Osmoregulation and Homeostasis

Kidney and Nephron

Nephron Functions

[Blank spaces for functions]
URINE FORMATION
QUESTIONS

1. Color the following parts on the diagrams below.

- Kidney (A)
- Ureter (B)
- Urinary bladder (C)
- Aorta (D)
- Inferior vena cava (E)
- Renal artery (F)
- Renal vein (G)
- Renal capsule (A)
- Renal cortex (B)
- Medulla (pyramid) (C)
- Papilla (D)
- Minor calyx (E)
- Major calyx (F)
- Renal pelvis (G)
- Renal artery (H)
- Oxygenated blood (H')
- Renal vein (I)
- Deoxygenated blood (I')
- Renal sinus (J)
- Ureter (K)
2. Match the structure with the correct letter from the diagram at the right.

_____ Minor calyx
_____ Renal artery
_____ Renal capsule
_____ Renal column
_____ Renal cortex
_____ Renal pelvis
_____ Renal pyramid
_____ Renal vein
_____ Ureter

3. Match the function with the correct letter from the diagram.

<table>
<thead>
<tr>
<th>LETTER</th>
<th>FUNCTION</th>
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<tbody>
<tr>
<td></td>
<td>Produces urine</td>
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<tr>
<td></td>
<td>Transport urine toward the urinary bladder</td>
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<tr>
<td></td>
<td>Carries urine to outside the body</td>
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<tr>
<td></td>
<td>Temporarily stores urine prior to elimination</td>
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<tr>
<td></td>
<td>Carries unfiltered blood into the kidney</td>
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<tr>
<td></td>
<td>Carries filtered blood out of the kidney</td>
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</tbody>
</table>
4. Match the structure with the correct number from the diagram.

_____ Afferent arteriole
_____ Glomerular capsule
_____ Collecting duct
_____ Distal convoluted tubule
_____ Efferent arteriole
_____ Glomerulus
_____ Loop of Henle
_____ Proximal convoluted tubule
_____ Peritubular capillaries

5. Match the structure or step with the correct letter from the diagram.

_____ Collecting duct
_____ Distal convoluted tubule
_____ Glomerulus
_____ Loop of Henle ascending limb
_____ Loop of Henle descending limb
_____ Proximal convoluted tubule
_____ Production of filtrate; filtrate has the same solute concentration as plasma or interstitial fluid; permeable to both water and solutes
_____ Reabsorption of water, ions and all organic nutrients
_____ Water is reabsorbed along this section because the wall is permeable to water but not solutes
This section is impermeable to water and to solutes; tubular cells actively pump sodium and chloride ions out of the tubular fluid

Secretion of ions, acids, drugs, toxins; variable reabsorption of water and sodium ions

Variable reabsorption of water and reabsorption or secretion of sodium, potassium, hydrogen and bicarbonate ions

6. What is the functional unit of the kidney called?

7. What is the primary purpose of urine production?

8. Define the following terms:

| Thermoregulation |  |
| Osmoregulation |  |
| Excretion |  |

9. List and describe the four physical processes that account for heat gain and loss.
10. A constant body temperature does not distinguish ectotherms from endotherms. Why?


What does distinguish ectotherms from endotherms?


11. What four adaptations have helped animals, both ectotherms and endotherms, regulate body temperature?


12. Match the term with the correct definition.

A. Countercurrent exchange
B. Vasoconstriction
C. Vasodilation

_____ Increase in the diameter of superficial blood vessels that results in increased blood flow through the vessels

_____ Decrease in the diameter of superficial blood vessels that results in decreased blood flow through the vessels

_____ The opposite flow of adjacent fluids that maximizes transfer rates; important in controlling heat loss in many endothermic animals
13. Examine Figure 44.8 p. 872.
   a. How does the human body respond to an increase in body temperature?
      __________________________________________________________
      __________________________________________________________
   b. How does the human body respond to a decrease in body temperature?
      __________________________________________________________
      __________________________________________________________

14. Define the following terms.

<table>
<thead>
<tr>
<th>Torpor</th>
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<tbody>
<tr>
<td>Hibernation</td>
<td>____________________________</td>
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<tr>
<td>Estivation</td>
<td>____________________________</td>
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</tbody>
</table>

15. What is the source of nitrogenous wastes in animals?
    __________________________________________________________

16. In what form are nitrogenous wastes excreted in:
   a. aquatic animals? ____________________________
   b. terrestrial animals? ____________________________

17. Why do terrestrial animals convert ammonia to urea or uric acid before excretion?
    __________________________________________________________
    __________________________________________________________
18. Examine Figure 44.21 p. 888.

a. How does the human body respond to an increase in blood osmolarity, due to dehydration or eating salty foods, above a set point?

________________________________________________________________________

________________________________________________________________________

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b. How does the human body (specifically the rennin-angiotensin-aldosterone system) respond to low blood pressure and low blood volume?

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