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Nanobiotechnology in combating CoVid-19

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Abstract:
Emergence of novel pandemic viral disease CoVid-19 and its mutational behaviour are alarming. The potential use of nano-biotechnology in combating CoVid-19 is promising. We glean available data to explore such possibility in this short note.

Keywords: Nanotechnology, carbon dots, CoVid-19, disease, virus

Nanobiotechnology in combating CoVid-19

Hybrid nanosystems are structured amalgamations of inorganic – organic, inorganic – inorganic (nanocomposites), and organic – organic nanoparticulated systems (lipid – polymer hybrid NPs) designed on the basis of particular requirements or usage at the targeted site **[1].** Huo C *et al.* have reported zirconia nano particles offered protection against pathogenic avian influenza virus and suggested the possibility of using it against a variety of infectious conditions **[2].** Kumar *et al.* (2019) developed iron oxide nanoparticles (IO-NPs) with particle size ranging from 10-15 nm against the pandemic influenza virus strain A/H1N1/Eastern India/66/PR8-H1N1. The antiviral effectiveness was estimated using RT-PCR. Considerable reductions in viral concentration were observed when treated with Iron oxide nanoparticles **[3].** This has potential application in the management of CoVid-19. Hu *et al.* (2018) reported that nanoparticle encapsulation of diphyllin and bafilomycin improved anti-influenza activity in animal models demonstrating the therapeutical potential of the nanoparticulate V-ATPase inhibitors for host-targeted treatment against influenza **[4].** Haggag *et al.* (2019) used the aqueous and hexane extracts of *Lampranthus coccineus* and *Malephora lutea* F. Aizoaceae for the synthesis of silver nanoparticles **[5].** They showed that silver nano particles of *L.coccineus* and *M. lutea* have antiviral activity against HSV-1, HAV-10, and CoxB4 virus**.** Wang *et al.* (2019) developed

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aptamer-antibody on a multiwalled carbon nanotube-gold conjugated sensing surface with a dielectrode to detect pandemic H1N1 **[6].** The application of nanomedicine in the design and development of vaccine candidates and formulation is promising **[7].** Ding *et al.* (2019) documented Cap-3M2e VLP as a bivalent nanovaccine with dual IAV and PCV2 protection **[8].** Pons-Faudoa *et al.* (2019) formulated a subcutaneously embedded nanofluidic component for the sustained release of antiviral drug, cabotegravir , an integrase inibitor (CAB) conjugated with 2-hydroxypropyl-β-cyclodextrin (βCAB) **[9].** They observed βCAB treatment inhibited viral replication by 90% and demonstrated the potential of continuous release of βCAB via a nanofluidic implant for viral infections including COVID 19 **[9].** Lcczechin *et al.* (2019) used seven various carbon quantum dots (CQDs) to estimate antiviral efficacy in human coronavirus HCoV-229E infections **[10].** Chowdhury *et al.* (2019) developed a pulse-triggered ultrasensitive electrochemical sensor utilizing graphene quantum dots with gold-embedded polyaniline nanowires for the diagnosis of hepatitis E virus **[11].** Huang *et al.* (2019) formulated benzoxazine monomer extracted carbon dots (BZM-CDs) and demonstrated their successful anti-viral exercise against Japanese encephalitis, ZIKA, dengue and non-enveloped viruses including swine parvovirus and adenoviruses **[12].** Qaddare *et al.* (2017) introduced a new carbon dot-conjugated nanosensor with high biocompatibility and non-toxicity for the identification of other DNA biomarkers **[13].** Lee *et al.* (2015) established plasmon-assisted fluoro-immunoassay (PAFI) for the detection of the flu virus uisng carbon nanotube adorned Au nanoparticle (Au NP) **[14].** Lou (2015) developed a strategy for the detection of DNA by highly sensitive electro chemi luminescence (ECL) based on the site-specific cleavage of BamHI endonuclease combined with the ECL of graphene quantum dots (GQDs) and bidentate chelation of dithiocarbamate DNA (DTC-DNA) test assembly **[15].** Thus, carbon quantum dots are a potential tool in the diagnosis and treatment of CoVid-19.

Conclusion:

Nanobiotechnology has enormous promise in the management of CoVid-19. Nanotechnology coupled with specific biomarkers has potentoial application in the clinical diagnosis and treatment of CoVid-19.

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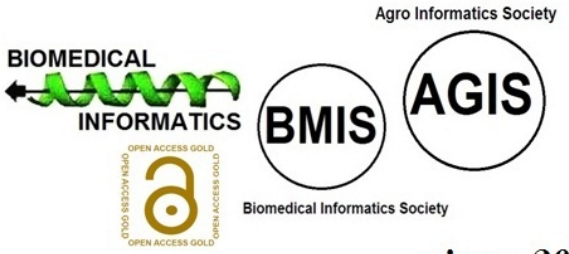

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