Introduction to Histology: Respiratory System

Pre-laboratory Questions

1. Describe the components of the upper respiratory tract?

   The upper respiratory tract consists of the pharynx, larynx, and the nasal cavity. The nose and the nasal cavity provide an airway for respiration. The paranasal sinuses surround the nasal cavities. These sinuses are air-filled and they help warm up and humidify the air that gets breathed in. Mucous also surrounds these areas. The pharynx then connects the nasal and oral cavities to the larynx and esophagus. During respiration, the air enters through the larynx, trachea, nasal, and oral cavity. The pharynx has 3 different regions: nasopharynx, oropharynx, and the laryngopharynx. These are airways and food also goes through the oropharynx. The last one is the larynx. This contains our vocal cords and it allows us to breathe and talk. This connects to the lower part of the pharynx and it keeps the air passage during breathing and digestion. It is composed of nine cartilages and an important one is the epiglottis. The epiglottis opens and closes when we eat. It will steer food down the right path to the esophagus.

2. What is the difference between the conducting portion of the respiratory system and the respiratory portion?

   The conducting portion of the respiratory tract starts at the nasal cavity. It will then extend through the pharynx, larynx, trachea, bronchi, and larger bronchioles. The conducting zone provides a passageway for incoming and outgoing air. It conditions the air and brings it into the lungs. It also removes debris and pathogens from incoming air. The respiratory portion contains the smallest bronchioles, alveolar ducts, and the alveoli. Gas exchange usually occurs here.

3. What is the function of the cartilage rings in the conducting portion of the respiratory system?

   The cartilage rings cover and protect the trachea. They are made of hyaline cartilage and are connected by dense connective tissue. The trachealis muscle and the elastic connective tissue together forms the fibroelastic membrane. This membrane connects the cartilage rings. It allows the trachea to stretch and expand when needed. The cartilage is there to also provide support and prevent the trachea from collapsing.

4. What is the function of the mucosa?

   The mucosa's function is to produce mucus. It is also responsible for absorption, digestion, and transporting the nutrients absorbed. There are 3 layers of the mucosa: epithelium, lamina propria, and the muscularis mucosa. The epithelium comes in direct contact with ingested food. The goblet cells in this layer will secrete mucus and fluid into the lumen and the enteroendocrine cells will secrete hormones into the interstitial spaces. The epithelial layer helps preserve the health of the alimentary canal as well. The lamina propria contains numerous blood and lymphatic vessels that helps with transporting absorbed nutrients. It also serves as an immune function by housing lymphocytes. The last layer is the muscularis mucosa. This is a thin layer of smooth muscle that pulls the mucosa of the stomach and small intestines into folds. This helps increase the surface area for digestion and absorption of the ingested food.

5. What is the name of the layer of loose connective tissue present throughout the respiratory system?

   The loose connective tissue layer throughout the respiratory system is the lamina propria.

6. In which structure in the lungs does the gas exchange take place?

   Gas exchange takes place in the alveoli of the lungs.

7. What are cilia and what is their function in the trachea?

   Cilia are hair-like structures that line the trachea. Their function in the trachea is to sweep fluids and trap foreign particles out of the airway. By doing this, they can keep it out of the lungs.

8. In which layer, can we find the tracheal glands?

   Tracheal glands are found in the submucosa layer of the trachea.

9. Why is there a smooth muscle present in the alveolar duct?

   The smooth muscles that are present in the alveolar duct helps with controlling the movement of air.

10. Why are there many blood vessels in between the alveolar sacs?

The alveolar sacs contain many blood vessels in between them because it helps with the gas exchange.