A Review: Outbreak of Corona

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ABSTRACT
A novel general wellbeing emergency undermining the globe with the development and spread of 2019 novel coronavirus (2019-nCoV) or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Till (29/03/2020) a total of 6,78,910 COVID positive cases and 31,771 deaths were reported worldwide and so far 987 cases were reported in India. The infection was transmitted to people through an unidentified intermediary creatures in Wuhan, Hubei territory, China in December 2019 which have a specific beginning in bats. Person to person transmission of virus is thought to be occurred by contact with diseased individual and inhalation of respiratory droplets produced by an infected person. Manifestations like fever, cough, breathlessness, tiredness, sore throat and malaise were appeared during its incubation period of 2 to 14 days.

1 INTRODUCTION
The impact of the virus is more among advance aged ones and people with comorbidities, whereas it shows less impact among adults. Luckily until this point, infants and child are rarely infected without any deaths but the future knowledge of this virus is obscure. Most of the infected individuals are asymptomatic initially but it might advances to pneumonia, acute respiratory distress syndrome (ARDS) and multi organ dysfunction and its mortality rate is evaluated to go from 2 to 3%. Diagnosis involves exclusive molecular tests which were used to examine the respiratory secretions and usual or poor WBC count with more C-reactive protein (CRP) were observed in common laboratory findings. Asymptomatic individuals or with mild infection shows abnormal CT chest scan. Basically steady and supportive treatment is required and the job of antivirals is yet to be set up. Strict infection control measures at hospitals and home separation of suspicious individuals with infection was done for the prevention of virus transmission because this COVID transmits more quicker than its two progenitors SARS-CoV and MERS-CoV but has less mortality. The worldwide impact of this novel pandemic is yet unsure. [1]

HCoVs: severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) have been witnessed by us. Assorted variety of host factors regulate the replication of HCoV which imparts uncommon changes in cell structure and physiology. Pathogenesis of HCoV mainly occurs due to exhilarating signal pathway which further inflects the induction of antiviral immune response. Ongoing examinations have started to uncover some basic aspects of the intricate HCoV-host interaction in unthinking point of interest.

Right now, we outline the present information of host factors co-opted and signaling pathways activated during HCoV infection, with an accent on HCoV-infection-induced stress response, autophagy, apoptosis, and innate immunity. The cross talk among these pathways and also the modulatory techniques used by HCoV, is additionally examined.

Coronaviruses are a group of spherical enveloped particles containing nonsegmented, single-stranded (positive-sense) RNA genomes depicted in Figure 1. Corona viruses which are known to contaminate human host counts six while economically important vertebrates like pigs and chicken are infected by other type of COVID. Among those six assortments, severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) are zoonotic (animal disease) and highly pathogenic coronaviruses that have resulted in
local and universal outbreak. Coronaviruses are classified under the order Nidovirales, family Coronaviridae, subfamily Coronavirinae, as per the International committee on Taxonomy of viruses. Coronavirinae is divided into four genera namely, Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus in the light of early serological and later genomic proof. [2]

2 TRANSMISSION
Maintaining close contact and droplets of infected persons are the major route of transmission in case of SARS-CoV whereas minute chances of transmission can also occur through sweat, stool, urine, and respiratory secretions. Upon entering the virus in the human body its primary targets are enterocytes and pneumocytes, where thereby establishes a cycle of infection and replication. CoV has other target sites which includes epithelial renal tubules, tubular epithelial cells of kidney, immune cells, and cerebral neuronal cells. [3, 4]

3 TAXONOMY
SARS-CoV belongs to the family Coronaviridae under order Nidovirales. Respiratory or intestinal infections are known to be caused by this family members in humans and other animals. Despite a marked degree of phylogenetic divergence from other known coronaviruses, SARS-CoV together with bat SARS-CoV are now considered group 2b coronaviruses. [5] Inoculation of patients’ specimens into embryonal monkey kidney cell lines such as FRhK-4 or Vero E6 cell lines leads to primary isolation of SARS-CoV, where thereby cells become round and refractile within 5 to 14 days due to the cytopathic changes that occur at foci. [6] Cell detachment occur within 24 to 48 h due to the spreading of these cytopathic changes throughout the cell monolayers. [7] Subcultures can be made on Vero (monkey kidney), Huh-7 (liver cancer) CACO-2 (colonic carcinoma) [8] or other colorectal cancer, MvLu (mink lung epithelial) and POEK and PS (pig) cell lines. [9]

4 CHARACTERS
SARS-CoV is zoonotic in origin which is suggested by epidemiological linkage of the initial human cases of the 2003 pandemic to wild game animals. [10] The isolation of SARS-CoV-like viruses from palm civets and subsequently horseshoe bats further supported this contention. Primary mode of transmittance occurs through person to person contact or by exposure of infected persons droplets either directly or indirectly, which are most commonly seen in health care facilities, workplaces, homes, and public transportation. [11]

5 FEATURES
Viral pneumonia with rapid respiratory deterioration is the hallmark feature of SARS. General presentations include fever, chills, myalgia, malaise, non-productive cough and to a lesser extent rhinorrhea and sore throat are seen. [12] The frequently encountered extrapulmonary manifestation is diarrhea. Apart from that hepatic dysfunction; dizziness, abnormal urinalysis; petechiae; myositis; neuromuscular abnormalities; and epileptic fits are seen. [13]

6 TARGET
The sequence of 2019-nCoV is completely known [14] which consist of only one PDB (PDB ID: 6LU7) and that is in complex with N3 (inhibitor) according to RCSB database. However, Bat-SL-CoVZC45 and SIRS CoV-ZSc (nucleotide blast, NCBI) have found similarity with 2019-nCoV to an extent of 95% and 88% respectively. This suggests that the 2019-nCoV has undergone changes w.r.t protein structural and functional levels. [15]

7 LIFE CYCLE
A brief description of coronavirus life cycle is discussed below focusing more on function of various viral proteins. Conformational change in spike facilitates the fusion between the viral and cell membranes followed by release of the nucleocapsid into the cell. Figure 2. These conformational changes occurs when corona virus binds to specific cellular receptors through spike protein. After its entry, the 5’ end of the genome RNA, ORFs 1a and 1b, are translated into pp1a and pp1ab; pp1ab is translated via a frame shift mechanism, which occurs at high frequency (25 to 30%). [16]

The primary structure and expression of the second open reading frame of the polymerase gene of the coronavirus MHV-A59; a highly conserved polymerase is expressed by an efficient ribosomal frameshifting mechanism. One or two papain-like proteases (PLpro or PLP) and a picornavirus 3C-like protease (3CLpro) are encoded by ORF 1a, which function to process pp1a and pp1ab into the mature replicase proteins. Also, encoded in the X domain of ORF 1a is a (putative) ADP-ribose 1'-phosphatase activity. Encoded in ORF 1b and processed from pp1ab are an RNA-
dependent RNA polymerase (RdRp) and a helicase, as well as other enzymatic activities, including a (putative) 3′-to-5′ exonuclease (ExoN), poly(U)-specific endoribonuclease (XendoU), and (putative) S-adenosyl methionine-dependent ribose 2′-O-methyl transferase. An additional putative enzymatic activity, cyclic phosphodiesterase, is encoded downstream in ORF 2a. These multiple enzymatic activities are speculated to play roles in metabolism of coronavirus RNA and/or in interfering with host cell processes.

8 CONCLUSION
The virus can easily spread from one person to another person; it is strictly prohibited to visit populated areas. According to WHO, the only possible way to escape the virus is to avoid contact with infected person. It is also known that Vaccines are not available in market, it is individual responsibility to take care a prevention is better than cure.

REFERENCES

Figure 2. Life Cycle Of Virus
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