

Modification of tomato traits and plant hormone signaling using Target-AID for efficient nucleotide substitution

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The Tomato, (*Lycopersicon lycopersicum*) flowering, associated with a young, developing fruit. Credit: Earth100/Wikipedia

Recently, scientists from the University of Tsukuba developed a novel CRISPR/Cas9-based genome-editing tool called Target activation-induced cytidine deaminase (Target-AID). They targeted SIDE^{LLA} and SIETR in the model tomato cultivar 'Micro-Tom' and in commercial tomato cultivars to confirm and extend the applicability of the Target-AID genome-editing system.

After confirming that nucleotide substitutions were induced by the Target-AID system, mutants that showed high GA sensitivity in both 'Micro-Tom' and the commercial cultivars were isolated. Nucleotide substitution was also successfully induced by multi-targeting with a single sgRNA and multi-targeting with multiple sgRNAs in a single vector. In addition, the Target-AID system also produced a Target-AID-specific pattern of indels with editing positions different from those of Cas9 vectors.

"We demonstrate that the Target-AID system could efficiently edit sgRNA-targeting sites and facilitate a case study on the application of base-editing technology to translational research that aims at the commercialization of genome-edited crops," Prof Ezura said. These results demonstrated that the Target-AID genome-editing system is a promising tool for molecular breeding in tomato crops, highlighting the scientific and agricultural potential of the combined use of Target-AID with other base-editing systems.

The research was published in *Horticulture Research*.

More information: Sachiko Kashojiya et al, Modification of tomato breeding traits and plant hormone signaling by Target-AID, the genome-editing system inducing efficient nucleotide substitution, *Horticulture Research* (2022). [DOI: 10.1093/hr/uhab004](https://doi.org/10.1093/hr/uhab004)

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