

CRISPR 2.0: New gene-editing tools offer plant breeders greater precision

There is no best, only better. This seems truly the case in the history of genome editing technology. When the CRISPR/CAS9 (clustered regularly interspaced short palindromic repeats/CRISPR associated-proteins) system was first developed in 2012-13, dubbed CRISPR 1.0, it was considered the best system ever in genome editing. But no longer.

.... In brief, [CRISPR] is a molecular scissor developed from a bacterial defense system that can be reprogrammed to make a cut across both DNA strands at a target genome site in animal and plant cells.

...

Although it is still being used widely due to its effectiveness in shutting down genes of interest, CRISPR 1.0 has been exposed with critical limitations, such as an inability to precisely replace, delete, and insert a single or more predetermined DNA base in the genome To improve CRISPR 1.0, many different CRISPR/CAS9 variants have been developed and tested, including the latest one, called prime editors.

Prime editors are a major upgrade of CRISPR 1.0 that can eliminate or minimize the limitations aforementioned, representing an enormous breakthrough in CRISPR/CAS9-based genome editing technology. Many scientists consider prime editors a game changer in genome editing.

.... [P]rime editing could be used to replace a target DNA base with any other single bases, to insert a DNA of one to 44 base pairs (bp), to delete a DNA of one to 80 bp, or to do any combinations of the listed three in human and mouse cells.

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