

chapter 23

Hypothalamic and Pituitary Hormones

Objectives

AFTER STUDYING THIS CHAPTER, THE STUDENT WILL BE ABLE TO:

1. Describe clinical uses of selected hormones.
2. Differentiate characteristics and functions of anterior and posterior pituitary hormones.
3. Discuss limitations of hypothalamic and pituitary hormones as therapeutic agents.
4. State major nursing considerations in the care of clients receiving specific hypothalamic and pituitary hormones.

Critical Thinking Scenario

John, 11 years of age, is brought to the pediatric nurse practitioner for his annual sports physical. His mother voices concerns about John's short stature and questions you about the use of growth hormone. You note that John is in the 25th percentile for height and the 50th percentile for weight.

Reflect on:

- ▶ Additional assessment questions to ask John and his mother.
- ▶ Factors that might influence their desire for increased height and the use of growth hormone to accomplish this.
- ▶ If John uses growth hormone, outline some of the disadvantages and side effects.

OVERVIEW

The hypothalamus and pituitary gland (Fig. 23–1) interact to control most metabolic functions of the body and to maintain homeostasis. They are anatomically connected by the hypophyseal stalk. The hypothalamus controls secretions of the pituitary gland. The pituitary gland, in turn, regulates secretions or functions of other body tissues, called *target* tissues. The pituitary gland is actually two glands, each with different structures and functions. The anterior pituitary is composed of different types of glandular cells that synthesize and secrete different hormones. The posterior pituitary is anatomically an extension of the hypothalamus and is composed largely of nerve fibers. It does not manufacture any hormones itself but stores and releases hormones synthesized in the hypothalamus.

Hypothalamic Hormones

The hypothalamus produces a releasing hormone or an inhibiting hormone that corresponds to each of the major hormones of the anterior pituitary gland.

Corticotropin-releasing hormone or factor (CRH or CRF) causes release of corticotropin (also called adrenocorticotropic hormone or ACTH), in response to stress and threatening stimuli. CRH is secreted most often during sleep and its secretion is influenced by several neurotransmitters. Acetylcholine and serotonin stimulate secretion; gamma-aminobutyric acid (GABA) and norepinephrine inhibit secretion. The ability of CRH to stimulate corticotropin secretion is increased by vasopressin and decreased or prevented by somatostatin and elevated levels of glucocorticoids. CRH can be used in the diagnosis of Cushing's disease, a disorder characterized by excess cortisol.

Growth hormone-releasing hormone (GHRH) causes release of growth hormone in response to low blood levels of the hormone. Found in the pancreas as well as the hypothalamus, GHRH structurally resembles a group of hormones that includes glucagon, secretin, vasoactive intestinal peptide, and gastric inhibitory peptide. Secretion of hypothalamic GHRH is stimulated by dopamine, norepinephrine, epinephrine, GABA, acetylcholine, and serotonin. The stimulatory effect of GHRH on secretion of growth hormone is blocked by somatostatin. GHRH may be used to