Complexation between a Semiflexible Polyelectrolyte and an Oppositely Charged Dendrimer

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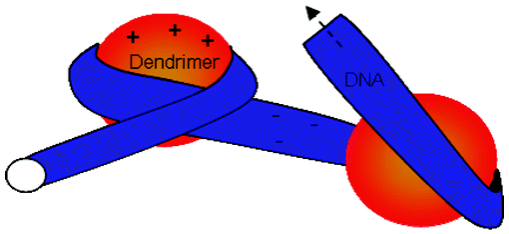
Abstract:

The general trend in the recent development in biology, pharmaceutics, and medicine is closely related to the utilization of nanotechnology. One of the examples is in gene therapy where DNA has to be delivered into a cell, for example, correct the genetic defects of damaged sites. Here the challenge is to be able to transport DNA, through the cell walls. This can be achieved by condensing DNA with an oppositely charged specimen, such as positively charged poly(amido amine) (PAMAM) dendrimers, as a way of replacing viral vectors as gene carriers for in vivo transfer. Transfection efficiency and functionality of DNA complexed with dendrimers may depend on the structure, size, and the charge density of these dendrimers. To study the effect of the size and the charge of the dendrimer on the condensed aggregates, the interaction between positively charged dendrimers of generations 2, 4, 6, 8 and linearized DNA plasmids (4331 bp) has been investigated using a theoretical model for semiflexible polyelectrolyte and soft (penetrable) spheres.



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