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Short note on CRISPR-based tools one of the methods for the diagnosis of COVID-19

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Introduction

Pneumonia cases of unknown etiology began to be reported in Wuhan, China, and it had been soon found that the cases were caused by a replacement sort of coronavirus. SARS-CoV-2, which causes COVID-19, has spread to several countries during a short time, and has become a worldwide health concern, an efficient thanks to combat COVID-19 is to detect infected individuals as early as possible, and implement isolation and quarantine procedures. However, some individuals infected with SARS-CoV-2 don't have the symptoms of COVID-19 at the time of diagnosis, and these asymptomatic or PR symptomatic individuals may transmit the virus to healthy individuals as silent carriers. Therefore, even within the absence of clinical findings, it's important to perform widespread testing, ranging from individuals suspected of being infected [1-2] To detect SARS-CoV-2 infection, it's possible to see the presence of viral antigens or viral RNA within the respiratory sample, or the presence of antibodies against the viral proteins within the blood sample. Rapid antigen tests are developed for the diagnosis of COVID-19. However, the sensitivity of those rapid antigen tests is extremely low. The SARS-CoV-2 antibodies reach detectable levels within the blood within several days to weeks after the onset of COVID-19 symptoms; therefore, antibody tests cannot provide sufficient sensitivity for diagnosis of acute infection. On the opposite hand, macromolecule tests can detect even a really small number of viruses in clinical samples. Therefore, RT-qPCR tests are developed and used for the detection of SARS-CoV-2 worldwide. Although it's made an excellent contribution in combating the pandemic, RT-qPCR requires sophisticated equipment and skilled personnel, which restricts the utilization of RT-qPCR to centralized laboratories.

Besides, concerns are increasing associated with the error rate of RT-qPCR tests designed for the detection of SARS-CoV-2 For these reasons, there's still an urgent need for alternative efficient diagnostic methods that enable rapid, scalable, and widespread testing of COVID-19 [3,4]. Clustered regularly interspaced short palindromic repeats (CRISPR)–Cas (CRISPR-associated proteins) systems are prokaryotic adaptive immune mechanisms want to cleave invading nucleic acids in nature. So far, CRISPR-based tools are used for several applications, like genome and transcriptome engineering, epigenome editing, and gene therapy an increasing number of studies are reported on the utilization of CRISPR-Cas systems for macromolecule detection and pathogen diagnosis. These methods are fast, low-cost, portable, easy to use, sensitive, and specific, and don't require complex devices additionally, during the COVID-19 pandemic, some studies on the utilization of CRISPR-Cas systems for detecting SARS-CoV-2 are reported. Since a number of these methods can detect SARS-CoV-2 [5]. with high accuracy and rapid turnaround, they'll help to beat a number of the restrictions of laboratory-based RT-qPCR tests and increase the general number of daily tests performed. Moreover, because CRISPR-based diagnostic methods are often performed with simple equipment, without requiring extensive technical expertise, they'll be used outside centralized laboratories, including airports, clinics, and resource-limited settings.

Consequently, these alternative methods have the potential to be complementary to RT-qPCR in combating COVID-19. Two of the CRISPR-based COVID-19 diagnostic tests have received emergency use authorization from the Food and Drug Administration (FDA), demonstrating that the CRISPR-based diagnostic methods are now available for field use, and can become increasingly common [6].

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