

## KEY TERMS

Addison's disease	Hormone replacement therapy (HRT)	Non-insulin-dependent diabetes mellitus (NIDDM)
Adrenocorticotrophic hormone (ACTH)	Hyperglycemia	Parathormone
Antidiuretic hormone (ADH)	Hypoglycemia	Thyroid-stimulating hormone (TSH)
Calcitonin	Insulin-dependent diabetes mellitus (IDDM)	Thyroid storm
Cretinism	Ketoacidosis	Thyroxine (T <sub>4</sub> )
Cushing's disease	Melatonin	Triiodothyronine (T <sub>3</sub> )
Diabetes mellitus	Myxedema	
Goiter	Negative feedback system	
Graves' disease		

## ■ THE ENDOCRINE SYSTEM

The endocrine system uses chemicals known as hormones, acting as messengers to various parts of the body, to trigger a reaction. Several components make up this system (Fig. 15-1), which is controlled by the hypothalamus. The hypothalamus gland, located in the brain, secretes chemicals called releasing factors that trigger the release of several hormones from the pituitary gland. The pituitary gland, also located in the brain, is known as the master gland because it secretes most of the body's hormones. The pituitary gland secretes follicle-stimulating hormone (FSH) and luteinizing hormone (LH), which are important to female reproduction, and **antidiuretic hormone (ADH)**, which helps prevent loss of water by the kidneys. In addition, the pituitary gland secretes **thyroid-stimulating hormone (TSH)**, which triggers thyroid gland function. Table 15-1 and Figure 15-2 provide a more in-depth look at all the hormones secreted by the pituitary gland. The hypothalamus is the body's coordinator—it tells the pituitary gland which hormones to send out to the body. When a hormone level becomes too high, the body tells the hypothalamus, which, in turn, tells the pituitary gland to stop producing the hormone. This is called a **negative feedback system**.

The gonads (sex organs) consist of the ovaries in females and the testes in males. These glands are responsible for secreting hormones in response to those released by the pituitary gland. The ovaries produce and release both estrogen and progesterone, and the testes produce and release androgens, which include testosterone. Chapter 20 covers the medications used to treat reproductive disorders.

The thyroid gland, which is located in the neck surrounding the esophagus, regulates metabolism, including temperature and body weight. The thyroid gland also regulates blood and bone calcium by secreting calcitonin. **Calcitonin** helps force calcium ions into bone. If the patient has insufficient calcitonin, the blood calcium level remains high and the bone calcium level remains low, thus leading to bone fractures. Replacement hormones help with both energy and calcium storage, but the prescriber may order only calcium supplements.

The four parathyroid glands are located on the surface of the thyroid gland and are responsible for the concentration of sodium and calcium in the blood and urine. The parathyroid glands, which are embedded in the thyroid gland, also help regulate calcium balance. They counter calcitonin with **parathormone**, which pulls calcium out of the bones into the bloodstream.

The pancreas, located in the abdominal cavity, has two major functions. First, it secretes digestive enzymes into the small intestine and thereby allows what we eat to be digested and used. The second function of the pancreas is achieved by secreting two hormones: insulin, which decreases blood glucose by moving it into the tissue, where it can be used; and glucagon, which increases blood glucose. The liver helps the pancreas determine blood glucose levels, so the liver and pancreas must be functioning properly to control blood glucose.

The adrenal glands are located above the kidneys. These glands are made up of the inner (adrenal medulla) and outer (adrenal cortex) portions. The secretion of **adrenocorticotrophic hormone (ACTH)**