

**NAME:** Okungbowa Faith.

**MATRIC NUMBER:** 18/MHS03/011.

**DEPARTMENT:** Anatomy.

**COURSE TITLE:** Histology of Systems.

**COURSE CODE:** ANA 204.

**QUESTION:** Explain the histological basics of the upper respiratory system (conducting portion of the respiratory system) attacked by coronavirus.

**ANSWER**

The conducting portion of the respiratory system consists of the nasal cavity, pharynx, larynx or voice box, trachea, windpipe, two primary bronchi, secondary, tertiary and terminal bronchioles. There are also series of interconnected cavities and tubes both inside and within the lungs providing a route for the air to reach the lungs, while conditioning it by filtering, warming, cooling and moistening air by conducting it into the lungs. The conducting passages are called ducts, the conducting portions are lined by ciliated pseudostratified columnar epithelial tissue which includes mucus secreting goblet cells, the ciliary beating sweeps mucus and dust it carries up the bronchi and trachea towards the pharynx where it can be swallowed. Small sacs or alveoli lined by a simple squamous epithelium. In any gland, each alveolus is enveloped by capillaries.

**Nasal Cavity:** The two nasal cavities open to the exterior by external nostrils, the nasal chamber is lined by ciliated columnar epithelium which is dotted with mucus cells that secrete mucus. The wall of each half of the nasal cavity is divisible into 3 distinct regions; Vestibule, Olfactory mucosa, Respiratory mucosa.

**Pharynx:** This is a common passage of the respiratory and digestive system, it has 3 parts; Anterior nasal pharynx, Middle oral pharynx and Posterior laryngeal pharynx. The pharynx is lined by both stratified squamous and ciliated pseudostratified epithelium with goblet cells. Different regions are lined by a different type of epithelium. Regions of the pharynx that are likely to be roughened up by food are lined by stratified squamous epithelium.

**Larynx:** The pharynx opens into the larynx and a regular tube through the opening called the glottis. Larynx controls the air pathways and is a specialized organ responsible for production of voice. It houses the two vocal cords. The wall of the larynx has a complex structure made up of a number of cartilages, membranes and muscles. It is lined by ciliated pseudostratified columnar epithelium except the vocal cords lined by stratified squamous epithelium.

**Trachea:** This a fibroelastic cartilaginous tube. It is a cylindrical tube about 12cm starting from the larynx to the bifurcation of the two primary bronchi, it is strengthened with 16-20 rings of hyaline cartilages that are connected by dense fibro elastic ligaments. The trachea consists of 4 layers; mucosa, submucosa, cartilage and smooth muscle layer, adventitia. Trachea is lined with a layer of pseudostratified ciliated columnar epithelium. The epithelium contains goblet cells, which are glandular, modified simple columnar epithelial cells that produce mucins, which are the main components of mucus. Mucus helps to moisten and protect the airways.

**Bronchi:** The trachea divides into two tubes called bronchi and each bronchus enters the lungs at the hilum. They have a similar structure to that of the trachea and they are lined by pseudostratified columnar epithelial tissue.

**Bronchioles:** Each primary bronchus divides into smaller secondary bronchi, there are 3 in the right lung and 2 in the left lung, the secondary bronchi further subdivide to give rise to tertiary bronchi and terminal bronchioles with diameter less than 1mm. It is lined by simple cuboidal epithelium.

In relation to the conducting portion attacked by coronavirus, Gas exchange is carried out by small alveoli sacs that make up most of the space in the lungs, the inhaled virus likely binds to the epithelial cells in the nasal cavity and passes through the air sac and then passes through the thin walls of the alveoli to the red blood cells and surrounding capillaries. The way oxygen is transferred to the blood and carbon dioxide is returned to the alveoli to be released from the lungs is the same way the virus enters into the body of an individual. The vitro data shows that the ciliated cells are primary cells infected in the conducting airways. The virus migrates down the respiratory tract from the nasal cavities > to pharynx > to larynx > to trachea where it incubates for a few days > to bronchi > to bronchioles and then into the lungs where it collapses the alveoli enough for the patient to start developing other respiratory tract infections. A greater immune response is triggered, nasal swabs would yield the virus as well as the innate immune response and at this point, the virus is completely manifested in the individual.

