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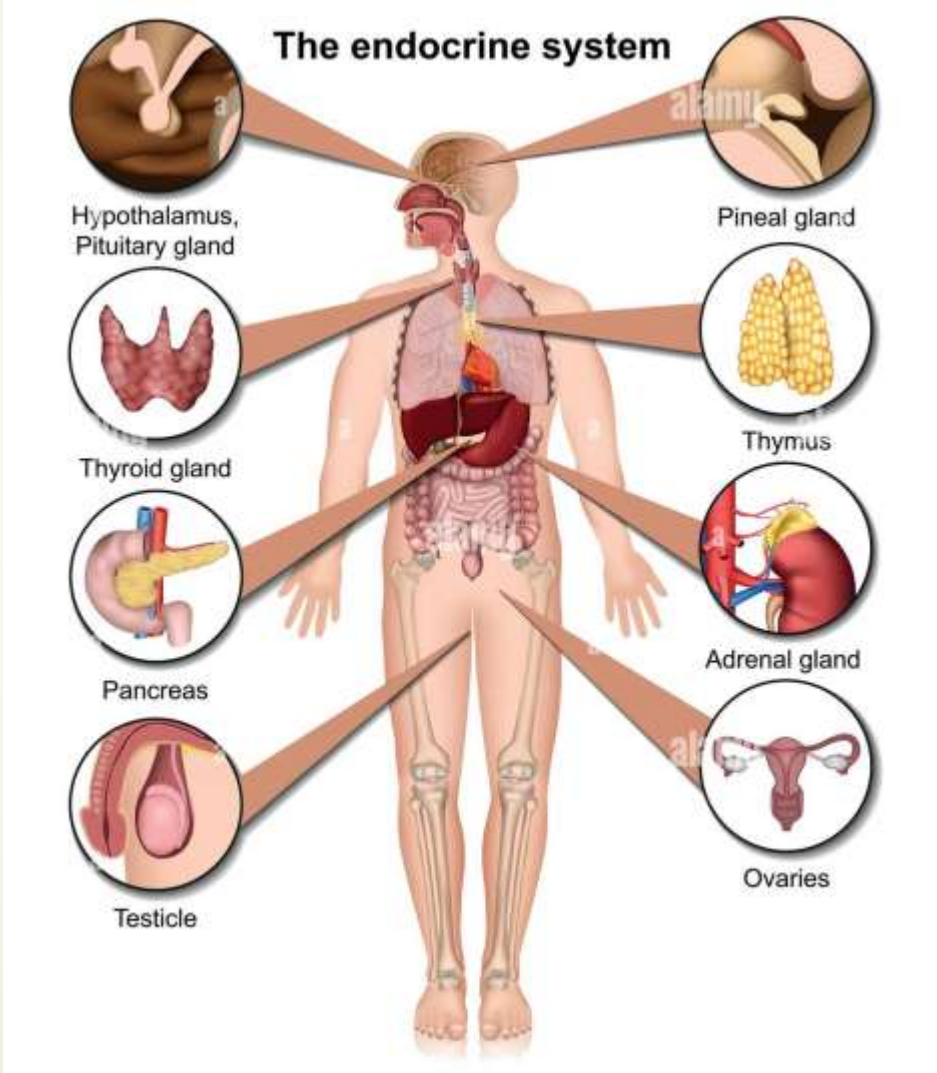
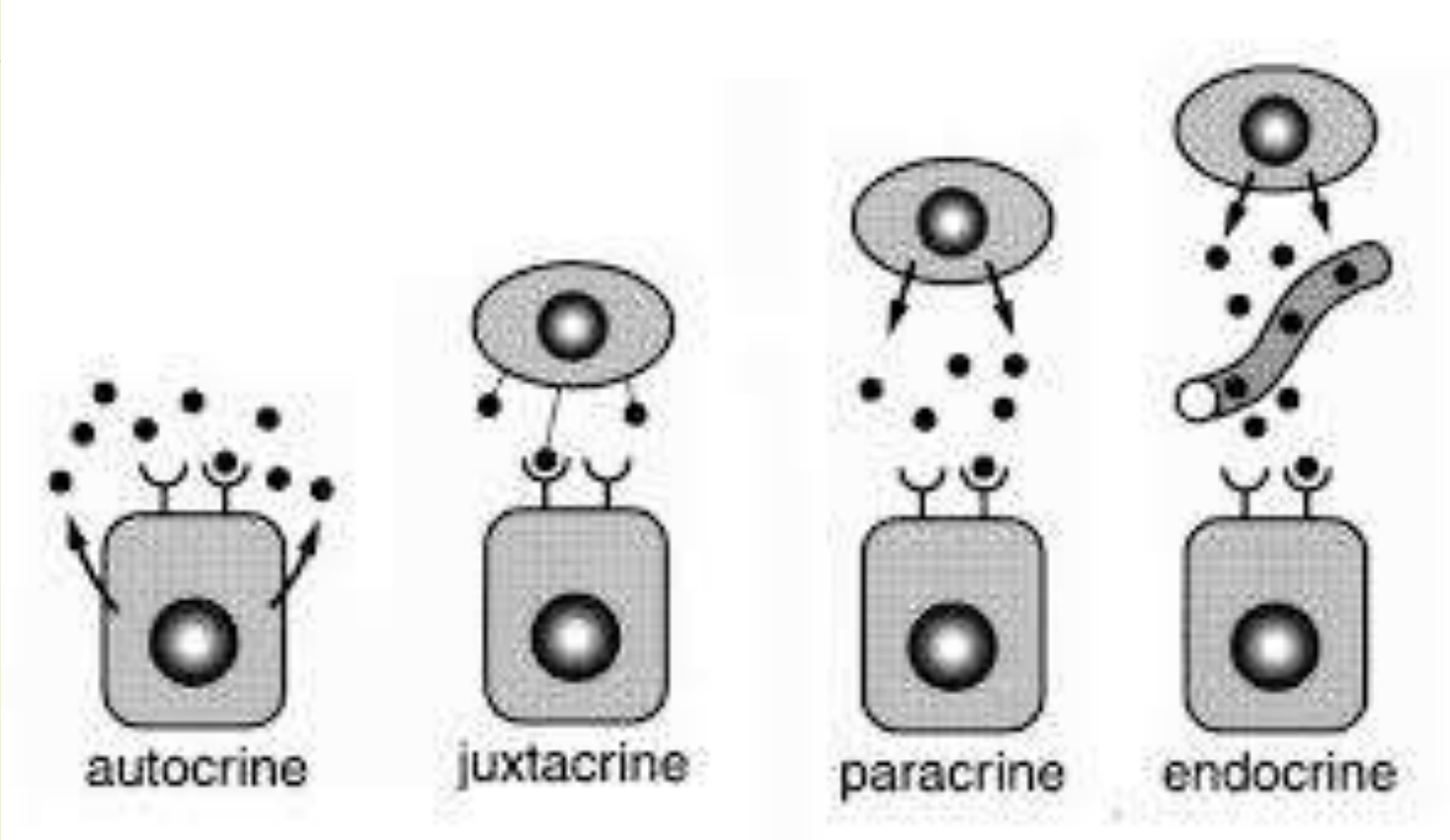
Endocrine Glands



- The **endocrine system** includes the endocrine glands and their hormones.
- The function of the endocrine system is to secrete **hormones** into the bloodstream.
- Each gland of the endocrine system releases specific hormones into your bloodstream. These hormones travel through your blood to other cells and help control or coordinate many body processes.
- **Hormone**: A Chemical messenger which targets a specific group of cells, in order to cause that group of cells do some activity or stop doing an activity.
- A hormone will only act on a part of your body if it “fits” — if the cells in the target tissue have receptors that receive the message of the hormone. Think of a hormone as a key and the cells of its target tissue, such as an organ or fat tissue, as specially shaped locks. If the hormone fits the lock (receptor) on the cell wall, then it’ll work; the hormone will deliver a message that causes the target site to take a specific action.

- The endocrine glands do not have ducts to carry their product to a surface. They are called ductless glands. **The word endocrine is derived from the Greek terms "endo," meaning within, and "krine," meaning to separate or secrete**.
- An autocrine signal is one that binds to receptors on the surface of the cell that produces it.
- Paracrine signaling involves the secretion of specific signaling factors by one cell which are perceived by corresponding receptors on another cell in the vicinity, triggering a response in it.
- Juxtacrine signaling requires direct contact between cellular components of the two cells involved


autocrine
juxtacrine
paracrine
endocrine

- Hormones control many different bodily processes, including:
- Metabolism.
- Homeostasis (constant internal balance), such as blood pressure and blood sugar regulation, fluid (water) and electrolyte balance and body temperature.
- Growth and development.
- Sexual function.
- Reproduction.
- Sleep-wake cycle.
- Mood.

Endocrine glands:

- **Hypothalamus**
- **Pituitary gland**
- **Thymus**
- **Thyroid**
- **Islet cells in the pancreas**
- **Parathyroid**
- **Pineal gland**
- **Testes**
- **Ovaries**

Other body tissues that release hormones include:

- **Adipose tissue (fat tissue).**
- **Kidneys.**
- **Liver.**
- **Gut (gastrointestinal tract).**
- **Placenta.**

Hypothalamus

- Your hypothalamus is a small region of your brain that connects to your pituitary gland through the pituitary stalk. It releases several hormones that control your pituitary gland.
- Your hypothalamus makes the following hormones:
- Corticotrophin-releasing hormone.
- Gonadotrophin-releasing hormone.
- Growth hormone-releasing hormone.
- Oxytocin (your hypothalamus makes oxytocin, but your pituitary gland stores and releases it).
- Somatostatin.
- Thyrotropin-releasing hormone.

Pituitary gland

- Your pituitary gland is a pea-sized gland at the base of your brain, behind the bridge of your nose and directly below your hypothalamus. It consists of two lobes: the posterior lobe and the anterior lobe. Your pituitary gland releases several hormones — many of which control the functions of other endocrine glands.
- The anterior pituitary makes and releases the following six hormones:
- Adrenocorticotropic hormone (ACTH or corticotropin).
- Follicle-stimulating hormone (FSH).
- Growth hormone (GH).
- Luteinizing hormone (LH).
- Prolactin.
- Thyroid-stimulating hormone (TSH).
- The posterior pituitary releases the following hormones:
- Antidiuretic hormone (ADH, or vasopressin).
- Oxytocin.

Thyroid gland

- Your thyroid is a small, butterfly-shaped gland located at the front of your neck under your skin. Your thyroid's main job is to control the speed of your metabolism (metabolic rate), which is the process of how your body transforms the food you consume into energy.
- Your thyroid releases the following hormones:
- Thyroxine (T4).
- Triiodothyronine (T3).
- Reverse triiodothyronine (RT3).
- Calcitonin.
- Thyroxine and triiodothyronine are often collectively called "thyroid hormone."

Parathyroid glands

- Most people have four pea-sized parathyroid glands located behind their thyroid gland (the butterfly-shaped gland in your neck). Sometimes, your parathyroid glands are located along your esophagus or in your chest. These are known as ectopic (in an abnormal place) parathyroid glands.
- The main job of your parathyroid glands is to release parathyroid hormone (PTH), which is responsible for the calcium balance in your blood and bone health.

Pineal gland

- Your pineal gland is a tiny gland in your brain that’s located beneath the back part of the corpus callosum (nerve fibers that connect the two parts of your brain). It releases the hormone melatonin, which helps control your sleep-wake cycle.

Adrenal glands

- Your adrenal glands, also known as suprarenal glands, are small, triangle-shaped glands that are located on top of each of your two kidneys.
- Your adrenal glands make the following hormones:
- Cortisol.
- Aldosterone.
- DHEA and androgens.
- Adrenaline (epinephrine).
- Noradrenaline (norepinephrine).

Pancreas

- Your pancreas is an organ in the back of your abdomen (belly). It’s part of your digestive system and endocrine system.
- The islet cells (endocrine cells) in your pancreas make the following hormones:
- Insulin.
- Glucagon.

Ovaries

- People assigned female at birth (AFAB) have two ovaries — each located on both sides of their uterus below the opening of the fallopian tubes. In addition to containing the egg cells necessary for reproduction, the ovaries produce the following hormones:
- Estrogen.
- Progesterone.
- Testosterone.

Testes

- People assigned male at birth (AMAB) have two testes that hang in a pouch outside of their body below their penis. The testes are part of the male reproductive system and produce sperm and the hormone testosterone.

Adipose tissue (fat tissue)

- Adipose tissue is commonly known as body fat. It's located all over your body, including under your skin, around internal organs, between muscles, in bone marrow and breast tissue.
- Adipose tissue makes and releases the following hormones:
- Leptin.
- Adiponectin.
- Plasminogen activator inhibitor-1.
- Estrogen.
- Angiotensin.

Kidneys

- Your kidneys are two bean-shaped organs that filter your blood. They're part of your urinary system, but they also produce hormones, including:
- Erythropoietin.
- Renin.
- The active form of vitamin D (vitamin D isn't actually a vitamin — it's a prohormone, which is a substance that your body converts into a hormone).

Liver

- Your liver is an essential organ and gland, performing hundreds of functions necessary to sustain life. It's considered part of your digestive system, but also produces hormones, including:
- Insulin-like growth factor 1 (IGF-1).
- Angiotensinogen.

Gut (gastrointestinal tract)

- Your gut (gastrointestinal tract) is the long, connected tube that starts at your mouth and ends at your anus. It's responsible for digestion. Scientists are currently studying the hormones that your gut makes and their effects. These hormones include:
- Ghrelin.
- Somatostatin.
- Glucagon-like peptide 1 (GLP-1).

Placenta

- The placenta is a temporary organ that develops in your uterus during pregnancy. It provides oxygen and nutrients to the developing fetus. The placenta produces the hormones estrogen and progesterone to maintain the pregnancy.

Causes of Endocrine Disorders

Endocrine disorders are typically grouped into two categories:

- Endocrine disease that results when a gland produces too much or too little of an endocrine hormone, called a hormone imbalance.
- Endocrine disease due to the development of lesions (such as nodules or tumors) in the endocrine system, which may or may not affect hormone levels.