

# METHODS AND COMPOSITIONS FOR CONTROLLING GENE EXPRESSION BY RNA PROCESSING

Tech ID: 22273 / UC Case 2012-055-0

## PATENT STATUS

| Country                  | Type          | Number    | Dated      | Case     |
|--------------------------|---------------|-----------|------------|----------|
| United States Of America | Issued Patent | 9,745,610 | 08/29/2017 | 2012-055 |

## BRIEF DESCRIPTION

Genetic systems often behave unpredictably due to structural interactions between DNA, RNA and protein components as well as functional interactions with host factors and metabolites. Due to these complexities, the ability to program gene expression quantitatively based on the characteristics of individual components is very limited. In nature, the control of the activity of an RNA transcript is crucial to its function. For example, the transcription, translation, and degradation of an mRNA is crucial to any gene expression event, and all three processes are controlled by a combination of elements including promoters, ribosome binding sites (RBSs), and cis -regulatory signals encoded in untranslated regions (UTRs). Methods and/or tools to facilitate the combination of various regulatory elements originating from various different sources to predictably control the activity of any desired RNA would be beneficial for numerous biotechnology applications. However, regulatory elements can unpredictably interact with each other through the formation of RNA structures and the recruitment of factors that affect global transcript accessibility and stability.

UC Berkeley researchers have developed methods and compositions for identifying appropriate combinations of regulatory elements simply and quickly. The invention allows for the combination of multiple regulatory elements in a fashion that predictably affects RNA activity.

## SUGGESTED USES

- » A synthetic RNA-processing platform (e.g., assembly of promoters, ribosome binding sites, cis-regulatory elements and riboregulators into single- and multigene operons)

## PUBLICATION

[RNA processing enables predictable programming of gene expression](#)

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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## INVENTORS

- » Doudna, Jennifer A.

## OTHER INFORMATION

### KEYWORDS

Genome engineering, gene editing,  
 CRISPR-Cas, Cys4, RNA

### CATEGORIZED AS

- » **Biotechnology**
- » Genomics
- » **Materials & Chemicals**
- » Biological
- » **Medical**
- » Gene Therapy
- » Research Tools
- » Therapeutics
- » **Research Tools**
- » Nucleic Acids/DNA/RNA

### RELATED CASES

2012-055-0

► 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

► Identification Of Sites For Internal Insertions Into Cas9



**University of California, Berkeley Office of Technology Licensing**

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