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A new diagnostic platform based on CRISPR

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New system adapts tool known for gene editing for rapid, inexpensive disease diagnosis New system adapts tool known for gene editing for rapid, inexpensive disease diagnosis



A team of scientists from the Broad Institute of MIT and Harvard, the McGovern Institute for Brain Research at MIT, the Institute for Medical Engineering & Science at MIT, and the Wyss Institute for Biologically Inspired Engineering at Harvard University has adapted a CRISPR protein that targets RNA (rather than DNA) as a rapid, inexpensive, highly sensitive diagnostic tool with the potential for a transformative effect on research and global public health.

The scientists demonstrated that this new technique will have a full range of applications such as detecting the presence of Zika virus in patient blood or urine samples within hours, distinguishing genetic sequences of African and American strains of Zika virus, discriminating specific types of bacteria, such as E. coli, detecting antibiotic resistance genes, identifying cancerous mutations in simulated cell-free DNA fragments, and rapidly reading human genetic information, such as risk of heart disease, from a saliva sample.

CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) are the hallmark of a bacterial defense system which forms the basis for the popular CRISPR-Cas9 genome editing technology.

Since the tool can be designed for use as a paper-based test that does not require refrigeration, the researchers feel that it is well suited for fast deployment and widespread use inside and outside of traditional settings such as at a field hospital during an outbreak, or a rural clinic with limited access to advanced equipment.