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## Construction of serum-resistance cationic polymer α-CD- PAMAM and evaluation of its performances as gene delivery vector

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Polyamidoamine (PAMAM) dendrimers as synthetic gene vectors have been proved to be efficient gene delivery systems. In this study, a kind of α-cyclodextrin-PAMAM conjugate polymer was synthesized as gene delivery vector. Based on 1H-NMR detection, about 6.4 PAMAM-G1 molecules were grafted onto an α-CD core. Agarose gel electrophoresis results revealed that CyD-G1 could efficiently bind with DNA and condense them into nano-scale particles which showed similar binding capacity of PEI-25K. Besides, it could protect DNA from DNase I degradation in a low N/P ratio. When N/P ratio in the CyD-G1/DNA polyplex was 40, the average particle size of CyD-G1/DNA polyplex was about 120nm, and zeta potential was +21mv. Also, this polyplex could maintain its particle size in a serum-containing solution within 360 mins. In comparison with PEI-25K carrier, CyD-G1 showed low cytotoxicity in various cell lines. Cell transfection results showed that CyD-G1 could efficiently deliver DNA into cells at N/P=80 compared with lipofectamine2000 and PEI-25K. Unlike lipofectamine2000 and PEI-25K, in serum-containing test condition, CyD-G1/DNA polyplex could maintain the transgene activities. The results of confocal laser scanning microscopy indicated that most DNA entered into cell nuclei within 4h, and this phenomenon was consistent with the results calculated by flow cytometry. Above all, CyD-G1 showed good transgene activities and this gene delivery vector could be used not only for *in vitro* but also for *in vivo* testing.

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