Lesson Self-Check

CAN YOU EXPLAIN IT?

FIGURE 16: Control systems in the skin help conserve body heat.

In the winter, you take steps to help your body maintain its internal temperature by wearing warm clothes and drinking hot beverages or eating hot soup. Your body also has its own ways of maintaining its internal temperature in cold weather. When your body temperature drops below a set point, your brain signals your muscles to contract and expand rapidly. These contractions, or shivering, generate heat, which helps increase your body temperature.

Many viruses and bacteria that cause illnesses reproduce best around 37 °C, which is normal body temperature. To fight off these agents, the body increases its internal temperature above the normal range. This makes it harder for the virus or bacteria to reproduce and your immune system can fight it off more quickly. By shivering, your body is trying to raise its internal temperature to meet the new set point. When the infection is cleared, your body returns to the set point, and the fever breaks.

Explain Refer to the notes in your Evidence Notebook to explain each of the following questions. Use evidence from the lesson to support your claims.

1. Why do you shiver when you have a fever?
2. Is this response an example of positive or negative feedback? Why?
3. How does a fever disrupt homeostasis? Use the terms *stimulus*, *control center*, *set point*, *receptors*, *effectors*, and *imbalance* in your answer.

CHECKPOINTS

Check Your Understanding

1. How do stomata function in most plants relative to gas exchange?
   - **a.** Stomata close to prevent nitrogen from escaping.
   - **b.** Stomata close to allow photosynthesis to occur.
   - **c.** Stomata open to allow carbon dioxide in and oxygen and water out.
   - **d.** Stomata open to allow water to build up in the plant.

2. The circulatory and respiratory systems work together to provide cells with oxygen and nutrients and remove waste products such as carbon dioxide. When you need *more* oxygen, how does the circulatory system respond?
   - **a.** More blood is sent to the lungs and less to the rest of the body.
   - **b.** The blood vessels to the arms and legs constrict to conserve oxygen.
   - **c.** The heart beats at a faster rate to match the rise in breathing rate.
   - **d.** Blood moves more slowly through the organs to carry away more wastes.

3. What would happen on a hot day if your brain did not receive input that your body was starting to heat up?
   - **a.** You would start to sweat.
   - **b.** You would start to overheat.
   - **c.** You would start to shiver.
   - **d.** You would not feel any effect at all.

4. Flatworms are invertebrates with soft bodies, and some live in freshwater environments. Based on this information, what can you predict about how a freshwater flatworm's body handles osmoregulation? Select all correct answers.
   - **a.** Excretes dilute urine
   - **b.** Excretes concentrated urine
   - **c.** Absorbs as much salt as possible from surroundings
   - **d.** Excretes as much salt as possible from its body

5. When a newborn baby nurses, the mother's body is stimulated to produce milk. What would happen to the milk supply if the mother chose to bottle-feed rather than breastfeed? Why?

6. People who experience severe blood loss go into a condition known as hemorrhagic shock. Shock occurs when the blood volume returning to the heart is reduced. The heart responds by trying to increase output, which can result in the patient bleeding to death if they are not treated in time. Is this an example of negative feedback or positive feedback? Explain your answer.

7. Many desert animals are nocturnal, waiting to forage when temperatures are cooler and humidity is greater. How does this behavior help these animals regulate water balance?

8. What would happen to glucose homeostasis if the pancreas could no longer produce glucagon?

9. Exercise increases carbon dioxide levels in the blood. This affects homeostasis by decreasing blood pH, which is detected by receptors in the brain stem. The brain stem is the control center for gas exchange. Based on this information, what message would the brain stem send to the muscles of the diaphragm and rib cage to restore blood pH homeostasis?

MAKE YOUR OWN STUDY GUIDE

In your Evidence Notebook, design a study guide that supports the main idea from this lesson:

Homeostasis is the regulation and maintenance of the internal environment within a set range that is necessary to support life at the cellular level.

Remember to include the following information in your study guide:

- Use examples that model main ideas.
- Record explanations for the phenomena you investigated.
- Use evidence to support your explanations. Your support can include drawings, data, graphs, laboratory conclusions, and other evidence recorded throughout the lesson.

Consider the role positive and negative feedback loops play in maintaining homeostasis in an organism.