

Harnessing CRISPR-Cas to combat COVID-19: from diagnostics to therapeutics

ABSTRACT

The coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), remains a global threat with an ever-increasing death toll even after a year on. Hence, the rapid identification of infected individuals with diagnostic tests continues to be crucial in the on-going effort to combat the spread of COVID-19. Viral nucleic acid detection via real-time reverse transcription polymerase chain reaction (rRT-PCR) or sequencing is regarded as the gold standard for COVID-19 diagnosis, but these technically intricate molecular tests are limited to centralized laboratories due to the highly specialized instrument and skilled personnel requirements. Based on the current development in the field of diagnostics, the programmable clustered regularly interspaced short palindromic repeats (CRISPR)/CRISPR-associated proteins (Cas) system appears to be a promising technology that can be further explored to create rapid, cost-effective, sensitive, and specific diagnostic tools for both laboratory and point-of-care (POC) testing. Other than diagnostics, the potential application of the CRISPR–Cas system as an antiviral agent has also been gaining attention. In this review, we highlight the recent advances in CRISPR–Cas-based nucleic acid detection strategies and the application of CRISPR–Cas as a potential antiviral agent in the context of COVID-19.

Keyword: Coronavirus; COVID-19; Isothermal amplification; Antiviral; CRISPR-Dx