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COVID-19 RESEARCH NEWSLETTER

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Nanomedicine as a promising therapeutic approach for COVID-19

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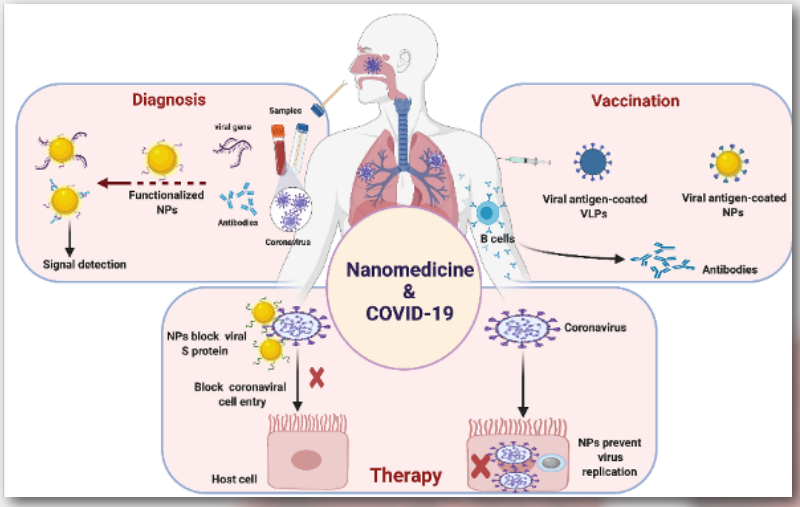

The COVID-19 pandemic caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has put the world in an unprecedented crisis, with huge human losses and deep socioeconomic damages. Due to the lack of specific treatment against SARS-CoV-2, effective vaccines and antiviral agents are urgently needed to properly restrain the COVID-19 pandemic. Repositioning of drugs, such as chloroquine and remdesivir, is a rapid process to reach safe therapeutics. The related clinical trials have revealed promising effects against COVID-19. Interestingly, nanomedicine as a promising therapeutic approach could effectively help win the battle between coronaviruses (CoVs) and host cells. This review discusses the potential therapeutic approaches, in addition to the contribution of nanomedicine against CoVs in the fields of vaccination, diagnosis and therapy.

Several SARS-CoV-2 S protein-based vaccine candidates have entered clinical phases, showing optimistic results. Furthermore, metallic and self-assembled nanovaccines, which are based mostly on antigenic properties of S protein, represent feasible and promising approaches to reduce the viral burden. Moreover, numerous NP-based diagnostic systems have been reported for CoVs and specifically for SARS-CoV-2. However, extensive studies in the field of NP-based therapy are still required.

To properly contain COVID-19 or any other emerging coronaviral pandemic, a complete understanding of virus virulence and transmission is required. This will enable the understanding of virus transfer between species, in addition to the identification of different encoded nonstructural proteins, enzymes and the related mechanisms of action. Accordingly, newer therapeutic targets can be recognized and developed using surface functionalized NPs. Additionally, studying the lifecycle of the virus and the host's response will enable to produce an effective nanovaccine. Based on these studies, future developments are expected in relation to a broad-spectrum'universal' NP-based vaccine or therapeutic to be ready for current and future CoV pandemics. Interestingly, microfluidics are expected to significantly contribute in CoV detection, taking the benefits of miniaturization, rapid detection and portability. This microsystem 'chip' can open new horizons toward the use of microfluidics in NPs fabrication and/or using them for detection of CoVs.

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If you are interested in sharing your COVID-19 releated research, please send your contribution to research.office@uaeu.ac.ae

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