

Corona Virus: A Pandemic Going Viral

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Abstract

In 2020, the worldwide corona virus outbreak has officially been declared a pandemic by the World Health Organization (WHO). According to the WHO, a pandemic is the worldwide spread of a new disease. A pandemic is when an epidemic spreads between countries. Numerous viral infections have arisen and affected global healthcare facilities. HIV/AIDS, bubonic plague, smallpox, cholera, flu and influenza caused by virus are some of the most brutal killers in human history. Corona viruses cause common cold and infections which are generally self-resolving. Any outbreaks of these diseases across international borders are properly defined as pandemic, especially smallpox which throughout history has killed between 300-500 million people in its 12,000 year existence. Millions of individuals are at serious chance of obtaining a few advancing viral contaminations.

Keywords: Corona virus, infection, SARS, MERS, pandemic

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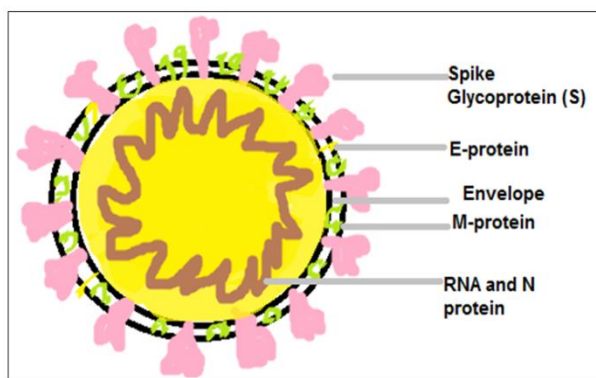
INTRODUCTION

It is intriguing to think that a small string of RNA can bring the world to its knees in 2020! During the last few years, corona viruses have become the most important worldwide because of the incidence of several deaths caused by them [1, 2]. The 2019 novel corona virus is one of seven members of this family known to infect humans and the third in the past three decades to jump from animals to humans. First emerging in China in December, this new corona virus has caused a global health emergency [3-5]. Since 2003, corona virus has caused multiple major public health events that resulted in global epidemics such as, severe acute respiratory syndrome - Severe Acute Respiratory Syndrome (SARS), Middle East respiratory syndrome (MERS) and corona virus disease 2019 COVID-19. Severe acute respiratory syndrome (SARS) was considered among newly emerged infectious diseases with a major morbidity and mortality, when it was first identified in 2002 in China. Due to a high case fatality rate, accurate knowledge of the SARS-CoV remains a priority. Especially since COVID-19 has out broken in Wuhan, Hubei, in December 2019, corona virus has had a significant impact on people's health and lives. But so far, the pathological diagnosis of COVID-19 has been relatively deficient [6-8].

Common indications of the Crown infection incorporate a fever, flu-like side effects such as hacking, sore throat and weakness, and shortness of breath. Past considers had detailed relationship between counter acting agent status to bovine crown infection and lower respiratory tract illness [9-12]. The Middle East respiratory syndrome corona virus (MERS-CoV) is a novel positive sense single stranded ribonucleic acid virus of the genus Beta corona virus [13]. The 2015 epidemic of Middle East respiratory syndrome (MERS) in the Republic of Korea has been the largest outbreak outside Middle East. This epidemic caused 185 laboratory-confirmed cases and 36 deaths in the Republic of Korea until September 2, 2015 [14, 15].

In humans, corona viruses cause respiratory tract infections that can be mild such as some cases of the common cold and others that can be lethal, such as SARS, MERS, and COVID-19 [6]. Symptoms in other species vary: in chickens, they cause an upper respiratory tract disease, while in cows and pigs they cause diarrhea. There are yet to be vaccines or antiviral drugs to prevent or treat human corona virus infections. They are enveloped viruses with a positive-sense single-stranded RNA genome and a nucleocapsid of helical symmetry. The genome size of corona viruses ranges from approximately 27 to 34 kilobases, the largest among known RNA viruses [4, 16, 17].

The name corona virus is derived from the Latin corona, meaning "crown" or "halo", which alludes to the characteristic appearance reminiscent of a crown or a solar corona around the virions (virus particles) when viewed under two-dimensional transmission electron microscopy, due to the surface being covered in club-shaped protein spikes. The hemagglutinin-esterases (HEs) are a family of viral envelope glycoprotein that mediates reversible attachment to O-acetylated sialic acids by acting both as lectins and as receptor-destroying enzymes (RDEs). Related HEs occur in influenza C, and corona viruses apparently as a result of relatively recent lateral gene transfer events [18].



Cross-sectional model of a Corona virus

The coronavirus spike protein is a multifunctional molecular machine that mediates coronavirus entry into host cells. It first binds to a receptor on the host cell surface through its S1 subunit and then fuses viral and host membranes through its S2 subunit. Two domains in S1 from different coronaviruses recognize a variety of host receptors leading to viral attachment. The most important structural proteins of CoV are spike (S) protein (trimeric), membrane (M) protein, envelop (E) protein, and the nucleocapsid (N) protein. Some of the viruses such as beta-CoVs also have hemagglutinin esterase (HE) glycoprotein [19]. The RNA genome of CoV has seven genes that are conserved in the order: ORF1a, ORF1b, S, ORF3, E, M, N in 5' to 3' direction. The two-third part of the RNA genome is covered by the ORF1a/b, which produces the two viral replicase proteins that are polyproteins (PP1a and PP1ab) [20].

Sixteen mature nonstructural proteins (NSPs) emerge from further processing of these two PPs. These NSPs take part in different viral functions including the formation of the replicase transcriptase complex. The remaining genome part of the virus encodes the mRNA which produces the structural proteins, i.e., spike, envelope, membrane, and nucleocapsid, and other accessory proteins [20]. Another important envelop-associated protein which is expressed by only some strains of CoV is the HE protein [21]. The RNA genome of CoV is packed in the nucleocapsid protein and further covered with envelope [22].

Sanitization or hand washing with cleanser is one of the essential means to prevent the spread of infections and hand hygiene in primary care settings [23]. Older people are at higher risk for severe illness from COVID-19 may result in increased stress during a crisis [8, 24]. Hearing about the pandemic repeatedly can be upsetting. Taking care of your body is recommended to take deep breaths, stretch, or meditate along with eating healthy, well-balanced meals, exercise regularly, get plenty of sleep, and avoiding alcohol and drugs. Also, strong health care system is needed for global corona pandemic [25].

However, there are seven major targets (spike protein, envelop protein, membrane protein, protease, nucleocapsid protein, hemagglutinin esterase, and helicase) for which drug design can be considered [26]. There are other 16 nonstructural proteins (NSPs), which can also be regarded from the drug design perspective. The major structural proteins and NSPs may serve an important role from drug design perspectives.

CONCLUSION

The 2019-novel coronavirus (nCoV) is a major source of catastrophe in the 21st century. Viruses do not comply with laws, and do not always behave predictably. They have one primary purpose: to build and pass on copies of themselves. They do not have any inherent malevolence, but simply the imperative to find a new host to live in, as they will perish without such defense. The event of frequent occurrence is a major deterrent factor toward the development of CoV-specific vaccines/drugs. Nevertheless, at this point in time, the absence of effective Medication/s to prevent or treat an assault is a significant concern.

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