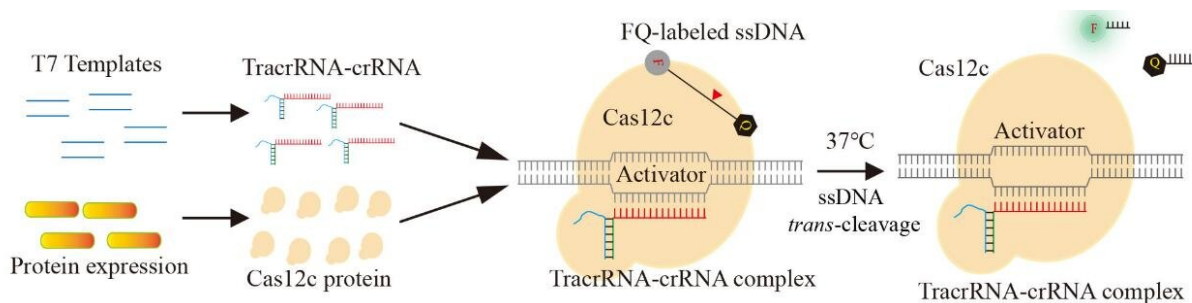


Researchers develop specific and sensitive Cas12c-based nucleic acid detection platform

December 28 2021, by Zhang Nannan



The illumination of the trans-cleavage activity of Cas12c1 and the FQ-labeled reporter array. Credit: Wang Zupeng

The prokaryotic clustered regularly interspaced short palindromic repeat (CRISPR) and CRISPR-associated (CRISPR/Cas) protein system has been reconstructed for a revolutionary targeted genome modification platform and nucleic acid detection tool. Restricted by the protospacer adjacent motif (PAM) requirement, specificity, and efficiency, more Cas proteins need to be characterized and adapted for genome editing and other applications. The RNA-guided DNA interference activity and ssDNA (single-strand DNA) trans-cleavage activity of Cas12c (subtypes V–C) has not been reconstructed in vitro, limiting its genome editing and nucleic acid detection applications.

Supervised by Prof. Zhong Caihong, Wang Zupeng, an assistant

researcher from the Wuhan Botanical Garden of the Chinese Academy of Sciences (CAS), developed a new, sensitive and specific Cas12c-based nucleic acid detection platform (Cas12c-DETECTOR). Results were published in the *International Journal of Biological Macromolecules*.

They first validated the trans-cleavage activity of Cas12c1 and optimized the single-guide RNA (sgRNA) structure, gRNA length, reaction buffer of Cas12c-DETECTOR.

Then they compared the sensitivity and specificity between Cas12c and Cas12a (subtype V-A), showing that Cas12c's higher sensitivity and specificity for nucleic acid detection.

The optimized Cas12c-DETECTOR was also applied for the detections of COVID-2019, HPV, and plant pathogen *Pseudomonas syringae* pv. *actinidiae* and the identification of single nucleotide polymorphisms (SNPs) of different sites.

Moreover, the researchers estimated two visual readout methods for Cas12c-DETECTOR to rapid, inexpensive, and visual nucleic acid detection.

These results illustrate that Cas12c-DETECTOR could be used for rapid, highly sensitive, and specific nucleic acid detection, improving and broadening CRISPR-based nucleic [acid](#) detection tools in [clinical diagnosis](#) and other applications.

More information: Zupeng Wang et al, Cas12c-DETECTOR: A specific and sensitive Cas12c-based DNA detection platform, *International Journal of Biological Macromolecules* (2021). [DOI: 10.1016/j.ijbiomac.2021.10.167](https://doi.org/10.1016/j.ijbiomac.2021.10.167)

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