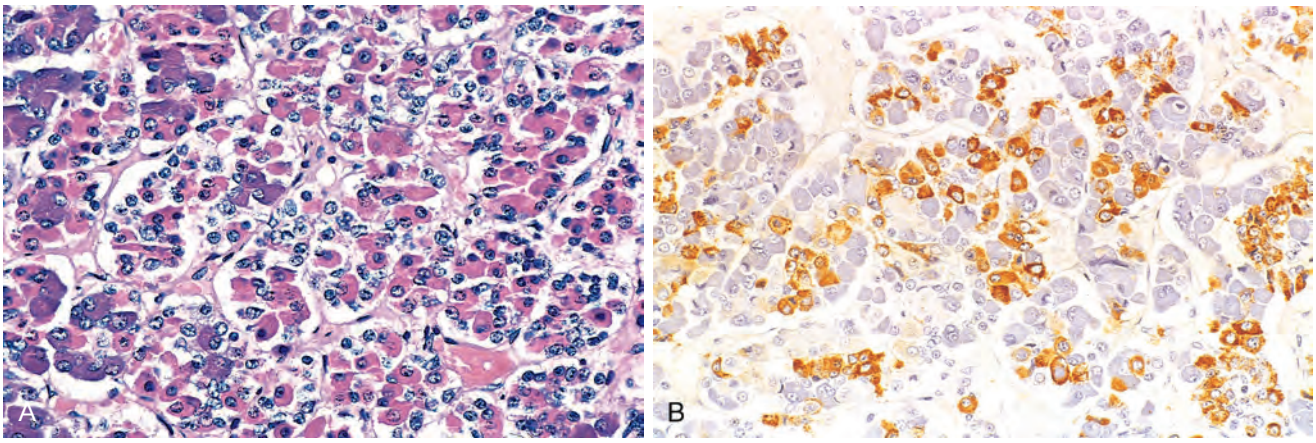

Figure 24-2 A, Photomicrograph of normal pituitary. The gland is populated by several distinct cell populations containing a variety of stimulating (tropic) hormones. Each of the hormones has different staining characteristics, resulting in a mixture of cell types in routine histologic preparations. **B,** Immunostain for human growth hormone.

uterine smooth muscle, facilitating parturition (uterine labor). Similarly, oxytocin released upon nipple stimulation in the postnatal period acts on the smooth muscles surrounding the lactiferous ducts of the mammary glands and facilitates lactation. Synthetic oxytocin can be given to pregnant women to induce labor. The most important function of ADH is to conserve water by restricting diuresis during periods of dehydration and hypovolemia. Decreased blood pressure, sensed by *baroreceptors* (pressure-sensing receptors) in the cardiac atria and carotids, stimulates ADH release. An increase in plasma osmotic pressure detected by *osmoreceptors* also triggers ADH secretion. In contrast, states of hypervolemia and increased atrial distention result in inhibition of ADH secretion.

Clinical Manifestations of Pituitary Disease

The manifestations of pituitary disorders are related to either excess or deficiency of pituitary hormones, or to mass effects.

Hyperpituitarism: Arising from excess secretion of trophic hormones. The causes of hyperpituitarism include pituitary adenoma, hyperplasia and carcinomas of the anterior pituitary, secretion of hormones by nonpituitary tumors, and certain hypothalamic disorders. The symptoms of hyperpituitarism are discussed later in the context of individual tumors.

Hypopituitarism: Arising from deficiency of trophic hormones. This may be caused by destructive processes, including ischemic injury, surgery or radiation, inflammatory reactions, and nonfunctional pituitary adenomas.

Local mass effects: Among the earliest changes referable to mass effect are radiographic abnormalities of the sella turcica, including sellar expansion, bony erosion, and disruption of the diaphragma sella. Because of the close proximity of the optic nerves and chiasm to the sella, expanding pituitary lesions often compress decussating fibers in the optic chiasm. This gives rise to *visual field abnormalities*, classically in the form of defects in both lateral (temporal) visual fields, so-called *bitemporal hemianopsia*. In addition, a variety of other visual field abnormalities may be caused by asymmetric growth of many tumors. Like any expanding intracranial mass, pituitary adenomas can produce signs and symptoms of *elevated intracranial pressure*, including headache, nausea, and vomiting. On occasion, acute hemorrhage into an adenoma is associated with clinical evidence of rapid enlargement of the lesion, a situation appropriately termed *pituitary apoplexy*. Acute pituitary apoplexy is a neurosurgical emergency, in that it can cause sudden death (see later).

Diseases of the posterior pituitary often come to clinical attention because of increased or decreased secretion of ADH.

Pituitary Adenomas and Hyperpituitarism

The most common cause of hyperpituitarism is an adenoma arising in the anterior lobe. These benign tumors are classified on the basis of the hormones that are produced by the neoplastic cells, which are detected by immunohistochemical stains (Table 24-1). Some pituitary adenomas can secrete two hormones (GH and prolactin being the most common combination), and rarely, pituitary adenomas are plurihormonal. Pituitary adenomas can be *functional* (i.e., associated with hormone excess and clinical manifestations thereof) or *nonfunctioning* (i.e., without clinical symptoms of hormone excess). Less common causes of hyperpituitarism include pituitary carcinomas and some hypothalamic disorders. Large pituitary adenomas, and particularly nonfunctioning ones, may cause hypopituitarism by encroaching on and destroying the adjacent anterior pituitary parenchyma.

Pituitary adenomas are usually found in adults; the peak incidence is from 35 to 60 years of age. They are designated, somewhat arbitrarily, *microadenomas* if they are less than 1 cm in diameter and *macroadenomas* if they