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

» Doudna, Jennifer A.

OTHER INFORMATION

KEYWORDS

Cas9

CATEGORIZED AS

» Agriculture & Animal Science
  » Animal Science
  » Other
  » Biotechnology
  » Genomics
  » Health
  » Medical
  » Research Tools
  » Research Tools
  » Animal Models
  » Other

RELATED CASES

2020-093-0

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 Endonuclease
» Methods For High Signal-To-Noise Imaging Of Chromosmal Loci In Cells Using Fluorescent Cas9
» A Dual-RNA Guided CasZ Gene Editing Technology
» 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
» 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

Endonucleases 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 Endonucleases

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