siRNA Delivery Using Hexameric Tetrahedral RNA Nanostructures for Gene Silencing

Summary (1024-character limit)

Researchers at the National Cancer Institute (NCI), in collaboration with researchers at the University of California, Santa Barbara (UCSB), developed a tetrahedral-shaped RNA nanoparticle for the delivery of siRNA to activate RNAi. The tetrahedral RNA nanoparticles can contain twelve Dicer substrate RNA duplexes for gene silencing. The NCI seeks parties interested in co-development or licensing of these tetrahedral RNA nanoparticles.

NIH Reference Number

E-075-2018

Product Type

- Therapeutics

Keywords

- RNA, Nanoparticle, RNAi, RNA Interference, siRNA, Gene Silencing, Shapiro

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

RNA interference (RNAi) is a biological response to double-stranded RNA that regulates expression of protein-coding genes and is a natural mechanism for gene silencing. Delivery of short, interfering RNA (siRNA) leads to RNAi of the targeted genes.

Researchers at the National Cancer Institute (NCI), in collaboration with researchers at the University of California, Santa Barbara (UCSB), developed a tetrahedral-shaped RNA nanoparticle for the delivery of siRNA to activate RNAi. The tetrahedral RNA nanoparticle is comprised of four RNA nanorings as the “faces” of the tetrahedral scaffold.

The tetrahedral RNA nanoparticles can contain up to twelve Dicer substrate RNA duplexes, enabling the simultaneous targeting of multiple genes with several siRNA copies.

Potential Commercial Applications

- Targeted therapeutic for cancer
- Research tool to study cancer
- Targeted therapeutic for RNA-based viruses

Competitive Advantages

- Increased functional capacity of RNA nanoparticles
- Can contain up to 12 targeting siRNAs while maintaining thermodynamic stability
- Allows for substitution of several siRNAs with other functional moieties while still maintaining large number of targeting siRNAs
- Shown to have superior cell uptake capabilities and silencing capacity compared to some other RNA-based nanoconstructs
- Can be assembled by co-transcriptional folding or one-pot processes

Inventor(s)

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Development Stage

- Basic (Target Identification)

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/696,619, Filed 11 Jul 2018

Related Technologies

- E-765-2013 - Multifunctional RNA Nanoparticles as Cancer and HIV Therapeutics

Therapeutic Area

- Cancer/Neoplasm