Research opportunities and challenges after CRISPR/Cas9

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Abstract

CRISPR/Cas9 is now one of the most popular technique in genome editing. From the bacterial immune system to molecular biological tool, CRISPR is better in the entire field of biotechnology. In this review, only the aspects of CRISPR/Cas9 in plant biotechnology has been discussed. Development of virus resistant plant is mostly like the original CRISPR technique present in bacteria, but in quite more simplified manner. In herbicide resistant plant development and crop improvement CRISPR is used as specialised scissor to introduce mutation in gene of interest. After the identification of CRISPR as an adaptive immune system of bacteria or archaea since 1987, a revolution has come. .Between the components of CRISPR-Cas9 system the designed sgRNA helps to recognise Cas9 into the specific region of DNA, the Cas9 protein is the endonuclease that creates Double Stranded Break.Thus SOS Repair will activate. In NHEJ, few random nucleotides will inserted and the gene is getting dysfunctional.In HDR, if we insert our gene of interest by designed cassette, which shows homology to the cutting sequence the Gene of Interest will be inserted.

**Keywords:** CRISPR/Cas9, genome editing, herbicide resistant, SOS.