

Endocrine System

by Sophia



WHAT'S COVERED

The nervous system provides one major way for the body to communicate. The brain processes information that's taken from the rest of the body and sends out responses through the nerves to be carried out, providing quick, consistent sorts of responses that can be stored for later use in things like memory. You will learn how you can use your problem solving skill as you make choices based on your responses. You will also consider how you can use your self and social skill as you react to the way other respond.

It is important to realize that the nervous system is not the only way that the body communicates. This tutorial will cover the endocrine system, specifically focusing on:

1. Hormones

There is another system in the human body called the endocrine system. The endocrine system is a system which uses chemicals secreted by glands that travel throughout the body and cause certain kinds of reactions.

These chemical communicators are called **hormones**. Hormones are chemicals that are secreted by glands that affect different kinds of bodily functions and behaviors.

They're carried throughout the body by the bloodstream and the lymph system, and they can trigger different kinds of events. Conversely, they can be triggered by different kinds of events, meaning the environment might create some arousal within the body.

➔ **EXAMPLE** When you're scared by an external event, you get a surge of adrenaline. This is a hormone response created by the endocrine system.



Problem Solving: Skill Tip

Decision making is an important part of problem solving. The endocrine system is an automatic system that you don't have conscious control over. So you can't just "decide" when your organs will secrete certain hormones. But you can make decisions about what do with the results, say, putting the surge of adrenaline toward running away as fast as possible.

There are also regular growth and life events which regulate the hormones that are being used in the body to send messages to the rest of the cells and the different parts.

➞ **EXAMPLE** In adolescence, there are a lot of hormones that are being sent to encourage growth in the body, especially secondary sexual characteristic growth.

These are all aspects of hormones and the communication involved with the endocrine system.



TERM TO KNOW

Hormone

A chemical secreted by a gland that affects internal and external activities.

2. Pituitary Gland

Some of the most important glands in the endocrine system are located in the head and neck area. The **pituitary gland** is an endocrine gland located towards the front, in the middle of the brain. This is what is known as the “master gland,” meaning that it controls the other glands within the body.

It sends out signals telling them when they should and should not release hormones for various kinds of functions. In this way, the pituitary gland is the brain of the endocrine system.

However, it's important to note that the pituitary gland is actually being regulated largely by the hypothalamus, which is the organ that's just above it. This provides a kind of link between these two communication systems, the nervous system and the endocrine system. The hypothalamus helps to tell the pituitary gland when it should send out those controlling hormones.

The pituitary gland also has an important function in secreting **growth hormones**, which regulate the body's development over time. At certain periods of a person's life, more growth hormones are being sent out. Too much or too little of these growth hormones can lead to different conditions, like dwarfism or gigantism.



TERMS TO KNOW

Pituitary Gland

The “master gland” of the endocrine system; secretes hormones that affect other glands.

Growth Hormone

A hormone secreted during childhood from the pituitary gland, that affects the physical growth of a person; too little can result in dwarfism while too much can result in gigantism.

3. Pineal Gland

The pineal gland is another endocrine gland located in the brain; this one is located a bit more towards the center and middle of the brain. The pineal gland helps to regulate the body's rhythms and cycles.

The pineal gland secretes a hormone called melatonin. The pineal gland is photosensitive, meaning it is sensitive to the amount of light within our environment. It will secrete more melatonin when it is dark, and less when it is light. In other words, light dictates melatonin production, which in turn affects our level of sleepiness or wakefulness. This is why we often feel sluggish on a cloudy day. Our **self and social awareness skill** can

help us predict how we'll react to these issues related to the pineal gland and prepare for what to do to feel better.



DID YOU KNOW

Originally, a lot of people thought that the pineal gland was useless and were convinced it was something left over from a previous time in human development, like the appendix.

4. Thyroid Gland

The **thyroid glands** are located within the neck. They control the rate of metabolism within the body. In other words, they tell the body how quickly it should make and use different sorts of energy.

You may have heard of different disorders that have to do with the thyroid gland, such as hyperthyroidism, which occurs when the thyroid produces too many hormones. This can lead to feelings of fatigue, because the body is tired from using so much energy, as well as increased sweating and appetite, difficulty concentrating, nervousness or restlessness. You can see how this creates more energy in the body than a person can use. A person with hyperthyroidism might be a very excitable or irritable kind of person.

The opposite of that is hypothyroidism, which is when there are too few hormones being produced. This can lead to feelings of depression, fatigue, weakness, as well as weight gain. Needless to say, the thyroid gland has a powerful effect on a person's personality and mood.



Self and Social Awareness: Skill Tip

Consider that when you are working with a colleague who seems irritable or down, they might not just be having an off day—they could have medical issues related to the thyroid. Use your social awareness to be mindful of the reasons people may act they way do.



TERM TO KNOW

Thyroid Gland

Gland located in the neck which is responsible for the regulation of metabolism.

5. 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.

6. 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.

7. 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**. Females 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 a system which uses chemicals, called **hormones**, secreted by glands, that affect different kinds of bodily functions and behaviors. The **pituitary gland** controls the other glands within the body with the assistance of the hypothalamus. The **pineal gland** secretes a hormone called melatonin. The **thyroid gland** controls metabolism. The **adrenal gland** secrete epinephrine and norepinephrine. The **pancreas** produces hormones that aid in digestion, like insulin. **Sex glands** release sex hormones that regulate sexual growth, arousal, and reproduction.

You learned you use your problem solving skill to take your reactions and make choices based on them. You also reflected on how you can use your self and social awareness skill to help you better understand how others act when their own systems react.

Good luck!

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