

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

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CONTACT

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



INVENTORS

» Doudna, Jennifer A.

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

PUBLICATION

A thermostable Cas9 with increased lifetime in human plasma

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
- ▶ Type III CRISPR-Cas System for Robust RNA Knockdown and Imaging in Eukaryotes
- ▶ Cas12-mediated DNA Detection Reporter Molecules
- ▶ Highly Multiplexed Tagging Methods for RNA Imaging and Other Applications
- ▶ 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
- ▶ Methods to Interfere with Prokaryotic and Phage Translation and Noncoding RNA
- ▶ Minimal RNA Targeting CRISPR Cas Systems
- ▶ Variant Cas12a Protein Compositions and Methods of Use
- ▶ 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
- ▶ Structure-Guided Methods Of Cas9-Mediated Genome Engineering
- ▶ Efficient Site-Specific Integration Of New Genetic Information Into Human Cells
- ▶ Virus-encoded DNA-binding Proteins
- ▶ 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