SPLIT-CAS9 FOR REGULATABLE GENOME ENGINEERING

Tech ID: 24519 / UC Case 2015-060-0

PATENT STATUS

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<th>Dated</th>
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<td>Issued Patent</td>
<td>11,208,638</td>
<td>12/28/2021</td>
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<td>3245232</td>
<td>04/21/2021</td>
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<td>11/22/2017</td>
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<td>Published Application</td>
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BRIEF DESCRIPTION

The CRISPR-Cas9 system can be used to quickly and specifically target and cleave DNA at sites defined by engineered single-guide RNAs (sgRNAs) and has led to its adoption as a robust and versatile platform for genome engineering. Cas9 contains two nuclease active sites that function together to generate DNA double-strand breaks (DSBs) at sites complementary to the guide RNA sequence and adjacent to a protospacer adjacent motif.

Structural studies of the Streptococcus pyogenes Cas9 showed that the protein exhibits a bilobed architecture comprising the catalytic nuclease lobe and the α-helical lobe of the enzyme and interactions between the two lobes seem to be mediated primarily through contacts with the bound nucleic acid rather than direct protein-protein contacts.

UC Berkeley researchers have developed a heterodimeric Cas9 system whose assembly and function is regulatable by the sgRNAs. The enzymatic activity of the split-Cas9 also closely mimics that of WT Cas9. Such a system enables analysis of the functionally distinct properties of each Cas9 structural region and offers a unique mechanism for controlling active protein assembly.

SUGGESTED USES

» Controlled use of Cas9 for genome engineering applications in cells

» Research of the functionally distinct properties of each Cas9 structural region

ADVANTAGES

» The split-Cas9 is highly stable and pure

» Enzymatic activity mimics WT Cas9

PUBLICATION

Rational design of a split-Cas9 enzyme complex

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Compositions and Methods for Identifying Host Cell Target Proteins for Treating RNA Virus Infections
- Lentivirus-like Particle Delivery of CRISPR-Cas9 & Guide RNA for Gene Editing
- Type III CRISPR-Cas System for Robust RNA Knockdown and Imaging in Eukaryotes
- Cas12-mediated DNA Detection Reporter Molecules