

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

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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

CONTACT

Terri Sale
terri.sale@berkeley.edu
tel: 510-643-4219.



INVENTORS

» Savage, David Frank

OTHER INFORMATION

KEYWORDS

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

CATEGORIZED AS

» **Biotechnology**

» Bioinformatics

» Genomics

» Health

» Other

» Proteomics

» **Medical**

» Diagnostics

» Research Tools

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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](#)
- ▶ [Novel, Programmable Nucleic Acid Binding And Cleaving CRISPR Proteins Which Can Sense And Respond To The Cellular Environment](#)



University of California, Berkeley Office of Technology Licensing

2150 Shattuck Avenue, Suite 510, Berkeley, CA 94704

Tel: 510.643.7201 | Fax: 510.642.4566

ipira.berkeley.edu/ | otl-feedback@lists.berkeley.edu

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