

Kidney Review Questions

KEY

- 1. Approximately what fraction of blood that flows through our system is “filtered out” by the kidney becoming waste (urine)?**
About 1/1000 to 2/1000 of the blood becomes waste.
- 2. What percentage of the water that flows through a nephron gets reabsorbed into the blood?**
About 99% of water is reabsorbed.
- 3. How many ml of water must you drink to replenish the water lost to urine each day?**
We must drink 1.8 L to 1.44 L of water per day.
- 4. What is the difference between an excretion and a secretion? Give examples of each.**
An excretion is the removal of wastes from the cells to the blood. Examples are: salts, minerals, and water.
A secretion is the removal of useful substances from cells. Examples are: digestive enzymes and hormones.
- 5. List 2 materials that are continuously being excreted by cells. Explain why each of the 2 are being excreted.**
Salts, minerals, water. Cells make water continuously through processes of cellular respiration therefore there is always an excess of water which is excreted. Cells continuously excrete salt to maintain correct concentration inside cell (water levels).
- 6. Which organ is responsible for detoxifying products of cellular metabolism?**
The liver is responsible.
- 7. What is removed from protein and what is produced when proteins are deaminated?**
Nitrogen and hydrogen are removed and ammonia is produced.
- 8. Why does the liver chemically alter ammonia?**
The liver chemically alters ammonia to form a less toxic material urea.
- 9. What does the liver add to ammonia and what is produced?**
Carbon dioxide is added to form urea (about 1000 times less potent than ammonia).
- 10. Explain how the process of “elimination” is different from the processes of excretion and secretion.**
Elimination is the removal of wastes from the body; it’s getting rid of waste substances from the organism completely.
- 11. Provide 4 examples of eliminated waste materials and include from what source they are eliminated from.**
Eliminated wastes are: carbon dioxide (lungs), food waste (anus), water (lungs, sweat, and kidney), and urea (kidney).
- 12. What is a nephron?**
A nephron is the functional unit of the kidney. It cleans the blood.
- 13. In your own words, explain each of the 3 stages of the action of a nephron. Be able to write an essay on this topic.**
Filtration - blood flows from the renal artery to the glomerulus. Pressure forces plasma from the capillaries to the Bowman’s capsule. Then it travels to the proximal tubule to become urine. Filtration is performed through simple diffusion.

Secretion - blood moves on to the capillary network surrounding the proximal tubule. ATP is used to actively transport penicillin, protons, and other ions into the urine. Reabsorption - movement of urine towards the distal tubule causes some water to diffuse back into the capillaries. ADH controls the amount of water that is reabsorbed. Glucose and amino acids are actively transported back into the capillaries.

14. What is ADH?

Anti diuretic hormone is the hormone that controls the amount of water that is reabsorbed back into the blood.

15. What happens to the urine if ADH is decreased?

The urine will become less concentrated (more water) if ADH is decreased.

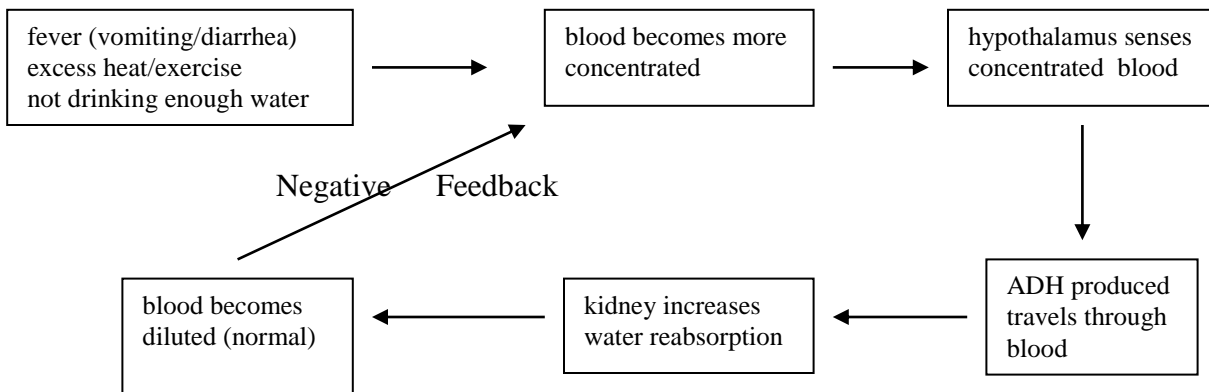
16. What happens to the urine if ADH is increased?

The urine will become more concentrated (less water) if ADH is increased.

17. Give 3 reasons why your body may become dehydrated.

Your body could become dehydrated if: you have a fever (vomiting/have diarrhea); excess heat/exercise; or not drinking enough water.

18. Draw a flow chart representing the pathway for ADH control.



19. If you ate 6 candy bars, would you expect there be sugar in your urine? Explain.

It depends on what you have eaten in the last few days. Most likely there would be sugar in your urine because the liver and muscle cells can only hold so much sugar/glycogen and the rest becomes waste.

20. If you drank 3 litres of water would you expect more water in your urine? Why or why not?

It depends on what you have drank in the last few days. Most likely yes, the more water you drink, the more water your body can afford to lose.

21. The human body does not excrete iron obtained from the breakdown of red blood cells. Suggest what the iron is used for?

No, iron is recycled to produce hemoglobin.

22. A kangaroo rat is adapted to live in very dry desert environments and can go its entire life without drinking water. It seems to get the little moisture it requires from the food it eats. However a kangaroo rat would die on a diet of only soybeans (mainly protein). Why? On a diet of soybeans a kangaroo rat would have to obtain its energy from protein (similar to people on the Atkins high protein diet). To get the energy out of protein, the rat's liver would have to form glucose from

amino acids. This involves the breakdown of the amino acids (deamination), a process which produces ammonia which is quickly converted to urea. Without water, the kangaroo rat could not effectively remove this waste urea from the blood.

