CAS13A/C2C2 - A DUAL FUNCTION PROGRAMMABLE RNA ENDORIBONUCLEASE

Tech ID: 25839 / UC Case 2016-163-0

PATENT STATUS

Country	Type	Number	Dated	Case
Japan	Issued Patent	7437474	02/14/2024	2016-163
United States Of America	Issued Patent	11,840,725	12/12/2023	2016-163
United States Of America	Issued Patent	11,827,919	11/28/2023	2016-163
Australia	Issued Patent	2017283538	11/03/2022	2016-163
United States Of America	Issued Patent	11,459,599	10/04/2022	2016-163
United States Of America	Issued Patent	11,459,600	10/04/2022	2016-163
Hong Kong	Issued Patent	40007733	09/16/2022	2016-163
Belgium	Issued Patent	3471749	01/12/2022	2016-163
Switzerland	Issued Patent	3471749	01/12/2022	2016-163
Germany	Issued Patent	602017052315.1	01/12/2022	2016-163
Denmark	Issued Patent	3471749	01/12/2022	2016-163
European Patent Office	Issued Patent	3471749	01/12/2022	2016-163
Spain	Issued Patent	3471749	01/12/2022	2016-163
Finland	Issued Patent	3471749	01/12/2022	2016-163
France	Issued Patent	3471749	01/12/2022	2016-163
United Kingdom	Issued Patent	3471749	01/12/2022	2016-163
Ireland	Issued Patent	3471749	01/12/2022	2016-163
Iceland	Issued Patent	3471749	01/12/2022	2016-163
Italy	Issued Patent	3471749	01/12/2022	2016-163
Liechtenstein	Issued Patent	3471749	01/12/2022	2016-163
Luxembourg	Issued Patent	3471749	01/12/2022	2016-163
Netherlands (Holland)	Issued Patent	3471749	01/12/2022	2016-163
Norway	Issued Patent	3471749	01/12/2022	2016-163
Sweden	Issued Patent	3471749	01/12/2022	2016-163
United States Of America	Issued Patent	10,494,664	12/03/2019	2016-163
United States Of America	Issued Patent	10,337,051	07/02/2019	2016-163
United Kingdom	Issued Patent	2557153	03/20/2019	2016-163
Germany	Issued Patent	212017000061.9	12/04/2018	2016-163
Germany	Issued Patent	212017000062.7	11/29/2018	2016-163
Germany	Issued Patent	212017000056.2	11/21/2018	2016-163
United States Of America	Published Application	20240182953	06/06/2024	2016-163
European Patent Office	Published Application	4036249 A1	08/03/2022	2016-163

BRIEF DESCRIPTION

Bacterial adaptive immune systems employ CRISPRs and CRISPR-associated (Cas) proteins for RNA-guided nucleic acid cleavage. Although generally targeted to DNA substrates, the Type VI CRISPR system directs interference complexes against single-stranded RNA substrates and in Type VI CRISPR systems, the single-subunit Cas13a/C2c2 protein functions as an RNA-guided RNA endonuclease.

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OTHER INFORMATION

KEYWORDS

Cas13a,CRISPR, genome editing, RNA, C2c2

CATEGORIZED AS

» **Biotechnology**
» Genomics
» **Materials & Chemicals**
» Biological
» **Medical**
» Diagnostics
» Research Tools
» **Research Tools**
» Nucleic Acids/DNA/RNA

RELATED CASES

2016-163-0

UC Berkeley researchers have discovered that the CRISPR-Cas13a/C2c2 has two distinct RNase activities that enable both single stranded target RNA detection and multiplexed guide-RNA processing. These dual RNase functions were found to be chemically and mechanistically different from each other and from the CRISPR RNA processing behavior of the evolutionarily unrelated CRISPR enzyme Cpf1. Methods for detecting the single stranded target RNA were also discovered using a Cas13a/C2c2 guide RNA and a Cas13a/C2c2 protein in a sample have a plurality of RNAs as well as methods of cleaving a precursor Cas13a/C2c2 guide RNA into two or more Cas13a/C2c2 guide RNAs.

SUGGESTED USES

- Multiplexed guide-RNA processing
- Diagnostic for sensitive target RNA detection

ADVANTAGES

- Detects target RNA directly without considerable engineering or stringent design constraints for each new RNA target
- Cleavage potent and detectable at extremely low levels of activated protein
- Highly specific method of detection
- Conventional detection methods can be used (e.g., using a labeled detector RNA)

PUBLICATION

Two distinct RNase activities of CRISPR-C2c2 enable guide-RNA processing and RNA detection

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
- 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
- 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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