

NUCLEIC ACID NANOPARTICLES FOR TRIGGERING RNA INTERFERENCE

SUMMARY

RNA interference (RNAi) is a naturally occurring cellular post-transcriptional gene regulation process that utilizes small double-stranded RNAs to trigger and guide gene silencing. By introducing synthetic RNA duplexes called small-interfering RNAs (siRNAs), we can harness the RNAi machinery for therapeutic gene control and the treatment of various diseases. The National Cancer Institute seeks partners to license or co-develop RNA, RNA-DNA, and DNA-RNA hybrid nanoparticles consisting of a DNA or RNA core with attached RNA or DNA hybrid duplexes.

REFERENCE NUMBER

E-156-2014

PRODUCT TYPE

- Therapeutics

KEYWORDS

- RNAi
- siRNA
- nanotechnology

COLLABORATION OPPORTUNITY

This invention is available for licensing and co-development.

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DESCRIPTION OF TECHNOLOGY

RNA interference (RNAi) is a naturally occurring cellular post-transcriptional gene regulation process that utilizes small double-stranded RNAs to trigger and guide gene silencing. By introducing synthetic RNA duplexes called small-interfering RNAs (siRNAs), we can harness the RNAi machinery for therapeutic gene control and the treatment of various diseases.

NCI researchers created RNA, RNA-DNA, or DNA-RNA hybrid nanocubes consisting of a DNA or RNA core (composed of six strands) with attached RNA or DNA hybrid duplexes. The nanocubes can induce the reassociation of the RNA duplexes, which can then be processed by the human recombinant DICER

enzyme, thus activating RNAi. This technology opens a new route for the development of “smart” nucleic acid based nanoparticles for a wide range of biomedical applications. Immune responses can be controlled by altering the composition of the particle.

The researchers are conducting preliminary mouse xenograft studies on a related potential therapeutic, and seek collaborators for scale-up, animal models, developing particles for multiple targets, and RNAi delivery methods.

POTENTIAL COMMERCIAL APPLICATIONS

- Treatment for cancer and infectious diseases.

COMPETITIVE ADVANTAGES

- Low cytotoxicity

INVENTOR(S)

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DEVELOPMENT STAGE

- Pre-clinical (in vivo)

PUBLICATIONS

Afonin KA, et al. [[PMID 24189588](#)]

PATENT STATUS

- U.S. Filed: PCT/US2015/029553
- Foreign Filed: WO 2010/1480
- Foreign Filed: WO 2013/075140,
- Foreign Filed: WO 2014/039809

RELATED TECHNOLOGIES

- [E-765-2013 - Multifunctional RNA Nanoparticles as Therapeutic Agents](#)
- [E-039-2012 - Targeted Nanoparticles for the Treatment of Virus-infected or Cancerous Cells](#)
- [E-078-2016](#)

THERAPEUTIC AREA

- Cancer/Neoplasm
- Infectious Diseases