CASX NICKASE DESIGNS, TANS CLEAVAGE DESIGNS & STRUCTURE

Tech ID: 29659 / UC Case 2019-011-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,275,964	04/15/2025	2019-011
European Patent Office	Published Application	3841205 A0	06/30/2021	2019-011

BRIEF DESCRIPTION

Metagenomic analysis of microbial DNA from groundwater samples revealed a new protein, CasX, that prevented bacterial transformation by plasmid DNA when expressed with cognate crRNAs targeting the plasmid[8]. Sequence analysis of CasXrevealed no similarity to other CRISPR-Cas enzymes, except for the presence of a RuvC nuclease domain similar to that found in both Cas9 and Cas12a enzyme families as well as transposases and recombinases. The evolutionary ambiguity of CasX hinted at a distinct structure and mechanism for DNA targeting, but without reconstitution of a functional CasX enzyme it was not possible to determine its
mechanism of plasmid interference.

UC Berkeley inventors found variant CasX polypeptides that induce programmable, site-specific genome repression in E. coli and genome editing in human cells, distinct from Cas9 and Cas12a, which establishes this enzyme family as a third CRISPR-Cas system for genetic manipulation.

SUGGESTED USES

- Genome editing
- Gene therapy
- Research tools
- Genomic imaging

ADVANTAGES

- Functions under different conditions than currently used CRISPR-Cas proteins
- Nucleotide sequence encoding the CasX is short, therefore especially useful when using a viral vector for deliver to cell

CONTACT

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

INVENTORS

- Doudna, Jennifer A.

OTHER INFORMATION

KEYWORDS

CRISPR, gene editing, genome, CasX, Cas12e

CATEGORIZED AS

- **Biotechnology**
  - Genomics
- **Imaging**
  - Medical
- **Medical**
  - Gene Therapy
  - Research Tools
  - Screening
  - Therapeutics
- **Research Tools**
  - Nucleic Acids/DNA/RNA
- **Veterinary**
  - Other
  - Therapeutics

RELATED CASES

2019-011-0

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
- 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)
- 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
- 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
- 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
- Structure-Guided Methods Of Cas9-Mediated Genome Engineering
- 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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University of California, Berkeley Office of Technology Licensing
2150 Shattuck Avenue, Suite 510, Berkeley,CA 94704
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