Synthetic Minimal Hammerhead Nuclease Ribozymes With Greatly Enhanced And Efficient Specific Cleavage Activity

Tech ID: 32806 / UC Case 2015-380-0

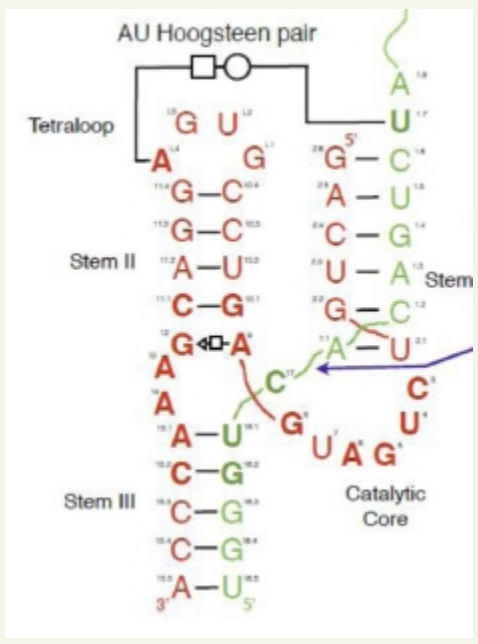
BACKGROUND

The hammerhead RNA sequence within satellite RNA genomes occurs at the interface of two monomeric segments of a linear concatamer following rolling circle replication. Although it is, in that context, a single self-cleaving strand of RNA that is capable of catalyzing only a single, albeit highly specific, cleavage reaction, the hammerhead RNA can be artificially engineered to create a true multiple-turnover ribozyme simply by separating the molecule into discrete catalytic and target strands. The latter constructs have been studied in vitro and also correspond to hammerhead ribozyme sequences that have used in targeting other RNAs

TECHNOLOGY DESCRIPTION

Researchers at UC Santa Cruz discovered an RNA nuclease ribozyme design principle that enables targeting of pathogenic RNAs, such as those produced by HIV and other disease-causing organisms and conditions, with 50-fold greater activity than previously believed possible, and with over 90% cleavage efficiency.

The ribozyme is specifically designed to facilitate formation of an AU trans-Hoogsteen base pair that is both necessary and sufficient for robust catalytic activity. Synthetic ribozymes designed according to these criteria are highly active and specific RNA nucleases, with significant potential as in vitro or in vivo biochemical reagents and as antiviral and anti-RNA therapeutic agents.



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OTHER INFORMATION

KEYWORDS

Catalytic RNA, Ribozyme, Infectious Disease, Hammerhead Ribozyme, RNA enzymes

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Research Tools**
  - Nucleic Acids/DNA/RNA

RELATED CASES

2015-380-0

APPLICATIONS

Research reagents

RNA nuclease activity

RNA based therapeutics

ADVANTAGES

- The synthetic minimal hammerhead nuclease ribozyme is at least 50 times more catalytically active than the other minimal hammerhead ribozymes currently employed as RNA nuclease reagents.
- The ribozyme (unlike natural hammerhead sequences) cleaves target substrate RNAs with greater than 90% completeness.
- The ribozyme is small (requiring only about 33 nucleotides) and is therefore easily and cost-effectively synthesized. It is therefore amenable to in vivo applications, including potential therapeutic applications, without eliciting anti-viral RNA immune, interferon or RNAi responses.

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,301,626	05/28/2019	2015-380

RELATED MATERIALS

- Minimal Hammerhead Ribozymes with Uncompromised Catalytic Activity - 07/17/2015

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