

论文

藻酸盐/PEI/DNA复合载体作为一种新型基因递送系统

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摘要:

目的克服多聚乙烯亚胺(PEI, polyethlenimine)/DNA载体对细胞的毒性以及在含血清培养基里对癌细胞基因的转移率低的问题。方法利用具有水溶性、可生物降解的、并带有负电的藻酸盐(alginate)对PEI/DNA载体进行包衣,制备出复合载体,并在体外含50%血清培养基里,与PEI/DNA载体比较对C3癌细胞转染率。结果在含50%血清的培养基里,藻酸盐包衣制备的复合载体 [alginate:DNA, 0.15 (w/w);PEI:DNA, N:P=10] 与PEI/DNA载体相比,对C3癌细胞基因转染率高出10~30倍,而且其表面正电荷数比PEI/DNA载体减少了一半,颗粒较小,并降低对细胞毒性和红血球集聚反应。结论作为新型的藻酸盐包衣制备的复合载体能提高在体外含高浓度血清培养基里对C3癌细胞的转染率,并能减少其对细胞毒性。

关键词: 藻酸盐 复合载体 多聚乙烯亚胺 基因递送

Alginate/PEI/DNA polyplexes: a new gene delivery system

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Abstract:

AimTo avoid the limitation of the use of cationic polyethlenimine (PEI)-complexed plasmid DNA use for *in vitro* or *in vivo* gene delivery due to its cytotoxicity and lower efficiency in the presence of serum. MethodsA polyplex with decreased positive charge on the complex surface was designed. The PEI/DNA (PD) complexes coated with an anionic biodegradable polymer, alginate were prepared and their gene delivery behavior with PD was compared. ResultsThe alginate-coated PD polyplex, where alginate:PEI:DNA [alginate:DNA, 0.15(w/w); PEI:DNA, N:P=10] showed about 10-30 fold-increased transfection efficiency compared to corresponding non-coated complexes to C3 cells in the presence of 50% serum. The surface charge of the alginate-coated complex was approximately half of that of the alginate-lacking complex. The size of alginate-coated complex was slightly smaller than that of the corresponding complex without alginate. The former complex also showed a reduced erythrocyte aggregation activity and decreased cytotoxicities to C3 cells in comparison with PD complex. ConclusionThe alginate-coated PD polyplexes as a new gene delivery system can improve transfection efficiency in high serum concentration with low cytotoxicity to C3 cells.

Keywords: polyplex polyethylenimine gene delivery alginate

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