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Complexation Between Weakly Basic Dendrimers and Linear Polyelectrolytes: Effects of Chain Stiffness, Grafts, and pOH THOMAS LEWIS, GUNJA PANDAV, AHMAD OMAR, VENKAT GANESAN, University of Texas at Austin — The unique architecture and high charge density of dendrimer molecules have attracted interest for their utilization in gene delivery applications. The strong binding affinity of cationic dendrimers to genetic materials make them effective gene delivery vectors not only by shielding the nucleic acid (NA) material from degradative enzymes in the blood stream, but also by reducing the overall negative charge of the dendrimer-NA material complex, which in turn creates more favorable interaction with the anionic cell membrane. However, the high cytotoxicities of cationic dendrimers have motivated the development of polyethylene glycol (PEG) conjugated dendrimer molecules, which have been shown to reduce dendrimer cytotoxicity while still retaining transfection ability. In order to gain insight into how the addition of neutral grafts affects the binding affinity and conformations of dendrimer-NA material complexes, we have developed and numerically solved a Self-Consistent Field Theory approach for both grafted and non-grafted annealed charged dendrimer molecules in the presence of linear polyelectrolyte molecules. Specifically, this work examines the effect of linear polyelectrolyte stiffness, grafting chain length, and solution pOH.

Thomas Lewis
University of Texas at Austin

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