GENERATION OF CHIMERIC RNA WITH TYPE III CRISPR-CAS

Tech ID: 34540 / UC Case 2026-092-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

RNA editing enables safe, reversible, and dose-tunable genetic correction without the permanent genomic risks or cargo limits of traditional DNA editing. However, conventional RNA editing tools often lack the ability to perform precise, large-scale modifications or site specific cut and paste operations on transcripts, which limits their therapeutic and research utility.

UC Berkeley researchers have developed a programmable RNA editing platform that utilizes Type III CRISPR-Cas complexes integrated with a ligase to generate chimeric RNA molecules. This method enables robust RNA trans splicing, allowing for the replacement of defective exons, the insertion of large genetic sequences into transcripts, and the creation of novel fusion proteins. This approach provides a transient and potentially safer method for correcting genetic errors at the transcript level while offering greater flexibility for large scale RNA engineering.

SUGGESTED USES

- RNA level correction of genetic mutations by replacing defective exons through trans splicing.
- Generation of novel chimeric proteins and fusion transcripts for research and therapeutic discovery.
- Large scale RNA engineering to introduce functional domains or regulatory elements into specific transcripts.
- Development of transient therapies for diseases caused by large gene defects such as muscular dystrophies.
- Programmable modification of viral RNAs to inhibit replication or alter viral function.

ADVANTAGES

- Uses programmable Csm complexes for surgical, site-specific RNA cleavage.
- Enables insertion of large sequences, bypassing the cargo limits of traditional gene editing.
- Integrates nuclease and ligase functions to streamline the production of stable chimeric transcripts.
- Operates at the RNA level, eliminating the risk of permanent, off-target genomic changes.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Next-Generation Lipid Nanoparticles for Precision Nucleic Acid Delivery
- 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
- Tissue-Specific Genome Engineering Using CRISPR-Cas9
- Type III CRISPR-Cas System for Robust RNA Knockdown and Imaging in Eukaryotes
- Targeted Nucleic Acid Editing via Cas9-Deaminase Fusion Proteins

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- **Biotechnology**
  - Genomics
  - Health
- **Research Tools**
  - Nucleic Acids/DNA/RNA

RELATED CASES

2026-092-0

- Cas9 Variants With Altered DNA Cleaving Activity
- Cas12-mediated DNA Detection Reporter Molecules
- Improved guide RNA and Protein Design for CasX-based Gene Editing Platform
- Compositions and Methods for Delivering Molecular Cargo to Cells
- 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
- Methods and Compositions for Modifying a single stranded Target Nucleic Acid
- Genetically Encoded, Biologically Responsive, And Programmable Bispecific Aptames As Therapeutic Protein Degraders
- A Dual-RNA Guided CasZ Gene Editing Technology
- A Protein Inhibitor Of Cas9
- RNA-directed Cleavage and Modification of DNA using CasX (CRISPR-CasX)
- Compositions and Methods for Genome Editing
- IS110 and IS1111 Family RNA-Guided Transposons
- Variant Cas12a Protein Compositions and Methods of Use
- In Vitro and In Vivo Genome Editing by LNP Delivery of CRISPR Ribonucleoprotein
- CRISPR CASY COMPOSITIONS AND METHODS OF USE
- Single Conjugative Vector for Genome Editing by RNA-guided Transposition
- CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF
- Compositions and Methods for VIPR-Based Nucleic Acid Targeting
- Precision-Engineered Cas12a: Eliminating Collateral DNA Cleavage for Next-Generation Genome Editing
- Selective Cell Elimination using RNA-guided Chromatin Shredding
- 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)
- Variant TnpB and wRNA Proteins
- 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 Csy4 Endoribonucleases
- Immune Cell-Mediated Intercellular Delivery Of Biomolecules
- Methods and Compositions for Controlling Gene Expression by RNA Processing

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