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Coronavirus: Family, how does it affect the body along with symptoms and treatment

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ABSTRACT

Coronavirus is a SARS (Severe Acute Respiratory Syndrome) like a virus in which this review article states how coronavirus affects the human body and mechanism of how it will enter the host cell. Knowing the mechanism of infection, a scientist can find an antidote within less span of time, not wasting on other processes. Coronavirus is Initially originated in China, Wuhan city and has become pandemic with 4,68,644 people got infected and death toll of about 21,191. India along counts about 614 cases and 9 deaths still now with Kerala standing in highest infections followed by Maharashtra. Presently several hot spots were created for carrying research on the virus. I hope that this article will create a foundation for discovering new vaccines and making the most possible way to cure the disease.

Keywords— Coronavirus, Angiotensin-converting enzyme 2(ACE 2), Spike protein (S), Lung cells

1. INTRODUCTION

Coronavirus is the deadliest, air transmissible disease where it affects vital organs like Lungs and Kidneys moreover it's mechanism is very less known. This review article will discuss the main point, how does *Coronavirus* affect the human lung cells. *Coronavirus* which is very well called as novel *Coronavirus* (n SARS COV-2) belongs to the family of *Caronaviridae* and it's the history of SARS(Severe acute respiratory syndrome) and MERS(Middle East respiratory syndrome) has caused a lot of deaths till date. It was said that this type of syndromes was caused by Bat species (*Rhinolophus spp.*) Genetic studies on novel *Coronavirus* through the Next-Gen Sequencing method have given that 98% of genetic material matches that of the viral Bat species.

Table 1: Zoonotic coronavirus that has caused serious disease in humans and agricultural animals

Coronavirus	Affected Host	Intermediate Host	Potential Reservoir/Ancestral Hosts	Similar Virus in Intermediate Host	Similar Virus in Reservoir Host
PEDV	Pigs	None identified	Bat (<i>Scotophilus kuhlii</i>)	None identified	BtCoV/512/05
SADS-CoV	Pigs	None identified	Bat (<i>Rhinolophus spp.</i>)	None identified	HKU2-CoV
SARS-CoV	Humans	Himalayan palm civet/raccoon	Bat (<i>Rhinolophus spp.</i>)	CoV isolate SZ3 and SZ16	SARS-related CoVs
MERS-CoV	Humans	Dromedary camels	Bat (<i>Taphozous perforatus</i> , <i>Rhinopoma hardwickii</i> and <i>Pipistrellus kuhlii</i>)	MERS-CoV—KFU-HKU 1 and KFU-HKU 13	BatCoV Rhhar, BatCoV Pikuh, BatCoV Taper

My study on this article intends how viral cell enters the respiratory system and mechanism of its infection. This paper also provides the latest work on how a vaccine is prepared and drugs being used to treat the disease.

2. MATERIALS

Cryo-electron microscopy is used for identifying viral cells infecting lung cells. The viral components are:

- Viral spike glycoproteins with S trimer, where after infection S trimer resolves into S1 and S2 proteins
- S1 - Receptor binding domain (RBD) binding to the enzyme.
- S2 – Role in membrane fusion.

The human cell components are:

- Angiotensin-converting enzyme 2(ACE 2) which is a protease domain.
- Amino acid transporter - B° AT 1.

3. METHODS

Human lung cells are of two types, 1. Mucous cells that secrete mucus, 2. Ciliated cells which remove dust particles and SARS-like virus affect ciliated cells where the viral cell attached to ACE 2 complex appearance is not yet noted. This ACE 2 combined with Amino acid transporter, B°AT 1 producing a complex. Where homologous trimers possess upper and lower configurations that get attaches to homodimers of ACE 2- B°AT-1 complex. Besides vital organs like kidneys and liver will also get affected. The study is done by using 3.5A° cryo-electron microscopy. Which is useful in finding the mechanism of infection.

4. RESULTS

The abstract tells about how *Coronavirus* effects the human body along with symptoms and its curation.

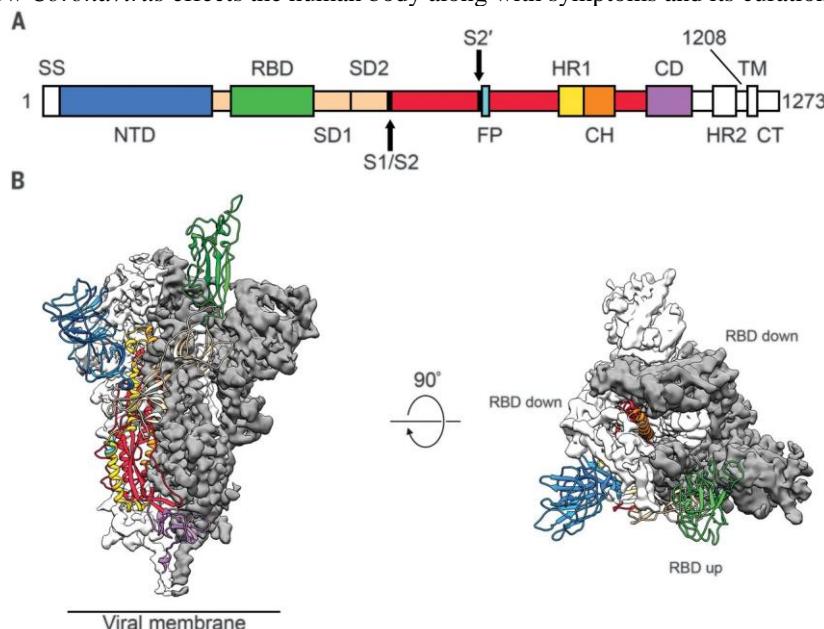


Fig. 1: The above figure is the structure of viral membrane spike protein with upper and lower configuration with S1 and S2 proteins

After attachment of the virus to the ACE 2- B°AT 1 complex, by leaving the viral outer glycoprotein it's genetic material (ssRNA) enters the lung cell which incorporates into human DNA by undergoing reverse transcription and produces viral proteins by undergoing lytic cycle. The variety of symptoms occurs in the body ranging from 7- 14 days, nausea, headache, muscle aches, sore throat, diarrhea, respiratory problems, influenza, and death occurs in severe cases. Since a lot of research is being done in finding a vaccine and an initial dose was given as phase -1 trial where the vaccine main principle is the “perfusion stabilized form of SARS COV-2 spike protein”, the vaccine can also be prepared by inhibiting the interaction of virus to the ACE 2 - B°AT-1 complex. Some combinatorial drugs like the one which treats for *Ebola- Remdesivir* and *Malaria- Chloroquine and Hydroxychloroquine* are now used as a trial to treat *Coronavirus*. Through this article, it was learned how different curative process was done in the form of drugs and vaccine.

5. DISCUSSION

The major findings of this article are the mechanism of infection, where people are not aware of finding how this new virus which was never seen before effects the body. My paper also finds how various methods of preparation of vaccine is done. This paper hasn't yet discussed ACE 2- B°AT -1 complex found on the mucous cells of lungs and also about recovery methods from the virus since it was not yet found. By this I close the topic of *coronavirus*: it's a mechanism of infection, symptoms, and treatment, I also recommend people to get sanitized and stay healthy.

6. REFERENCES

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