

1. Which body system does the respiratory system work in close conjunction with to supply and rid the body of various gases? cardiovascular system
2. The respiratory system is responsible for the uptake of oxygen gas and the removal of carbon dioxide gas.

Functional Anatomy of the Respiratory System

3. List the major organs of the respiratory system.

Nose, pharynx, larynx, trachea, bronchi, bronchioles, and lungs (including alveoli)

4. In which organs of the respiratory system does all of the gas exchange occur at? alveoli
5. Because all of the gas exchange occurs at the structures in the previous questions, all other organs and structures of the respiratory system are considered conducting passageways.
6. As air is inhaled through the respiratory passageways, what happens to it? Why is this important?

As air is inhaled it is purified, humidified, and warmed. Therefore when this air reaches the lungs it is cleaner (has fewer irritants such as dust or bacteria) and is warm and damp.

The Nose

7. The nose is the only externally visible structure of the respiratory system. Air enters through the nostrils or external nares.
8. What are the olfactory receptors and where are they located?

The olfactory receptors that enable the sense of smell are located in the mucosa (mucous membrane) in the superior portion of the nasal cavity, just beneath the ethmoid bone.

9. Explain how the respiratory mucosa help with the three functions mentioned in Question #6.

The respiratory mucosa rests on a rich network of thin-walled veins that warms the air as it flows by. The sticky mucus produced by the mucosa's glands moistens the air and also traps incoming bacteria and other foreign debris. The cells of the nasal mucosa are ciliated and create movement that propels contaminated mucus posteriorly toward the throat so that it can be swallowed and digested.

10. What type of specific tissue, from Unit 2, mostly lines the respiratory tract?

Pseudostratified ciliated columnar epithelial tissue

11. Explain why many people often experience runny noses on cold winter days.

The low temperatures on cold winter days make the mucosal cilia sluggish so mucus builds up in the nasal cavity and may dribble out toward the nostrils.

12. What are the nasal conchae and what respiratory functions do they serve?

The nasal conchae are the uneven, mucosa covered projections, or lobes, on the lateral walls of the nasal cavity. Nasal conchae greatly increase the surface area of the mucosa exposed to the air, and increase air turbulence which traps inhaled particles onto the mucus-coated surfaces, where they are trapped and prevented from reaching the lungs.

13. List and briefly explain the two subdivisions of the palate.

Hard Palate—the partition that separates the nasal cavity from the oral cavity and is supported by bone (roof of mouth located anteriorly)

Soft Palate—the partition that separates the nasal cavity from the oral cavity and is unsupported (roof of mouth located posteriorly)

14. List the four types of paranasal sinuses. What function do these structures do these serve in the human body?

The paranasal sinuses include: the frontal, sphenoid, ethmoid, and maxillary sinuses. Sinuses lighten the skull, act as resonance chambers for speech, and produce mucus (which drains into the nasal cavities).

15. Explain the difference between rhinitis and sinusitis.

Rhinitis—inflammation of the nasal mucosa causing nasal congestion and post nasal drip (a result of cold viruses and allergens)

Sinusitis—inflammation of the sinuses caused blockage by mucus or infectious matter, sinus headache is common due to partial vacuum within sinus cavity

16. The pharynx, commonly known as the throat, has three subdivisions. What are they?

Nasopharynx—superior portion

Oropharynx—middle portion

Laryngopharynx—inferior portion

17. What are tonsils? What are the three types? What functions do they serve? (p.355)

Tonsils are clusters of lymphatic tissue found in the pharynx (throat). Tonsils function to trap and remove any bacteria or other foreign pathogens entering the throat.

Pharyngeal tonsils (adenoids)—located high in the nasopharynx

Palatine tonsils—located in the oropharynx at end of soft palate

Lingual tonsils—located at the base of the tongue

18. What is the larynx? What is its overall function?

The larynx, or voice box, is located inferior to the pharynx and is formed by 8 rigid hyaline cartilages and the epiglottis (a flap of elastic cartilage)

The larynx functions to route air and food into the proper areas and plays a role in speech.

19. How is food prevented from entering the larynx?

Food is prevented from entering the larynx because the epiglottis, the “guardian of the airways”, protects the superior opening of the larynx. When we swallow food or fluids, the larynx is pulled upward and the epiglottis tips, forming a lid over the opening of the pharynx.

20. What is the name given to the two folds inside the larynx? What major function do these folds serve?

The pair of folds within the larynx are called the vocal folds, or true vocal cords. The vocal cords vibrate with expelled air allowing speech to occur.

21. The trachea, or windpipe, is made primarily of hyaline cartilage. It is lined with ciliated mucosa which constantly move (beat continuously) to propel mucus away from the lungs to be swallowed or spat out.

22. Even though the list of reasons is quite large and convincing, explain how smoking affects the cilia of the trachea alone and how this results in ‘smoker’s cough.’

It paralyzes the cilia by inhibiting ciliary activity and makes them sluggish. It also destroys them long-term and prevents their removal of mucus. The only remaining for mucus removal is coughing – hence the name “Smoker’s cough.”

23. Explain how the structure of the trachea assists it in its functions within the respiratory system.

The trachea is fairly rigid and is lined with C-Rings of hyaline cartilage. The open parts of these rings lean upon the esophagus and allow it to expand anteriorly when we swallow large pieces of food. The solid portions support the tracheal walls and keep it open in spite of pressure changes during breathing.

24. What is the Heimlich maneuver and what is it used for?

It is an emergency procedure in which a person uses a person’s own lungs the air within the lungs to expel or pop-out an obstructing piece of food or other object.

25. What is a tracheostomy?

It is a surgical opening of the trachea to provide an alternate route for air to reach the lungs.

26. The trachea branches into two major subdivisions called the right and left bronchi. Each of these tubes runs oblique or diagonal before its runs into a medial depression or hilus within each lung.

27. Why is the right bronchus more prone to a foreign object to becoming lodged within it?

It is wider, shorter, and straighter than the left side.

28. The lungs are found within the middle part of the chest called the mediastinum.

29. The narrow, superior portion of each lung is called an apex whereas the broad lung area resting upon the diaphragm is called the base. The right lung is larger than the left lung because it has three lobes whereas the left lung only has 2 lobes. This is because the heart takes up some of the mediastinal space as well.

30. Just like the heart, each lung is encased in a serous membrane called a pleurum (pleura = plural) which comes in doubles as well. The visceral serosa covers the surface of each lung whereas the parietal serosa lines the thoracic cavity. The fluid between these two membranes is called pleural fluid.

31. What is pleurisy and how is it caused?

It is inflammation of the pleura; a disorder where the serosal fluid is depleted in each pleura causing the two membranes to stick together creating painful friction. A stabbing pain with each breath is a usual symptom.

32. The smaller subdivisions of the bronchi are called bronchioles and continuously branch and branch creating a tree-like pattern called the bronchial or respiratory tree. The terminal bronchioles lead into zone structures and eventually lead into the alveoli which are small air sacs. There are millions of clustered alveoli in each lung.

33. Explain what structures comprise each respiratory zone.

The respiratory zone includes the respiratory bronchioles, the alveolar ducts, the alveolar sacs, and alveoli. It is the only area where the gases are exchanged.

34. Explain the structure of the respiratory membrane below. Start with the walls of the alveoli. Do not forget to mention the capillaries.

The walls of the alveoli are made of a single layer of simple squamous epithelium. Alveolar pores connect neighboring air sacs and provide alternate routes for air to reach alveoli when feeder bronchioles are clogged with mucus. The externa surfaces of the alveoli are wrapped in a cob-web like grouping of capillaries so gas exchange between blood and lungs can take place. The alveolar and capillary walls make up the respiratory membrane or air-blood barrier.

35. Through which process are the gases exchanged at the alveolar membranes?

Simple diffusion

36. Explain the multiple ways that the alveoli are the final line of defense for the respiratory system.

There are macrophages called “dust cells” that wander in and out of the alveoli picking up bacteria, carbon particles, and other debris for removal. Also, there are cuboidal cells in the alveoli that produce a compound called surfactant which coats the alveolar surface and maintains proper lung function.