Name _____ **Period** _____

Chapter 26: Hormones and the Endocrine System

Guided Reading Activities

Big idea: The nature of chemical regulation

Answer the following questions as you read modules 26.1–26.3:

1. In order for your cells to coordinate with each other, they rely on two organ systems: the endocrine system and the nervous system.

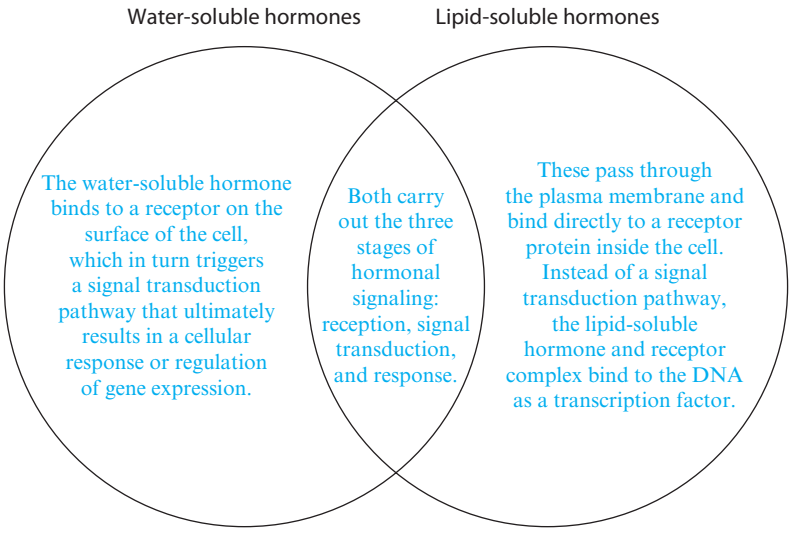
2. Complete the following table, which compares the features of signaling in the endocrine and nervous systems.

	Endocrine system signaling	Nervous system signaling
Mode of transmission	Chemical signals	Electrical signals
Speed of transmission	Several seconds	Fraction of a second
Duration of transmission	Long-lasting	Less than a second, in other words, fleeting effects

3. Both endocrine and nervous system signaling is specific. Briefly explain how this is accomplished in each type of signaling.
   In endocrine signaling, the hormones bind only to certain receptors on the surfaces of cells. In nervous system signaling, the communication is limited to cells that are connected by specialized junctions.
4. List the three stages of signaling using hormones.
   Reception, signal transduction, and response

5. True or false: Only lipid-soluble hormones use a signal transduction pathway. If false, make it a correct statement.
   False, although both carry out signal transduction, only water-soluble hormones use a signal transduction pathway.

6. Complete the Venn diagram comparing water-soluble hormones to lipid-soluble hormones.



7. What two effects did atrazine, a common chemical in weed killer, have on male frogs?
   Atrazine lowered the levels of testosterone and reduced the success of amplexus.

8. Briefly explain the point of studies that examine the effects of the chemicals in weed killers on frogs.
   These studies can help us understand the long-term unintended consequences of chemicals in our environment.

Big idea: The vertebrate endocrine system

Answer the following questions as you read modules 26.4–26.5:

1. What are three ways in which endocrine glands can be stimulated to release a hormone?
   - A change in certain ion levels or nutrients can stimulate an endocrine gland.
   - They can be stimulated by the nervous system directly.
   - Hormones can also stimulate endocrine glands to release hormones.
2. Match the following gland to the product it secretes or its effect: thyroid gland, pineal gland, parathyroid glands, adrenal glands, and pituitary gland.

   Secretes melatonin: pineal gland

   Raises calcium levels: parathyroid gland

   Requires iodine in trace amounts to produce its hormones: thyroid gland

   Helps the kidneys to retain water through the release of ADH: pituitary gland

   Releases epinephrine: adrenal glands

3. True or false: Only specialized endocrine glands secrete hormones. If false, make it a correct statement.
   False, other structures, for example, the liver and the stomach, can secrete hormones.

4. The ___hypothalamus___ is the connection between the endocrine and nervous systems.

5. Which pituitary lobe actually makes endocrine hormones and which one simply stores them?
   The posterior pituitary simply stores hormones; the anterior portion makes and secretes them.

6. What roles do the neurosecretory cells of the hypothalamus have in regulating function of the pituitary gland?
   The neurosecretory cells of the hypothalamus make releasing and inhibiting hormones that act on the pituitary and help to regulate its functions.

Big idea: Hormones and homeostasis

Answer the following questions as you read modules 26.6–26.12:

1. Insufficient iodine in the diet can lead to a condition known as a(n) ___goiter___.

2. Complete the following table, which compares hypothyroidism to hyperthyroidism.

	Hypothyroidism	Hyperthyroidism
Description	Too little T3 and T4 hormones	Too much T3 and T4 hormones
Symptoms	Weight gain, lethargy, and intolerance to cold	Excessive sweating, irritability, and overheating
Cause	Usually an autoimmune issue	A tumor on the pituitary or thyroid

3. True or false: The gonads produce gametes and sex hormones. If false, make it a correct statement.
   True

4. Complete the following table, which compares the different types of human sex hormones.

	Estrogens	Progestins	Androgens
Description (including an example of each)	Promote the development of female features and maintain the female reproductive system	Prepare the uterus to support the embryo; progesterone is an example.	Maintain the male reproductive system and promote male characteristics; testosterone is an example.
Present in males or females	Present in both	Present in both	Present in both

5. Some female bodybuilders take anabolic steroids, which are synthetic versions of testosterone. Briefly explain why these women usually develop male characteristics.
They develop male characteristics because testosterone is responsible for maintaining and promoting male features.
6. The pancreas secretes the hormones _____insulin_____ and _____glucagon_____.

7. Refer to the graph on page 526 of your textbook. What likely caused the glucose levels to spike at 8 a.m.?
The person probably had breakfast.

8. Briefly explain how glucagon and insulin are antagonistic hormones. Your answer should include their effects.
They have opposite effects because insulin stimulates the removal of glucose from the blood, and glucagon stimulates the increase of glucose by releasing glycogen (a polymer of glucose).
9. True or false: All forms of diabetes result in elevated levels of glucose in the blood. If false, make it a correct statement.
True

10. Do diabetics need to regulate their starch intake? Briefly explain your answer either way.
Yes, because starch is a polymer of glucose.

11. A mutation in a person's DNA leads to nonfunctioning insulin receptors on the surfaces of his or her cells. Briefly explain what the consequence of this mutation.
They would not be able to bind insulin, and glucose levels in the blood would be high.

12. Which of the following hormones is responsible for stimulating the adrenal cortex to release corticosteroids?

    a. ACTH

    b. Adrenaline

    c. Mineralcorticoids

    d. Noradrenaline

13. Briefly compare the different effects the hormones of the adrenal medulla have versus the hormones of the adrenal cortex on the human stress response.
The adrenal medulla produces epinephrine and norepinephrine that work to produce the "fight-or-flight" response. This is a short-term response. The adrenal cortex has a long-term response. The adrenal cortex releases mineralcorticoids and glucocorticoids to mediate this response.

14. Each kidney has a(n) ____adrenal gland____ that sits on top of it; this gland is made of two parts called the ____adrenal medulla____ and the ____adrenal cortex____.

15. How does PRL lead to increased milk supply in female humans?
In female humans, PRL stimulates mammary glands to produce milk and stimulates swelling of the breasts.

16. Which portion of the pituitary releases oxytocin? Was the oxytocin made there? Briefly explain your answer.
The posterior pituitary releases oxytocin. It is made by neurosecretory cells of the hypothalamus and travels down to be stored in the posterior pituitary.

CONNECTING THE BIG IDEAS

Use your knowledge of the information contained within this chapter's "Big Ideas" to answer this question.

A parent wants to inject their son with additional HGH during puberty to increase his chances of playing professional basketball. Would administration of HGH during puberty increase a person's height beyond what their normal height without the additional HGH would have been?

