RAVEN CHAPTER 44 GUIDED NOTES: CIRCULATION & RESPIRATION

Circulation

1. Why aren’t diffusion and active transport sufficient for transport in multicellular animals?

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2. Briefly describe circulation in the cnidarians and flatworms

3. Compare the circulatory systems of higher animals.
   a. Open ____________________________________________________________

                                                  _______________________
   Who has one? _____________________________________________________

   b. Closed _________________________________________________________

                                                  _______________________
   Who has one? _____________________________________________________

4. List and describe the three principal functions of the vertebrate circulatory system.
   a. _______________________________________________________________

                                                  _______________________

   b. _______________________________________________________________

                                                  _______________________

   c. _______________________________________________________________
5. Briefly describe the components of the blood.
   a. Plasma ________________________________________________________________
   b. Erythrocytes __________________________________________________________
   c. Leukocytes ___________________________________________________________
   d. Platelets _____________________________________________________________

6. Compare the structure of each vessel. Pay particular attention to structure-function correlations:
   a. Artery ________________________________________________________________
      ________________________________________________________________
   b. Capillary __________________________________________________________
      ________________________________________________________________
   c. Vein ________________________________________________________________
      ________________________________________________________________

7. How do precapillary sphincters help regulate capillary blood flow, blood pressure, and body temperature?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

8. What happens to blood pressure and velocity as the blood flows through:
   a. Artery ________________________________________________________________
   b. Capillary __________________________________________________________
   c. Vein ________________________________________________________________

9. If blood pressure in veins is so low, how does blood return to the heart from the legs?
   ________________________________________________________________
   ________________________________________________________________
10. Discuss the role of the lymphatic system in returning interstitial blood to the circulatory system. Discuss the role of osmosis in the movement of fluid between capillaries and interstitial fluid.

11. What is the adaptive value of the four chambered heart?

12. Answer the following regarding the structure of the human heart.
   a. Which side is oxygen rich ... oxygen poor
   b. Which chambers create the blood pressure in the arteries?
   c. What causes the heart sounds?

13. How is heart rate regulated?

14. Discuss the homeostatic regulation of blood pressure and the role of:
   a. baroreceptor reflex
   b. ADH
   c. aldosterone
15. Label the diagram of the heart.

16. Describe the types of cardiovascular diseases that are leading causes of death in US:
   a. Stroke ____________________________
      ____________________________
      ____________________________
      ____________________________
      ____________________________
   b. Heart attack _______________________
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      ____________________________
      ____________________________
      ____________________________
   c. Atherosclerosis ____________________
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      ____________________________
      ____________________________
      ____________________________
   d. Arteriosclerosis ____________________
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17. Discuss the role of zymogens in blood clotting.

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18. Hypothesize why clotting is referred to as a “cascade reaction”.

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**Gas Exchange**

19. Describe the relationship of the respiratory surface to the transport (circulatory) system.

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20. Through what process do gases move across the cell membrane?

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21. What are two characteristics typical of a respiratory surface?
   a. __________________________________________________________
   b. __________________________________________________________

22. Why must all animals constantly move either water (for aquatic animals) or air (for terrestrial animals) across their respiratory surface

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23. How do partial pressures of gases influence the exchange of gas?

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24. Why do terrestrial animals have internal respiratory surfaces?

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25. What is countercurrent about the function of a fish’s gills?

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__________________________________________________________________________________

26. What adaptive value is the countercurrent exchange system of gills?

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__________________________________________________________________________________
__________________________________________________________________________________

27. List some features that show how tracheal tubes and lungs are adapted for gas exchange?

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__________________________________________________________________________________
__________________________________________________________________________________

28. Label the diagram of the human respiratory system.

What should be drawn here in the diagram?
29. What is the role of the alveoli?

________________________________________________________________________
________________________________________________________________________

30. Describe how breathing is regulated. Include the role of each of the following.

a. medulla ________________________________________________________________

b. pH ________________________________________________________________

c. carotid & aortic arteries ________________________________________________

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31. Explain the mechanics of human breathing. How does the diaphragm enable breathing?

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32. What is the adaptive value of hemoglobin?

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33. Review the dissociation curves for hemoglobin. Explain what they illustrate.

![Dissociation curves for hemoglobin](image.png)
34. How does lowering pH influence oxygen release from the blood?

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35. Why does oxygen leave the hemoglobin when it passes through the resting tissues?

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36. How is CO\textsubscript{2} carried in the blood?

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37. Outline the reactions showing the path of carbon dioxide produced in body cells, then transported as bicarbonate ion in the plasma, to the carbon dioxide released into the alveoli.

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