

Quiz Yourself: Chapter 19

Choices can be used more than once or not at all

1-5. Matching

- | | | |
|----------------------|---|-----------------|
| A) During exhalation | the lungs are shrinking | 1) <u> A </u> |
| B) During inhalation | respiratory system pressure is about -3 mmHg | 2) <u> B </u> |
| | respiratory system pressure is about +3 mmHg | 3) <u> A </u> |
| | alveolar pressure is lower than atmospheric pressure | 4) <u> B </u> |
| | alveolar pressure is higher than atmospheric pressure | 5) <u> A </u> |

6-10. Matching

- | | | |
|-------------------------------------|----------------------------------|------------------|
| A) Tidal volume (TV) | Vital Capacity (VC) – (TV + ERV) | 6) <u> C </u> |
| B) Residual volume (RV) | about 3 L in young males | 7) <u> C </u> |
| C) Inspiratory reserve volume (IRV) | VC – (IRV + ERV) | 8) <u> A </u> |
| D) Expiratory reserve volume (ERV) | about 500 mL | 9) <u> A </u> |
| E) Functional residual volume (FRV) | RV + ERV | 10) <u> E </u> |

11-15. Matching

- | | | |
|---|---|------------------|
| A) Respiratory system pressure (P_{rs}) | $= P_{rs} / R_{air}$ | 11) <u> C </u> |
| B) Airway resistance (R_{air}) | is about 6 to 8 L/min | 12) <u> C </u> |
| C) Air flow (MRV, F_{air}) | is comparable to Blood Flow (BF) | 13) <u> C </u> |
| | is comparable to Vascular Resistance (VR) | 14) <u> B </u> |
| | is comparable to arterial pressure - venous pressure (~MAP) | 15) <u> A </u> |

16-20. Matching

- | | | |
|-----------------------|--|------------------|
| A) Shortage of CO_2 | makes the blood acidic | 16) <u> B </u> |
| B) Excess CO_2 | makes the blood alkaline | 17) <u> A </u> |
| | stimulates reflex increases in rate and depth of breathing | 18) <u> B </u> |
| | stimulates reflex decreases in rate and depth of breathing | 19) <u> A </u> |
| | makes the blood have a higher hydrogen ion concentration | 20) <u> B </u> |

Fill in

21. During inhalation the transpulmonary pressure is less positive than during exhalation.
22. During exhalation the respiratory system pressure increases.
23. Carbon dioxide is about 133 times more concentrated in the alveoli than in the atmosphere.
24. Gases move from an area of high pressure to an area of low pressure.
25. Breathing into a bag will raise the pCO_2 in the blood.

Study Questions

1. Explain how the airways, lungs, pleura and relevant muscles function together to cause inhalation and exhalation.
2. Explain the inter-relationships between lung compliance and transpulmonary pressure; and between airway resistance, respiratory system pressure, and airflow.
3. Explain how gas is exchanged in the lungs and in the systemic tissues.
4. Explain how O_2 and CO_2 are transported in the blood; and how ventilation affects pCO_2 and pH.

Quiz Yourself: Chapter 20

Choices can be used more than once or not at all

1-5. Matching

- | | | |
|------------------------|---|-----------------|
| A) 125 mL/min | normal reabsorption of tubular fluids by the kidney | 1) <u> B </u> |
| B) 123.5 to 124 mL/min | urine formation by the kidney without vasopressin | 2) <u> C </u> |
| C) 5 to 10 mL/min | normal filtrate formation by the kidney | 3) <u> A </u> |
| D) 1 to 1.5 mL/min | normal urine formation by the kidney | 4) <u> D </u> |
| E) none of the above | normal cardiac output | 5) <u> E </u> |

6-10. Matching (major hormonal control)

- | | | |
|---------------------------------|------------------------------|------------------|
| A) Controlled by angiotensin II | PCT | 6) <u> A </u> |
| B) Controlled by vasopressin | DCT1 | 7) <u> A </u> |
| C) Controlled by aldosterone | DCT2 and Collecting duct | 8) <u> E </u> |
| D) None of the above | Thick ascending nephron loop | 9) <u> D </u> |
| E) B and C | Thin descending nephron loop | 10) <u> D </u> |

11-15. True or False (True = A; False = B) (reabsorption into the blood from tubules)

- | | |
|--|------------------|
| A) The PCT acts as a mass absorber | 11) <u> A </u> |
| B) The nephron loop (of Henle) creates an osmotic gradient | 12) <u> A </u> |
| C) The DCT and collecting system are regulated by hormones | 13) <u> A </u> |
| D) Water reabsorption occurs by osmosis (diffusion) in the renal tubules | 14) <u> A </u> |
| E) Na^+ is actively transported by Na^+ / K^+ pumps in the basolateral membrane | 15) <u> A </u> |

16-20. Matching

- | | | |
|----------------------------------|--|------------------|
| A) Atrial natriuretic hormone | stimulates aldosterone | 16) <u> C </u> |
| B) Converting enzyme | causes renal excretion of sodium | 17) <u> A </u> |
| C) K^+ / Angiotensin II | causes renal conservation of water | 18) <u> D </u> |
| D) Vasopressin | causes renal conservation of sodium | 19) <u> E </u> |
| E) Angiotensin II / Aldosterone | converts angiotensin I to angiotensin II | 20) <u> B </u> |

Fill in

21. About 67% of water and sodium reabsorption occurs from the proximal tubule .
22. H^+ is secreted usually via counter-transport with Na^+ .
23. Vasopressin (hormone) is inhibited by excess water consumption.
24. Sodium reabsorption is largely dependent on Na^+/K^+ pumps .
25. Sodium reabsorption from the renal tubules is stimulated largely by angiotensin II / aldosterone (hormone).

Study Questions

1. Explain the process of glomerular filtration in the kidney. Include a description of the mechanisms involved.
2. Compare and contrast reabsorption and secretion in the proximal tubules, nephron loop, distal tubules, and collecting ducts. Include a description of the mechanisms involved.
3. Explain the significance of the reabsorption and secretion processes..

Quiz Yourself: Chapter 21

Choices can be used more than once or not at all

1-5. Matching

- | | | |
|--|--|-----------------|
| A) Glomerulosa cells of adrenal cortex | Produce aldosterone | 1) <u> A </u> |
| B) Cardiac stretch (volume) receptors | Detect osmolarity of blood | 2) <u> D </u> |
| C) Juxtaglomerular cells of kidney | Are stimulated by angiotensin II | 3) <u> A </u> |
| D) Osmoreceptors | Detect changes in blood volume and cardiac filling | 4) <u> B </u> |
| | Are stimulated by sympathetic NS and produce renin | 5) <u> C </u> |

6-10. Matching

- | | | |
|-------------------------------|--|------------------|
| A) Atrial natriuretic hormone | Stimulates aldosterone | 6) <u> C </u> |
| B) Converting enzyme | Causes renal excretion of sodium | 7) <u> A </u> |
| C) Angiotensin II | Causes renal conservation of water | 8) <u> D </u> |
| D) Vasopressin | Causes renal conservation of sodium | 9) <u> E </u> |
| E) Aldosterone | Converts angiotensin I to angiotensin II | 10) <u> B </u> |

11-15. Matching

- | | | |
|---|--|------------------|
| A) $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3 \rightarrow \text{H}^+ + \text{HCO}_3^-$ | Secreted into renal tubules | 11) <u> D </u> |
| B) $\text{CO}_2 + \text{H}_2\text{O} \leftarrow \text{H}_2\text{CO}_3 \leftarrow \text{H}^+ + \text{HCO}_3^-$ | Seen in systemic capillaries | 12) <u> A </u> |
| C) HCO_3^- | Seen in pulmonary capillaries | 13) <u> B </u> |
| D) H^+ | Reabsorbed out of renal tubules | 14) <u> C </u> |
| | Occurs in cytoplasm of renal tubular cells | 15) <u> A </u> |

16-20. Matching

- | | | |
|------------------------|---|------------------|
| A) Parathyroid hormone | Increases phosphate excretion by kidney | 16) <u> A </u> |
| B) Calcitriol | Increases calcium reabsorption by kidney | 17) <u> A </u> |
| | Increases calcium absorption by intestines | 18) <u> B </u> |
| | Increases phosphate absorption by intestines | 19) <u> B </u> |
| | Increases resorption of calcium and phosphate from bone | 20) <u> A </u> |

Fill in

21. Low blood volume will stimulate a reflex increase (change) in vasopressin (hormone).
22. Low osmolarity will stimulate a reflex decrease (change) in vasopressin (hormone).
23. Vasopressin (hormone) is inhibited by excess water consumption.
24. Sodium reabsorption from the renal tubules is stimulated largely by angiotensin II / aldosterone (hormone).
25. Calcium & phosphate absorption from the intestines is stimulated largely by calcitriol .

Study Questions

4. Compare and contrast the homeostatic control of acid-base balance by the lungs and the kidney.
5. Explain the homeostatic control of fluid and electrolyte balance following loss of blood volume or low water intake. Emphasize the role of the kidney.
6. Explain the homeostatic control of blood calcium and phosphate. Include the role of parathyroid, renal, and thyroid hormones.