COMPOSITION AND METHODS OF A NUCLEASE CHAIN REACTION FOR NUCLEIC ACID DETECTION

Tech ID: 31940 / UC Case 2020-120-0

PATENT STATUS

Country	Type	Number	Dated	Case
Japan	Published Application	2023-527768	06/30/2023	2020-120
China	Published Application	CN116157536A	05/23/2023	2020-120
European Patent Office	Published Application	4153772	03/29/2023	2020-120

Additional Patent Pending

BRIEF DESCRIPTION

This invention leverages the nuclease activity of CRISPR proteins for the direct, sensitive detection of specific nucleic acid sequences. This all-in-one detection modality includes an internal Nuclease Chain Reaction (NCR), which possesses an amplifying, feed-forward loop to generate an exponential signal upon detection of a target nucleic acid.

Cas13 or Cas12 enzymes can be programmed with a guide RNA that recognizes a desired target sequence, activating a non-specific RNase or DNase activity. This can be used to release a detectable label. On its own, this approach is inherently limited in sensitivity and current methods require an amplification of genetic material before CRISPR-base detection.

SUGGESTED USES

All nucleic acid diagnostics and detection, both DNA and RNA.

ADVANTAGES

Current methods of programming Cas13 or Cas12 enzymes to release a detectable label require an amplification of genetic material before CRISPR-base detection and are inherently limited in sensitivity. In these existing scenarios, a guide RNA recognizes a desired target sequence, activating a non-specific RNase or DNase activity.

In contrast, this invention includes an all-in-one detection modality with an internal Nuclease Chain Reaction (NCR) and an amplifying, feed-forward loop. The technology generates an exponential signal upon detection of a target nucleic acid.

RELATED MATERIALS

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OTHER INFORMATION

KEYWORDS

nucleic acid, nuclease chain reaction, NCR, Cas13, Cas12

CATEGORIZED AS

» **Biotechnology**
» Bioinformatics
» Genomics
» Health
» Other
» Proteomics
» **Medical**
» Diagnostics
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» Bioinformatics
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» Scientific/Research

» **Engineering**

» Other

RELATED CASES

2020-120-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Compression of Genetic Information in Multiple Reading Frames
- 2'-fluoro RNA Activators for Enhanced Activation of Csm6 in RNA Detection Assays

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