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# Evaluation of novel cationic pyridinium-based amphiphile C12-Man-Q as an efficient *in vitro* gene delivery agent

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Gene therapy has become the research focus for many laboratories in pharmacy, medicine, biochemistry and chemical engineering worldwide. Synthetic cationic lipids are widely used components of non-viral gene carriers and the factors regulating their transfection efficiency are subject of considerable interest.[1] The development of novel nontoxic cationic structures high gene transfection efficiencies is of great importance.[2]

A number of cationic 1,4-dihydropyridine (1,4-DHP) amphiphiles capable of transfecting plasmid DNA (pDNA) into different cell lines *in vitro* were developed by our research group. During these studies it was established that 1,1′-[(3,5-didodecyloxycarbonyl-4-phenyl-1,4-dihydropyridine-2,6-diyl)dimethylen]-bispyridinium dibromide (D-19) was the optimal structure among tested synthetic lipid-like compounds.[3-5]

The aim of the present study was to investigate the influence of remoted cationic moieties at the positions 2 and 6 of 1,4-DHP molecule on gene delivery activity. The results of transfection efficiency in various cell lines of synthesised amphiphile C12-Man-Q were compared with data obtained for cationic 1,4-DHP derivative D-19.

The target cationic 1,4-DHP derivative C12-Man-Q with remoted from 1,4-DHP cycle cationic moieties at the positions 2 and 6 was synthesised in the multistep procedure, including Mannich reaction with the subsequent amine quaternisation in 50% yield. Transfection efficiencies of compounds were evaluated in BHK-21, Cos7, Huh and HepG2 cell lines. The obtained data showed that compound D-19 possessed high activity when transfecting active proliferating cells. We propose that compound D-19 is cell type specific as the differences in the transfection efficacy were found for the tested cell lines. The most significant property of compound C12-Man-Q is its moderate ability to transfect many cell lines. Comparing with compound D-19, new derivative C12-Man-Q is less cell type specific.

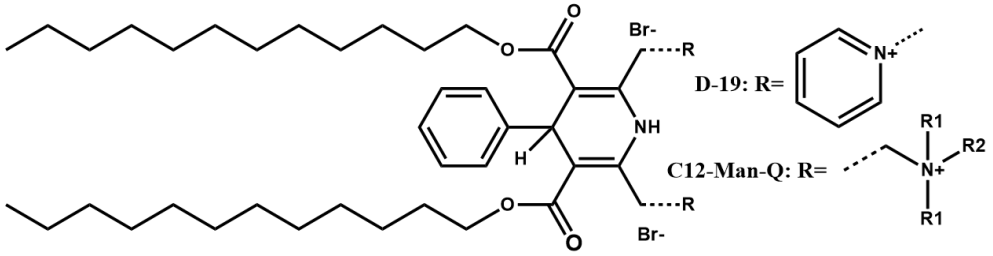


**Figure 1.** Structures of tested compounds: D-19 and C12-Man-Q.

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