SPLIT-CAS9 FOR REGULATABLE GENOME ENGINEERING

Tech ID: 24519 / UC Case 2015-060-0

PATENT STATUS

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<td>Issued Patent</td>
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<td>United States Of America</td>
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BRIEF DESCRIPTION

The CRISPR-Cas9 system can be used to quickly and specifically target and cleave DNA at sites defined by engineered single-guide RNAs (sgRNAs) and has led to its adoption as a robust and versatile platform for genome engineering. Cas9 contains two nuclease active sites that function together to generate DNA double-strand breaks (DSBs) at sites complementary to the guide RNA sequence and adjacent to a protoscaler adjacent motif.

Structural studies of the Streptococcus pyogenes Cas9 showed that the protein exhibits a bilobed architecture comprising the catalytic nuclease lobe and the α-helical lobe of the enzyme and interactions between the two lobes seem to be mediated primarily through contacts with the bound nucleic acid rather than direct protein-protein contacts.

UC Berkeley researchers have developed a heterodimeric Cas9 system whose assembly and function is regulatable by the sgRNAs. The enzymatic activity of the split-Cas9 also closely mimics that of WT Cas9. Such a system enables analysis of the functionally distinct properties of each Cas9 structural region and offers a unique mechanism for controlling active protein assembly.

SUGGESTED USES

- Controlled use of Cas9 for genome engineering applications in cells
- Research of the functionally distinct properties of each Cas9 structural region

ADVANTAGES

- The split-Cas9 is highly stable and pure
- Enzymatic activity mimics WT Cas9

PUBLICATION

Rational design of a split-Cas9 enzyme complex

RELATED CASES

2015-060-0

CONTACT

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INVENTORS

- Doudna, Jennifer A.

OTHER INFORMATION

CATEGORIZED AS

- Biotechnology
- Genomics
- Medical
- Gene Therapy
- Research Tools
- Nucleic Acids/DNA/RNA

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Methods and Compositions for Using Argonaute to Modify a Single-Stranded Target Nucleic Acid
- COMPOSITIONS AND METHODS FOR IDENTIFYING HOST CELL TARGET PROTEINS FOR TREATING RNA VIRUS INFECTIONS
- Cas9 Variants With Altered DNA Cleaving Activity
- Cas12-mediated DNA Detection Reporter Molecules
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 CasZ Gene Editing Technology
CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-VanPhi")
A Protein Inhibitor Of Cas9
Small Cas9 Protein Inhibitor
Decorating Chromatin for Precise Genome Editing Using CRISPR
CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-Theta")
COMPOSITIONS AND METHODS FOR INCREASING HOMOLOGY-DIRECTED REPAIR
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 ("Cas-Omega")
CRISPR-CAS EFFECTOR POLYPEPTIDES 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)
Improved gRNA and Protein Design for CasX-based Gene Editing Platform
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