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Review Article

A CRITICAL REVIEW ON CORONAVIRUS AND THEIR CLINICAL TRIALS

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ABSTRACT

The objective of the present review article is to spread awareness in society about Corona virus infection and their clinical trials with respect to the world's conditions. On 28th December 2019 news was highlighted in the newspaper that china got infected by Corona virus (2019-nCoV) and many patients got died due to severe conditions and unavailable treatments. At the same time, the same virus was spread in the whole world due to which World Health Organization (WHO) declared Corona virus as pandemic virus or diseases. The total number of cases around the world rose to more than 9 lakhs with high mortality reported by World Health Organization. Till date the patient's number and mortality is increasing day by day but no one have any vaccine or drug against Corona virus. However, Ayurveda and some medicinal scientist had disclosed some medicines against same viral infections after trials on rats and humans. However, no effective reports are available. Therefore, the present review article will provide all information related to the same virus and global condition.

Keywords: Coronavirus, Clinical trials, Herbs and drugs, Morphology, Pandemic infection.

1. INTRODUCTION

Coronavirus disease2019 (COVID-19) is a communicable virus caused by strict acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was first recog -nized in 2019 in Wuhan, China, and has since broadened globally, resulting in the 2019-20 coronavirus pandemics [1-9]. In 1937, a coronavirus was first reported in the birds infected bronchitis by virus that has the ability to gravely destroy fowl stocks [10-14].

In the 1960s, human coronaviruses were first reported in the noses of patients with the common cold [15-19]. There are two human coronaviruses such as OC43 and 229E and these are responsible for an excess number of common colds. They are classified on the basis of the crown-like projections on their body surfaces. The Latin word "Corona" means "halo" or "crown". Surrounded by humans, disease nearly all frequently occurs throughout the winter and early spring months [20-25]. It is not rare for an individual to become sick with a cold that is caused by a coronavirus and then grab it once more in four months later. However, it happens due to the coronavirus antibo -dies do not last for a very long time [26-31].

The death charge from an eruption of the coronavirus in Italy rose in the last days by 427 to 3,405, overtaking the total number of deaths so far registered in China, officials said on Thursday [32-36].

Nearly 220,000 people have now been established with the coronavirus globally, of which at least 84,000 have recovered from COVID-19, while more than 8,800 have died, according to data from Johns Hopkins Univer -sity in the US [37-39]. Hydroxychloroquine is lives saving drug used in the world [40-46]. The present review article will discuss in detail about coronaviruses and their transmission, symptoms, clinical trials, herbal drugs and treatments.

2. CHARACTERISTICS OF VIRUSES

Viruses are microscopic in nature. They can be visualized by using a light microscope, electron microscope, and a fluorescent microscope. They are filterable through bacteria proof filters. They can be crystallized by using chemicals or naturally, and thus behave like chemicals. They consist of a simple structure [47-55]. Mainly they are made up of nucleic acid, and protein coat or Capsids. They contain either DNA or RNA as a genetic material never both. They can be cultivated only in living cells. They are cellular and don't contain any cell organelles. They use host cell organelles during reproduction as biosynthetic machinery. They are obligate intracellular parasites which mean they totally depend on living cells

for their own growth and development. They undergo mutations [56-59]. They are temperature sensitive and are inhibited within seconds at 50°C. They are infectious and play the role as a pathogen in the organisms, including bacteria, blue-green algae, fungi, plants, insects, and vertebrates. They lack enzymes essential for protein and nucleic acid synthesis and so depend upon synthetic machinery of host cells. They multiply by a complex process and not by binary fission. They are unaffected by antibiotics. They are sensitive to interferon [9, 17, 44, 39, 60].

3. STRUCTURE OF VIRUSES

All viruses exist in two different forms, extracellular and intracellular form. Virions are extracellular infectious virus particles or infectious viruses while nucleic acid is the intracellular form [61-63]. Structure of viruses is made up of different parts as explained below. The size of viruses is measured by using an electron microscope, collodion membrane filter of graded porosity, and ultracentrifugation. The viruses are mostly smaller than bacteria. The size of viruses varies from 20 nm to 300 nm [6, 32, 47, 52, 64].

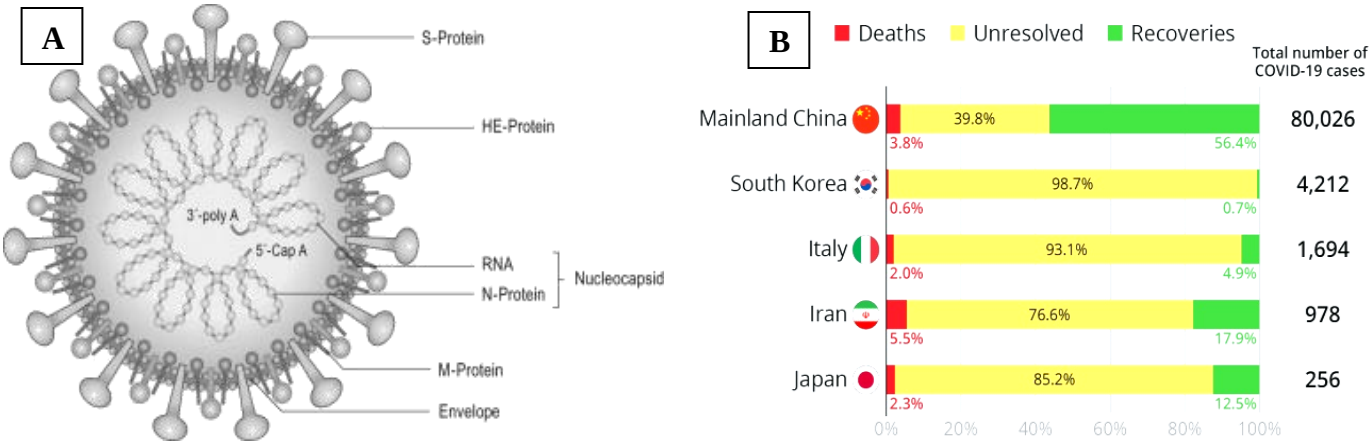

Fig. 1: [A] Coronavirus morphological structure and their [B] current status in the world [1-4]

The largest virus is the pox virus measuring 300 nm while the smallest virus is foot and mouth disease virus measuring 20 nm [44, 39, 65]. They are made up of virions, Capsids, nucleocapsids, envelope, and capsomers. The capsids are a protein coat, which functions as a shell to protect the viral genome from nucleases and which during infection attaches the virion to specific receptors exposed on the prospective host cell. Capsids are made up of capsomers [45]. The simple viruses consists of the nucleocapsid (Nucleic acid + protein Coat) while some complex viruses consists of nucleocapsids (Nucleic acid + protein Coat + Protein layers). In other complex viruses in addition to nucleocapsids, lipoprotein envelope (Nucleic acid + protein Coat + Protein layers + Envelope) is present [6, 12, 32, 39, 47, 52, 64].

All viruses have a very simple structure. Simple viruses are not complex in nature and consist of genetic material at center and surrounded by a protein Capsids while complex viruses are surrounded by proteins, lipids, and carbohydrates. Complex viruses consists envelope which protects the virus and also serves for transmission from one host to another. The envelope is adapted from the host during reproduction. The envelope is mainly made up of lipids or glycoprotein. The spikes are made up of glycoprotein, called peplomers [11-34]. They contain less genetic information which leads to less protein synthesis and use. The intact virus unit is called as virions and each virion is made up of nucleic acid core surrounded by Capsids to form nucleocapsid. It may be naked or open and composed of capsomer subunits [6, 32, 47, 52, 64].

The scientists Crick and Watson have shown that the tetrahedral, octahedral, and icosahedral symmetry of polyhedral capsids. Almost all viruses are icosahedral in shape because this shape is the most efficient shape for the packing and bonding of the capsomers and also they require less free energy. The icosahedron has 20 faces, each of which is a normal triangle, and thus each face has threefold rotating symmetry. There are 12 vertices where 5 faces meet, and thus every vertex has fivefold rotating symmetry. There are 30 edges in which 2 faces meet, and each border possesses twofold rotational symmetry [13-29]. Thus the icosahedrons are characterized by twofold, threefold, and fivefold symmetry axes. The icosahedral capsids size is fixed by its geometry and the size of the capsid determines genome

size. The basic structural unit of capsids is called as capsomer [26-42].

Capsomer is may be of two types namely, pentamers and hexamers. The pentamers are made up of five monomers while hexamers are made up of six monomers. The monomers are held together by weak bonds because of that only in some viruses the capsids breaks down into capsomers during purification [31-44]. According to the crystallography rules, an only a certain number of capsomers can be present in icosahedral capsids. The minimum number of capsomers can theoretically be 12, 32,42,72,92, 162, 252, 362,492, 642, and 812. Only 12 are pentamers and other rest is hexamers. The number of subunits in an icosahedral structure is 60T, where the permissible values of T are given by T = H 2 + HK + K 2, where H and K are integers and T is called the triangulation number. Permissible triangulation numbers are 1, 3, 4, 7, 9, 12, 13, 16, and so forth. A subunit defined in this way is not necessarily formed by one protein molecule, although in most cases this is how a structural subunit is in fact formed. Some viruses that form regular structures that are constructed using icosahedral symmetry principles do not possess true icosahedral symmetry [9, 11-14].

4. PATHOGENESIS

Once viruses got entered in the body through respiratory tract, host body shows cough, fever, and shortness of breath, muscle pain, sputum production and sore throat [1-7]. If it increases at high level then it will leads to severe pneumonia and multi organ failure. The tempo of deaths per quantity of diagnosed cases is on average 3.4%, ranging from 0.2% in those under 20, to approximately 15% in those over 80 years old [8-24]. Transmission Human coronaviruses most usually broaden from an infected person to healthy persons through the air by coughing and sneezing close personal contact, such as shaking hands or touching an object or surface with the virus on it [24-29], then touching your mouth, nose, or eyes before washing your hands Rarely, fecal contamination. In the United States, public typically get impure with common human coronaviruses in the fall and winter. Young children and older people are most likely to get infected [30].

5. CLINICAL TRIALS

In Seattle, the first clinical trial of a vaccine started with four volunteers on 16th march 2020. The vaccine contains a harmless genetic code copied from the virus that causes the disease. Along with these vaccines other antiviral drugs also used in trials and these were Remdesivir, Chloroquine and hydroxychloroquine, Tocilizumab, Favilavir and Passive antibody therapy [15-48].

The scientists from AYUSH India disclosed some Ayurvedic medicines or trails medicines against coronavirus such as Shadang paniya powder, Agastya haritaky powder, arsenicum album 30, and Khamira maarwareed [7].

6. TREATMENTS

Currently there is no any vaccine or drug available to protect humanity against human coronavirus infection. Take pain killers or fever relaxers. However we can protect ourselves by doing following things [1-8, 13-15].

- Clean hands often with soap and water for at least 20 seconds.
- Keep away from touching eyes, nose, or mouth with unwashed hands.
- Guard Stay home while are sick shun close contact with others.
- Cover mouth and nose with a tissue when you cough or sneeze, then throw the tissue in the trash and wash your hands.
- Clean and disinfect objects and surfaces.

7. CORONAVIRUS STATUS IN INDIA

The total number of coronavirus cases in India crossed 3 lakhs while the death toll is now more than 9000. The ministry reported a rise in cases by 10,000 in 24 hours for the first time. The health ministry said that India's Covid-19 count had for the first time seen an increase of more than 4,000 cases in 24 days [24]. A day after it said that there was no such ICMR study, the health ministry said on Saturday that there was a "statistical rate of growth-based analysis" that without a lockdown and containment measures, Covid-19 cases could be projected to spiral to 8.2 lakh by August 15, registering a 41% cumulative growth rate. Though the health ministry had on Friday denied reports about an ICMR study, it clarified that the chart was a statistical analysis [21-34]. Even as the 21-day lockdown looks set to be extended, the Centre in consultation with states is moving to restart economic activity in a graded manner in what marks a major change of approach in the fight against the Covid-19 pandemic. PM Modi said while the earlier mantra was "jaan hai to jahan hai (if there is life, you can enjoy the world)", the way ahead would be guided by "jaan bhi,

jahan bhi (life as well as our world)". Odisha, Punjab, Maharashtra and Telangana have extended the coronavirus lockdown till 3rd May [7].

8. CONCLUSION

It is concluded that the present scenario of the world is too much critical and the people have to aware about the same infection and their prevention. Therefore the present article may help to all to know about coronavirus.

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