EFFICIENT SITE-SPECIFIC INTEGRATION OF NEW GENETIC INFORMATION INTO HUMAN CELLS

Tech ID: 24215 / UC Case 2014-199-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,570,418	02/25/2020	2014-199

BRIEF DESCRIPTION

The CRISPR/Cas9 system is a robust genome editing technology that works based on the RNA-programmed DNA cleaving activity of the Cas9 enzyme. Cas9 generates blunt double-strand DNA (dsDNA) breaks (DSBs) at sites defined by a guide sequence contained within an associated CRISPR RNA (crRNA) transcript and has transformed the ability to engineer eukaryotic organisms by initiating DNA repair pathways that lead to targeted genetic re-programming. There is a need, however, for methods that increase the efficiency of target DNA modification by Cas9 targeting complexes and/or increase the effectiveness of such methods.

UC Berkeley researchers have found a simple and robust approach for introducing new genetic information site-specifically, in a eukaryotic cell, and with high efficiency using timed delivery of Cas9-guide RNA ribonucleoprotein (RNP) complexes. The approach combines well-established cell cycle synchronization techniques with direct nucleofection of the pre-assembled Cas9 ribonucleoprotein (RNP) complexes to achieve controlled nuclease action at the phase of the cell cycle best for HDR.

SUGGESTED USES

- Genome editing (e.g., human, plants, and animal cells)
- Genome engineering in both transformed and primary human cells

ADVANTAGES

- Enhanced HDR efficiency in human cells
- Highly efficient, site-specific editing
- Simple and robust editing
- Cell mortality minimized

PUBLICATION

CONTACT

Terri Sale
terri.sale@berkeley.edu
tel: 510-643-4219.

INVENTORS

- Doudna, Jennifer A.

OTHER INFORMATION

KEYWORDS

Genetic engineering, homology-directed repair, HDR, genome editing, Cas9, CRISPR

CATEGORIZED AS

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

RELATED CASES

2014-199-0

Enhanced homology-directed human genome engineering by controlled timing of CRISPR/Cas9 delivery @import

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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
- Highly Multiplexed Tagging Methods for RNA Imaging and Other Applications
- Improved guide RNA and Protein Design for CasX-based Gene Editing Platform
- Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease
- Miniature Type VI CRISPR-Cas Systems and Methods of Use
- 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
- Methods and Compositions for Modifying a single stranded Target Nucleic Acid
- A Dual-RNA Guided CasZ Gene Editing Technology
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF (“Cas-VariPhi”)
- A Protein Inhibitor Of Cas9
- RNA-directed Cleavage and Modification of DNA using CasX (CRISPR-CasX)
- Compositions and Methods for Genome Editing
- Methods to Interfere with Prokaryotic and Phage Translation and Noncoding RNA
- Minimal RNA Targeting CRISPR Cas Systems
- Variant Cas12a Protein Compositions and Methods of Use
- 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
- 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
- Virus-encoded DNA-binding Proteins
- 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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University of California, Berkeley Office of Technology Licensing

2150 Shattuck Avenue, Suite 510, Berkeley,CA 94704

Tel: 510.643.7201 | Fax: 510.642.4566

ipira.berkeley.edu/ | otl-feedback@lists.berkeley.edu