Abstract Title: Nanoliposomes from a cationic lipid used as a genetic vehicle

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Abstract

The development of molecular techniques has had a considerable impact in medicine and health sciences, mainly in the development of systems for therapy and diagnosis, based on nanoscience and nanotechnology, developing precise, reproducible and low-cost methods for the obtaining of micrometric and nanometric scale structures, focusing on the study of biotransporters that increase cellular biocompatibility, as in gene therapy (GT), which is a therapeutic strategy based on the modification of the genetic repertoire of cells through administration of nucleic acids (transfection). GT requires genetic vehicles that must be biocompatible, non-toxic, effective and organ specific. The design of the genetic vehicles implies innovative and promising methodologies for the cure of genetic diseases in a safe way. The aim of this work was to design and synthesize a new cationic lipid derived from molecules that are naturally found in cells, to be used in the transfer of genetic material with nanoliposomes. The cationic lipid was synthesized using a steroid, a primary amine and a basic amino acid, characterized by spectroscopy and used to form stable cationic nanoliposomes and nanolipoplexes with plasmid DNA, to transfect eukaryotic cells in culture. The synthesis yield of 70% was obtained. In the IR spectrum, the characteristic signal of the amide bond was observed at 1693.25 cm-1. Stable nanoliposomes were formed with several lipid mixtures of a size that ranged from 102 to 244 nm in diameter. Upon addition of the plasmid DNA, nanolipoplexes were formed that transfected cells in culture without toxicity. This new cationic lipid could be used to transfer genes to eukaryotic cells safely.

Keywords: liposomes, lipoplexes, cationic lipids, gene therapy, lipofection

Professional Biography

Bravo-Estupiñan, Diana Marcela has completed her professional degree as Bacteriology at the age of 21 years from Pontificia Universidad Javeriana, Bogotá - Colombia. She is Master student in ENCB-Instituto Politécnico Nacional, México. She has participated in several national and international congresses since he entered the field of research.



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