CHIMERIC CAS9 VARIANTS WITH NOVEL ENGINEERED ENZYMATIC ACTIVITIES

Tech ID: 31832 / UC Case 2020-093-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

In this invention, the HNH domain of a Cas9 is replaced by a domain that could have diverse enzymatic activities. This invention enables engineering of Cas9 chimeras that possess novel, conformation-sensitive enzymatic activity to perform specific genome editing in vitro, in vivo, and ex vivo.

Prior to this invention, all of the strategies to engineer Cas9 fusion proteins and provide Cas9 with non-natural enzymatic activity for genome manipulations were engineered by fusing specific domains to the N- or C-terminus of Cas9 via long and flexible linkers, or through domain insertion approach. The disadvantages of these synthetic Cas9 chimeras are that the attached domain is on the long flexible linker, and it is very dynamic. Thus, these fusions have a broad activity window and they are large, which makes it difficult to deliver them to the cells.

SUGGESTED USES

Basic and applied research, and therapeutics.

ADVANTAGES

This approach has several advantages such as the smaller size of engineered fusion, less off-targets, and narrower activity window because of conformational activation of the new domain upon a Cas9 interaction with the DNA target.

RELATED MATERIALS

INVENTORS

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OTHER INFORMATION

KEYWORDS

Cas9

CATEGORIZED AS

Agriculture & Animal Science

Animal Science

Biotechnology

Genomics

Health

Medical

Research Tools

Animal Models

Other

RELATED CASES

2020-093-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Compositions and Methods for Identifying Host Cell Target Proteins for Treating RNA Virus Infections
- Lentivirus-like Particle Delivery of CRISPR-Cas9 & Guide RNA for Gene Editing
- 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 Endonuclease
- CasX Nickase Designs, Tans Cleavage Designs & Structure
- A Dual-RNA Guided Cas2 Gene Editing Technology
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-VarPhi")
- Modifications To Cas9 For Passive-Delivery Into Cells
- A Protein Inhibitor Of Cas9
- Split-Cas9 For Regulatable Genome Engineering
- NANOPORE MEMBRANE DEVICE AND METHODS OF USE THEREOF
- Optimized Virus-like Particles for Cas9 RNPs & Transgene/HDR Template Delivery
- Protein Inhibitor of Type VI-B CRISPR-Cas System
- 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 EFFCTOR POLYPEPTIDES AND METHODS OF USE THEREOF
- Engineered/Variant Hyperactive CRISPR CasPn Enzymes And Methods Of Use Thereof
- Engineering Cas12a Genome Editors with Minimized Trans-Activity
- 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)
- 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
- 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
- Small Molecule Assisted Cell Penetrating Cas9 RNP Delivery
- Methods and Compositions for Controlling Gene Expression by RNA Processing