IMPROVED CAS12A PROTEINS FOR ACCURATE AND EFFICIENT GENOME EDITING

Tech ID: 30433 / UC Case 2019-162-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20220315914	10/06/2022	2019-162

BRIEF DESCRIPTION

Mutated versions of Cas12a that remove its non-specific ssDNA cleavage activity without affecting site-specific double-stranded DNA cutting activity. These mutant proteins, in which a short amino acid sequence is deleted or changed, provide improved genome editing tools that will avoid potential off-target editing due to random ssDNA nicking.

SUGGESTED USES

Genome editing in animals, plants, and human cells.

ADVANTAGES

Accurate and efficient genome editing.

Background: Cas12a (formerly called Cpf1) is a type V CRISPR-Cas enzyme derived from bacteria that is used for RNA-guided genome editing in animal, plant and human cells. However, Cas12a possesses an additional enzymatic activity in which a DNA target-bound Cas12a can rapidly and non-specifically degrade any single-stranded DNA (ssDNA) substrate in a sequence-independent manner. This enzymatic activity is endonucleolytic, which means that the ssDNA substrate does not need a free 5' or 3' end to be cut. For this reason, natural Cas12a-type enzymes have the potential to induce off-target genome editing due to nicking of exposed ssDNA in cells.

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INVENTORS

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OTHER INFORMATION

KEYWORDS

genome editing, Cas12a

CATEGORIZED AS

» **Agriculture & Animal Science**
» Animal Science
» Plant Traits
» Plant Varieties
» Transgenics
» **Biotechnology**
» Food
» Genomics
» Health
» Proteomics
» **Environment**
» Other
» **Medical**
» Gene Therapy
» Research Tools
» Screening
» Therapeutics
» **Veterinary**

» Other

» Therapeutics

RELATED CASES

2019-162-0

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
- 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
- Methods and Compositions for Modifying a single stranded Target Nucleic Acid
- 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
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF
- Engineered/Variant Hyperactive CRISPR CasPhi Enzymes 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
- Methods and Compositions for Controlling Gene Expression by RNA Processing

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