



## 34.1 The Endocrine System

### Lesson Objectives

-  Describe the structure and function of the endocrine system.
-  Explain how hormones work.

### Lesson Summary

**Hormones and Glands** The endocrine system is made up of endocrine glands that release hormones into the blood.

- ▶ **Hormones** are chemicals made in one part of the body that affect cells in other parts of the body. Hormones travel throughout the body in the bloodstream.
  - Hormones bind to **target cells**, which are cells that have specific receptors for a hormone either in the cell membrane or inside the cell.
  - A hormone will not affect a cell that does not have receptors for the hormone.
- ▶ Glands are organs that release secretions. The body has two types of glands.
  - **Exocrine glands** release their secretions through ducts either outside the body or into the digestive system.
  - **Endocrine glands** release hormones directly into the bloodstream. Other structures that are not usually considered glands, such as bones, fat tissue, the heart, and the small intestine, also produce and release hormones.
- ▶ All cells, except for red blood cells, produce hormonelike substances called **prostaglandins**. Prostaglandins are modified fatty acids that usually affect only nearby cells and tissues. They are sometimes called “local hormones.”

**Hormone Action** There are two types of hormones.

- ▶ Steroid hormones are produced from cholesterol. They can cross cell membranes of target cells, bind with their receptors, and enter the nucleus. The hormone-receptor complexes change the expression of genes in the target cell, often resulting in dramatic changes in the cell’s activity.
- ▶ Nonsteroid hormones can be proteins, small peptides, or modified amino acids. They cannot cross cell membranes. The receptors for nonsteroid hormones are on the cell membrane. Compounds called secondary messengers carry the messages of nonsteroid hormones inside target cells.

### Hormones and Glands

For Questions 1–4, write True if the statement is true and False if the statement is false.

- \_\_\_\_\_ 1. Hormones are chemical messengers that are transported by the bloodstream.
- \_\_\_\_\_ 2. Any cell can be a target cell for a hormone.
- \_\_\_\_\_ 3. The body’s response to hormones is the same as it is for nerve impulses.
- \_\_\_\_\_ 4. Insulin and glucagon are two opposing hormones.

Gland	Hormone(s) Produced	Function
Parathyroid	Parathyroid hormone	
Pineal		Regulates rhythmic activities
	Thyroxine	
	Corticosteroids, epinephrine, norepinephrine	
		Maintains the level of glucose in the blood
		Regulates formation of eggs and development of secondary female sex characteristics; prepares uterus for fertilization
	Testosterone	

8. Summarize the action of a steroid hormone on a target cell.

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9. Summarize the action of a nonsteroid hormone on a target cell.

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