-1, B: POGED-2, C: POGED-3, D: PDMAEMA

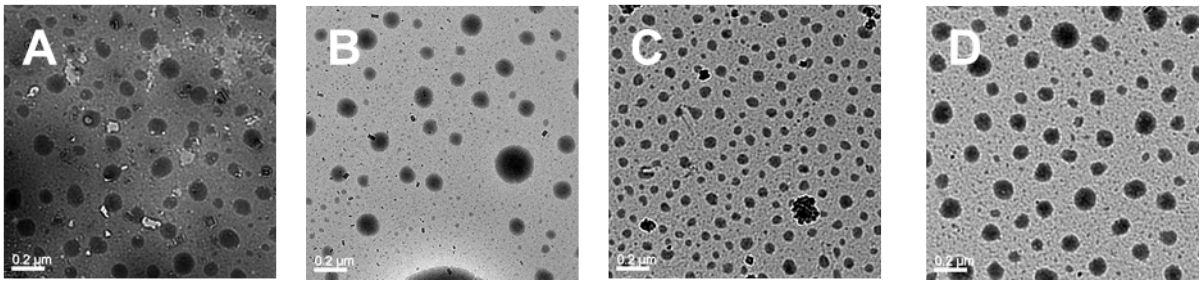

Figure 3. Zeta potential of the pDNA complexes of the cationic polymers at various polymer/pDNA (N/P) ratios.

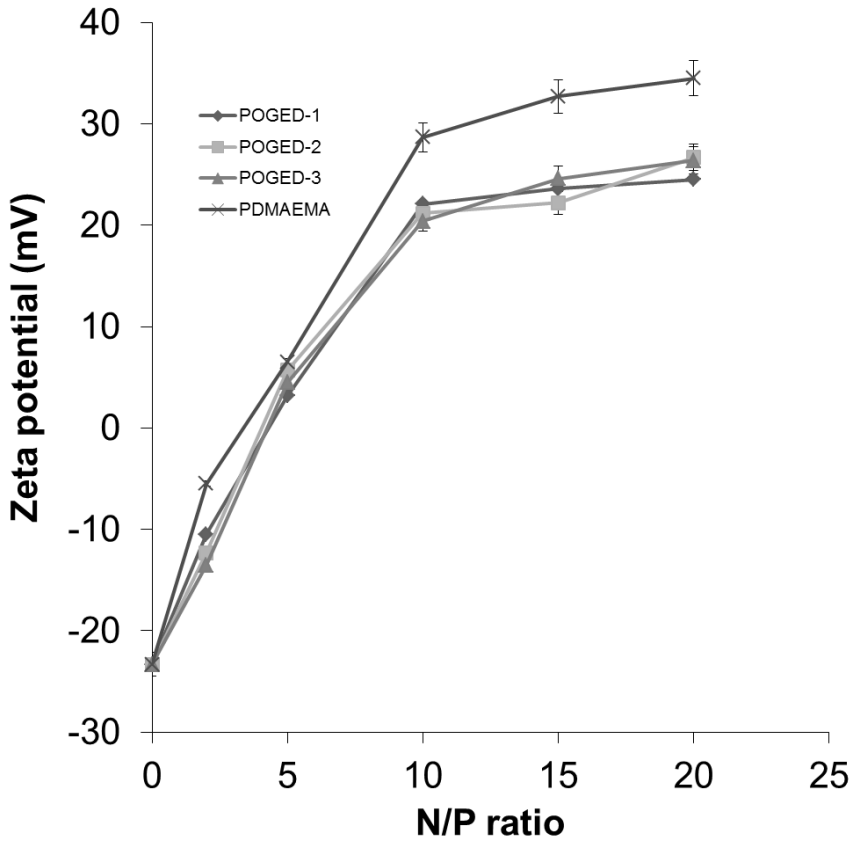

Figure 4. Size profile of polyplexes after incubation in medium with 10% FBS (N/P ratio = 50)