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ORIGIN.

The Coronavirus disease 19 (COVID-19) is a highly transmittable and pathogenic viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which started from Wuhan, China and spread around the world. Genome analysis shows that it is genetically related to SARS like viruses which is gotten from bats and thus the primary reservoir, then to the intermediate source origin (Pangelon) which can then be mutated to humans which in turn causes

COVID-19.

ETIOLOGY.

COVID-19 is a virus which belongs to the family *corovarinidae* in the *Nidoviradae* order which it's primary origin is the bat and then to the pangalon which is then transmitted to humans. In which the human to human transmissions has been widely confirmed and also through fecal outlet or respiratory droplets (coughing, sneezing). Fecal outlet - in which infected individual touches the surrounding and then an un-infected individual can inoculate himself by touching this surfaces and then touching the mucous

membranes. This could also be contacted through faulty drainage system.

Respiratory droplet - which includes coughing and sneezing. This droplet can cause infection in individual within 3-6 feet's close, and also can stay on surfaces which could survive approximately 24 hours and then cause infection when touched by an infected individual. This could cause infect by using these parts(hands) that carries the infection to touch the mucous membranes and inoculate themselves.

It could also be airborne for about 3 hours by research which could cause infection also.

COVID-19 can be symptomatic or asymptomatic(although could also cause the spread of the infection). The virus gets into the respiratory system which attaches to the alveolar(in the lungs) to the type 2 pneumocyte of the alveolar which's are the structure responsible for the production of surfactants which helps reduce surface tension of the lungs to prevent collapsing of the alveolar.

The spike protein of the virus which attaches to the membrane of the host cell binds the type 2 receptor pneumocyte which is called angiotensin II(receptor enzyme II) which allows for

the virus to be engulfed and taken into the cell which releases its RNA and the host ribozymes converts the mRNA to a protein(translation)The single stranded RNA converts to specific protein molecules which then are proteolyzed to whole virus particle structure by enzyme proteonase.RNA dependent RNA polymerase also converts thr single stranded RNA to more RNAs.

STRUCTURE .

It is approximately 50-200nm in diameter like other coronaviruses.It has four structural proteins;S(spike),

E(Envelope),M(membrane), and N(nucleocapsid) proteins.The N protein holds the RNA genome and the S,E and M proteins together creates viral envelope.

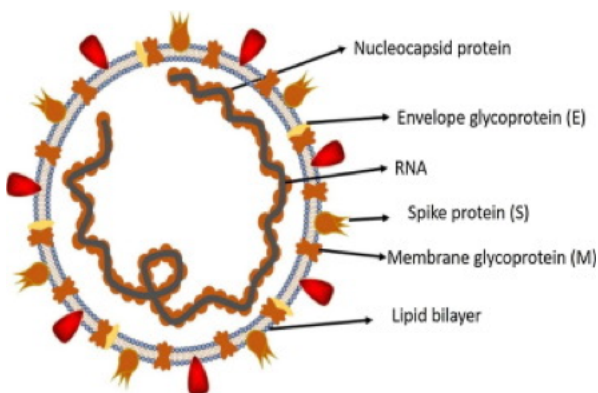


Figure : structure of respiratory syndrome causing Coronavirus .

PATHOPHYSIOLOGY.

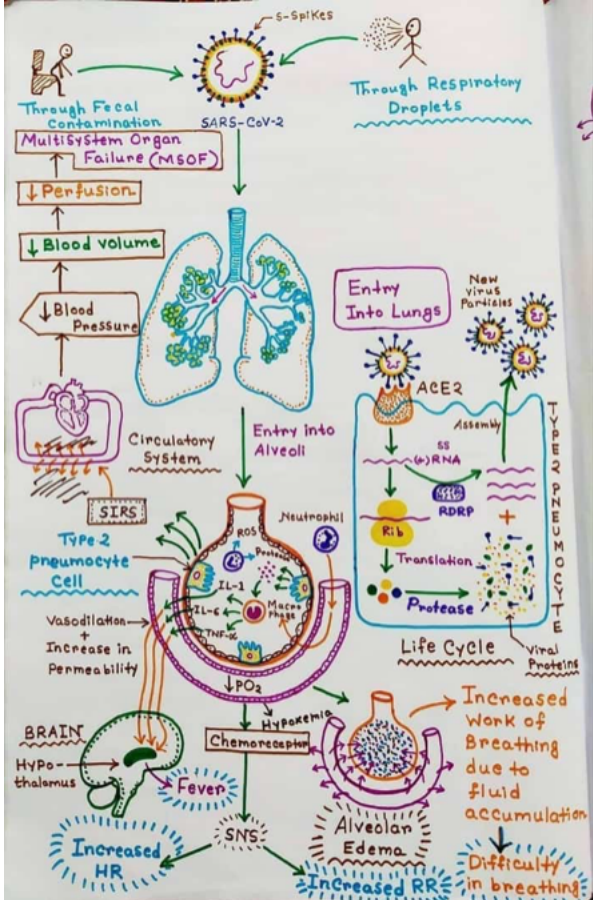


Figure 2 : Summary of the infection.

The lung(alveolar) is the mostly affected organ by COVID-19 because the access the host cell through the enzyme ACE 2 which is abundantly in type 2 alveolar cells of the

lungs. These viruses cause damages to the type 2 pneumocyte causing the release of specific inflammatory mediator cells stimulating the macrophages and then secreting specific cytokines that come into the blood stream causing the dilation of the smooth muscle and contraction increasing the permeability; This permeability causes vasodilation and increases capillaries permeability. The fluid in the plasma then gets into the interstitial and the alveolar which start to accumulate outside the alveolar compressing it and some enters the alveolar affecting the production of

surfactants and in turn causing alveolar oedema (leading to increasingly surface tension and then collapsing pressure causing alveolar collapse). Accumulated fluid outside the alveolar causes decrease in gas exchange, hypoxia and difficult breathing which leads to ARDS.

The intervention of the neutrophils although may kill one of the viruses but will cause lung consolidation which also alters gas exchange and then hypoxemia and alveolar collapse.

The hypothalamus through the release of the interleukin I and VI release through the blood to the CNS which

stimulates the hypothalamus to release prostaglandin by PGE II which causes increase in temperature (fever). Inflammation of the lungs in severe cases that causes leaching into the blood stream causing systemic inflammatory response into different parts of the body and the ARDS and to septic shock, cardiac permeability, hypotension due to reduction blood volume; This multisystem organs failure which starts from pneumonia from the lungs in the alveolar.

Symptoms includes; Cough, sneezing, fever which are the primary

symptoms.

Others include

hypoxemia, increase heart rate, increase respiration rate,, increase

Alt, AST, creatinine e.t.c.

Diagnosis includes ;

- Firstly thug clinical history should be taken.

- Complete blood cell count(which presents with increase lymphocytes.

- CMP.

- Nasopharyngeal swab.

(helps to rule out influenzas A and B infection)

- Fever(high temperature)

- RT-PCR(Sensitive but takes time).Test using sputum,aspirate,Nasopharyngeal swab,blood)

- Nucleic acid amplification

test(NAAT) but quite expensive.

-Also

CT scan It shows ground glass

opacity,consolidation and crazy paving patterns.

Ultrasound which shows pleural line

thickening,increase B- lines within the specific

zones,and lung

consolidation with bronchograms.

[https://
en.m.wikipedia.org/wiki/
Coronavirus_disease_2019](https://en.m.wikipedia.org/wiki/Coronavirus_disease_2019)

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