THERMOSTABLE RNA-GUIDED ENDONUCLEASES
AND METHODS OF USE THEREOF (GEOCAS9)

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OTHER INFORMATION
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» Genomics
» Materials & Chemicals
» Biological
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» Research Tools
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» Nucleic Acids/DNA/RNA
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RELATED CASES
2017-151-0
BRIEF DESCRIPTION

The CRISPR-Cas system is now understood to confer bacteria and archaea with acquired immunity against phage and viruses. CRISPR-Cas systems consist of Cas proteins, which are involved in acquisition, targeting and cleavage of foreign DNA or RNA, and a CRISPR array, which includes direct repeats flanking short spacer sequences that guide Cas proteins to their targets. The programmable nature of these systems has facilitated their use as a versatile technology that is revolutionizing the field of genome manipulation. There is a need in the art for additional CRISPR-Cas systems with improved cleavage and manipulation under a variety of conditions and ones that are particularly thermostable under those conditions.

UC researchers discovered a new type of RNA-guided endonuclease (GeoCas9) and variants of GeoCas9. GeoCas9 was found to be stable and enzymatically active in a temperature range of from 15°C to 75°C and has extended lifetime in human plasma. With evidence that GeoCas9 maintains cleavage activity at mesophilic temperatures, the ability of GeoCas9 to edit mammalian genomes was then assessed. The researchers found that when comparing the editing efficiency for both GeoCas9 and SpyCas9, similar editing efficiencies by both proteins were observed, demonstrating that GeoCas9 is an effective alternative to SpyCas9 for genome editing in mammalian cells. Similar to CRISPR-Cas9, GeoCas9 enzymes are expected to have a wide variety of applications in genome editing and nucleic acid manipulation.

SUGGESTED USES

Genome editing

Genetic engineering

Gene therapy

Research tools (e.g., high-throughput screening of gene functions in cell lines and in vivo)

Creation of transgenic animal models

ADVANTAGES

Functions under different conditions than current CRISPR-Cas9 proteins (e.g., thermostable and enzymatically active in a wide temperature range)

Has an extended lifetime in human plasma
A thermostable Cas9 with increased lifetime in human plasma