American Journal of Biomedical Research, 2020, Vol. 8, No. 1, 15-18
Available online at http://pubs.sciepub.com/ajbr/8/1/3
Published by Science and Education Publishing
DOI:10.12691/ajbr-8-1-3

Corona Virus, Precaution and Some Treatments

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Received February 08, 2020; Revised March 09, 2020; Accepted March 17, 2020

Abstract More than 1,100 people have died after an outbreak of coronovirus in the central Chinese city of Wuhan, after that World Health Organisation has declared a global health emergency in World. The Corona Virus is an enveloped single-stranded RNA virus belonging to the family Coronaviridae. It causes a variety of diseases in mammals and birds but, in the last few decades, has shown to be capable of infecting humans as well. The outbreak of severe acute respiratory syndrome (SARS) in 2003 and, more recently, Middle-East respiratory syndrome (MERS) has demonstrated the lethality of CoVs when they cross the species barrier and infect humans. News reports of patients with an unknown pneumonia werefirst identified on 31 st December with the Wuhan Municipal Health Commission. On 1st January 2020, the seafood market was closed and decontaminated while countries with travel links to Wuhan went on high alert for potential travelers with unexplained respiratory disease.

Keywords: *corona virus, Coronaviridae, pneumonia, SARS-CoV*

Cite This Article: Ravi Kumar, Chhater Singh, Alimuddin Saifi, Sanjeev Kumar, and Bijander Kumar, "Corona Virus, Precaution and Some Treatments." *American Journal of Biomedical Research*, vol. 8, no. 1 (2020): 15-18. doi: 10.12691/ajbr-8-1-3.

1. Introduction

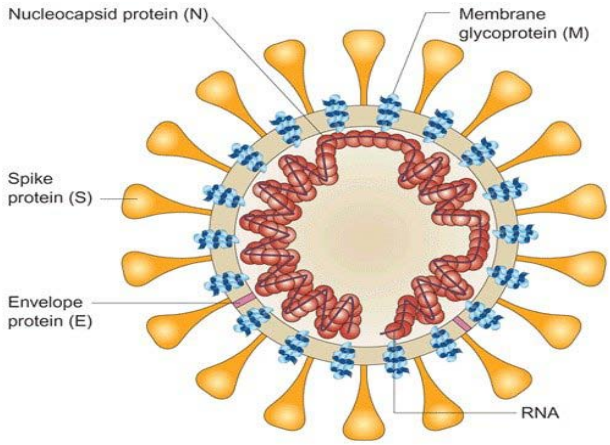
Corona virus (CoV) is a group of novel virus that caused thefirst major pandemic and enzootic infection. [1,2] Its belonging to the family of Coronaviridae within the order Nidovirales. [3] Coronaviridae are enveloped RNA viruses named after their corona or crown-like projection seen on electron microscopy. [4] The name "coronavirus" is derived from the Latin word corona, meaning crown or halo, Coronaviruses (CoVs) is primarily cause infections in birds and mammals but, in the recent days these infections shown in humans. [5]

Types- These are mainly four genera –

- **Alpha Corona Virusα(α-CoVs)-** The Alpha coronavirus are classified as feline FCoV, FECV (Feline Enteric Coronavirus) and FIPV (Feline Infectious Peritonitis Virus), Porcine TGEV (Transmissible Gastro- Enteritis Virus), Porcine PEDV (Epidemic Diarrhea Virus), PRCoV (Porcine Respiratory Coronavirus) and canine CCoV.
- **Beta Corona Virus(β-CoVs)-** Beta coronaviruses are spread through the mammalians, such as mice, human with SARS-CoV, HCoV-OC43, HCoV-HKU1, and MERS-CoV, Murine coronavirus (MHV) and Bovine Coronavirus (BCoV).
- **Gama Corona Virus (γ-CoVs)-** Gamma coronaviruses are transmitted through the birds, with one exception of a beluga whale.
- **Delta Corona Virs(δ-CoVs)-** The delta coronavirus genus was created in 2012 and subcategory are (HKU11, HKU12, HKU13). The fatality case is 50% in mammals. [6,7,8]

Virology- Corona viruses is an enveloped positive-sense single stranded RNA virus with a genome size of almost 30 kb, [9] And the protein of CoV is a short, integral membrane protein of 76–109 amino acids. [10] Some Proteins that contribute to overall structure of all corona viruses are the spike(S), envelope (E), membrane (M), and nucleocapsid (N), proteins are Peplomers, Hemagglutinin esterase.[11] The hydrophilic amino terminus of proteins consisting of 7–12 amino acids, and the hydrophobic transmembrane domain contain 25 amino acids. [12,13] The genome of these virus is predicted to have 14 functional open reading frames (ORFs), [14] Two large 5′-terminal ORFs, ORFs 1a and 1b,encode 16 non structural proteins are involved in the transcription and replication of the largest genome of all RNA viruses. [15,16,17] The S protein is a N-terminal signal sequence that gain access to the ER, and is heavily N-linked glycosylated. [18] Homotrimers of the virus encoded S protein make a spike structure on the surface of the virus. [19] The trimeric S glycoprotein can be help in the attachment to the host receptor. [20] The M protein is the most important protein for making the structure of virion. It is a small (~25–30 kDa) protein with 3 transmembrane domains, and it has a small N-terminal glycosylated ectodomain and a much larger C-terminal endodomain in viral particles. [21] The E protein (~8–12 kDa) is present in small quantities in the virion structure, it has a N-terminal ectodomain and a C-terminal endodomain and has an ion channel activity, this protein is opposed to the structural proteins and the ion channel is

required for Pathoenesis. [22,23] the N protein is present only in the nucleocapsid, The N-terminal domain and C-terminal domain are bind on RNA molecules with different mechanism. The N protein binds the viral genome in a beads-on-a-string type conformation. [24]



Structure of corona virus

2. Introduction of Virus into the Cell, Replication and Transcription –

The coronaviruse are entering into the cytoplasm of host cell. Firstly the viruses are bind to the receptor that present on the cell surface throgh the spike (S) protein. The S protein is bind with receptors and form a complex, after that the virus entery in the cell are start, and the virus particle are release the RNA genome, which is approximately 26-32 kb.

Symptoms- The person infected with corona virus are shown the symptoms like as ″pneumonia, [25]

- Fever
- Cough
- Sore throat
- Difficulty breathing.
- Diarrhea

Treatment- Since there are presently no effective drug for the treatment of CoV infections, and no effective vaccines against MERS-CoV infection, but some ancient drugs are small effective in the prevention of infection. [26]

- **Shuanghuanglian-** Shuanghuanglian (SHL) Injection, a Chinese medicine that prepared from the extract of honeysuckle, Scutellaria baicalensis, and fructus forsythia. These extract are commonly used for the treatment of various infectious diseases caused by bacterium or viruses in respiratory tract. [27,28] The main chemical components of this injection are –Chlorogenic acid, baicalin, and forsythia glycosides, which have ability to enhance the immunity and inhibit the viruses growth. [29] The SHLI can also enhance the NK cell activity, promote the production of alpha-interferon, and decrease the level of CD4+ cells and the ratio of CD4+/CD8+ while increasingCD8+ and the rate of lymphocyte transformation, It has been approved for treatment of ART infection since1973 in China. [30]
- **Liquorices-** The Liquorice are more commonly in India, and some important chemicals are present in this crude drugs, like as- Glycyrrhizin, Glycyrrhitic acid, and Liquiritoside etc. The glycyrrhizin are most active in inhibiting the replication of the SARS-associated virus. [31] Glycyrrhizin has a low selectivity index, but was a significantly potent inhibitor of replication of all the viruses tested. The mechanism of glycyrrhizin's activity against SARS-CV is unclear, But Glycyrrhizin are affects cellular signalling pathways such as protein kinase C; casein kinase II and transcription factors such as activator protein. The glycyrrhizin and its aglycone metabolite 18 glycyrrhetinic acid are regulate the synthesis of nitrous oxide synthase and help in the production of nitrous oxide, Nitrous oxide inhibits the replication of several viruses-eg. Japanese encephalitis virus4 (a member of the Flaviviridae family), which can also be inhibited by glycyrrhizin. [32,33]
- **Interferon with ribavarin-** The combnation of interferon and ribavarin are effective against coronaviruses, and these are inhibit the replication of corona virus. Immuno modulatory properties of inerferon which alter the effect of viral infection, like as potentiation of cytotoxic activity of lymphocytes. [38]

Precautions-: The Centers for Disease Control and Prevention-Healthcare Infection Control Practices Advisory Committee proposed guidelines, describing the methods and indications for these precautions are- [34].

Standard Precautions: Standard precautions are designed to reduce the risk of transmission from both recognized and unrecognized sources of infection, some important precautions are-

1. Correct and consistent use of available PPE and appropriate hand hygiene.
2. Perform hand hygiene before and after all patient contact, and after contact with respiratory secretions.
3. Ensure that environmental cleaning and disinfectants are used for all instruments/apparatus that are used in patients caring.The environmental surfaces are cleaning with water and detergent and applying commonly used hospital level disinfectants (such as sodium hypochlorite) is an effective and sufficient procedure.
4. Manage laundry, food service utensils and medical waste in accordance with safe routine procedures**.**
5. The Use a medical mask with an eye/facial protection, goggles or a face shield, gloves and a clean, non-sterile, long-sleeved fluid resistant gown.
6. Avoid the movement and transport of patients out of the room or open area unless medically necessary.
7. Cover the nose and mouth during coughing or sneezing with tissue or flexed elbow.
8. Respiratory protection must be worn both Hospital staff and visitors when entering the room. And use the respiratory protection devices.
9. Prevent of the infection through the banned the living animals purchasing and solding. Because the source and mode of transmission of the CoV in Wuhan, in seafood market where live animals are

also sold, it is thought that zoonotic transmission may be involved. [34,35,36]

3. Conclusion

Every patient is potentially at risk for acquiring and transmitting infectious diseases to other patients and Animals. Therefore, standard precautions should be necessory for patients admitted in a hospital. In Future research on coronaviruses will continue to investigate many aspects of viral replication and pathogenesis and find the suitable treatment that cure these infections. Many of the non-structural and accessory proteins encoded by these viruses remain uncharacterized with no known function, and it will be important to identify mechanisms of action for these proteins as well as defining their role in pathogenesis and diminish these non-structural protein with suitable medicine and protect humanity.

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