Vascular Regulation

To complete this worksheet, select:

Module: Distribution
Activity: Animations
Title: Vascular Regulation

Introduction

1. a. How do Mean Arterial Blood Pressure (MABP) and Systemic Vascular Resistance (SVR) factor together to produce the total Cardiac Output (CO)?

b. What systems both influence and regulate MABP and SVR thereby impacting CO?

Primary Factors That Affect Circulation

2. Name the three primary factors that influence circulation.

3. Blood moves from areas of high pressure toward areas of lower pressure. Describe how the right atrial and aortic pressures affect blood movement.


5. Identify and describe three factors that increase SVR.
   Vasoconstriction -
   Polycythemia or Dehydration -
   Vessel Length -
6. Cardiac Output (CO) is a product of heart rate and stroke volume. What three factors influence heart rate and stroke volume?

________________________________________________________________________

________________________________________________________________________

Structures and Functions

7. Summarize how each of the following affect blood flow.
   Heart - ____________________________________________________________________
   Arterioles - ____________________________________________________________________
   Veins & Kidneys - ____________________________________________________________________

8. Explain ventricular importance in maintaining blood pressure. ____________________________________________________________________

9. a. Describe ventricular activity during each of the following.
   Systole - ____________________________________________________________________
   Diastole - ____________________________________________________________________
   b. What are normal systolic and diastolic pressures for a resting adult? ____________________________________________________________________
   c. What is the importance of blood vessel elasticity? ____________________________________________________________________

10. If normal resting blood pressure is 120/80, then why is MABP 93? ____________________________________________________________________

11. Explain how, and why, arterioles and small arteries affect SVR? ____________________________________________________________________
12. How does vasoconstriction affect SVR and local blood flow?

13. How does vasodilation affect SVR and local blood flow?


15. In what way(s) does venous return of blood affect cardiac output?

16. How does increased water reabsorption by the kidneys affect blood volume and venous return?

17. How does decreased water reabsorption by the kidneys affect blood volume and venous return?

18. What is the body's primary blood reservoir?


20. a. Explain the effect of venoconstriction.

b. Explain the effect of venodilation.
21. Describe how venous valves and muscular movements affect venous blood flow.

22. Explain how breathing contributes to venous blood flow.

Neural Regulation of Blood Pressure

23. Generally describe the role of the following receptors relative to blood pressure monitoring.

24. Describe each of the following neural reflexes.
   - Baroreceptor Reflexes -
   - Carotid Sinus Reflex -
   - Aortic Reflex -

25. Describe physiological adjustments in response to dropping MABP.
   - Sympathetic Signals -
   - Parasympathetic Signals -
   - Heart Rate, Contractility, Venous Tone, Cardiac Output -
26. Describe physiological adjustments in response to rising MABP.

27. How do chemoreceptors in the carotid and aortic bodies contribute to re-establishing homeostasis during hypoxia, acidosis, or hypercapnia?

Hormonal Regulation of Blood Pressure

28. Neural regulation of blood pressure is short-term and quick in response. What about hormonal regulation of blood pressure?

29. What activates the RAA system?

30. Describe the role of each of the following hormones. Name their source, too.
   - Renin -
   - Angiotensinogen -
   - Angiotensin I -
   - Angiotensin II -

31. How does angiotensin II affect cells in the proximal convoluted tubules in kidney nephrons?
32. a. How does angiotensin II affect target cells in the adrenal cortex? _______________________________
   
   b. How does this affect cardiac output? _______________________________
   
33. How does angiotensin II affect sensations of thirst? How does this contribute to blood pressure homeostasis?
   
   ________________________________________________________________

34. What stimulates the release of Anti-Diuretic Hormone (ADH)? _______________________________
   
35. Where is ADH produced and secreted? _______________________________
   
36. How does ADH affect smooth muscle in arteriole walls? _______________________________
   
37. How does ADH affect the kidneys? How does this contribute to blood pressure homeostasis?
   
   ________________________________________________________________

38. How does ADH affect sweat glands? How does this contribute to blood pressure homeostasis?
   
   ________________________________________________________________

39. What stimulates ANP secretion? _______________________________

40. How does ANP affect the kidneys and what ultimate affect that that have on blood volume?
   
   ________________________________________________________________