

Solid Lipid Nanoparticles for Sustained Release of siRNAs

Researchers in Dr. Richard Zare's lab have developed solid lipid nanoparticles (SLNPs) that provide sustained *in vivo* delivery of small interfering RNAs (siRNAs). siRNAs can silence genes responsible for disease, which makes them promising tools for gene therapy. However, *in vivo* delivery of siRNAs remains challenging due to lack of safe, efficient, and sustained delivery systems. siRNAs are rapidly degraded in the plasma and cellular cytoplasm resulting in short siRNA activity. To overcome these limitations the inventors have created new SLNPs to encapsulate and protect the siRNA and provide sustained *in vivo* siRNA delivery. In addition to solid lipids, the researchers suggest using lipids extracted from human adipose tissue to form nanoparticles with the aim of providing better biocompatibility.

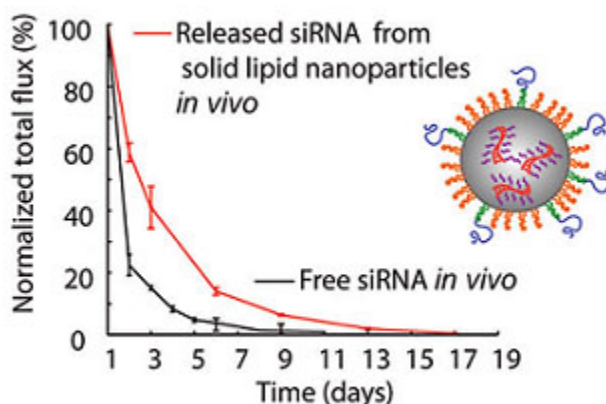


Illustration shows the *in vivo* release data of fluorescently labeled siRNA. Left- release data of free (unencapsulated) siRNA. Right- release of siRNA from SLNPs. SLNPs are coated with lipids (orange) and other molecules and contain siRNA (red) in complex with a positively charged lipid (purple).

Stage of Research

The inventors have shown that the SLNPs provide sustained release of siRNA *in vivo*

and *in vitro* over a period of 10-13 days with retained functionality.

Applications

- RNAi-based therapeutics

Advantages

- Allows sustained release of siRNA
- Biocompatible
- Minimal toxicity
- Less costly than polymeric carriers

Publications

- U.S. Published Patent Application 20130243848, ["NANOPARTICLES, NANOPARTICLE DELIVERY METHODS, AND SYSTEMS OF DELIVERY "](#).
- Tatsiana Lobovkina, Gunilla B. Jacobson, Emilio Gonzalez-Gonzalez, Robyn P. Hickerson, Devin Leake, Roger L. Kaspar, Christopher H. Contag, and Richard N. Zare. [In Vivo Sustained Release of siRNA from Solid Lipid Nanoparticles](#). ACS Nano, vol. 5, no. 12, pp. 9977-9983, published online November 12, 2011, 10.1021/nn203745n
- Gebel, Erika, [Fatty Bundles Sneak siRNA Into Cells](#). Chemical & Engineering News, published online November 21, 2011

Patents

- Published Application: [20130243848](#)

Innovators

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