

A Method of Nanoparticle-Mediated Gene Transfer

University of South Florida investigators have developed a novel chitosan-based method of gene delivery to target cells.

Chitosan is a safe, non-viral nanoparticle that can be administered via the mucosal route (e.g., intranasally). Research has already demonstrated that chitosan is an efficient drug delivery compound, but is now being developed for gene delivery. The use of chitosan alone, however, is limited by its low water solubility and low efficiency of transfection.

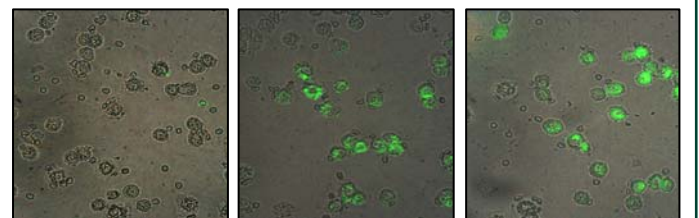
Our invention takes advantage of the safety and route of administration of chitosan, while enhancing its efficiency of transfection for use in gene delivery. Using our method, the stability of the DNA-modified chitosan complex and the solubility and mucoadhesive properties of chitosan are vastly improved. **Data from animal experiments show intranasal administration of the plasmid DNA-modified chitosan complex results in increased delivery of plasmid DNA to target cells (see Figure).**

This technology can be used to develop safe, highly effective transmucosal gene transfer systems for a broad spectrum of applications and is now available for licensing.

Advantages:

- Non-viral vector provides a safe route of administering gene therapy
- Provides enhanced gene delivery via intranasal administration
- Sustained gene expression

Intranasal gene delivery system improves plasmid DNA delivery to target cells



Control

Thiolated

Crosslinked

GFP expression after intranasal administration of GFP pDNA via chitosan or modified chitosan complexes. Increased delivery and sustained expression of DNA to cells is seen after delivery via the modified chitosan nanoparticles.

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