

# Endocrine System: Hormones

by Sophia Tutorial



## WHAT'S COVERED

This lesson is going to cover the endocrine system and hormones. Our discussion breaks down as follows:

1. The Endocrine System
2. Types of Gland
  - a. Adrenal Gland
  - b. Pancreas
  - c. Sex Glands

## 1. The Endocrine System

The endocrine system is a system of communication that the body uses to send chemicals that are secreted by different glands throughout the body. This causes certain kinds of reactions. These can cause long-term reactions like human growth or short-term reactions, like a jolt of adrenaline.

The chemicals secreted by the glands are hormones, and these are chemical messengers that affect different kinds of body functions and behaviors. They are carried by the bloodstream and the lymph system all throughout the body to cause the different cells and organs to react in different ways. They can be triggered by the environment or by normal growth/aging.

🔗 **EXAMPLE** For example, environmental causes such as a car backfiring or slipping on a rock when hiking can trigger hormones. Or, normal growth and aging, such as an individual in adolescence, can cause an increase in hormone release.

## 2. Types of Glands

### 2a. Adrenal Glands

**Adrenal glands** are the endocrine glands located on the top of the kidneys. They secrete hormones that are related to short-term things like stress and arousal. Two hormones in particular are released by the adrenal glands:

- **Epinephrine**, which is related to fear responses
- **Norepinephrine**, which is related to anger responses

Epinephrine and norepinephrine are the hormones generally referred to as adrenaline. Both of these hormones can cause the body to react with different kinds of aroused or alert responses. They might increase heart rate and blood pressure, or they might release more stored up energy within our cells so we can get ready to move. They can send more blood to the muscles, which triggers the fight or flight response to prepare a person for survival.



#### TERMS TO KNOW

### Adrenal Glands

Endocrine glands located on top of the kidneys which secrete hormones related to stress and arousal

#### Epinephrine

An excitatory hormone secreted by the adrenal glands and related to fear; a.k.a. adrenaline

#### Norepinephrine

An excitatory hormone secreted by the adrenal glands and related to anger

## 2b. Pancreas

The **pancreas** is a long gland located just under the stomach and liver, and hovers above the small intestine. It helps in digestion, and has a twofold use:

- It acts as an endocrine gland by releasing hormones, like insulin. Insulin helps regulate the body's use and production of energies and sugars.
- It acts to create digestive enzymes, which work with the bile released from the liver. This helps in digestion occurring within the small intestine after food moves from the stomach.



#### TERM TO KNOW

### Pancreas

A gland in both the endocrine and digestive systems which produces and secretes insulin to control blood sugar and hunger

## 2c. Sex Glands

Sex glands are endocrine glands that produce sex hormones. These hormones regulate sexual growth, arousal, and reproduction.

It's important to note that sex hormones are present in both men and women. The difference is the amount of each hormone found in males and females. Males have more androgens, or testosterone, produced by the **testes**. Women have more estrogens, the female hormones produced by the **ovaries**. Estrogens can be used in different kinds of situations such as birth control.



#### DID YOU KNOW

Performance-enhancing drugs like steroids are actually the sex hormone androgens. They are linked to

muscle growth and increased aggression. Side effects include baldness, impotence, and heart disease.



## TERMS TO KNOW

### Testes

Males sex glands which secrete the hormone testosterone, affecting secondary sex characteristics such as facial hair and male sexual functioning

### Ovaries

Female sex glands which secrete estrogen, affecting secondary sex characteristics such as the development of breasts and female sexual functioning



## SUMMARY

The **endocrine system** is the system of communication that the body uses to send hormones throughout the body. This causes many types of reactions within the body. There are several **types of glands** in the endocrine system. The adrenal glands are on top of the kidneys and secrete epinephrine and norepinephrine. The pancreas is located under the stomach and liver and above the intestine. It produces hormones that aid in digestion, like insulin. The ovaries in women and the testes in men are the endocrine glands that produce sex hormones. Androgens are the male sex hormones and estrogens are the female hormones. The sex hormones regulate sexual growth, arousal, and reproduction.

Good luck!

Source: This work is adapted from Sophia author Erick Taggart.



## TERMS TO KNOW

### Adrenal Glands

Endocrine glands located on top of the kidneys which secrete hormones related to stress and arousal.

### Epinephrine

An excitatory hormone secreted by the adrenal glands and related to fear; a.k.a. adrenaline.

### Norepinephrine

An excitatory hormone secreted by the adrenal glands and related to anger.

### Ovaries

Female sex glands which secrete estrogen affecting secondary sex characteristics such as the development of breasts and affects female sexual functioning.

### Pancreas

A gland in both the endocrine and digestive systems which produces and secretes insulin to control blood sugar and hunger.

### Testes

Males sex glands which secrete the hormone testosterone affecting secondary sex characteristics such as facial hair and also affects male sexual functioning.