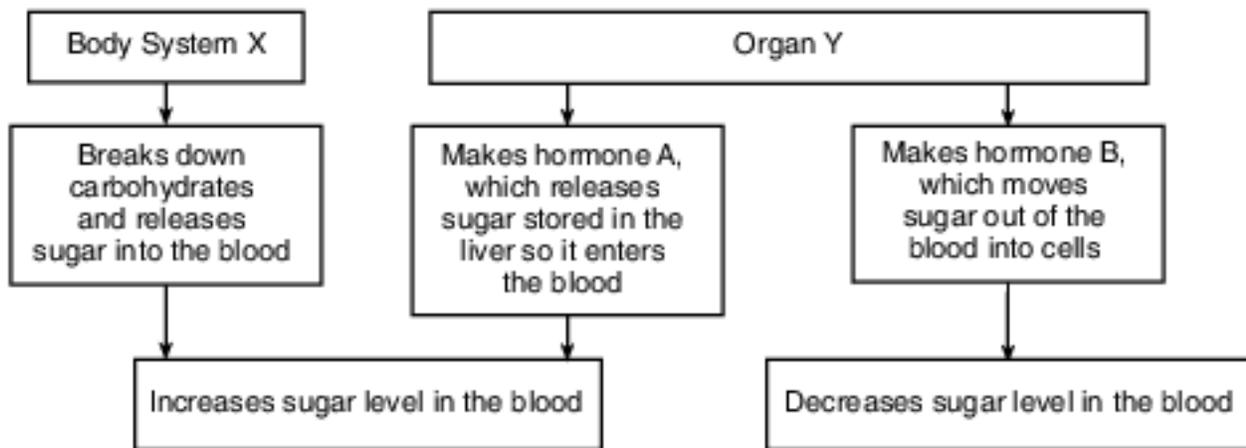


- 6 In response to an increasing blood glucose level, the human body will normally
- (1) store the glucose in cell nuclei
 - (2) release a hormone that lowers the blood glucose
 - (3) produce a hormone that destroys the glucose
 - (4) use the excess glucose to make proteins

- 7 Energy drinks have become increasingly popular. Some of these drinks contain large amounts of caffeine, which is known to increase heart rates in most individuals. This effect on the heart rate can be dangerous because it can lead to
- (1) a disruption in the absorption of starch
 - (2) an increase in blood volume
 - (3) a decrease in oxygen levels
 - (4) an imbalance in homeostasis

Base your answers to questions 8 on the diagram below and on your knowledge of biology. This diagram represents the roles of different parts of the human body in keeping blood sugar at a balanced, normal level over time.

Homeostasis of Blood Sugar Level



- 8 The diagram shows human body structures that are coordinated to maintain homeostasis. Which row correctly identifies the functions of these structures?

Row	Body System X	Organ Y
(1)	Digestion	Regulation
(2)	Circulation	Synthesis
(3)	Excretion	Transport
(4)	Locomotion	Nutrition

- | | |
|-------|-------|
| (1) 1 | (3) 3 |
| (2) 2 | (4) 4 |

- 9 When the human body is responding to stress, the hormone adrenaline is released. A short time later, the body returns to normal. This is an example of how a human
- | | |
|----------------------------------------------|-------------------------------------|
| (1) reacts to an antibody | (3) maintains cellular organization |
| (2) develops genetic variation in body cells | (4) maintains dynamic equilibrium |

- 10 Like humans, animals including dogs and cats get goose bumps. On a cold day, these goose bumps cause their coats to expand creating a layer of insulation. If the animal is scared, the coat will also expand making the animal look larger to predators. These responses serve as examples of
- (1) allergic reactions
 - (2) learned behaviors
 - (3) detection and response to stimuli
 - (4) reproductive and feeding success

- 11 Which change is an example of a response to a stimulus?
- (1) The pupil of an eye decreases in size in bright light.
 - (2) A leaf absorbs sunlight in the morning.
 - (3) The water level of a pond rises on a rainy day.
 - (4) A dead tree decays after many years.
- 12 A small lizard spends the morning hours lying in the sunlight until its body temperature rises. Later on in the day, the lizard rests in a shady area until its body temperature cools. This type of behavior is important to
- | | |
|--------------------------|----------------------|
| (1) maintain homeostasis | (3) attract mates |
| (2) detect variations | (4) obtain nutrients |

-
- 13 Organ systems of the human body interact to maintain a balanced internal environment. As blood flows through certain organs of the body, the composition of the blood changes because of interactions with those organs. State one change in the composition of the blood as it flows through the respiratory system. [1]

Base your answers to questions 14 on the passage below and on your knowledge of biology.

The Protein Shredder

In every cell, thousands of important processes are occurring around the clock. One of the ways a cell manages to coordinate all of these processes is by sending protein messages. After the protein messages are delivered and read, they need to be destroyed to prepare for the arrival of the next message.

The task of destroying these proteins falls on cell structures known as proteasomes. Think of a proteasome as a tubelike protein shredder. Protein molecules that have served their purpose are transported to the proteasome, unfolded, fed through the tube, and cut into smaller molecules that can then be used to synthesize new protein molecules. Proteasomes can shred any type of protein.

Individuals with a neurological disorder known as hereditary ataxia have been found to have an excess of protein in the cells of their brains and spinal cords. The abnormal level somehow leads to the death of cells in portions of the cerebellum. These areas of cell loss can be seen on a brain scan.

There are several forms of hereditary ataxia but all of them result in poor coordination. The symptoms progress over a period of years. In the beginning, the individuals experience only minor coordination problems. As time passes, the symptoms become worse. The affected individuals will have poor balance when walking. They will be clumsy and have difficulty talking and swallowing.

- 14 Based on the symptoms shown by individuals with hereditary ataxia, state two functions regulated by the cerebellum and spinal cord. [1]

Functions: _____ and

Base your answers to questions 15 on the information below and on your knowledge of biology.

The fight-or-flight response in humans prepares the body to fight off or run away from a potential threat. This response results from a series of nerve and chemical signals that direct how cells function. This, in turn, determines the actions of organs in these situations.

Some of the changes experienced by the individuals as part of this response include:

increased pulse rate increased blood glucose levels increased breathing rate

- 15 Select one of the listed changes experienced by the individual and write it on the line below.
Explain how the change you chose allows the individual to effectively respond to a threat. [1]
Change:

Answer Keys

1 4

2 3

3 3

4 3

5 2

6 2

7 4

8 1

9 4

10 3

11 1

12 1

13 Allow 1 credit. Acceptable responses include, but are not limited to:

- — The blood takes in oxygen as it flows through the respiratory system.
- — The oxygen level goes up/increases.
- — It releases water.
- — It releases carbon dioxide.

14 Allow 1 credit. Acceptable responses include, but are not limited to:

- — coordination
- — balance
- — walking
- — talking
- — swallowing
- Note: Do not accept symptoms, i.e, “poor balance” or “difficulty walking.”

15 Allow 1 credit. Acceptable responses include, but are not limited to:

- Change: Increased pulse rate:
 - — moves blood rich in glucose/oxygen to the cells faster
 - — allows the body to get rid of waste products/carbon dioxide faster
- Note: Do not accept an answer that only states that the blood moves faster without explaining how this helps an individual effectively respond.
- Change: Increased blood glucose levels:
 - — provide cells with a ready source of energy more rapidly
- Change: Increased breathing rate:
 - — eliminates carbon dioxide faster
 - — allows the body to get oxygen into the blood faster