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Complexation Between Cationic Diblock Copolymers and Plasmid DNA SEYOUNG JUNG, THERESA REINEKE, TIMOTHY LODGE, Univ of Minnesota - Twin Cities — Deoxyribonucleic acids (DNA), as polyanions, can spontaneously bind with polycations to form polyelectrolyte complexes. When the polycation is a diblock copolymer with one cationic block and one uncharged hydrophilic block, the polyelectrolyte complexes formed with plasmid DNA (pDNA) are often colloidally stable, and show great promise in the field of polymeric gene therapy. While the resulting properties (size, stability, and toxicity to biological systems) of the complexes have been studied for numerous cationic diblocks, the fundamentals of the pDNA-diblock binding process have not been extensively investigated. Herein, we report how the cationic block content of a diblock influences the pDNA-diblock interactions. pDNA with 7164 base pairs and poly(2-deoxy-2-methacrylamido glucopyranose)-block-poly(N-(2-aminoethyl) methacrylamide) (PMAG-b-PAEMA) are used as the model pDNA and cationic diblock, respectively. To vary the cationic block content, two PMAG-b-PAEMA copolymers with similar PMAG block lengths but distinct PAEMA block lengths and a PAEMA homopolymer are utilized. We show that the enthalpy change from pDNA-diblock interactions is dependent on the cationic diblock composition, and is closely associated with both the binding strength and the pDNA tertiary structure.

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