

Gene transfer using new complexes between cardiolipin-like dicationic lipids and plasmid DNA to tumor cells

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Abstract

The lipid vesicles of bisamphiphiles cardiolipin-like dicationic lipids (CDL) I-IV were studied for creation of lipoplexes with plasmid DNA of different sizes to obtain stable lipoplexes for gene transfer to gene therapy. Lipoplexes' sizes (300 ± 100 nm) and stability (> 2 hrs) of CDL were sufficient to be used in gene transfer against monolayer and suspension cell cultures. The CDL total cytotoxicity determined by MTT-test was lower compare to lipofectin as a control. Transfection conditions against tumor cells lines were optimized by lipoplexes of CDL and plasmid DNA. The most efficient transfection for lipoplexes CDL-plasmid DNA was at the lipid-DNA (L/D) ratio equal to 5 (for lipofectin, it was 2). For monolayer cell cultures, lipoplexes CDL-I are comparable in terms of transfection efficacy with lipofectin; in the case of suspension culture, their efficiency was lower by one order of magnitude. It permits a usage of lipoplexes suggested as mediators for gene transfer and delivery to human tumor cells.

Keywords

Cell culture, Dicationic lipids, Gene transfer, Lipofection, Reporter gene