

Name _____ Period _____

Chapter 45: Hormones and the Endocrine System

The nervous and endocrine systems transmit signals throughout the body. Both involve signaling between cells, and are emphasized in the Curriculum Framework (CF), especially in EK.3.D.2. Hormones are chemical signals carried through the blood to target tissues. Information you learned in Chapter 11, Cell Communication, will be applied in this chapter. Because the endocrine system is explicitly part of the CF, this is an important chapter. You will not need to know every hormone and how it functions, but select one or two that you can use as examples. Focus on the role of feedback in regulation of hormone production and the ways target cells receive and respond to chemical signals.

Overview

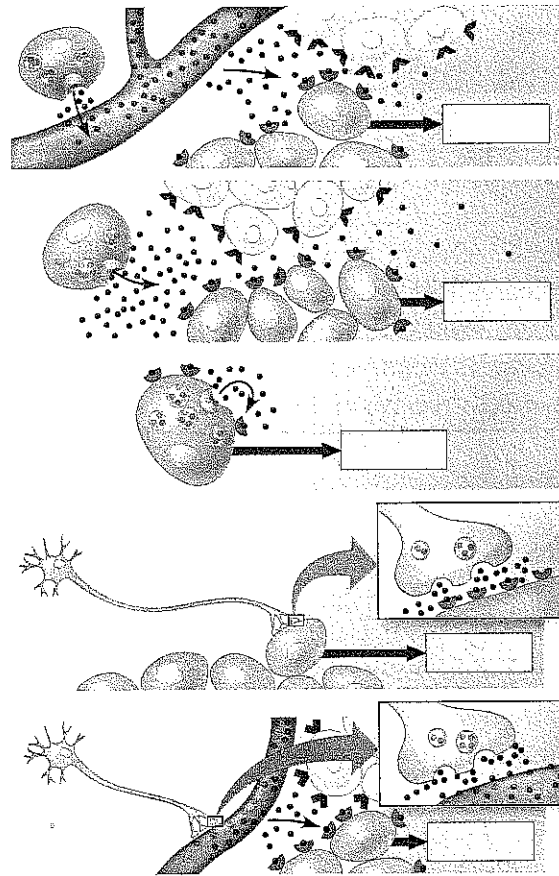
1. What is a *hormone*?
2. Why does a hormone elicit a response only with *target cells*?
3. The body has two long-distance regulating systems. Which involves chemical signals by hormones?
4. What is the other major communication and control system?

Concept 45.1 Hormones and other signaling molecules bind to target receptors, triggering specific response pathways

5. Explain the difference between an *endocrine gland* and an *exocrine gland*. Give an example of each.
6. Several types of secreted signaling molecules are discussed in this chapter. Compare the action of each of the following, and give an example.

hormones**local regulators****neurotransmitters****pheromones**

7. Figure 45.2 in your text shows five different types of signals. Label and explain each one.

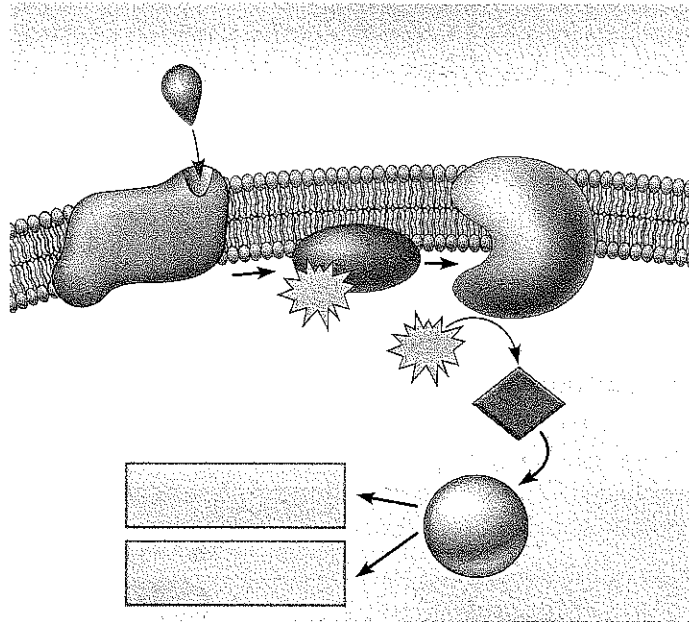


- Recall that target cells have receptors for specific hormones. Where are the receptors for lipid-soluble hormones found?
- Where are the receptors for the water-soluble proteins found?
- Carefully read the section Cellular Response Pathways, and use that information to complete this table.

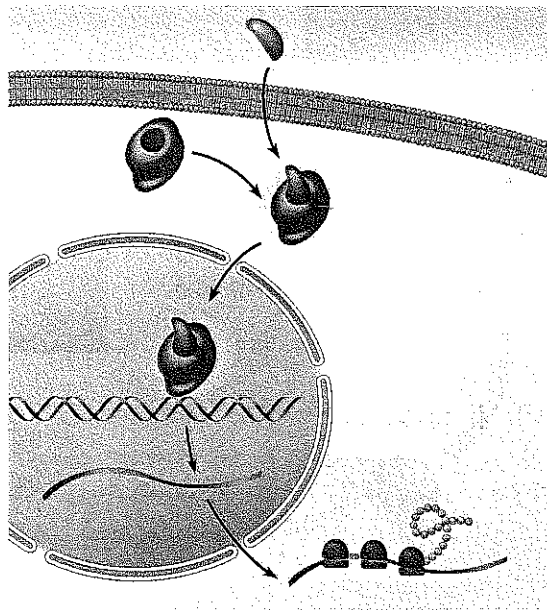
Hormone Type	Method of Secretion	Mode of Travel in Bloodstream	Location of Receptors	Examples
Water-soluble				
Lipid-soluble				

11. What endocrine gland secretes *epinephrine*?

12. What are the two intracellular responses in the liver to epinephrine? How do these help the body deal with short-term stress?
13. Use the following figure to explain the *signal transduction* pathway for *epinephrine*. (You may need to review signal transduction in Chapter 11.)



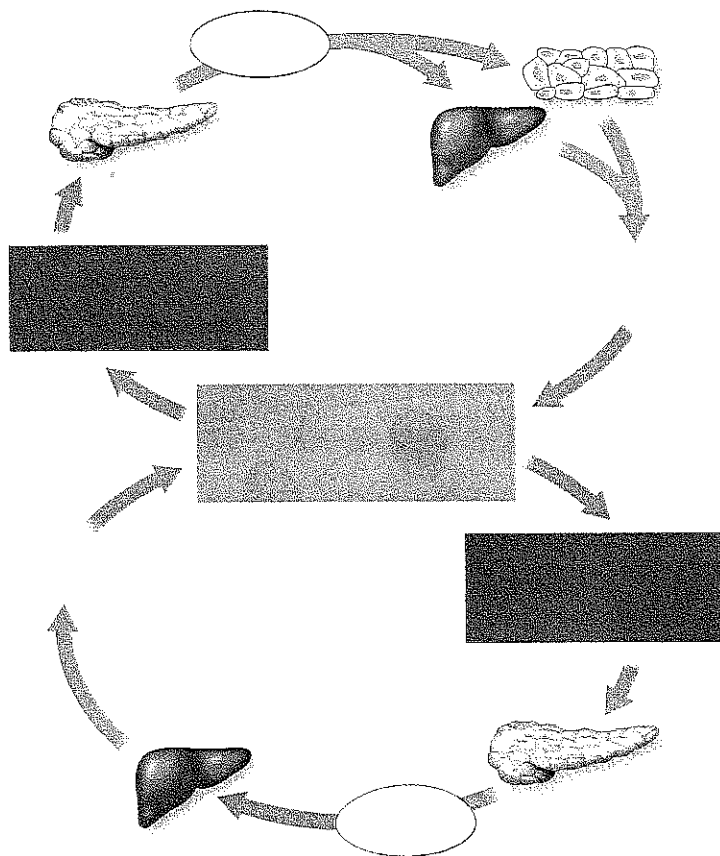
14. *Lipid-soluble hormones*, such as estradiol, bind to *intracellular receptors*. Explain the action of this *steroid* in the following figure.



15. One hormone can have several different effects. For example, epinephrine can cause the release of glucose from liver cells, dilate blood vessels to skeletal muscles, and constrict intestinal blood vessels. All these effects prepare the body for “fight or flight.” Explain how these multiple effects are possible.

Concept 45.2 Feedback regulation and coordination with the nervous system are common in endocrine signaling

16. Throughout this course, we have emphasized *feedback loops*. What occurs in a *negative feedback* loop? Describe a negative feedback loop with a specific example.
17. How is *oxytocin* an example of a hormone that is under *positive regulation*?
18. On the AP Biology Exam, you will be expected to explain a feedback loop. Use this figure to explain the control of blood glucose by *insulin* and *glucagon*. This is a commonly used example, and one you should know. (Turn back to page 910, Figure 41.21, if you need help with this figure.)



19. The *hypothalamus* directly secretes hormones that travel to the *posterior pituitary* and regulating hormones that affect secretions of hormones by the *anterior pituitary*. The anterior pituitary secretes seven different hormones. Each hormone has a specific target tissue. Select two pituitary hormones and give the target and response for each.

Hormone	Target Tissue	Response

20. What are *tropic hormones*? Give three examples, and tell what each hormone regulates.
21. Every hormone causes a response in target cells. Too little or too much of the signal can disrupt homeostasis. Select two hormones and describe the effect of hyposecretion and hypersecretion of the signaling molecule.

Hormone	Effect of Hyposecretion	Effect of Hypersecretion

Concept 45.3 *Endocrine glands respond to diverse stimuli in regulating homeostasis, development, and behavior*

22. What two hormones are antagonistic controllers of blood calcium levels?
23. How does *parathyroid hormone (PTH)* raise blood calcium? (Note three ways.)
24. Are blood calcium levels regulated by positive or negative feedback? Justify your response.
25. What are two estrogen-like *endocrine disruptors* that occur in the environment? What effect does each seem to have?

Test Your Understanding Answers

Now you should be ready to test your knowledge. Place your answers here:

1. _____ 2. _____ 3. _____