

Overcoming the challenges of siRNA delivery: Nanoparticle strategies

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Running title: siRNA delivery by nanoparticles

Abstract

RNA interference (RNAi) is a natural cellular process that can be operated to silence specific gene expression at the post-transcriptional level by intracellular delivery of small interfering RNAs (siRNAs) and microRNAs.

Therapeutics based on siRNA have an immense potential for the treatment of incurable diseases such as cancers.

However, the in vivo utilization of siRNA and also the delivery of this agent to the target site is one of the most

controversial challenges. The helpful assistance by nanoparticles can improve stable delivery and also enhance

efficacy. More nanoparticle-based siRNA therapeutics is expected to become available in the near future. Herein, we

have discussed the existing hurdles for systemic administration of siRNA as therapeutic agents and highlights the

various strategies to overcome these hurdles, including lipid-based nanoparticles and polymeric nanoparticles, and

we also briefly reviewed chemical modification.

Keywords

RNAi, Systemic delivery, Lipid-based nanoparticle, Polymeric nanoparticle, Chemical modification, Cancer