CRISPR CASEY COMPOSITIONS AND METHODS OF USE

Tech ID: 28903 / UC Case 2018-044-0

PATENT STATUS

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<tr>
<th>Country</th>
<th>Type</th>
<th>Number</th>
<th>Dated</th>
<th>Case</th>
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<tr>
<td>United States Of America</td>
<td>Published Application</td>
<td>20200255858</td>
<td>08/13/2020</td>
<td>2018-044</td>
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<td>Patent Cooperation Treaty</td>
<td>Published Application</td>
<td>WO2019089804</td>
<td>05/09/2019</td>
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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 systems 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, so there is a need in the art for additional Class 2 CRISPR/Cas systems (e.g., Cas protein plus guide RNA combinations).

Previously UC Berkeley researchers discovered a new type of Cas protein, CasY (also referred to as Cas 12d protein). 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. Recent studies have shown that the CasY complex utilizes a novel RNA, in addition to the guide RNA, to perform double stranded cleavage of DNA. Similar to CRISPR Cas9, CasY 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
» Genomic imaging

ADVANTAGES

» Functions under different conditions than current CRISPR-Cas proteins (e.g., lower temperatures)
» Nucleotide sequence encoding the CasY protein is short, therefore it's especially useful in situations that employ a viral vector (e.g., an AAV vector), for delivery to a cell such as a eukaryotic cell
Methods and Compositions for Using Argonaute to Modify a Single-Stranded Target Nucleic Acid

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

Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease

Methods For High Signal-To-Noise Imaging Of Chromosomal Loci In Cells Using Fluorescent Cas9

A Dual-RNA Guided Cas2 Gene Editing Technology

MODULATORS OF TYPE VI-D CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF

CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-VarPhi")

A Protein Inhibitor Of Cas9

Small Cas9 Protein Inhibitor

Split-Cas9 For Regulatable Genome Engineering

Decorating Chromatin for Precise Genome Editing Using CRISPR

Optimized Virus-like Particles for Cas9 RNPs & Transgene/HDR Template Delivery

CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-Theta")

COMPOSITIONS AND METHODS FOR INCREASING HOMOLOGY-DIRECTED REPAIR

Single Conjugative Vector for Genome Editing by RNA-guided Transposition

CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-Omega")

CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF

EngineeredVariant Hyperactive CRISPR CasPhi Enzymes And Methods Of Use Thereof

Type V CRISPR/CAS Effector Proteins for Cleaving ssDNA and Detecting Target DNA

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 (CasGamma)

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

Chimeric Cas9 Variants With Novel Engineered Enzymatic Activities

Small Molecule Assisted Cell Penetrating Cas9 RNP Delivery

Methods and Compositions for Controlling Gene Expression by RNA Processing