

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

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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

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
- ▶ Single-Stranded Nucleic Acid Detection And Imaging System Using Cas9
- ▶ 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
- ▶ Split-Cas9 For Regulatable Genome Engineering
- ▶ 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
- ▶ CRISPR-Cas Effector Polypeptides and Methods of Use Thereof
- ▶ 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