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Review on Corona Virus

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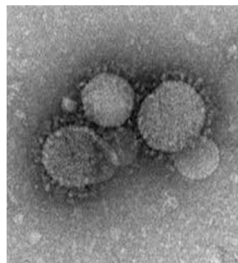
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Abstract: The recent emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from the Hubai province in China in late 2019 demonstrates the epidemic potential of coronavirus. The rapid spread of this virus across the world in only 2 months highlights the transmissibility of this family of viruses and the significant morbidity and mortality that they can cause.

I. INTRODUCTION

Corona viruses was first identified by a group of virologists (J D Almeida, D M Berry, C H Cunningham, D Hamre, M S Hofstad, L Mallucci, K McIntosh and D A J Tyrrell), who relayed their findings in 1968 to the journal Nature, which published a brief annotation. As the journal Nature reported in 1968, "these viruses are members of a previously unrecognized group which suggest should be called the coronaviruses, by recalling the characteristic of virus by seeing it under electron microscope."

The word corona has different meanings. But it was the sun that the virologists had in mind when they choose the name coronaviruses. As they wrote, they compared "the characteristic 'fringe' of projections" on the outside of the virus with the solar corona.



II. HUMAN CORONAVIRUS TYPES

The seven coronaviruses that can infect people are:

A. Common Human Coronavirus

- 1) 229E (alpha coronavirus)
- 2) NL63 (alpha coronavirus)
- 3) OC43 (beta coronavirus)
- 4) HKU1 (beta coronavirus)

B. Other Human Coronavirus

- 5) MERS-CoV (beta coronavirus-Middle East Respiratory Syndrome)
 - 6) SARS-CoV (beta coronavirus-Severe Acute Respiratory Syndrome)
 - 7) SARS-CoV-2 (novel coronavirus causing COVID-19)
- a) *229E (alpha coronavirus)(HCoV-229E)*: HCoV-229E is a species of coronavirus infecting human and bats. It is an enveloped, positive sense, single stranded RNA virus which enters its host cell by binding to the APN receptor. It is one of the viruses responsible for common cold. It is the member of *Alphacoronavirus* and subgenus *Duvinacovirus*.
- b) *NL63 (alpha coronavirus)(HCoV-NL63)*: HCoV-NL63 was first identified in late 2004 in a seven-month old child with bronchiolitis in the Netherlands. Diseases include mild to moderate upper respiratory tract. The virus is an enveloped, positive-sense, single-stranded RNA virus which enters its host cell by the ACE2 receptor. Associated infections, severe lower respiratory tract infection, croup and bronchiolitis.
- c) *OC43 (beta coronavirus)(HCoV-OC43)*: HCoV-OC43 is a member of the species *Betacoronavirus 1* which infects humans and cattle's. The virus is an enveloped, positive-sense, single-stranded RNA virus which enters its host cell by binding to the N-acetyl-9-O-acetylneuraminic acid receptor. It has, like other coronavirus from genus *Betacoronavirus*, subgenus *Embecovirus*, an additional shorter spike like surface protein called hemagglutinin esterase.

- d) *HKU1 (beta coronavirus)(CoV-HKU1)*: CoV-HKU1 is originated from infected mice. In humans, infection results in an upper respiratory disease with symptoms of common cold, but can advance to pneumonia and bronchiolitis. The virus is an enveloped, positive-sense, single-stranded RNA virus which enters its host cell by binding to the N-acetyl-9-O-acetylneuraminic acid receptor. It has the Hemagglutinin esterase gene, which distinguishes it as a member of the genus.
- e) *MERS-CoV (beta coronavirus-Middle East Respiratory Syndrome)*: MERS is a viral respiratory disease caused by a novel coronavirus which was first identified in Saudi Arabia in 2012. Typical MERS symptoms include fever, cough and shortness of breath. Some laboratory cases of MERS-CoV infection are reported as asymptomatic, meaning that they do not have clinical symptoms, but they are positive in MERS infection. It is a zoonotic virus, which means that it is transmitted between animals and people. No vaccine or specific treatment is currently unavailable, however vaccines and treatment is developed. Until more is understood about MERS-CoV, people with diabetes, renal failure, chronic lung disease, and immunocompromised persons are considered to be at high risk of severe disease from MERS-CoV infection.
- f) *SARS-CoV (beta coronavirus-Severe Acute Respiratory Syndrome)*: Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus called SARS-associated coronavirus (SARS-CoV). SARS was first reported in Asia in February 2003. The illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained. The explosive nature of the first SARS epidemic, the high mortality, its transient reemergence a year later, and economic disruptions led to a rush on research of the epidemiological, clinical, pathological, immunological, virological, and other basic scientific aspects of the virus and the disease. This research resulted in over 4,000 publications, only some of the most representative works of which could be reviewed in this article. The marked increase in the understanding of the virus and the disease within such a short time has allowed the development of diagnostic tests, animal models, antivirals, vaccines, and epidemiological and infection control measures, which could prove to be useful in randomized control trials if SARS should return. The findings that horseshoe bats are the natural reservoir for SARS-CoV-like virus and that civets are the amplification host highlight the importance of wildlife and biosecurity in farms and wet markets, which can serve as the source and amplification centers for emerging infections.
- g) *SARS-CoV-2 (Novel Coronavirus Causing COVID-19)*: COVID-19 was first reported in late 2019 in Wuhan, China and has since spread extensively in China and worldwide. As described by the National Institutes of Health, it is a successor of SARS-CoV-1. It is contagious in humans, and the World Health Organization (WHO) has designated the ongoing pandemic of COVID-19 a Public Health Emergency of International Concern. Taxonomically, SARS-CoV-2 is a strain of severe acute respiratory syndrome-related coronavirus (SARSr-CoV). It is believed to have zoonotic origins and has close genetic similarity to bat coronaviruses, suggesting it emerged from a bat-borne virus. Transmission occurs primarily via respiratory droplets from coughs and sneezes within a range of about 1.8 meters (6 ft). Indirect contact via contaminated surfaces is another possible cause of infection. Preliminary research indicates that the virus may remain viable on plastic (polypropylene) and stainless steel (AISI 304) for up to three days, but does not survive on cardboard for more than one day or on copper for more than four hours; the virus is inactivated by soap, which destabilizes its lipid bilayer. SARS-CoV-2 produces at least three virulence factors that promote shedding of new virions from host cells and inhibit immune response.

III. CONCLUSION

There are hundreds of coronaviruses, most of which circulate in animals. Only seven of these viruses infect humans and four of them cause symptoms of the common cold. But, three times in the last 20 years, a coronavirus has jumped from animals to humans to cause severe disease. SARS, a beta coronavirus emerged in 2002 and was controlled mainly by aggressive public health measures. There have been no new cases since 2004. MERS emerged in 2012, still exists in camels, and can infect people who have close contact with them. The World Health Organization declared the novel coronavirus outbreak “a public health emergency of international concern” on January 30. On March 11, 2020 after sustained spread of the disease outside of China, the World Health Organization declared the COVID-19 epidemic a pandemic. Public health measures like ones implemented in China and now around the world will hopefully blunt the spread of the virus while treatments and a vaccine are developed to stop it.

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