ANATOMY OF THE ENDOCRINE SYSTEM

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The endocrine system is made up of glands that produce and secrete hormones, chemical substances produced in the body that regulate the activity of cells or organs. These hormones regulate the body’s growth, metabolism (the physical and chemical processes of the body), and sexual development and function. The hormones are released into the bloodstream and may affect one or several organs throughout the body.

Hormones are chemical messengers created by the body. They transfer information from one set of cells to another to coordinate the functions of different parts of the body. The major glands of the endocrine system are the hypothalamus, pituitary, thyroid, parathyroids, adrenals, pineal body, and the reproductive organs (ovaries and testes). The pancreas is also a part of this system; it has a role in hormone production as well as in digestion.

**ENDOCRINE GLANDS IN THE HEAD AND NECK**

**Hypothalamus**
The hypothalamus is a region of the brain that controls an immense number of bodily functions. It is located in the middle of the base of the brain. It is the control center for many autonomic functions of the peripheral nervous system. Connections with structures of the endocrine and nervous systems enable the hypothalamus to play a vital role in maintaining homeostasis.

As a limbic system structure, the hypothalamus also influences various emotional responses.

Function:
The hypothalamus is involved in several functions of the body including:
- Autonomic Function Control
- Endocrine Function Control
- Homeostasis
- Motor Function Control
- Food and Water Intake Regulation
- Sleep-Wake Cycle Regulation

**Pituitary Gland (Hypophysis Cerebri)**
The pituitary gland is a small, oval structure attached to the undersurface of the brain. The gland is well protected by virtue of its location in the sella turcica of the sphenoid bone. Because the hormones produced by the gland influence the activities of many other endocrine glands, the hypophysis cerebri is often referred to as the master endocrine gland. For this reason, it is vital to life.

The pituitary gland is divided into an anterior lobe, or adenohypophysis, and a posterior lobe, or neurohypophysis. A projection from the pars anterior, the pars tuberalis, extends up along the pituitary stalk.

The pituitary gland influences the activities of many other endocrine glands. The pituitary gland is itself controlled by the hypothalamus and the activities of the hypothalamus are modified by information received along numerous nervous afferent pathways from different parts of the central nervous system and by the plasma levels of the circulating electrolytes and hormones.

**Pineal Gland**
The pineal gland is a small cone-shaped body that projects posteriorly from the roof of the third ventricle of the brain. The gland has a rich blood supply and is innervated by postganglionic sympathetic nerve fibers. The pineal gland can influence the activities of the pituitary gland, the islets of Langerhans of the pancreas, the parathyroids, the adrenals, and the gonads. The pineal secretions, produced by the pinealocytes, reach their target organs via the bloodstream or through the cerebrospinal fluid. Their actions are mainly inhibitory and either directly inhibit the production of hormones or indirectly inhibit the secretion of releasing factors by the hypothalamus.
**Thyroid Gland**
The thyroid gland consists of right and left lobes connected by a narrow isthmus. It is a vascular organ surrounded by a sheath. The sheath attaches the gland to the larynx and the trachea. The thyroid hormones increase the metabolic activity of most cells in the body. The parafollicular cells produce the hormone thyrocalcitonin, which lowers the level of blood calcium.

**Parathyroid Glands**
The parathyroid glands are ovoid bodies and are four in number and are closely related to the posterior border of the thyroid gland, lying within its fascial capsule. The chief cells produce the parathyroid hormone, which stimulates osteoclastic activity in bones, thus mobilizing the bone calcium and increasing the calcium levels in the blood. The parathyroid hormone also stimulates the absorption of dietary calcium from the small intestine and the reabsorption of calcium in the kidney. It also strongly diminishes the reabsorption of phosphate in the kidney. The secretion of the parathyroid hormone is controlled by the calcium levels in the blood.

Figure 1. Endocrine system
http://www.yalemedicalgroup.org/stw/Page.asp?PageID=STW023050