Meet Robert Hadlow. He was the tallest man ever at 8’11” tall.

HOW???
The endocrine system.
Overview

Video: Intro to Endocrine System

Made up of **glands** - organs that secrete chemical messengers

- Regulates many activities in the body:
  - Growth and development
  - Reproduction
  - Regulation of metabolism
  - Responses to stress
  - Maintaining homeostasis

All of these are long and continual processes!
<table>
<thead>
<tr>
<th></th>
<th>Nervous System</th>
<th>Endocrine System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of cells</strong></td>
<td>Neurons</td>
<td>Epithelial</td>
</tr>
<tr>
<td><strong>Name of chemical messenger</strong></td>
<td>Neurotransmitter</td>
<td>Hormone</td>
</tr>
<tr>
<td><strong>Where is signal received?</strong></td>
<td>Receptors on next neuron</td>
<td>Receptors on target cell</td>
</tr>
<tr>
<td><strong>Speed of response</strong></td>
<td>Milliseconds</td>
<td>Seconds -hours</td>
</tr>
</tbody>
</table>
How Does It Work?

- Small glands located throughout the body secrete (make) hormones.
- **Hormones** - chemical messengers that get released by glands and sent into the blood stream.
- Hormones regulate activity of specific cells in the body.
How Does It Work?

1. Endocrine glands release hormones
2. Hormones travel through the blood to **target cell**
3. Hormones bind to the receptors on target cell
4. Hormones cause a change in the target cell

Video: How The Endocrine System Works
How Does It Work?

Target cells have specific receptors that allow them to detect certain hormones.
Negative Feedback Mechanism

….IT’S BACK!

1. **Stimulus**
   A change in the body

2. **Receptor**
   Receives message from stimulus

3. **Control Center**
   Processes message and sends command

4. **Effector**
   Carries out response to restore homeostasis

5. **Response**
   Original stimulus is decreased or turned off
Negative Feedback Example

Stimulus: rising blood glucose level

High blood glucose level is detected by insulin-secreting cells of pancreas.

Negative feedback loop

As body cells take up blood glucose, glucose levels in the blood decline, and insulin release stops (negative feedback).

Return to homeostatic blood glucose level

Pancreas secretes the hormone insulin causing liver cells to take up glucose and store it as glycogen.

Most body cells also take up more glucose.
Positive Feedback Mechanism

1. **Stimulus**
   A change in the body

2. **Receptor**
   Receives message from stimulus

3. **Control Center**
   Processes message and sends command

4. **Effector**
   Carries out response to restore homeostasis

5. **Response**
   Original stimulus is increased
Positive Feedback Example

Nerve impulses from cervix transmitted to brain

Brain stimulates pituitary gland to secrete oxytocin

Head of baby pushes against cervix

Oxytocin carried in bloodstream to uterus

Oxytocin stimulates uterine contractions and pushes baby towards cervix
10 Major Endocrine Glands
As the editor of the GHS yearbook, your job is to study the glands of the endocrine system, and really get to know what each one is about. Then share your knowledge by creating a yearbook profile for all 10 glands.

Make sure to have a cover page!
Endocrine Disorders

1. Produce too much of a hormone—hypersecretion
   - Gigantism
   - Hyperthyroidism
   - Cushing Syndrome

2. Produce too little of a hormone—hyposecretion
   - Pituitary Dwarfism
   - Addison’s disease
   - Diabetes
Gigantism

- Hypersecretion (over production) of **growth hormone** by the pituitary gland during early growth years

- Robert Wadlow was 8’11”
- Tumor pressing on pituitary gland
Hyperthyroidism

- **Hypersecretion of** thyroxine **by the thyroid gland.**
- Symptoms include weight loss, fast heart rate, nervousness, shaking, fatigue
- Often caused by Graves’ Disease
Cushing Syndrome

- Hypersecretion of cortisol (a glucocorticoid) by the adrenal glands.
- Redistribution of body fat, thin reddened skin.
Pituitary Dwarfism

- Hyposecretion of growth hormone by the pituitary gland
- Short stature
Addison’s Disease

- **Hyposecretion of cortisol** (a glucocorticoid) by the adrenal glands

- Dehydration, drop in blood glucose, weight loss, fatigue, skin hyperpigmentation
Diabetes

- **Hyposecretion** secretion of **insulin** by the pancreas.

- Symptoms may include thirst and fatigue, as well as low/high blood glucose.