

# 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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## INVENTORS

- » Doudna, Jennifer A.

## 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
- ▶ 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
- ▶ 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
- ▶ 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
- ▶ Immune Cell-Mediated Intercellular Delivery Of Biomolecules
- ▶ Methods and Compositions for Controlling Gene Expression by RNA Processing



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