عنوان مقاله:

Cationic niosomes for efficient shRNA transfection in the MCF-7 breast cancer cell line

محل انتشار:

سومین کنگره بین المللی و پانزدهمین کنگره ملی ژنتیک ایران (سال: 1397)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

Short hairpin RNAs (shRNA) RNA interference (RNAi) are appropriate candidates for cancer related gene therapy development. Overcoming the systemic delivery of RNAi is a hard challenge to produce RNAi drugs. Novel and safe delivery solutions for RNAi therapeutics is essential to obtain the full potential of this promising technology. Methods In this research, we designed a cationic niosomal nanocarrier for shRNA tranfection for silencing the long non-coding RNA Urothelial Carcinoma-Associated 1 gene (UCA1). Plasmid (pRNAT-U6.1), containing UCA1 shRNA, designed with bioinformatics tools and synthesized. Dynamic light scattering (DLS), gel retardation assay and MTT cell toxicity assay were used to find appropriate nanoformulation for various molar ratios of materials,. Results & Discussion Physical characteristics and stability of plasmid/UCA1 shRNA, polyplexed with cationic vesicles prepared from various molar ratios of surfactant (Tween80), squalene(sq) and cationic charge lipid (DDAB) or Polyethyleneimine(PEI) were investigated. The cationic niosomes composed of Tween80/sq/PEI was selected for further experiments. The particle sizes of the vesicles were in nano size determined by DLS. Gel retardation assay showed niosomal nanocarrier can protect the shRNA plasmid from DNase 1 enzyme. Furthermore, MTT assay has been performed and no significant cytotoxicity were observed in MCF7 cancer cell. Cell cycle and apoptosis analysis represent the efficiency of UCA1 shRNA transfection of these cationic vesicles and demonstrated significant cell cycle arrest and apoptosis in MCF7 cancer cells Conclusions Considering the results and importance of gene therapy, this nanoformulation has potential for further extensive in vitro and in vivo experiments.

کلمات کلیدی:

Short hairpin RNAs (shRNA), RNA interference (RNAi), Gene therapy, Nanocarrier, niosomes