IDENTIFICATION OF SITES FOR INTERNAL INSERTIONS INTO CAS9

Tech ID: 25087 / UC Case 2015-178-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,008,555	05/18/2021	2015-178

BRIEF DESCRIPTION

The ability to add a protein domain of new function is a standard molecular biology technique, and usually the domain is fused to a protein terminus. The CRISPR-associated protein Cas9 already has widespread utility for genome engineering, yet adding protein domains would increase precision and specificity. Both protein termini of Cas9, however, are close to each other and in a small defined region, which limits the effectiveness of standard fusion approaches. Therefore, insertion sites within Cas9 that will not disrupt Cas9 function are needed.

Researchers at UC Berkeley have identified over 150 such sites. In proof-of-concept experiments, a PDZ protein interaction domain has been intercalated and increased functionality without decreasing Cas9 nuclease activity. In further experiments, the internal insertion sites have been used to alter Cas9 activity in an allosteric manner, effectively creating tunable Cas9.

SUGGESTED USES

- Biosensors that control gene expression in response to inputs
- Therapeutics
- Basic research tool

ADVANTAGES

- Spatiotemporal control over Cas9 binding/cleavage
- Higher specificity of Cas9 activity
- Compatible with a wide variety of known protein domains

RELATED MATERIALS

CONTACT

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Agriculture & Animal Science**
» Devices
» **Biotechnology**
» Genomics
» **Medical**
» Diagnostics
» Research Tools
» Screening
» **Research Tools**
» Nucleic Acids/DNA/RNA
» Screening Assays

RELATED CASES

2015-178-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- COMPOSITIONS AND METHODS FOR IDENTIFYING HOST CELL TARGET PROTEINS FOR TREATING RNA VIRUS INFECTIONS
- Genome Editing via LNP-Based Delivery of Efficient and Stable CRISPR-Cas Editors
- 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 Endoribonuclease
- RNA-directed Cleavage and Modification of DNA using CasY (CRISPR-CasY)

- CasX Nickase Designs, Tans Cleavage Designs & Structure
- In Vivo Gene Editing Of Tau Locus Via Liponanoparticle Delivery
- A Dual-RNA Guided CasZ Gene Editing Technology
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF (“Cas-VariPhi”)
- Modifications To Cas9 For Passive-Delivery Into Cells
- A Protein Inhibitor Of Cas9
- RNA-directed Cleavage and Modification of DNA using CasX (CRISPR-CasX)
- Compositions and Methods for Genome Editing
- Split-Cas9 For Regulatable Genome Engineering
- NANOPORE MEMBRANE DEVICE AND METHODS OF USE THEREOF
- Methods to Interfere with Prokaryotic and Phage Translation and Noncoding RNA
- 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
- 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
- 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
- Class 2 CRISPR/Cas COMPOSITIONS AND METHODS OF USE
- Compositions and Methods of Use for Variant Csy4 Endoribonucleases
- Methods and Compositions for Controlling Gene Expression by RNA Processing

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