THERMOSTABLE RNA-GUIDED ENDONUCLEASES AND METHODS OF USE THEREOF (GEOCAS9)

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OTHER INFORMATION

KEYWORDS

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

CATEGORIZED AS

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

RELATED CASES

2017-151-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,692,184	07/04/2023	2017-151

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. The programmable nature of these systems has facilitated their use as a versatile technology that is revolutionizing the field of genome manipulation. There is a need in the art for additional CRISPR-Cas systems with improved cleavage and manipulation under a variety of conditions and ones that are particularly thermostable under those conditions.

UC researchers discovered a new type of RNA-guided endonuclease (GeoCas9) and variants of GeoCas9. GeoCas9 was found to be stable and enzymatically active in a temperature range of from 15°C to 75°C and has extended lifetime in human plasma. With evidence that GeoCas9 maintains cleavage activity at mesophilic temperatures, the ability of GeoCas9 to edit mammalian genomes was then assessed. The researchers found that when comparing the editing efficiency for both GeoCas9 and SpyCas9, similar editing efficiencies by both proteins were observed, demonstrating that GeoCas9 is an effective alternative to SpyCas9 for genome editing in mammalian cells. Similar to CRISPR-Cas9, GeoCas9 enzymes are expected to have a wide variety of applications in genome editing and nucleic acid manipulation.

SUGGESTED USES

Genome editing

Genetic engineering

Gene therapy

Research tools (e.g., high-throughput screening of gene functions in cell lines and in vivo)

Creation of transgenic animal models

ADVANTAGES

Functions under different conditions than current CRISPR-Cas9 proteins (e.g, thermostable and enzymatically active in a wide temperature range)

Has an extended lifetime in human plasma

Shown to work in mammalian cells

PUBLICATION

A thermostable Cas9 with increased lifetime in human plasma

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
- RNA-directed Cleavage and Modification of DNA using CasY (CRISPR-CasY)
- 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
- 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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