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SARS–COV, MERS-COV and Coronavirus (COVID-19): Origin and characteristics

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Abstract
With the global pandemic of unknown pneumonia in Wuhan, China, in December 2019, a new coronavirus, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2), has drawn the attention of the entire world which has been resulted into global emergency. The current COVID-19 pneumonia pandemic is spreading globally at an accelerated rate. The present article represents the origin and characteristics of it.

Keywords: SARS-COV, MERS-COV, COVID-19, Origin, characteristics

Introduction
Coronavirus disease 2019 (COVID-19) is a sort of respiratory illness that can spread from person to person [1]. According to the latest data, up to the April 4, 2020, the number of confirmed cases globally reached 10, 51635, of which 56,985 were dead [2].
COVID-19 is the clinical syndrome associated with SARS-CoV-2 infection. It is characterized by a respiratory syndrome, ranging from a mild upper respiratory illness to severe interstitial pneumonia and acute respiratory distress syndrome (ARDS). Though it belongs to the same beta coronavirus genus of the coronaviruses liable for the SARS and Middle East Respiratory Syndrome (MERS) (i.e SARS-CoV and MERS-CoV, respectively), this novel virus seems to be substitute to milder infections [3]. While CoVs are very common and can infect a variety of different animals, including cats, pigs, and bats, they rarely jump species barrier and infect humans [4].
Coronaviruses (CoVs) are the, single positive stranded RNA viruses; which belong to the subfamily Coronavirinae. The CoVs genome, ranging from 26 to 32 kilobases in length and known as the largest viral RNA. Earlier, there were six CoVs known to account human diseases, and these can be grouped into low pathogenic and highly pathogenic CoVs. The low pathogenic CoVs, including 229E, HKU1, OC43 and NL63, account for 10% to 30% of upper respiratory tract infections and results in to mild respiratory diseases. In contrast, the highly pathogenic CoVs, including SARS and MERS CoV, predominantly infect lower air- ways and cause fatal pneumonia [5].

Origin
In 2003, the Chinese population experienced a threat from a virus causing SARS in Guangdong province. The infected patients had pneumonia symptoms with a diffused alveolar injury which lead to ARDS. SARS initially displayed in Guangdong, China and then spread rapidly around the globe with more than 8000 infected persons and 776 deceases [6]. It was found that bats were the natural hosts and Mechanical ventilation was supported to 20%–30% of the infected patients. The fatality rate was 10%, the human-to-human Airborne transmission was perceived, and the care was taken by adopting strict public health measures [7]. MERS has caused the death of more than 587 people all over the world; the first report of MERS-CoV was received from a hospital in Jeddah in Saudi Arabia in September 2012, Where Dr. Zaki from Egypt isolated it from the throat of a patient, who died because of severe respiratory and renal failure. The MERS-CoV is a RNA virus with protein envelope. On the outer surface, virus has spike like glycoprotein which are responsible for the attachment and entrance inside host cells [8].
SARS-CoV has evolved as a new human infection in South China with an overall mortality rate of about 9.6%. MERS-CoV is another highly pathogenic CoV, first found in Saudi, had mortality rate, 34.4%. These two are treated as highly pathogenic and it is very sure that both were transmitted from bats to palm civets or dromedary camels, and finally to humans [9]. The origin of MERS-CoV is unknown but the phylogenic studies represents that the main source of this virus is the camel, which got infected by African bats in past. Human to human transmission is limited in the case of MERS [8]. A novel coronavirus named ‘‘2019 novel coronavirus’’ or ‘‘2019-nCoV’’ by the World Health Organization (WHO) was responsible for the current pneumonia outbreak that initiated in early December, 2019 in Wuhan City, Hubei Province, China. This outbreak was concerned with a large seafood and animal market, and research is going on to determine the origins of the infection. Coronaviruses mainly cause respiratory and gastrointestinal tract infections [10].
Bats are considered to be the natural hosts of SARS-CoV-2, while pangolins and snakes are thought to be the intermediate hosts. However, later studies show that no evidence showed that snakes are the hosts of SARS-CoV-2. Study from Wuhan institute of virology stated that the similarity of gene sequence between SARS-CoV-2 and bat coronavirus is as high as 96.2%. However, the results of current research have not yet fully find out the potential natural host and the intermediate host of the SARS-CoV-2, adequate evidence has proved that this virus might be sourced from wild animals [11].

Characteristics

The virus which is liable for COVID-19 infects people of all ages but there are two groups of individuals at a better risk of causing severe COVID-19 disease. People those are older (that is people over 60 years old); and people with underlying medical conditions (such as disorder, cardiovascular disease, diabetes, chronic respiratory illness, and cancer). The danger of severe disease mostly increases with age ranging from around 40 years. It is required that adults during this age range protect themselves and successively protect others that may be more vulnerable [12].

The most common symptoms for COVID-19 are fever, followed by cough, pharyngitis and dyspnea; all of the infected patients had at least one symptom. However, consistent with the CCDC report, 81% of the cases had mild symptoms and 1.2% is asymptomatic [3].

Elderly subjects might not have fever but present with decrease generally condition, delirium, poor feeding, and fall/fracture [13]. The clinical representation of MERS-CoV infection varies from asymptomatic to very severe pneumonia with ARDS, septic shock, and multi organ failure liable for death. Risk factors for severe COVID-19 disease include advanced age, chronic medical conditions, immune compromise, and cancer [14]. One study of 204 patients with confirmed COVID-19 suggests 48.5% of patients have gastrointestinal (GI) symptoms. These symptoms may include anorexia (83.8%), diarrhea (29.3%), vomiting (0.8%), and abdominal pain (0.4%) [14].

Three major trajectories for COVID-19 are mild disease with upper respiratory symptoms, non-severe pneumonia, and severe pneumonia complicated by acute respiratory distress syndrome (ARDS) necessitating aggressive resuscitative measures [15]. Some COVID-19 patients might develop arrhythmia, acute heart injury, impaired renal function, and abnormal liver function (50.7%) at admission [16].

In epidemiological and clinical investigations confirmed on ten pediatric SARS-CoV-2 infection cases, symptoms in these cases were nonspecific and no children required respiratory support or medical care. Chest X-rays lacked definite signs of pneumonia, a defining feature of the infection in adult cases [17].

Discussion

There is no specified treatment for COVID-19 till date, but drugs are in pipeline which bind with the spike glycoprotein and inhibit its entrance host cells. MERS-CoV and SAR-CoV are from an equivalent genus, therefore the drugs which inhibit the expansion of SARS-CoV and MERS-CoV also can inhibit the expansion of COVID-19 but those drugs aren't completely inhibiting virus activity.

The various regulatory bodies and Centers for Disease Control and Prevention (CDC) have issued preventive measures to avoid the spread of COVID-19. They recommended avoiding visit high risk areas, contact with individuals who are symptomatic and therefore the consumption of meat from regions with known COVID-19 outbreak. Basic hand hygiene measures also are recommended, including frequent hand washing and therefore the use of personal protective equipment (PPE) like face masks, mobile app, preventative measures which will be taken, also as a symptom checker

Conflict of Interest: the authors have no conflict of interest to declare.

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