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**MATRIC NUMBER:** 18/MHS07/016

**LEVEL**: 200 LEVEL

**COLLEGE**: MEDICINE AND HEALTH SCIENCES

**DEPARTMENT**: PHARMACOLOGY

**DATE:** 14TH APRIL, 2020

**ASSIGNMEN T**: ConVid-19 is the ongoing viral pandemic in the world and the reason you are at home. Discuss the anatomical application on this virus on the respiratory system of humans.

Corona virus is a large positive strand RNA virus that can affect the respiratory tract. The genomic RNA is capped, polyadenylated and associated with nucleocapsid proteins within an enveloped virion. The envelope is covered by the characteristic surface called glycoprotein, the glycoprotein gives it a crown-like appearance which hooks the cell membrane allowing the genetic material of the virus to enter the human cell. Corona virus spreads through droplets transmitted into the air from coughing or sneezing, people near can take in through the mouth, nose or eyes. It affects the respiratory system when the viral particles in the droplets go through the nasal passage of the mucous membrane in the back of the throat. The mucous membrane lines the mouth, nose and eyes. At the mucous membrane the viral particles attach to a particular receptor in cells. The genetic material of the viral particles hijacks the metabolism of the cell and multiplies itself . The copies burst out and infect other neighbouring cells. The symptoms of corona virus often starts with the throat, it causes sore throat and dry cough. The virus can move down the bronchial tubes. When the virus reaches the lungs, it attacks it in three phases;

* Viral replication
* Immune hyper-reactivity
* Pulmonary( lung) destruction

The alveoli are tiny sacs of air where gaseous exchange occurs inside the lung. The alveoli is wrapped with capillaries where red blood cells release carbondioxide and pick up oxygen . The alveoli has two cells that facilitate gas exchange, they are type 1 alveoli cell and type 2 alveoli cell. The type 1 alveoli cells are thin enough for oxygen to pass through while the type 2 alveoli cell secretes surfactant. Surfactant is a substance that lines the alveolus and prevents it from collapsing. When the virus reaches the lungs their mucous membrane becomes inflamed which can damage the alveoli or lung sac. The alveoli will have to work harder to carry out its functions which is to supply oxygen to the blood that is circulated through out the body and remove carbondioxide from the blood for it to be exhaled. When the immune system affects the area of infection, it also kills the alveoli cells which causes three things that hinder gas exchange;

* Alveoli collapse due to loss of surfactant from type 2 alveoli cell
* Less oxygen enters the blood stream due to the lack of type 1 alveoli cell
* More fluid enters the alveoli.

Response of the immune system

The process of the viral particles hijacking cells to reproduce, causes inflammation in the lungs which triggers an immune response. As this process unfolds, fluids begin to accumulate in the alveoli resulting in a dry cough and making breathing difficult.

* After the infection, Type 2 alveoli cell release inflammatory signals that recruit macrophages.
* Macrophages release cytokines that cause vasodilation which allows more immune cells to come to the sites of injury and exit the capillary.
* Fluid accumulates inside the alveoli.
* The fluid dilutes the surfactant which triggers the onset of alveoli collapse, decreasing gas exchange and increasing the work of breathing.
* Neutrophils are recruited to the site of infection and release reactive oxygen species(ROS) to destroy infected cells.
* Type 1 and 2 alveoli cells are destroyed leading to the collapse of the alveolus and causing acute respiratory distress syndrome(ARDS)
* If inflammation becomes severe, the protein rich fluid can enter the blood stream and travel elsewhere in the body causing systemic inflammatory response syndrome (SIRS).
* SIRS may lead to septic shock and multi-organ failure which can have fatal consequence.

The inflammation of the mucous membrane and impaired flow of oxygen can cause the alveoli and lung sac to be filled with fluids, pus and dead cells which could result in pneumonia. Corona virus is associated respiratory disease such as severe acute respiratory disease and middle-east respiratory syndrome.

The symptoms of covid-19 are fever, cough, shortness of breath. It can signal any number of illnesses from flu to strep throat (streptococcal pharyngitis) to the common cold.

The death of people suffering from corona virus is due to the systemic inflammatory response syndrome( SIRS) which occurs as the protein rich fluid from the lungs enters the bloodstream resulting in septic shock and multi-organ failure.