# Osmoregulation and Excretion Concept Questions

1. Being an osmoconformer is much easier than using energy to maintain osmolarity different from the environment. Why aren't all animals simply osmoconformers?

2. Summarize the challenges faced by an osmoregulator in salt water versus one in fresh water.

3. Tardigrades are remarkable animals in that they can survive complete desiccation. Why is drying out fatal to nearly all organisms?

4. Not all animals have complex kidneys like yours. How do animals without kidneys manage to excrete metabolic waste?

5. Conserving water is an important role of the kidneys. Name a couple of other important functions of these organs.

6. Your friend says they hardly ever sweat so they don't really need to drink much water. What would you say?

7. Where does nitrogenous waste come from?

8. You and your friend are watching his goldfish one day and your friend asks "Do goldfish pee?"
a) What would you say?
b) Why can't salt water fishes or terrestrial animals excrete ammonia like the goldfish?

9. In terms of kidney function, why is a high-protein diet dangerous?

10. In a documentary on the Love Nature channel, you learn about an amphibian, a reptile and a mammal species in the Amazon rainforest. It explains that the amphibian lays eggs without shells in water, the reptile buries its shelled eggs on the sandy shores of the river and the mammal gives birth to live young. Based on this information, predict what kind of nitrogenous waste each one would use and justify your predictions.

11. Dragonfly larvae, which are aquatic, excrete ammonia, whereas adult dragonflies, which are terrestrial, excrete uric acid. Explain.

12. Filtration removes wastes from the blood. Why, then, are reabsorption and secretion necessary?

13. Imagine a molecule of urea in someone's blood. List the structures in the order the molecule would pass through them during excretion. renal pelvis, urethra, loop of Henle, ureter, bladder, Bowman's capsule, proximal tubule, distal tubule, collecting duct, renal artery.

14. After water is removed from the blood during filtration, why does it return to the blood during the formation of urine?

15. Why is it important that there are many capillaries inside Bowman's capsule?

16. How would a decrease in blood pressure in the arteriole leading to the glomerulus affect the rate of filtration of blood within Bowman's capsule?

17. As you're telling your friends about all the cool stuff you learned in biology, one of them says "Bah! The kidney is just a filter!" What would say to correct her?

18. When would you expect a person to produce very small quantities of urine?

19. For every 100 mL of seawater consumed, 150 mL of body water is lost. The solute concentration of seawater is greater than that of blood. Provide a physiological explanation for the loss of body water.

20. Imagine that a blood clot lodges in the renal artery, partially blocking the blood flow to the kidney. Explain why this condition would lead to high blood pressure.

21. Most people know that high blood pressure increases your risk of heart attack and stroke but it can also affect your kidneys. Describe the effect you would expect high blood pressure to have on kidney function.

22. Lots of people know that salty foods can cause high blood pressure but they can also affect kidney function. Explain how your body responds to salty foods. 23. Drinking too much alcohol can cause a hangover, the symptoms of which are believed to be caused by dehydration. Explain this by describing the way alcohol affects water balance in the body.

24. A disorder called central diabetes insipidus is caused by a lack of ADH. Predict the symptoms of this disorder and explain why they are caused by a lack of ADH. (ADH increases water reabsorption by the collecting ducts. Without it, less water is reabsorbed and excessive urine production results. Excessive, intense or irresistible thirst is also a symptom.)

25. Your friend's father was recently diagnosed with kidney failure and has to be on dialysis. He wonders what that means and asks you to explain it to him. What do you say?

26. Your friend's father has kidney stones. What are they and what advice would his doctor give him?