

Exploring the Potential of Repurposing Previous NP Based Diagnostic Approaches Used for Coronaviruses in the COVID-19 Pandemic

Abstract

The wildfire-like spread of COVID-19, caused by severe acute respiratory syndrome-associated coronavirus-2 (SARS-CoV-2), has resulted in a pandemic that has put unprecedented stress on the world's healthcare systems and varying severities of socioeconomical damage. As there are no specific treatments to combat the virus, current approaches to overcome the crisis have mainly revolved around vaccination efforts, preventing human-to-human transmission through the enforcement of lockdowns and the repurposing of drugs. To efficiently facilitate the measures implemented by governments, rapid and accurate diagnosis of the disease is vital. Reverse-transcription polymerase chain reaction (RT-PCR) and computed tomography (CT) have been the standard procedures to respectively diagnose and evaluate COVID-19. However, disadvantages including the necessity of specialized equipment and trained personnel, high financial cost of operation, and the emergence of false negatives have hindered their ability to be applied in high-demand and/or resource-limited sites. Nanoparticle-based methods of diagnosis have been previously reported to provide precise results within a short period of time. Such methods have previously been studied in previous outbreaks of coronaviruses including severe acute respiratory syndrome-associated coronavirus (SARS-CoV) and middle east respiratory syndrome coronavirus (MERS-CoV). Given the urgent need for rapid diagnostic techniques, this review discusses nanoparticle use in the detection of the aforementioned coronaviruses to highlight approaches that could potentially be translated for use during the COVID-19 pandemic.