Endoribonucleases For Rna Detection And Analysis

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Technology description

Bacteria and archaea possess adaptive immune systems that rely on small RNAs for defense against invasive genetic elements. CRISPR (clustered regularly interspaced short palindromic repeats) genomic loci are transcribed as long precursor RNAs, which must be enzymatically cleaved to generate mature CRISPR-derived RNAs (crRNAs) that serve as guides for foreign nucleic acid targeting and degradation. This processing occurs within the repetitive sequence and is catalyzed by a dedicated CRISPR-associated (Cas) family member in many CRISPR systems.Endoribonucleases that process CRISPR transcripts are bacterial or archaeal enzymes capable of catalyzing sequence- and structure- specific cleavage of a single- stranded RNA. These enzymes cleave a specific phosphodiester bond within a specific RNA sequence.

UC Berkeley researchers discovered variant Cas endoribonucleases, nucleic acids encoding the variant Cas endoribonucleases, and host cells genetically modified with the nucleic acids that can be used, potentially in conjunction with Cas9, to detect a specific sequence in a target polyribonucleotide and of regulatingproductionof a target RNA in a eukaryotic cell. For example, it wasfoundthat the variant Cas endoribonuclease has an amino acid substitution at a histidine residue such that is is enzymatically inactive in the absence of imidazole and is activatable in the presence of imidazole.

Additional Information

Publication

RNA-protein analysis using a conditional CRISPR nuclease

Related Materials

Mechanism of substrate selection by a highly specific CRISPR endoribonuclease

Related Technologies

Compositions and Methods of Use for Variant Csy4 Endoribonucleases

Additional Technologies by these Inventors

Compositions and Methods of Use for Variant Csy4 Endoribonucleases

Methods and Compositions for Controlling Gene Expression by RNA Processing

Structure-Guided Methods Of Cas9-Mediated Genome Engineering
Methods and Compositions for Using Argonaute to Modify a Single-Stranded Target Nucleic Acid
Efficient Site-Specific Integration Of New Genetic Information Into Human Cells
Cas9 Variants With Altered DNA Cleaving Activity
Split-Cas9 For Regulatable Genome Engineering
Single-Stranded Nucleic Acid Detection And Imaging System Using Cas9
Methods For High Signal-To-Noise Imaging Of Chromosomal Loci In Cells Using Fluorescent Cas9
Identification Of Sites For Internal Insertions Into Cas9
Cas13a/C2c2 - A Dual Function Programmable RNA Endoribonuclease
Small Molecule Assisted Cell Penetrating Cas9 RNP Delivery
THERMOSTABLE RNA-GUIDED ENDONUCLEASES AND METHODS OF USE THEREOF (GeoCas9)
Cas12c/C2C3 Compositions and Methods of Use
CRISPR CASY COMPOSITIONS AND METHODS OF USE
A Dual-RNA Guided CasZ Gene Editing Technology
Class 2 CRISPR/Cas COMPOSITIONS AND METHODS OF USE
Cas12-mediated DNA Detection Reporter Molecules
A Protein Inhibitor Of Cas9
CasX Nickase Designs, Tans Cleavage Designs & Structure

Application area

Purifying a target RNA in a mixed population of nucleic acids
Detection of specific sequences in a target polyribonucleotide
Regulating expression of a target RNA in a eukaryotic cell

Institution

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