

Endocrine System

by Sophia



WHAT'S COVERED

In this lesson, you will learn about what the endocrine system is and how hormones can interact within the endocrine system. Specifically, this lesson will cover:

1. Endocrine System Overview

The **endocrine system** is a body system that consists of **glands**. Glands are clusters of cells that produce and secrete specific molecules such as **hormones**. Hormones are small signaling molecules (derived from either amino acids or lipids) that interact with **target cells** to change those cells' behavior in a way that promotes homeostasis.

Many hormones play specific roles in specific parts of the body. Certain cells have a specific receptor for a particular type of hormone, ensuring that hormone can only affect those target cells. Because of this, not all cells are affected by all hormones.



TERMS TO KNOW

Endocrine System

A system of glands that produces and secretes hormones into the bloodstream; the endocrine system is used to communicate on a broad scale to the cells in the body.

Glands

Glands are clusters of cells that produce and secrete specific molecules; endocrine glands secrete hormones directly into the bloodstream, where they can quickly reach their target cells anywhere in the body.

Hormones

The major chemical messenger of the endocrine system, hormones, are produced, stored and secreted by glands; hormones either increase or decrease activity of the cells with which they interact.

Target Cell

The cell or group of cells with which a hormone is designed to interact.

2. Opposing Hormone Interaction

Hormones can actually interact with each other in order to produce different effects. One type of hormone interaction is an **opposing interaction**; where the effect of one hormone opposes the effect of another.

➔ **EXAMPLE** Examples of opposing hormone interactions are insulin and glucagon. Insulin is a type of hormone that helps to lower sugar levels, while glucagon is a type of hormone that helps to increase blood sugar levels. There are certain situations when these hormones need to be released, such as after a meal (insulin) or when starved (glucagon), but not at the same time.



TERM TO KNOW

Opposing Interaction

A term used to describe hormones that create opposite effects of one another; an example would be that insulin lowers blood glucose while glucagon elevates blood glucose.

3. Synergistic Hormone Interaction

Sometimes hormones can create **synergistic interactions**, which means the two hormones cooperate with each other to affect a target cell.



TERM TO KNOW

Synergistic Interaction

A term used to describe hormones that create similar effects through slightly different mechanisms; an example would be that ADH stimulating kidneys retain water while aldosterone stimulates kidneys to retain sodium, which in turn retains water.

4. Permissive Hormone Interaction

A **permissive interaction** is when one hormone will prepare a cell for another hormone. For the second hormone to be able to affect the target cell, the target cell first has to be exposed to the first hormone. Think of it as one hormone will prep the cell for the other hormone to be able to take effect. The second hormone does not take effect until the cell has been exposed to the first hormone.



TERM TO KNOW

Permissive Interaction

When one hormone allows another hormone to have its full effect; an example would be thyroid hormones allowing growth hormone to have its full metabolic effects.



SUMMARY

This lesson has been a brief **overview of the endocrine system** and hormone interactions. Specifically, you looked at **opposing, synergistic, and permissive hormone interactions**.

Keep up the learning and have a great day!



TERMS TO KNOW

Endocrine System

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Gland

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Hormones

The major chemical messenger (derived from either amino acids or lipids) of the endocrine system. Hormones are produced, stored and secreted by glands; hormones either increase or decrease activity of the cells with which they interact.

Opposing Interaction

A term used to describe hormones that create opposite effects of one another. An example would be: insulin lowers blood glucose while glucagon elevates blood glucose.

Permissive Interaction

When one hormone allows another hormone to have its full effect. An example would be: thyroid hormones allowing growth hormone to have its full metabolic effects.

Synergistic Interaction

A term used to describe hormones that create similar effects through slightly different mechanisms. An example would be: ADH stimulating kidneys to retain water while aldosterone stimulates kidneys to retain sodium, which in turn retains water.

Target Cell

The cell or group of cells with which a hormone is designed to interact.