DNA Nanoswitches Rapidly Detect Emerging Viruses Including SARS-CoV-2

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With nanoswitches developed to target SARS-CoV-2 RNA in human saliva, researchers could successfully detect the virus' presence within about two hours.

Programmable DNA nanoswitches that bind to viral RNA in human body fluids may provide an inexpensive platform to rapidly detect a wide variety of emerging viruses including SARS-CoV-2, according to a new study published on Friday.

Recent emerging viral threats highlight the cost and difficulty in responding rapidly. To address these challenges, the research team, led by Lifeng Zhou at the State University of New York, developed a platform for low-cost and rapid detection of viral RNA with DNA nanoswitches that mechanically reconfigure in response to specific viruses.

This approach may make testing more manageable in resource-limited areas, only costs about 1 penny per reaction, and can be performed within hours, according to the study published on Science Advances.

The researchers first tested this approach with DNA nanoswitches designed to target a sequence in the Zika virus genome and demonstrated its ability to detect clinically-relevant levels of Zika RNA in human urine.

They later developed nanoswitches to target SARS-CoV-2 RNA in human saliva, finding that they could successfully detect the virus' presence within about two hours.

The nanoswitches also successfully differentiated between Zika virus and Dengue virus, which occur in overlapping geographical regions and cause similar symptoms, demonstrating the nanoswitches' potential to avoid misdiagnoses, said the study.

Read the original article on Xinhua.