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Chapter 39 outline

**Chapter 39: Endocrine and Reproductive System**

**Section 39.1: The Endocrine System**

*The endocrine system is made up of glands that release their products into the blood stream. These products deliver messages throughout the body.*

**Hormones-** chemicals that are released into the bloodstream and affect the activity of cells in other parts of the body

**Target Cells-** cells that have receptors for particular hormones

**Figure 39.1:** Much of the increase in heart rate and breathing that people experience when on rollercoasters is due to the action of hormones.

**Exocrine glands:** Glands that release their products directly into the organ(s) that uses them

**Endocrine glands:** glands that release their secretions into the blood stream

**Figure 39.2:** Endocrine glands produce hormones that affect many parts of the body

* Hypothalamus: makes hormones that control the pituitary gland, makes hormones that are stored in the pituitary gland, link between nervous system and endocrine system
* Pituitary gland: Produces hormones that regulate the function of many other glands in the body
* Parathyroid gland: 4 glands, release parathyroid hormone, regulates blood calcium levels
* Thymus: during childhood, releases thymus, stimulates T-cell development, leading to healthy immune system
* Adrenal glands: release epinephrine and norepinephrine, helps the body respond to stress
* Pineal gland: releases melatonin, related to rhythmic activities such as sleep cycle
* Thyroid: produces thyroxin, regulates body metabolism
* Pancreas: produces insulin and glucagon, regulate amount of glucose in the blood
* Ovary: produce estrogen and progesterone.
  + Estrogen- development of secondary sex characteristics and development of eggs
  + Progesterone- prepares uterus for fertilized fetus
* Testis: produces testosterone, responsible for sperm production and development of secondary sex characteristics

**Figure 39.3:** Two main types of hormones are steroid hormones and nonsteroid hormones

**Progstaglandins-** hormone-like substance produced by all cells, only affect nearby cells and tissues

*Like most systems of the body, the endocrine system is regulated by feedback mechanisms that function to maintain homeostasis*.

**Figure 39.4:** When the hypothalamus senses the level of thyroxine in the blood is too low, it secrets TRH. TRH stimulates the anterior pituitary to secrete TSH. TSH stimulates the thyroid to release thyroxine. Increased levels of TSH and thyroxine inhibit TRH secretions by the hypothalamus.

**Figure 39.5:** When exercising, it is important to replenish lost liquid

**Section 39.2: Human Endocrine Glands**

**Pituitary gland-** The pituitary gland is a bean-shaped structure that dangles on a slender stalk of tissue at the base of the skull.

*The pituitary gland secretes nine hormones that directly regulate many body functions and controls the actions of several other endocrine functions.*

**Figure 39.6:** The pituitary gland, which directly controls many other endocrine glands, is located below the hypothalamus in the brain. The pituitary gland has two lobes: an anterior and posterior lobe.

*The hypothalamus controls the secretions of the pituitary gland.*

**Figure 39.7:** The hypothalamus controls the secretions of the pituitary gland

* Antidiuretic hormone (ADH): stimulates kidneys to reabsorb water from collecting tubules
* Oxytocin: contractions during birth, releases milk in nursing mothers
* Follicle-stimulating hormone (FSH): Stimulates production of mature eggs and sperm
* Luteinizing Hormone (LH): Stimulates ovaries and testes; prepares uterus for implantation of fertilized egg
* Thyroid-stimulating hormone (TSH): Stimulates the synthesis and release of thyroxine from the thyroid gland
* Adreno-corticotropic hormone (ACTH): stimulates release of some hormones from the adrenal cortex
* Growth hormone (GH): stimulates protein synthesis and growth in cells
* Prolactin: stimulates milk production in nursing mothers
* Melanocyte-stimulating hormone (MSH): Stimulates the melanocytes of the skin, increasing their production of the skin pigment melanin

**Figure 39.8:** Hormones produced by the thyroid and parathyroid glands play a major role in maintaining the level of calcium in the blood. The thyroid gland wraps around the trachea.

*The thyroid gland has the major role of regulating the body’s metabolism.*

*Hormones from the thyroid and parathyroid glands act to maintain homeostasis of the calcium levels in the blood.*

*The adrenal glands release hormones the help the body prepare for and deal with stress.*

**Figure 39.9:** The adrenal glands release hormones that help the body prepare for and deal with stress. Each adrenal gland is divided into two structural parts: the adrenal cortex and the adrenal medulla.

*Insulin and glucagon help to keep the level of glucose in the blood stable.*

**Diabetes mellitus:** amount of glucose rises so high that the kidneys may excrete glucose in urine, can damage every cell in the body

**Figure 39.10:** Type 2 diabetes promotes atherosclerosis, which reduces the elasticity of arteries.