(SD2021-085) Method for sequestering RNA binding proteins to affect their activity

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BACKGROUND

The main way to reduce the activity of RBPs in cells is through gene expression knockdown (i.e. siRNAs or antisense oligonucleotides). More recently, circular RNAs have been used as a competitive inhibitor of miRNA activity by capturing the Argonaute proteins – which already occurs naturally in cells. There are also no known small molecule inhibitors of RBPs.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have generated a technology that can sequester RNA binding proteins (RBP) and inhibit their activity in cells. The technology is a single-strand of RNA containing high or low affinity binding site(s) for an RBP of interest. The purpose of the binding site is to recruit an RBP in vivo and sequester it from its normal RNA targets thereby preventing its interaction with endogenous RNA targets.

The RNA also contains a 5' SCNMV Exo Element and a 3' MALAT1 pseudoknot to protect both ends of the transcript from degradation by nucleases. This property allows the RNA to be completely stable and can be allowed to accumulate to high concentration when expressed from a DNA expression vector. Alternatively, this RNA can be transcribed ex vivo and be delivered to cells by means of transfection reagent.

APPLICATIONS

Research tool. Control RBP activity.

Therapeutic for diseases. Technology can be delivered to and expressed in cells using viral adeno-associated vectors (AAV) or be delivered to cells as a synthetic strand of RNA.

ADVANTAGES

The only comparable technology that can achieve similar specificity for RBPs is circular RNAs. However, the ability of circular RNAs to bind RBPs is mostly explored for microRNAs (miRNAs). In comparison, this new technology/invention is general for any RNA binding protein(s).

OTHER INFORMATION

KEYWORDS

RNA binding proteins, post-transcriptional regulation, microRNA, non-miRNA, ribosome occupancy, competitive inhibition

CATEGORIZED AS

- **Biotechnology**
  - Genomics
  - Proteomics
- **Medical**
  - Research Tools

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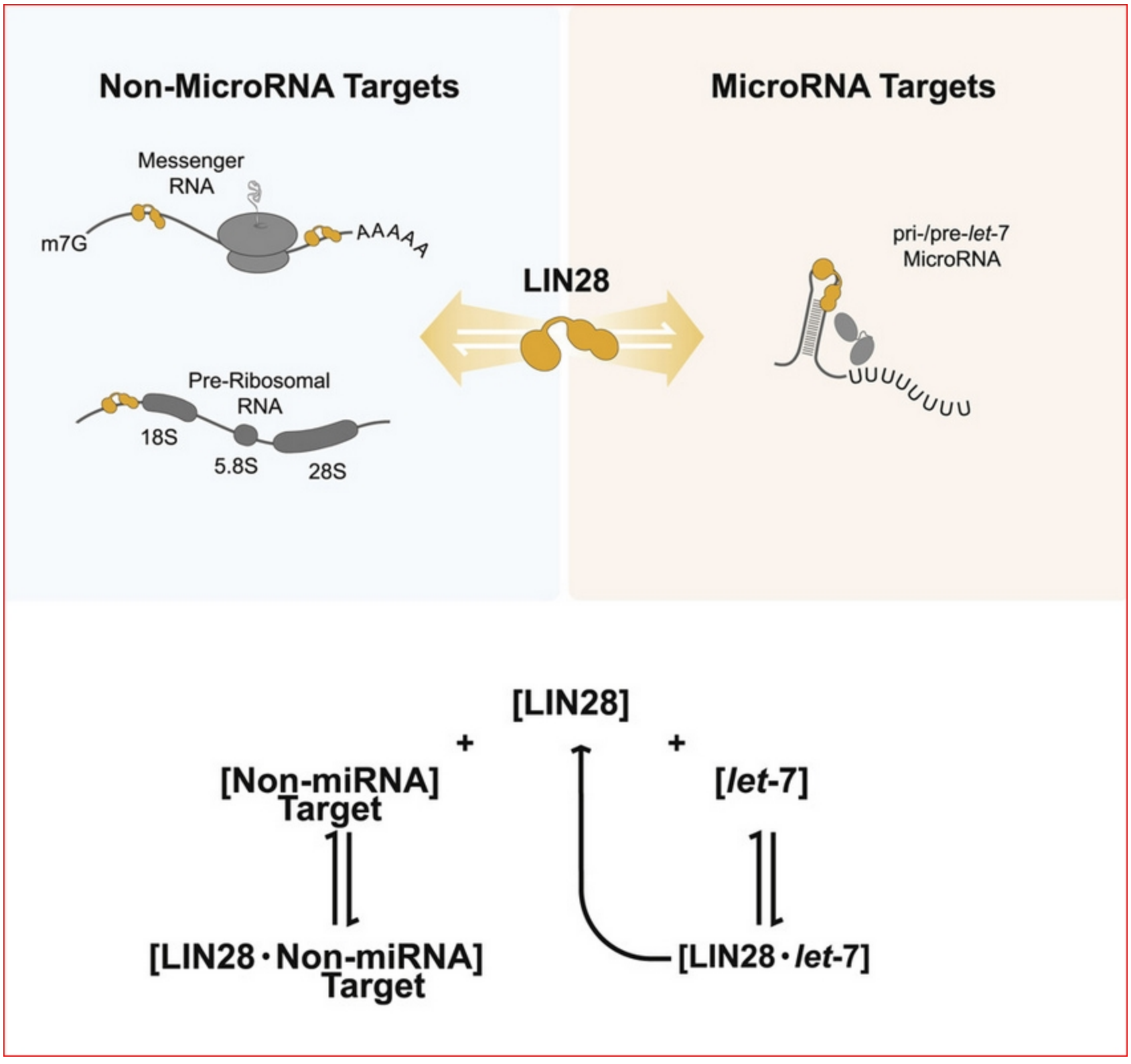

INTELLECTUAL PROPERTY INFO

Patent-pending. UC San Diego is seeking partners to commercialize this technology. Licensing is active.

RELATED MATERIALS

▶ Tan FE, Sathe S, Wheeler EC, Yeo GW. Non-microRNA binding competitively inhibits LIN28 regulation. Cell Rep. 2021 Aug 10;36(6):109517. doi: 10.1016/j.celrep.2021.109517. - 08/10/2021

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