METHODS AND COMPOSITIONS FOR USING ARGONAUTE TO MODIFY A SINGLE-STRANDED TARGET NUCLEIC ACID

Tech ID: 23887 / UC Case 2014-094-0

PATENT STATUS

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<td>Published Application</td>
<td>WO 2015/157534</td>
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<td>United Kingdom</td>
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BRIEF DESCRIPTION

Argonaute (Ago) proteins are small RNA or DNA guided, site-specific endonucleases, which are present in all three kingdoms of life. The various functions of Argonaute proteins in eukaryotes have been studied extensively. Recent studies have suggested that prokaryotic Argonautes are involved in identifying foreign genetic elements in a sequence specific manner and/or in the recruitment of nucleases. The nucleic acid guided binding and cleavage activities of Argonaute (Ago) proteins are reminiscent of the activities of RNA-guided proteins within CRISPR-Cas systems and use a guide nucleic acid (e.g., a guide RNA) to identify a target nucleic acid. The guide RNAs utilized by all currently known Ago proteins include a 5’-phosphate and a 3’-hydroxyl and these methods are limited because the guide RNAs utilized by the heterologously expressed Ago proteins are generally indistinguishable from the thousands of RNAs present in the host cell.

UC Berkeley researchers have discovered a technology that facilitates the precise and controlled targeting of Argo nuclease activity (or other protein activities such as binding) to single stranded target nucleic acids (e.g., ssRNA, ssDNA, mRNA, rRNA, tRNA, microRNA, etc.) which overcomes the above-mentioned limitation. The researchers showed CRISPR-associated Ago proteins cleaved single-stranded target sequences using 5’-hydroxylated guide RNAs rather than the 5-phosphorylated guides used by known Argonautes.

SUGGESTED USES

» Precise and controlled targeting of Ago nuclease activity (or binding/cleaving) to single stranded target nucleic acids (e.g., ssRNA, ssDNA, mRNA, rRNA, tRNA, etc).

ADVANTAGES

» Guide RNAs distinguishable from the thousands of RNAs present in the host cell

PUBLICATION

A bacterial Argonaute with noncanonical guide RNA specificity

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

» COMPOSITIONS AND METHODS FOR IDENTIFYING HOST CELL TARGET PROTEINS FOR TREATING RNA VIRUS INFECTIONS
» 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
» Cas13a/C2c2 - A Dual Function Programmable RNA Endonuclease
» Methods For High Signal-To-Noise Imaging Of Chromosomal Loci In Cells Using Fluorescent Cas9
» A Dual-RNA Guided CasZ Gene Editing Technology
» MODULATORS OF TYPE VI-D CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF
» CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-VarPhi")
» A Protein Inhibitor Of Cas9
Small Cas9 Protein Inhibitor
Split-Cas9 For Regulatable Genome Engineering
Decorating Chromatin for Precise Genome Editing Using CRISPR
Optimized Virus-like Particles for Cas9 RNPs & Transgene/HDR Template Delivery
CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF ("Cas-Theta")
COMPOSITIONS AND METHODS FOR INCREASING HOMOLOGY-DIRECTED REPAIR
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 ("Cas-Omega")
CRISPR-CAS EFFECTOR POLYPEPTIDES AND METHODS OF USE THEREOF
Engineered/Variant Hyperactive CRISPR CasPn Enzymes And Methods Of Use Thereof
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
Endonucleases 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 (CasGamma)
Class 2 CRISPR/Cas COMPOSITIONS AND METHODS OF USE
Compositions and Methods of Use for Variant Cas4 Endoribonucleases
Identification Of Sites For Internal Insertions Into Cas9
Chimeric Cas9 Variants With Novel Engineered Enzymatic Activities
Small Molecule Assisted Cell Penetrating Cas9 RNP Delivery
Methods and Compositions for Controlling Gene Expression by RNA Processing