High-Fidelity Cas13a Variants

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BACKGROUND

Cas13a can be used as part of the CRISPR-Cas toolkit and it exclusively targets RNA, which makes it a promising tool for RNA detection. As a diagnostic and/or RNA detection tool, Cas13a's activity is measured by the fluorescence signal of the cleaved reporter RNA, which is quenched before cleaving. However, Cas13a-based technologies exhibit high tolerance for mismatches between the guide-RNA and target RNA of interest, limiting their use for the detection of mutations like single nucleotide polymorphisms (SNPs).

BRIEF DESCRIPTION

Professor Giulia Palermo and colleagues from the University of California, Riverside and the University of Rochester have developed high-fidelity Cas13a variants with increased sensitivity for base pair mismatches.

The activation of these Cas13a variants can be inhibited with a single mismatch between guide-RNA and target-RNA, a property that can be used for the detection of SNPs associated with diseases or specific genotypic sequences.

APPLICATION

- Cas13a variants with increased sensitivity to detect base pair mismatches such as SNPs associated with diseases or specific genotypes.

PATENT STATUS

Patent Pending

RELATED MATERIALS

- AM Molina Vargas, et al., New design strategies for ultra-specific CRISPR-Cas13a-based RNA detection with single-nucleotide mismatch sensitivity, Nucleic Acids Research, Volume 52, Issue 2, 25 January 2024, Pages 921–939 - 01/24/2024

CONTACT

Grace Yee
grace.yee@ucr.edu
tel: 951-827-2212.

OTHER INFORMATION

KEYWORDS

CRISPR, Cas13a, SNP, diagnostic

CATEGORIZED AS

- **Biotechnology**
  - Genomics
- **Medical**
  - Diagnostics
  - Gene Therapy

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Riverside,CA 92521

otc@ucr.edu

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