

Your Endocrine System

This lesson will help you find answers to questions that teens often ask about their endocrine system. For example:

- ▶ Why does my heart beat faster when I am frightened or excited?
- ▶ Why am I shorter (or taller) than most of my classmates?
- ▶ Why do some people have diabetes?

Words to Know

endocrine system
gland
pituitary gland

The Regulator

Your nervous system has been described as your body's control center. Your **endocrine** (EN·duh·krihn) **system** works closely with your nervous system to regulate body functions.

The endocrine system consists of several glands located throughout your body. A **gland** is a group of cells, or an organ, that secretes a chemical substance. The substances secreted by the endocrine glands are called *hormones*. Hormone comes from a Greek word that means "to set in motion." The endocrine glands secrete their hormones directly into your bloodstream, where they are carried to various parts of the body and activate these parts in specific ways. Some hormones are produced continually; others are produced only at certain times.

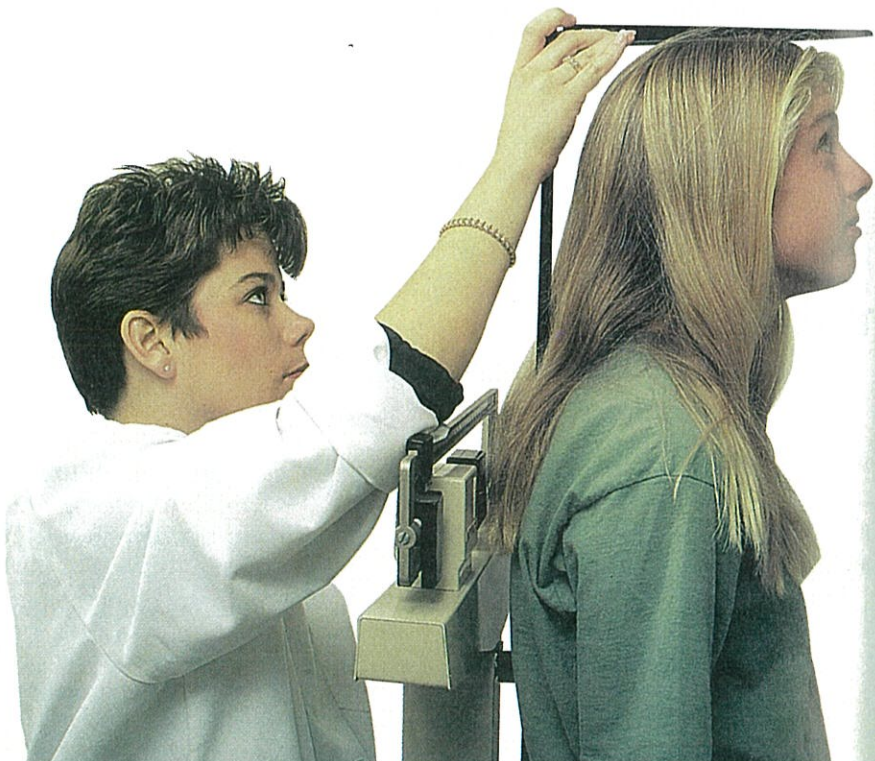
in Your Journal

Make a list of some of the major changes your body has undergone in the last year. Review the characteristics of adolescent growth on pages 211–213. Then, describe those changes that you consider to be secondary sex characteristics.

The Glands of the Endocrine System

Each hormone produced by the endocrine glands regulates one of your body's activities. **Figure 10.27** shows the locations of the endocrine glands and tells what each one does.

A gland in your endocrine system, the pituitary gland, controls your growth.



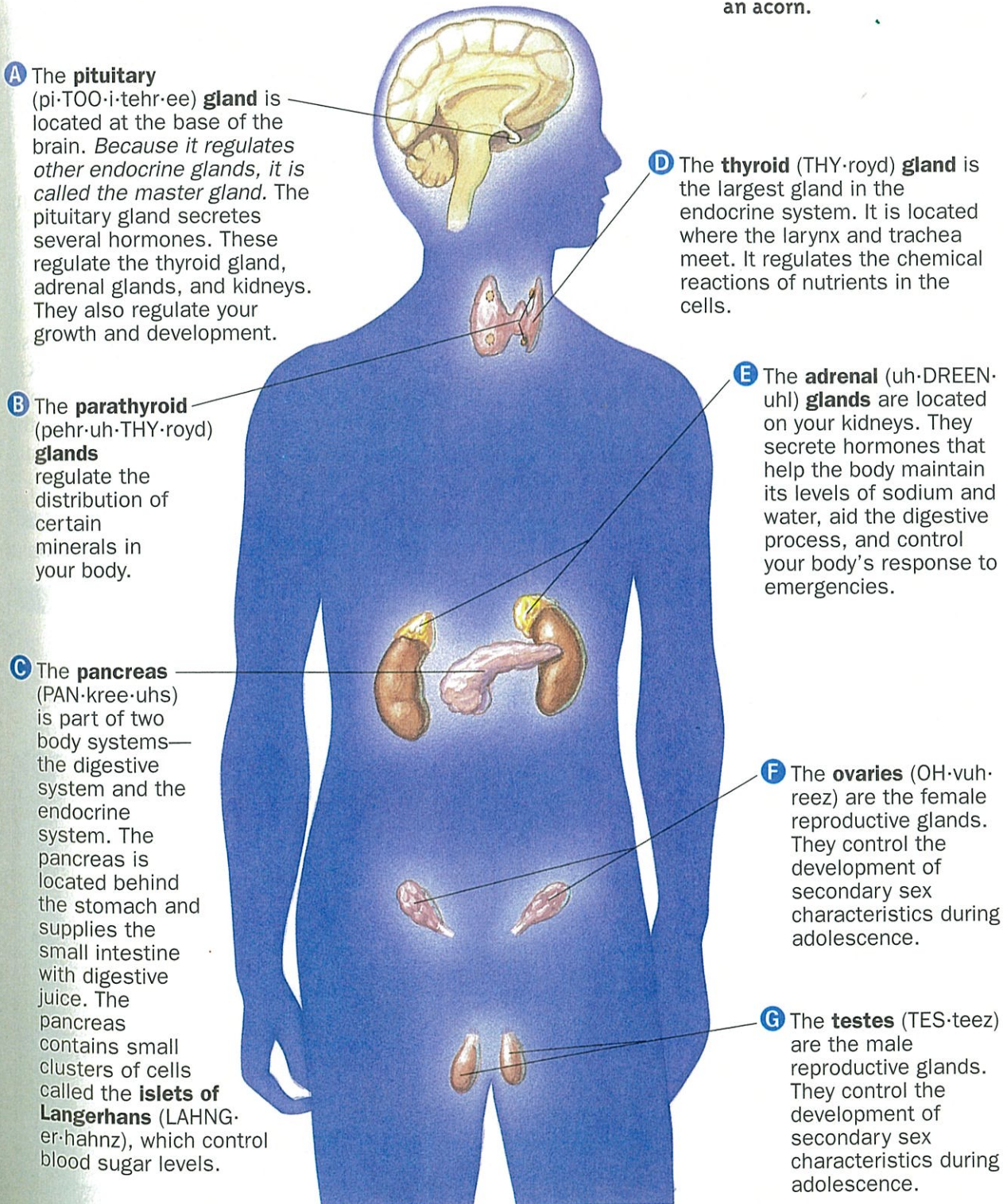
The endocrine glands work on signals from the brain or from other glands. The brain tracks the presence of substances in the blood. For example, when the brain senses too little thyroid hormone in the blood, it signals the pituitary. The pituitary, in turn, signals the thyroid, which releases more of the hormone.

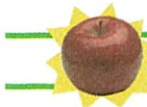
Did You Know?

Small and Important

The pituitary gland is one of the smallest, but most important, glands in your body. It is about the size of an acorn.

Figure 10.27
The Endocrine System





Your Total Health

Learn to Relax

ACTIVITY!

Relaxation is one way to relieve stress. What do you do to relax? Do you lie down, listen to some music, or go for a leisurely walk? Keep a list for a week of how many times a day you relax, and what you did each time. Do you think you need to relax more often? If so, plan ways to include more relaxation time into your schedule.

Activities That Hormones Control

Medical experts are still uncertain about the functions of the pineal and thymus glands. The other glands do the following jobs.

- The pituitary gland controls physical growth; controls other glands; controls the movements of smooth muscles.
- The parathyroid regulates calcium and phosphorous levels.
- The islets of Langerhans regulate your blood sugar level.
- The thyroid gland controls the rate at which food is converted to energy in the cells.
- The adrenal glands control the body's water balance and use of carbohydrates, proteins, and fats; start the stress response.
- Ovaries and testes control secondary sex characteristics.

Good health habits are important for a healthy endocrine system, especially during the teen years.

The Stress Response

Whenever you are excited or anxious, your body is under stress. Your adrenal glands then release the hormone *adrenaline* (uh-DRE-nuhl-in). **Figure 10.28** shows how adrenaline prepares your body to respond to stress. This response ends when the cause of the stress is gone, or when your body slows down because it cannot maintain the high level of activity.

The stress response can be harmful if it goes on too long or happens too often. You can avoid harm caused by the stress response by learning to manage stress.

Figure 10.28
The Effects of Stress on the Body

Various changes occur as the body responds to stress. Some of them are listed here.

Body Part	Under Stress	After Stress
Brain	Blood flow to brain increases	Blood flow to brain decreases
Sweat glands	Sweat production increases	Return to normal
Lungs	Air passageways expand	Air passageways contract
Circulatory system	Heart rate increases; blood pressure rises; blood to skeletal muscles increases	Returns to normal
Digestive system	Digestion slows	Digestion increases
Adrenal gland	Releases adrenaline	Returns to normal
Liver and gallbladder	Gallbladder stimulates liver to release sugar	Return to normal

Disorders of the Endocrine System

Most endocrine disorders are related to the production of a hormone—too much or too little. **Figure 10.29** describes some disorders of the endocrine system.

Figure 10.29
Disorders of the Endocrine System

Disorder	Description
Diabetes mellitus	Loss of nutrients and energy due to inadequate insulin production by the islets of Langerhans; symptoms include lack of energy, extreme thirst, and frequent urination
Goiter	Enlargement of the thyroid gland; visible as a swelling of the lower neck; caused by too little iodine
Growth extremes	Caused by the release of abnormal amounts of growth hormones; too little growth hormone causes dwarfism (results in a very small person); too much growth hormone causes gigantism (results in a very large person)

Q & A



A Fishy Solution

Q: I don't think I eat foods that contain iodine. Why don't I have a goiter?

A: You don't need much iodine in your diet. Since seawater contains iodine, eating seafood can provide all the iodine needed to keep your thyroid healthy. Also, the table salt you use may have small amounts of iodine added.

Review

Lesson

7

Using complete sentences, answer the following questions on a separate sheet of paper.

Reviewing Terms and Facts

- 1. Vocabulary** What is a *gland*? Explain the role of glands in the endocrine system.
- 2. Identify** What gland is part of the endocrine system and also plays an important role in the digestive system?

Thinking Critically

- 3. Explain** What is the largest gland? Where is it located? What is its function?

- 4. Analyze** Why is caring for your endocrine system especially important during the teen years?

Applying Health Concepts

- 5. Personal Health** Think of a situation when you experienced a stress response. Describe what caused the response, the changes your body underwent, and how the situation was resolved.
- 6. Health of Others** There are two main forms of diabetes—juvenile and adult. Do research to find out how these two types of diabetes and their treatments differ. Make a chart comparing the two types. Share your findings in class.