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**NAME: ODENIYI IBUKUN ABIOLA**

**DEPARTMENT: ANATOMY**

**COURSE: ANA 204 (HISTOLOGY OF SYSTEMS)**

**ASSIGNMENT**

Explain the histologic basic of the upper respiratory system (conducting portion of the respiratory system) attacked by the corona virus.

COVID-19 is a mild to severe respiratory illness that is caused by a coronavirus (severe acute respiratory syndrome coronavirus 2 of the genus *Betacoronavirus*), is transmitted chiefly by contact with infectious material (such as respiratory droplets

), and is characterized especially by fever, cough and shortness of breath and may progress to pneumonia and respiratory failure. COVID-19 was first identified in Wuhan, China in December, 2019.

The new strain (COVID-19) is so genetically similar to SARS that it has inherited the title SARS-CoV-2. So combining early research the new outbreak with the past lessons from SARS (severe acute respiratory syndrome) and MERS can provide an answer.

**The Lungs: Ground Zero**

For most patients, COVID-19 begins and ends in their lungs, because like the flu, coronaviruses are respiratory diseases. They spread typically when an infected person coughs or sneezes, spraying

droplets that can transmit the virus to anyone in close contact. Coronavirus also causes flu-like symptoms: Patients might start out with a fever and cough that progresses to pneumonia or worse.

After the SARS outbreak, the World Health Organization reported that the disease typically attacked the lungs in three phases: viral replication, immune hyper-reactivity, and pulmonary destruction.

Not all patients went through all three phases- in fact only 25% of SARS patients suffered respiratory failure, the defining signature of severe cases. Likewise, COVID-19, according to early data, causes milder symptoms in about 82% of cases, while the remainder are severe or critical. “This novel coronavirus appears to follow other patterns of SARS” according to Matthew B. Frieman, University of Maryland School of Medicine associate professor, who studies highly pathogenic coronaviruses.

In the early days of an infection, the novel coronavirus rapidly invades human lung cells. Those lung cells come in two classes: ones that make mucus and ones with hair-like batons called cilia. Mucus though gross when outside the body, helps protect lung tissue from pathogens and make sure your breathing organ doesn’t dry out. The cilia cells beat around the mucus, clearing out debris like pollen or viruses. Frieman explains that SARS loved to infect and kill cilia cells, which then sloughed off and filled patients’ airways with debris and fluids, and hypothesizes that the same is happening with the novel coronavirus. That is because the earliest studies on COVID-19 have shown that many patients develop pneumonia in both lungs, accompanied by symptoms like shortness of breath.

That is when phase two and the immune system kicks in. Aroused by the presence of a viral invader, our bodies step up to fight the disease by flooding the lungs with immune cells to clear away the damage and repair the lung tissue. When working properly, this inflammatory process is tightly regulated and confined only to infected areas. But sometimes our immune system goes haywire and those cells kill anything in their way, including the health tissue. So the individual gets more damage instead of the immune response. Even more debris clogs up the lungs, and pneumonia worsens.

During the third phase, lung damage continues to build-which can result in respiratory failure. Even if death doesn’t occur, some patients survive with permanent lung damage. According to the World Health Organization, SARS punched holes in the lungs, giving them “a honeycomb-like appearance”-and these lesions are present in those afflicted by the novel coronavirus too. These holes are likely created by the immune system’s hyperactive response, which creates scars that both protect and stiffen the lungs. When that occurs, patients often have to be put on ventilators to assist their breathing. Meanwhile, inflammation also makes the membranes between the air sacs and blood vessels more permeable, which can fill the lungs with fluid and affect their ability to oxygenate blood. In severe cases, fluids food the lungs and restricts breathing which eventually leads to death.

**REFRENCES**

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