Cellular Transplantation and Tissue Engineering 2012 vol.7 N3, pages 29-33

Gene transfer to mice organs using non-viral systems for targeted delivery with different hydrophobicity and with lactose addressing group

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Abstract

Biodistribution of lipoplexes formed of cholenim substances I-III, containing one, two or three cholesterol moieties, and eukaryotic 14C-DNA and(or) reporter gene into mice organs using a variety of administration routes (intraperitoneally, i.p.; portal vein or left renal artery) is studied in this paper. It is shown that biodistribution doesn't depend on lipoplex lipid composition under i.p. administration, and depends on lipid nature under vein and artery administration. Effective in vivo transfection and reporter gene expression are demonstrated under portal vein administration of lipoplex formed of dicholenim II and lactosylated lipid IV (1 to 1 mass ratio). In the case, the β-Gal gene expression (above 0,3 mcg/g of tissue) is demonstrated in lungs, liver and spleen histochemically and spectrophotometrically. Introduction of cholesterol moieties into oligoethylenimine structure results in optimal hydrophilicity/hydrophobicity ratio, their stabilization, and optimal value of critical constant of micelle formation. There are certain outlooks due to usage of the lipoplexes described for targeted gene delivery.

Keywords

Biodistribution of lipoplexes, Cholenim substances I-III, Lactosylated lipid IV