

Title:

Combinatorial-Designed Lipid Nanoparticles for Intracellular Delivery of Biomacromolecular Therapeutics

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Abstract:

The clinical success of intracellularly targeted biomacromolecular therapeutics has been limited by poor stability, as well as the impermeability of cell membrane to drugs. An efficient and safe tool to deliver these biotherapeutics into the cytosol of targeted cells are highly desirable. We developed libraries of cationic lipid-based nanoparticles (termed “lipidoid”) for the intracellular delivery of various gene drugs (e.g. DNA, mRNA, and siRNA), as well as cytotoxic proteins. An efficient delivery of therapeutic siRNA or cytotoxic proteins into cancer cells inhibits cell proliferation in vitro and suppresses tumor growth in a murine breast cancer model. Moreover, the combinatorial approach in developing these nanoparticles allows the structure-function relationships study of lipid nanoparticles based intracellular delivery.