

The Endocrine System

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Pineal Gland

Hypothalamus

Parathyroid Glands

Adrenal Glands

Kidneys

Testes

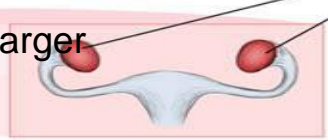
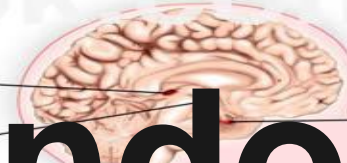
Pituitary Gland

Thyroid Gland

Pancreas

Ovaries

The Endocrine System



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Signaling Molecules

- Hormones or other signaling molecules bind to the receptor proteins in or on target cells to trigger specific pathways.
- Simple Pathways- hormones are released from an endocrine cell, travel through the bloodstream, and then interact with the target cell to create a physiological response
- Paired Pathways- sets of simple hormone pathways with coordinated activities, these are often relied on by homeostatic control systems
- Each receptor only responds to certain signals, and so there are many unique pathways that accomplish multiple tasks in the body.

Homeostasis

- Regulates internal environment of an organism or cell to maintain equilibrium
- Complex due to the vastness of this system.
- Each of the glands work independently but together at the same time to control different body functions



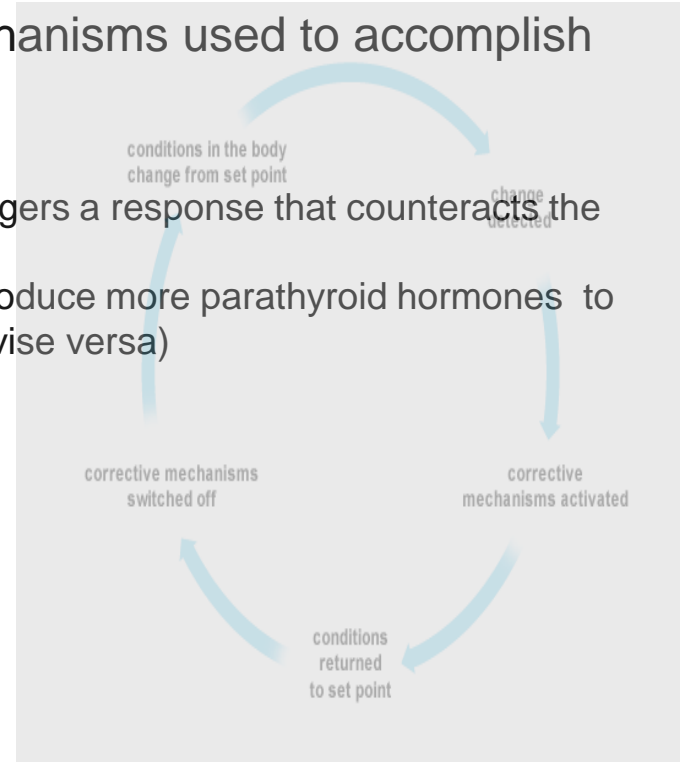
Negative and Positive Feedback

- Systems of feedback controls are primary mechanisms used to accomplish homeostasis.

Physiology- the way an organism or body part functions

- Negative Feedback- a change in a physiological variable triggers a response that counteracts the initial change- more common than positive feedback

Example: if calcium in blood decreases, the parathyroid glands produce more parathyroid hormones to bring the calcium level back to the original balanced amount (and vice versa)



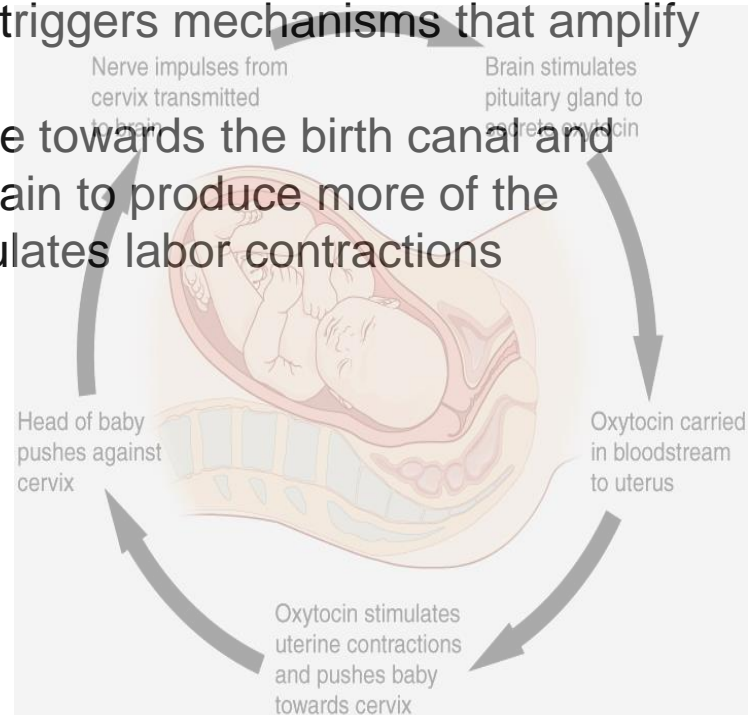
Negative and Positive Feedback cont.

- Positive Feedback- change in a variable triggers mechanisms that amplify the change

Example: during childbirth, the baby will move towards the birth canal and pressure receptors in the cervix will tell the brain to produce more of the hormone oxytocin, which enhances and stimulates labor contractions

Negative= inhibits stimulus

Positive= enhances stimulus



Structure and Function

- Hypothalamus: transfers messages from the body to the brain. Links nervous and endocrine system.
- Pineal gland: secretes melatonin to control sleep cycles. Also called a “third eye”.
- Pituitary gland: also links nervous and endocrine system. Releases hormones which affect growth, reproduction, metabolism, and sexual development.
- Thyroid: thermostat of your body. Creates what is your Adams apple. Also Controls rate at which body produces energy.
- Parathyroid: controls calcium levels. Four on and around thyroid.
- Pancreas: secretes insulin and glucagon to control blood sugar levels.
- Adrenal: takes orders from pituitary gland. First line of defense in physical or emotional stress. Also affects how energy is stored and food is used. Controls body shape and hairiness.
- Testes: produce testosterone
- Ovaries: estrogen

Relationship with Nervous System

- The endocrine system is directly related with nervous system through the hypothalamus and pituitary gland.
- Both of these glands are found in the brain and receive direct messages from brain.

video: <https://www.youtube.com/watch?v=nNLsXKkLSTs>

Diseases and Disorders

Hypoglycemia: lack of glucose in the blood due to the pancreas produces too much insulin thus breaking down sugar too rapidly. Can be caused by consuming too much alcohol, a tumor in the pancreas, or certain medications.

Osteoporosis: basically the loss of bone density. Caused by age and lack of hormone production.

Hypothyroidism: occurs when the thyroid is not producing enough thyroid hormone which helps your metabolism, so in it's absence your metabolic rate decreases. Caused by autoimmune diseases, thyroid surgery, medications, or radiation therapy.

Gigantism- over excretion of a growth hormone in hypothalamus. causes people to have growth deformities and be "oversized"

Evolutionary Importance

Well considering the endocrine system plays a large role in the developmental process, the strengthening of bones and muscles, as well as reproduction itself, life would be impossible. The endocrine system helps develop the major body systems including the sex organs, which make reproduction possible. Also works with the immune system to help create homeostasis within the body.