

# SINGLE-STRANDED NUCLEIC ACID DETECTION AND IMAGING SYSTEM USING CAS9

Tech ID: 24729 / UC Case 2015-090-0

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,180,792	11/23/2021	2015-090

## BRIEF DESCRIPTION

Genome editing using CRISPR/Cas9 has enabled rapid and accessible alteration of specific genomic loci in many organisms. A flexible means to target nucleic acids would allow alteration and imaging of endogenous RNA transcripts, for example, analogous to CRISPR/Cas-based genomic tools, but most nucleic acid targeting methods rely on incorporation of exogenous tags.

UC Berkeley researchers discovered compositions and methods for labeling a single stranded target nucleic acid with the use of a Cas9 protein; a Cas9 guide RNA; and a quenched PAMmer (a single stranded oligonucleotide having a protospacer adjacent motif (PAM) sequence. The PAMmer also contains a detectable label and a quencher moiety that quenches the detectable label. Cas9 cleavage of the PAMmer is predicted on complete Cas9 sgRNA: target complementarity and thus is highly specific. The inventors have used the methods and compositions to track RNA in living cells in a programmable manner without genetically encoded tags.

## SUGGESTED USES

- » Detection of endogenous and foreign single-stranded nucleic acids (e.g., in cell culture, patient samples, and environmental samples)
- » Fixed and live-cell imaging of single-stranded nucleic acids

## ADVANTAGES

- » Ultra-low background and thus fewer false positive signals
- » Highly specific and sensitive detection

## PUBLICATION

[Programmable RNA Tracking in Live Cells with CRISPR/Cas9](#)

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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## INVENTORS

- » Doudna, Jennifer A.

## OTHER INFORMATION

### KEYWORDS

Imaging, Cas9

### CATEGORIZED AS

- » **Biotechnology**
- » Genomics
- » **Imaging**
- » Medical
- » **Research Tools**
- » Nucleic Acids/DNA/RNA
- » Reagents

### RELATED CASES

2015-090-0

▶ 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
- ▶ 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
- ▶ 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
- ▶ Efficient Site-Specific Integration Of New Genetic Information Into Human Cells
- ▶ 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



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