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- Abstract

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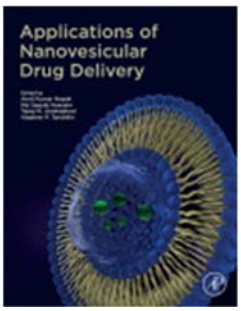

Chapter 24 - Nanovesicles for the delivery of siRNA

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Abstract

Small interfering RNAs (siRNAs) are a class of nucleic acid-based drugs that are capable of hindering gene expressions by meddling/interacting with a messenger RNA (mRNA) prior translation when administered as part of gene therapy. The mechanism of discovery of RNA via gene silencing, as induced by double-stranded RNAs, makes siRNAs ideal drug candidates for combatting several diseases because, every known disease is expressed by specific genes, which are usually accompanied by the production of harmful proteins. However, this technique is yet to gain full implementation in therapeutics as siRNA-delivery can be hindered by large macromolecules which they comprise of, and hence, makes them somewhat difficult to administer. Also, once they find their way into the blood stream, rapid degradation of these proteins by plasma enzymes occurs, and as a result of their negatively charged ends, they are repelled by negatively charged cell walls, which also poses a challenge to the delivery of fragile siRNA molecules. Thus, by loading of siRNA molecules with nanovesicles (NVs), they become easily absorbed or taken up by protein cells into the cytoplasm, which in turn brings about the attenuation of target gene expressions. There are also evidences of exosome-mediated delivery of siRNAs in vitro and in vivo target genes for pH responsive target-cells. Therefore, this chapter focuses on the role of NVs for siRNA delivery. Other medical applications related to the approaches for siRNA delivery in relation to nanoparticles in chemically modified siRNAs are also discussed.

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