RNA-DIRECTED CLEAVAGE AND MODIFICATION OF DNA USING CASY (CRISPR-CASY)

Tech ID: 26043 / UC Case 2017-017-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,258,575	03/25/2025	2017-017
United States Of America	Issued Patent	11,371,062	06/28/2022	2017-017
European Patent Office	Published Application	3532089 A0	09/04/2019	2017-017

BRIEF DESCRIPTION

The CRISPR-Cas system is now understood to confer bacteria and archaea with acquired immunity against phage and viruses. CRISPR-Cas systems consist of Cas proteins, which are involved in acquisition, targeting and cleavage of foreign DNA or RNA, and a CRISPR array, which includes direct repeats flanking short spacer sequences that guide Cas proteins to their targets. Class 2 CRISPR-Cas are streamlined versions in which a single Cas protein bound to RNA is responsible for binding to and cleavage of a targeted sequence. The programmable nature of these minimal systems has facilitated their use as a versatile technology that is revolutionizing the field of genome manipulation. Current CRISPR Cas technologies are based on systems from cultured bacteria, leaving untapped the vast majority of organisms that have not been isolated. There is a need in the art for additional Class 2 CRISPR/Cas systems (e.g., Cas protein plus guide RNA combinations).

UC Berkeley researchers discovered a new type of Cas protein, CasY. CasY is short compared to previously identified CRISPR-Cas endonucleases, and thus use of this protein as an alternative provides the advantage that the nucleotide sequence encoding the protein is relatively short. CasY utilizes a guide RNA to perform double stranded cleavage of DNA. The researchers introduced CRISPR-CasY into E. coli, finding that they could block genetic material introduced into the cell. Further research results indicated that CRISPR-CasY operates in a manner analogous to CRISPR-Cas9, but utilizing an entirely distinct protein architecture containing different catalytic domains. CasY is also expected to function under different conditions (e.g., temperature) given the environment of the organisms that CasY was expressed in. Similar to CRISPR Cas9, CasY enzymes are expected to have a wide variety of applications in genome editing and nucleic acid manipulation.

SUGGESTED USES

- Diagnostics

ADVANTAGES

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INVENTORS

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OTHER INFORMATION

KEYWORDS

CRISPR, gene editing, genome, gene therapy, cell biology, CasY, Cas12d

CATEGORIZED AS

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

RELATED CASES

2017-017-0

» Functions under different conditions than current CRISPR-Cas proteins (e.g., lower temperatures)

» Nucleotide sequence encoding the CasY protein is short

PUBLICATION

New CRISPR–Cas systems from uncultivated microbes

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Next-Generation Lipid Nanoparticles for Precision Nucleic Acid Delivery
- 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
- Targeted Nucleic Acid Editing via Cas9-Deaminase Fusion Proteins
- 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
- Compositions and Methods for Delivering Molecular Cargo to Cells
- Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease
- Miniature Type VI CRISPR-Cas Systems and Methods of Use
- Generation of Chimeric RNA with Type III CRISPR-Cas
- CasX Nickase Designs, Tans Cleavage Designs & Structure
- Methods and Compositions for Modifying a single stranded Target Nucleic Acid
- Genetically Encoded, Biologically Responsive, And Programmable Bispecific Aptames As Therapeutic Protein Degraders
- 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
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF
- Compositions and Methods for VIPR-Based Nucleic Acid Targeting
- Precision-Engineered Cas12a: Eliminating Collateral DNA Cleavage for Next-Generation Genome Editing
- 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
- Immune Cell-Mediated Intercellular Delivery Of Biomolecules
- Methods and Compositions for Controlling Gene Expression by RNA Processing

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