

The Respiratory System

C23 Study Guide Questions – (Note: “>” = Hot List Questions)

Tortora and Derrickson

1. In physiology we recognize that the word respiration may have different meanings. What are some of the different meanings associated with the term “respiration”?
2. > List the most important functions performed by the respiratory system?
3. > What is the air flow pathway between the nasal cavity and alveoli?
4. >How does external respiration differ from internal respiration? (Fig 23-1)
5. > What is the difference between the upper and lower respiratory tract? Where is the division between the two tracts? Functions?
6. >What is the difference between the conducting division and the respiratory division of the respiratory system? (Fig 23-8)
7. What is the histology of the cells that line the nasal cavity? What is the function and structure of the olfactory mucosa? What accessory structures of the nasal cavity are found in the lamina propria?
8. What erectile tissue is associated with the inferior concha? Function? Why is it important?
9. What two structures define the superior and inferior margins of the pharynx? What are the three regions within the pharynx? Indicate prominent structures:
10. What happens when you swallow to the larynx and epiglottis?
11. >What is the relationship between the vestibular folds and the vocal cords? What is the opening between the vocal cords called?
12. The common term used to describe the trachea is “windpipe”. How long is the trachea?
13. What is the function of the hyaline “C” rings?
14. What is the histology of the cells that line the trachea? Why is it called the mucociliary escalator?
15. How many lobes are in the right and left lungs?

16. What is the cardiac impression? If you swallow food into the trachea which bronchi is it likely to pass into? Why?
17. What is the inferior end of the trachea called? List all the segments of the bronchial tree between the primary bronchi and the alveolus.
18. What is the difference between pulmonary arteries and bronchiole arteries? What is the origin of each type of artery?
19. Where do we see the absence of C-shaped hyaline cartilage that supports the bronchiole tree?
20. What changes occur between the bronchioles, terminal bronchioles, and respiratory bronchioles? Significance?
21. >What is the structure of an alveolus? What type of cells form the alveolus? Their functions? (Fig 23-11 // Fig 23-12)
22. >What is the function of the dust cells? Their other name?
23. >What is the respiratory membrane? Structure and function?
24. Where is the intra-pleural cavity (pleural cavity)? What is in this cavity? Function?
25. >What muscle type is in the walls of the air and blood passageways of the lungs? Functions?
26. What is the Valsalva maneuver? How and when is this used?
27. >Where is the location of the respiratory center?
28. >What is the respiratory cycle? What are the two phases called? Length of each? Passive or active?
29. >When at rest (i.e. quiet breathing), how much air is moved into the lungs? What is this volume called?
30. >Where is the location of the ventral respiratory center, dorsal respiratory center, and the pontine respiratory center? Functions during quiet and forced respiration? (Fig 23.24)
31. > What is the role of the medullary respiratory center in controlling normal quiet breathing and forceful breathing? (Fig 23-25)
32. > What type of receptors send signals to the respiratory control center? Where are these sensors located? (Fig 23-27)

33. >What is the primary stimulus that can activate both the central and peripheral chemoreceptors? (Fig 23-27)
34. How may pain, anxiety, and other emotions influence the respiratory cycle?
35. >What chemoreceptor may be stimulated by low oxygen? When?
36. >When may oxygen inhibit the central chemoreceptors? The danger? Type of feedback loop?
37. >What are the characteristics of the following type of respiration: apnea, dyspnea, tachypnea, and bradypnea.
38. What must happen to the intrapulmonary pressure for air to move into the lungs? How is this accomplished? Which skeletal muscles contract during quiet respiration? Forced respiration?
39. What is pneumothorax?
40. What is atelectasis?
41. >How will epinephrine from the adrenal gland and the sympathetic neurotransmitter norepinephrine influence air flow in the bronchiole tree?
42. >How will histamine released from WBC and parasympathetic neurotransmitter acetylcholine influence air flow in the bronchiole tree?
43. How will tuberculosis and black lung disease affect pulmonary function? Explain.
44. >How may hydrogen bonds affect lung function? Role of surfactant? When is surfactant produced? Significance?
45. >What are the four respiratory volumes? Draw chart showing volumes. (Fig 23-16)
46. >What is the difference between respiratory volumes and respiratory capacities? Define total lung capacity and vital capacity.
47. If you breathe in 500 ml of air, how much of this air actually reaches the alveoli?
48. What is the alveolar ventilation rate? How do you determine AVR?
49. >What is the difference between anatomical dead space and physiologic dead space?
50. What is the difference between obstructive and restrictive lung diseases?

51. >What is the significance of Dalton's law? What are the main four gasses in air? What is partial pressure?
52. > What is the concentration gradient for oxygen and carbon dioxide between the pulmonary and systemic environments (external vs tissue)? (Fig 23-17)
53. > How is carbon dioxide and oxygen transported in the blood? (Fig 23-18)
54. >What is the difference between pulmonary gas exchange and systemic gass exchange? What are the major events associated with the transport of oxygen and carbon dioxide between the pulmonary and systemic enviroment? (Fig 23-23)
55. >What happens to gasses during systemic and alveolar gas exchange? Be able to associate these terms with your explanation: (carbonic anhydrase, chloride shift, protons, bicarbonate, venous reserve)
56. >Where is carbonic anhydrase located? What is its function?
57. >What cation causes oxygen to be unloaded from hemoglobin?
58. >What is the significance of the chloride shift?
59. >What variables affect gas exchange? Which way will the oxygen dissociation curve move for variables that cause more oxygen to be released from hemoglobin?
60. >What is ventilation? What is perfusion? What is the significance of the ventilation- perfusion coupling mechanism?
61. If mucous blocks a bronchiole, what will happen to blood flow in this area?
62. How many oxygen molecules may be carried by one hemoglobin molecule? How many oxygens would you expect to see in the pulmonary artery? How many oxygens would you expect to see in the pulmonary vein?
63. Why is carbon monoxide a dangerous poison?
64. How is acidosis and alkalosis related to hypercapnia and hypocapnia?
65. > What are the corrective homeostatic responses to acidosis and alkalosis?
66. > Under normal conditions, the partial pressure of oxygen has little effect on respiration. However, in emphysema carbon dioxide concentration become so high that the central chemoreceptors no longer respond to carbon dioxide and respiration is now stimulated by low oxygen levels. What is this condition called? What is the danger of giving a person in this condition oxygen?

67. What is hypoxia? Define the following terms : (hypoxemic hypoxia, ischemic hypoxia, anemic hypoxia, histotoxic hypoxia)

68. What is chronic obstructive pulmonary disease?

69. >What is the difference between bronchitis and asthma? Which condition is reversible?

70. >What is the Hering-Breuer Reflex?

71. >What is the irritant reflex?

Hot List Questions:

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