
CRISPR tools to engineer and fight Bacteria

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Abstract

CRISPR-Cas systems have emerged as a powerful biotechnological tool. The Cas9 protein is a RNA-guided nuclease that can be easily reprogrammed to target any sequence of interest. Our work focuses on the development of CRISPR-Cas9 tools to edit bacterial genomes and control gene expression. In particular, we investigate how these tools can be used in high-throughput to perform functional screens and decipher genetic interactions. Recently we have also shown how CRISPR system can be used as sequence-specific antimicrobial. The Cas9 protein can kill bacteria when directed to cut in their chromosome. Guide RNAs can be programmed to kill Bacteria carrying antibiotic resistance or virulence genes specifically, and the CRISPR system can be delivered to bacterial populations using phage capsids. Altogether CRISPR are greatly expanding the toolbox of synthetic biology leading to exciting developments.

Keywords: CRISPR, Bacteria, Phage

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