The primary functions of the respiratory system are 1) smell, 2) air conduction, and 3) the exchange of oxygen and carbon dioxide between the animal and the environment, referred to as respiration. This chapter will cover the respiratory system.

Chapter Learning Objectives

By the end of this chapter, you should be able to do the following:

• Compare and contrast the histologic features, cell composition and functional differences between respiratory epithelium and olfactory epithelium.
• Describe the histologic features and functions of the vomeronasal organ.
• List four functions of the conducting airways.
• Compare and contrast the histologic features of the trachea, bronchi, and bronchioles.
• Describe the structures that form the alveolar air-blood barrier.
• Compare and contrast the histologic features and functions of the alveolar cells: type I pneumocytes, type II pneumocytes, and alveolar macrophages.
Review Questions

By the end of this chapter, you should be able to answer the following:

• Respiratory epithelium is common to the upper respiratory tract (e.g. nasal cavity) and lower respiratory tract (e.g. bronchi). What are the primary functions of respiratory epithelium?

• What histologic features distinguish the trachea from the mainstem bronchi? What features distinguish mainstem bronchi from bronchioles?

• What are two separate disease processes that could contribute to the loss of smell (Hint: consider the “peripheral” aspects of the sense of smell as well as the “central” aspects).

• What are the normal functions of the mucociliary escalator and which cells contribute to this function? What would be the consequences of damage to or reduction in the efficiency of the mucociliary escalator?

• What structural features of alveoli facilitate gas exchange?