Saffiya Habib et al., J Pharma Care Health Sys 2016, 3:2(Suppl)
http://dx.doi.org/10.4172/2376-0419.C1.012

Novel cholesterol based siRNA lipoplexes with and without PEG-modification: Characterization and *in vitro* cytotoxicity studies

Saffiya Habib, Mario Ariatti and **Moganavelli Singh**
University of KwaZulu-Natal, South Africa

Cationic liposomes have potential in carrying small interfering RNA (siRNA) molecules as gene medicines. However, unfavorable liposome-serum interactions often limit their efficacy. In order to address this concern, liposome-stabilizing agents, cholesterol (Chol) and polyethylene glycol (PEG) were incorporated in the design of new liposome-siRNA systems. The helper lipid, Chol, was combined in equimolar quantities with the cytofectin, N,N-dimethylaminopropylamidosuccinylc holesterylformylhydrazide (MS09), to give unilamellar vesicles. For PEG-modification, distearoylphosphatidylethanolamine poly(ethylene glycol) 2000 was added at 2 mol %. Electrostatic association of liposomes with siRNA was followed in band shift and fluorescence quenching assays. Liposome-siRNA complexes (lipoplexes) were observed as globular aggregates by cryo-transmission electron microscopy. Characterization of lipoplexes by Zeta-potential Nanoparticle Tracking Analysis (Z-NTA) showed that lipoplex size and zeta potential were dependent on both liposome composition and the MS09:siRNA (w/w) mixing ratio. siRNA within lipoplexes resisted serum-induced damage at MS09:siRNA (w/w) ratios of 12:1-32:1. The effects of lipoplexes on cell growth were evaluated with a non-targeting siRNA sequence in transformed and non-transformed human cell lines. MTT and alamarBlue® assays showed that MCF-7 and HEK293 cells retained at least 78% viability at final siRNA and lipid concentrations of 57 nM and 29-60 μM, respectively. In general, cell survival profiles of MS09/Chol and MS09/Chol/PEG liposomes compared favorably with that of Lipofectamine™ 3000 and control formulations which contained the conventional helper lipid, dioleoylphosphatidylethanolamine (DOPE). At present, the siRNA delivery capability of liposomes is under assessment and the most promising formulations will be applied to the delivery of oncogene-specific siRNA in gene silencing experiments.

Biography

Saffiya Habib was graduated with BSc in Biochemistry and Microbiology from the University of KwaZulu-Natal, South Africa. She has completed her MSc from the same university in the field of liver directed gene therapy. She is presently engaged in non-viral gene delivery research directed towards cancer therapy as part of her PhD studies.

saffiya.habib@gmail.com

Notes: