VERSATILE CAS9-MEDIATED INTEGRATION TECHNOLOGY

Tech ID: 25758 / UC Case 2016-132-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,248,216	02/15/2022	2016-132

BRIEF DESCRIPTION

Many advancements to the Cas9 system (both the Cas9 nuclease and the sgRNA sequence) have been made to increase and optimize its efficiency and specificity. Since many diseases and traits in humans have a complex genetic basis, multiple genomic targets must be simultaneously edited in order for diseases to be cured or for traits to be impacted. Thus in order for CRISPR/Cas9 to be an effective gene therapeutic technology, huge swathes of the genome must be edited simultaneously, efficiently, and accurately.

To address many of these issues, UC Berkeley researchers have developed a system method to rapidly manipulate multiple loci. This system allows for either sequential (maintaining inducible Cas9 present in the genome) or simultaneous (scarless excision) manipulation of Cas9 itself and can be applied to any organism currently utilizing the CRISPR technology. The system can also be applied conveniently to create genomic libraries, artificial genome sequences, and highly programmable strains or cell lines that can be rapidly (and repeatedly) manipulated at multiple loci with extremely high efficiency.

SUGGESTED USES

» Rapid manipulation of multiple loci with one sgRNA in bacteria, yeast, or other model or non-model organisms, including human cell lines for basic research/study, or applied/medical research/study.

» Use(s) in mitotic gene drives (mosquitos), bio-fuel production (algae, yeast, bacteria, etc.), or artificial/exogenous metabolic pathway construction.

ADVANTAGES

» Control over positioning (genomic loci) of the target site(s) to be used for Cas9-induced double-stranded break formation

» Control over the target sequence to be used (same or different from genomic sequence, or exogenous, or artificial).

» Multiplexing is more rapid and efficient since only one sgRNA is needed to program Cas9 targeting to all of the artificial sequences placed at different loci.

» Cas9 can be excised out of the genome either (i) simultaneously as the other genes being manipulated or (ii) sequentially excised and removed in a single step at a later time

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OTHER INFORMATION

KEYWORDS

CAS9, CRISPR, sgRNA, gene

CATEGORIZED AS

» **Biotechnology**

» Genomics

» **Medical**

» Gene Therapy

» Research Tools

» **Research Tools**

» Nucleic Acids/DNA/RNA

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2016-132-0

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