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ANATOMY

18/MHS01/088

ANA 204 (HISTOLOGY)

Question: Explain the histological basic of the upper respiratory system (conducting potion of the respiratory system) attacked by the corona virus.

 Corona virus is a global pandemic with a death toll of over 2 million, as it affects daily lives and function putting majority of the world’s activities to a halt. The name coronavirus comes from the Latin word corona, meaning crown or halo. Under an electron microscope, the virus looks like it is surrounded by a solar corona.The novel coronavirus, identified by Chinese authorities on January 7 and since named SARS-CoV-2, is a new strain that had not been previously identified in humans. It’s a respiratory virus and thus it enters through the respiratory tract.

When the virus enters the body, it begins to attack. Once inside the body, it begins infecting epithelial cells in the lining of the upper respiratory tract, which includes the nose, mouth, larynx and bronchi. Infection of human respiratory airways by SARS-Cov-2 typically produces mild common cold symptoms. However, infection by a recently emerged can lead to a fatal pneumonia characterized as severe acute respiratory syndrome (SARS). A protein on the receptors of the virus can attach to a host cell's receptors and penetrate the cell. Inside the host cell, the virus begins to replicate until it kills the cell. The patient begins to experience mild version of symptoms: dry cough, shortness of breath, fever and headache and muscle pain and tiredness, comparable to the flu.

Symptoms become more severe once the infection starts making its way to the lower respiratory tract.

THE UPPER RESPIRATORY TRACT

The upper respiratory tract consist of organ forming the conducting portion of the respiratory system. This conducting portion main function is the conditioning and conduit for the passage of air to and from the alveoli.

 We will start by looking at the several organs of the upper respiratory tract which are: nasal cavities, pharynx, larynx, trachea, bronchi, bronchioles, and terminal bronchioles. It should be under stood that majority of the conducting portion is lined by the RESPIRATORY EPITHELIUM, and a small portion by OLFACTORY EPITHELIUM. This organs possess 4 layers consisting of cells, glands and muscles. They are: Mucosa, Submucosa, Muscularis and Adventitia or Serosa.

RESPIRATOTY EPITHELIUM

Most of the nasal cavities and conducting portion of the system is lined with mucosa having ciliated pseudostratified columnar epithelium commonly known as Respiratory epithelium. This epithelium has five major cell types, all of which contact an unusually thick basement membrane:

1. Ciliated columnar cells are the most abundant, each with 250-300 cilia on its apical surface
2. Goblet cells are also numerous and predominate in some areas (Figure 17–2), with basal nuclei and apical domains filled with granules of mucin glycoproteins
3. Brush cells are a much less numerous, columnar cell type, in which a small apical surface bears sparse, blunt microvilli and synaptic contact with afferent nerve endings on their basal surfaces
4. Small granule cells are difficult to distinguish in routine preparations, but possess numerous dense core granules 100-300 nm in diameter
5. Basal cells are mitotically active stem and progenitor cells that give rise to the other epithelial cell types.

OLFACTORY EPITHELIUM

The olfactory chemoreceptors for the sense of smell are located in the olfactory epithelium, a specialized region of the mucous membrane covering the superior conchae at the roof of the nasal cavity. This thick, pseudostratified columnar epithelium has three major cell types:

1. Olfactory neurons are bipolar neurons present throughout this epithelium. Their nuclei form an irregular row near the middle of this thick epithelium. The apical (luminal) pole of each olfactory cell is its dendrite end and has a knoblike swelling with about a dozen basal bodies, from which long cilia project into the overlying aqueous layer.
2. Supporting cells are columnar, with narrow bases and broad, cylindrical apexes containing the nuclei and extending microvilli into the fluid layer. Well-developed junctional complexes bind the supporting cells to the olfactory cells.
3. Basal cells are small, spherical or cone-shaped cells near the basal lamina. These are the stem cells for the other two types, replacing the olfactory neurons every 2-3 months and support cells less frequently.

SYMPTOMS OF SARS-COV-2:

Early [symptoms](https://www.webmd.com/lung/covid-19-symptoms) include:

* [Fever](https://www.webmd.com/lung/what-is-a-fever)
* Dry cough
* Fatigue

The virus can lead to [pneumonia](https://www.webmd.com/lung/understanding-pneumonia-basics), respiratory failure, [septic shock](https://www.webmd.com/a-to-z-guides/sepsis-septicemia-blood-infection), and death. If you notice the following severe symptoms in yourself or a loved one, get medical help right away:

* [Trouble breathing](https://www.webmd.com/lung/breathing-problems) or shortness of breath
* Ongoing [chest pain](https://www.webmd.com/pain-management/guide/whats-causing-my-chest-pain) or pressure
* New confusion
* Can’t wake up fully
* Bluish lips or face

CONCLUSION:

SARS-CoV-2 is a disease that can cause what doctors call a respiratory tract infection. It can [affect your upper respiratory tract](https://www.webmd.com/lung/coronavirus-covid-19-affects-body) (sinuses, nose, and throat) or [lower respiratory tract](https://www.webmd.com/lung/what-does-covid-do-to-your-lungs) (windpipe and lungs).

It spreads the same way other coronaviruses do, mainly through person-to-person contact. Infections range from mild to serious, that cause severe diseases like Middle East respiratory syndrome (MERS) and sudden acute respiratory syndrome (SARS). It is advised to cultivate social distancing and abstaining from crowded areas.

REFERENCES:

1. <https://www.webmd.com/lung/coronavirus>
2. <https://www.ncbi.nlm.nih.gov/pubmed/11829103>