METHODS AND COMPOSITIONS FOR MODIFYING A SINGLE STRANDED TARGET NUCLEIC ACID

Tech ID: 23725 / UC Case 2014-079-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,494,620	12/03/2019	2014-079

BRIEF DESCRIPTION

The CRISPR-Cas9 RNA-guided DNA endonuclease uses RNA–DNA complementarity to identify target sites for sequence-specific double-stranded DNA cleavage. Cas9 acts on DNA substrates exclusively because both binding and catalysis require recognition of a short DNA sequence, known as the protospacer adjacent motif (PAM), next to and on the strand opposite the target site in dsDNA. Cas9 has proven to be a versatile tool for genome engineering and gene regulation, but it has been thought to be incapable of targeting RNA.

UC Berkeley researchers have developed a technology and methods that allows for precise binding and/or cleaving a single stranded target nucleic acid that does not depend on the presence of PAM in the target nucleic acid. The researches showed that Cas9 binds with high affinity to single-stranded RNA (ssRNA) targets matching the Cas9-associated guide RNA sequence when the PAM is presented in trans as a separate DNA oligonucleotide. Using specially designed PAM-presenting oligonucleotides (PAMmers), Cas9 can be specifically directed to bind or cut RNA targets while avoiding corresponding DNA sequences.

SUGGESTED USES

» Binding and/or cleaving of a single stranded nucleic acid targets, including single stranded RNA targets (e.g., ssRNA, mRNA, tRNA, microRNA, etc.)

ADVANTAGES

» Cas9 can be directed to bind or cut RNA targets while avoiding corresponding DNA sequences

» Cas9 can be used for programmable transcript recognition without the need for tags

PUBLICATION

Programmable RNA recognition and cleavage by CRISPR/Cas9

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ COMPOSITIONS AND METHODS FOR IDENTIFYING HOST CELL TARGET PROTEINS FOR TREATING RNA VIRUS INFECTIONS

▶ Genome Editing via LNP-Based Delivery of Efficient and Stable CRISPR-Cas Editors

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OTHER INFORMATION

KEYWORDS

Genome engineering, Cas9, PAM, ssRNA

CATEGORIZED AS

» **Biotechnology**
» Genomics
» **Materials & Chemicals**
» Biological
» **Medical**
» Gene Therapy
» Research Tools
» Therapeutics
» **Research Tools**
» Nucleic Acids/DNA/RNA

RELATED CASES

2014-079-0

- Tissue-Specific Genome Engineering Using CRISPR-Cas9
- Type III CRISPR-Cas System for Robust RNA Knockdown and Imaging in Eukaryotes
- Cas9 Variants With Altered DNA Cleaving Activity
- Cas12-mediated DNA Detection Reporter Molecules
- Improved guide RNA and Protein Design for CasX-based Gene Editing Platform
- Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease
- Miniature Type VI CRISPR-Cas Systems and Methods of Use
- RNA-directed Cleavage and Modification of DNA using CasY (CRISPR-CasY)
- CasX Nickase Designs, Tans Cleavage Designs & Structure
- In Vivo Gene Editing Of Tau Locus Via Liponanoparticle Delivery
- A Dual-RNA Guided CasZ Gene Editing Technology
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF (“Cas-VariPhi”)
- A Protein Inhibitor Of Cas9
- RNA-directed Cleavage and Modification of DNA using CasX (CRISPR-CasX)
- Compositions and Methods for Genome Editing
- IS110 and IS1111 Family RNA-Guided Transposons
- Methods to Interfere with Prokaryotic and Phage Translation and Noncoding RNA
- Variant Cas12a Protein Compositions and Methods of Use
- In Vitro and In Vivo Genome Editing by LNP Delivery of CRISPR Ribonucleoprotein
- CRISPR CASY COMPOSITIONS AND METHODS OF USE
- Single Conjugative Vector for Genome Editing by RNA-guided Transposition
- Improved Cas12a Proteins for Accurate and Efficient Genome Editing
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF
- Engineered/Variant Hyperactive CRISPR CasPhi Enzymes And Methods Of Use Thereof
- Selective Cell Elimination using RNA-guided Chromatin Shredding
- Methods Of Use Of Cas12L/CasLambda In Plants
- Type V CRISPR/CAS Effector Proteins for Cleaving ssDNA and Detecting Target DNA
- THERMOSTABLE RNA-GUIDED ENDONUCLEASES AND METHODS OF USE THEREOF (GeoCas9)
- Variant TnpB and wRNA Proteins
- Efficient Site-Specific Integration Of New Genetic Information Into Human Cells
- Class 2 CRISPR/Cas COMPOSITIONS AND METHODS OF USE
- Compositions and Methods of Use for Variant Csy4 Endoribonucleases
- Methods and Compositions for Controlling Gene Expression by RNA Processing

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