

Chapter 10: Endocrine System

1. Introduction:

The endocrine system consists of glands that secrete hormones directly into the bloodstream. These hormones regulate various physiological processes and maintain homeostasis.

2. Types of Glands:

- **Endocrine Glands:** Ductless glands that secrete hormones directly into the blood. (e.g., Thyroid, Pituitary)
- **Exocrine Glands:** Glands with ducts that release secretions to specific locations. (e.g., Salivary, Sweat glands)

Differences:

Endocrine Glands	Exocrine Glands
Ductless	Have ducts
Secrete hormones into blood	Secrete enzymes or fluids locally
Regulate long-term processes	Perform specific localized functions

3. Major Endocrine Glands and Their Hormones:

a) Pituitary Gland:

- **Location:** Base of the brain.
 - **Hormones:**
 - **Growth Hormone (GH):** Stimulates growth.
 - **Tropic Hormones:** Stimulate other glands (e.g., TSH).
 - **Antidiuretic Hormone (ADH):** Regulates water balance.
 - **Oxytocin:** Stimulates uterine contractions during childbirth.
 - **Disorders:**
 - **Hyposecretion of GH:** Dwarfism.
 - **Hypersecretion of GH:** Gigantism or Acromegaly.
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b) Thyroid Gland:

- **Location:** In the neck, around the trachea.
 - **Hormone:**
 - **Thyroxine (T4):** Regulates metabolism.
 - **Disorders:**
 - **Hypothyroidism:** Sluggishness, weight gain (e.g., Cretinism).
 - **Hyperthyroidism:** Increased metabolism, weight loss.
 - **Feedback Mechanism:**
 - TSH (from pituitary) stimulates thyroid to release thyroxine.
 - High thyroxine levels inhibit TSH production.
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c) Adrenal Glands:

- **Location:** On top of each kidney.
 - **Hormones:**
 - **Adrenaline (Epinephrine):** Prepares body for 'fight or flight'.
 - **Cortical Hormones (Cortisol):** Regulate metabolism and immune response.
 - **Disorders:**
 - **Hyposecretion:** Addison's disease.
 - **Hypersecretion:** Cushing's syndrome.
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d) Pancreas (Islets of Langerhans):

- **Location:** Below the stomach.
 - **Hormones:**
 - **Insulin:** Lowers blood glucose levels.
 - **Glucagon:** Raises blood glucose levels.
 - **Disorders:**
 - **Hyposecretion of Insulin:** Diabetes Mellitus.
 - **Hypersecretion of Insulin:** Hypoglycemia.
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4. Feedback Mechanism:

- The regulation of hormone levels is often controlled by feedback loops.
- **Example:** If thyroxine levels are low, the pituitary gland secretes more TSH, stimulating the thyroid to produce more thyroxine. High thyroxine levels inhibit further TSH production.

5. Significance:

- The endocrine system maintains homeostasis and regulates growth, metabolism, stress response, and reproductive functions.
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