TYPE V CRISPR/CAS EFFECTOR PROTEINS FOR CLEAVING SSDNA AND DETECTING TARGET DNA

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OTHER INFORMATION

KEYWORDS

Cas12, Cpf1, CRISPR, genome editing

CATEGORIZED AS

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

RELATED CASES

2018-057-0

PATENT STATUS

Country	Type	Number	Dated	Case
Japan	Issued Patent	7316275	07/19/2023	2018-057
United States Of America	Issued Patent	11,447,824	09/20/2022	2018-057
United States Of America	Issued Patent	11,118,224	09/14/2021	2018-057
United States Of America	Issued Patent	10,253,365	04/09/2019	2018-057
United States Of America	Published Application	20210388437	12/16/2021	2018-057
European Patent Office	Published Application	3714050 A0	09/30/2020	2018-057
Rep Of Korea	Published Application	10-2020-0103638	09/02/2020	2018-057
Australia	Published Application	WO 2019/104058	05/31/2019	2018-057
Canada	Published Application	WO 2019/104058	05/31/2019	2018-057

Additional Patent Pending

BRIEF DESCRIPTION

Class 2 CRISPR–Cas systems (e.g., type V CRISPR/Cas systems such as Cas12 family systems) are characterized by effector modules that include a single effector protein. For example, in a type V CRISPR/Cas system, the effector protein - a CRISPR/Cas endonuclease (e.g., a Cas12a protein) - interacts with (binds to) a corresponding guide RNA (e.g., a Cas12a guide RNA) to form a ribonucleoprotein (RNP) complex that is targeted to a particular site in a target nucleic acid via base pairing between the guide RNA and a target sequence within the target nucleic acid molecule. Thus, like CRISPR-Cas9, Cas12 has been harnessed for genome editing based on its ability to generate targeted, double-stranded DNA (dsDNA) breaks.

UC Berkeley researchers have discovered that RNA-guided DNA binding unleashes indiscriminate single-stranded DNA (ssDNA) cleavage activity by Cas12a that completely degrades ssDNA molecules. The researchers found that target-activated, non-specific ssDNase cleavage is also a property of other type V CRISPR-Cas12 enzymes. By combining Cas12a ssDNase activation with isothermal amplification, the researchers were able to achieve attomolar sensitivity for DNA detection. For example, rapid and specific detection of human papillomavirus in patient samples was achieved using these methods and compositions.

SUGGESTED USES

Platform for molecular diagnostics for detecting target DNAs (double or single stranded)

ADVANTAGES

- Highly specific method of detection
- Attomolar sensitivity for DNA detection
- Target DNAs can be detecting using any convenient detection method (e.g., using labeled single stranded detector DNA)

RELATED MATERIALS

- CRISPR-Cas12a target binding unleashes indiscriminate single-stranded DNase activity

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

- Improved guide RNA and Protein Design for CasX-based Gene Editing Platform
- Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease
- 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
- A Dual-RNA Guided CasZ Gene Editing Technology
- Single-Stranded Nucleic Acid Detection And Imaging System Using Cas9
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF (“Cas-VariPhi”)
- Modifications To Cas9 For Passive-Delivery Into Cells
- A Protein Inhibitor Of Cas9
- RNA-directed Cleavage and Modification of DNA using CasX (CRISPR-CasX)
- Compositions and Methods for Genome Editing
- Split-Cas9 For Regulatable Genome Engineering
- Methods to Interfere with Prokaryotic and Phage Translation and Noncoding RNA
- 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
- THERMOSTABLE RNA-GUIDED ENDONUCLEASES AND METHODS OF USE THEREOF (GeoCas9)
- Structure-Guided Methods Of Cas9-Mediated Genome Engineering
- Endoribonucleases For Rna Detection And Analysis
- Efficient Site-Specific Integration Of New Genetic Information Into Human Cells
- CRISPR-Cas Effector Polypeptides and Methods of Use Thereof
- Class 2 CRISPR/Cas COMPOSITIONS AND METHODS OF USE
- Compositions and Methods of Use for Variant Csy4 Endoribonucleases
- Identification Of Sites For Internal Insertions Into Cas9
- Methods and Compositions for Controlling Gene Expression by RNA Processing

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