A Study of DNA/Dendrimer Complexes which are used as non viral vectors in nanomedicine

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The complex formation between the Poly(amido amine) (PAMAM) dendrimer and Deoxyribonucleic acid (DNA) has been studied using a new developed theoretical model describing the interaction between linear polyelectrolyte (LPE) chain and ion ā?» penetrable sphere (Porous sphere) representing dendrimer of different generations G1, G2, G3, G4, G6 and G8. The electrostatic interaction free energy for a system of LPE chain and an oppositely charged sphere has been studied by the penetrable sphere model. The calculated electrostatic interaction free energy is compared with each term calculated by Schiessel model. It was found that the wrapping degree of LPE around dendrimer increases by increasing the concentration of 1:1 salt solution, Bjerrum length and the LPE chain length, as a result the charge inversion of dendrimer becomes stronger. While the wrapping degree decreases by increasing the persistence length of LPE chain (chain rigidity). The aggregate formed by the complexation between a multiple dendrimers and LPE chain bears a slightly constant charge which is negative for all generations with the exception of G4 which found to have a slightly constant and positive net charge when the dendrimer radius is decreased during the interaction between dendrimer and LPE chain. The wrapping degree of LPE chain around dendrimers of smaller generations G1, G2, G3, and G4 increases considerably with increasing of the salt concentration, whereas for higher generations this wrapping degree is insensitive to concentration of salt which means that the aggregate seems to be neutralized. The developed model has been proved to be a suitable one to describe the complexation between the LPE and the dendrimer.

Comments:I need oral presentation