IMPROVED GUIDE RNA AND PROTEIN DESIGN FOR CASX-BASED GENE EDITING PLATFORM

Tech ID: 32199 / UC Case 2021-064-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

The inventors have developed two new CasX gene-editing platforms (DpbCasXv2 and PlmCasXv2) through rationale structural engineering of the CasX protein and gRNA, which yield improved in vitro and in vivo behaviors. These platforms dramatically increase DNA cleavage activity and can be used as the basis for further improving CasX tools.

The RNA-guided CRISPR-associated (Cas) protein CasX has been reported as a fundamentally distinct, RNA-guided platform compared to Cas9 and Cpf1. Structural studies revealed structural differences within the nucleotide-binding loops of CasX, with a compact protein size less than 1,000 amino acids, and guide RNA (gRNA) scaffold stem. These structural differences affect the active ternary complex assembly, leading to different in vivo and in vitro behaviors of these two enzymes.

SUGGESTED USES

Research and applications related to gene editing.

ADVANTAGES

Improved in vitro and in vivo behaviors of CasX and guide RNA.

RELATED MATERIALS

Research and applications related to gene editing.

CATEGORIZED AS

» Agriculture & Animal Science
  » Animal Science
  » Other
  » Transgenics
  » Biotechnology
  » Genomics
  » Energy
  » Bioenergy
  » Engineering
  » Engineering
  » Imaging
  » Medical
  » Molecular
  » Medical
  » Gene Therapy
  » Imaging
  » Research Tools
  » Therapeutics
  » Research Tools
  » Other
  » Protein Synthesis

RELATED CASES

2021-064-0

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

Lentivirus-like Particle Delivery of CRISPR-Cas9 & Guide RNA for Gene Editing

Cas12-mediated DNA Detection Reporter Molecules

Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease

Miniature Type VI CRISPR-Cas Systems and Methods of Use

CasX Nickase Designs, Tans Cleavage Designs & Structure

A Dual-RNA Guided CasZ 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 CAS9 COMPOSITIONS AND METHODS OF USE

Single Conjugative Vector for Genome Editing by RNA-guided Transposition

Improved Cas12a Proteins for Accurate and Efficient Genome Editing

Protein Inhibitor of Type II-A CRISPR-Cas System

CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF

Engineered/Variant Hyperactive CRISPR CasPhi 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

Endonucleases 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 Cas4 Endonucleases

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