Aim: How does the Nervous system help to maintain homeostasis?

How does the Endocrine system help to maintain homeostasis?
What do you think the nervous system does?

What are the parts of the nervous system?
What controls the movement of the body?

- Movement or locomotion of the body involves the interaction of muscles and bones.
- Movement of the body involves the skeletal and muscular systems under the control of the nervous system (Skeletal and muscular system work together).
- Movement or locomotion allows the organism to find food, shelter, a mate, and to move away from danger.
Which systems are responsible for the coordination and control of the body’s activities?

• The **nervous system** and **endocrine system** control the coordination of many of the body’s activities and the other systems.

• The two systems **respond to and send messages to cells throughout the body**.
What is another word for control and coordination?
Hint: It is one of the 8 life functions.
Pictures of some parts of the Nervous system

Nerve Cell

Brain
Parts of the Nervous system

- Consists of the brain, spinal cord, and a network of nerves
Purpose of the Nervous system

- Sends signals along nerves
- Nervous tissue has the ability to transmit impulses
- The nervous system helps with CELL COMMUNICATION!

**CFU1:** What is the job of the nervous system?
The nervous system maintains homeostasis in the body by regulating body temperature.

- When the body temperature drops, nerve impulses from the brain signal the muscles to shiver, which generates heat and warms the body.
In class practice over Nervous and Endocrine systems!
• 1. Inhaling carbon monoxide reduces the ability of red blood cells to carry oxygen. This can lead to brain damage. Which three systems of the body interact in this situation?
• (1) digestive, respiratory, and circulatory
• (2) immune, circulatory, and digestive
• (3) respiratory, circulatory, and nervous
• (4) excretory, nervous, and respiratory
2. In the space below, sketch a chemical molecule that might be released from nerve cell A and be recognized and bind to area I of nerve cell B. [1]
Base your answers to question 3 on the diagram of nerve cells below and on your knowledge of biology.

3. Describe what would happen if a drug molecule shaped like cell B were introduced into this nerve pathway. [1]

- ___________________________________________________________________________
- ___________________________________________________________________________
- ___________________________________________________________________________
- ___________________________________________________________________________
- ___________________________________________________________________________
What do you think the endocrine system does?

What are the parts of the endocrine system?
Which systems are responsible for the coordination and control of the body’s activities?

- The **nervous system and endocrine system** control the coordination of many of the body’s activities and the other systems
- The two systems **respond to and send messages to cells throughout the body**
What is another word for control and coordination?

Hint: It is one of the 8 life functions.
Parts of the Endocrine system

- Consists of glands that **secrete hormones (chemical messengers) into the circulatory system** → some of the endocrine glands include the pancreas, testes, ovaries, pituitary, adrenal, and the thyroid gland.
Purpose of the Endocrine system

- The glands of endocrine system **produce chemical messengers (hormones)** that travel in the bloodstream.
- The endocrine system also does **cell communication using hormones**.

**CFU1:** What is the job of the endocrine system?
How are messages sent and received in the body?

• The signals (from nerves) and hormones (from glands) have **SPECIFIC SHAPES**!

• They only effect certain cells in the body that have the **same shape receptor** on their cell membrane!
Check for understanding

*Target cell simply means the cell the hormone is intending to affect.

2. Letter $B$ indicates
   (1) ribosomes
   (2) receptor molecules
   (3) tissues
   (4) inorganic substances

3. Explain why cell $A$ is a nontarget cell for the hormone illustrated in the diagram. [1]
Check for understanding

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Letter $B$ indicates
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Explain why cell $A$ is a nontarget cell for the hormone illustrated in the diagram.

[1]

Cell $A$ is a nontarget cell for the hormone because its receptors are the wrong shape. (It will not match the hormone.)
The endocrine system maintains homeostasis in the body by regulating blood sugar level.

- Blood sugar level is constantly monitored, and hormones are released as needed to keep it at acceptable levels.
- Insulin is released by the pancreas (a gland in the endocrine system) when we eat food in order to lower blood glucose levels.
Check for understanding:

4. Identify the organ labeled \( X \). [1]

5. Identify the substance produced by the cells of ALL the endocrine glands that helps maintain homeostasis. [1]

6. Which gland releases insulin?
Check for understanding:

Identify the organ labeled X. [1]
• PANCREAS!

Identify the substance produced by the cells of ALL the endocrine glands that helps maintain homeostasis. [1]
• HORMONES!

Which gland releases insulin?
• PANCREAS!
In class practice over the Endocrine system!
1. A similarity between the nervous system and the hormone-secreting system in humans is that they both
(1) are composed of the same type of cells
(2) are composed of many glands
(3) help to maintain homeostasis
(4) secrete chemicals directly into the blood
2. The activity of all human body systems is coordinated by

(1) the secretion of hormones and the nervous system
(2) the interaction of nerve impulses with the excretory system
(3) the movement of digested food by the circulatory system
(4) the secretion of hormones and the circulatory system
• 3. Two primary agents of cellular communication are
• (1) chemicals made by blood cells and simple sugars
• (2) hormones and carbohydrates
• (3) enzymes and starches
• (4) hormones and chemicals made by nerve cells
Base your answers to questions 4 and 5 on the diagram below and on your knowledge of biology.

4. The pituitary gland may release hormone 2 when blood pressure drops. Hormone 2 causes gland B to release a different hormone that raises blood pressure, which, in turn, stops the secretion of hormone 2. The interaction of these hormones is an example of
   (1) DNA base substitution
   (2) a feedback mechanism
   (3) manipulation of genetic instructions
   (4) an antigen-antibody reaction

**Negative feedback cycle in the body**
Base your answers to questions 4 and 5 on the diagram below and on your knowledge of biology.

- Each arrow in the diagram represents a different hormone released by the pituitary gland that stimulates the gland indicated in the diagram. All structures are present in the same organism.

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- Each arrow in the diagram represents a different hormone released by the pituitary gland that stimulates the gland indicated in the diagram. All structures are present in the same organism.

- 5. Why does hormone 1 influence the action of gland A but not gland B or C?

- (1) Every activity in gland A is different from the activities in glands B and C.
- (2) The cells of glands B and C contain different receptors than the cells of gland A.
- (3) Each gland contains cells that have different base sequences in their DNA.
- (4) The distance a chemical can travel is influenced by both pH and temperature.
Base your answers to questions 10 through 6 on the diagram of nerve cells below and on your knowledge of biology.

- 6. Identify one substance, other than the secretions from nerve cells, used in cell communication. [1]
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