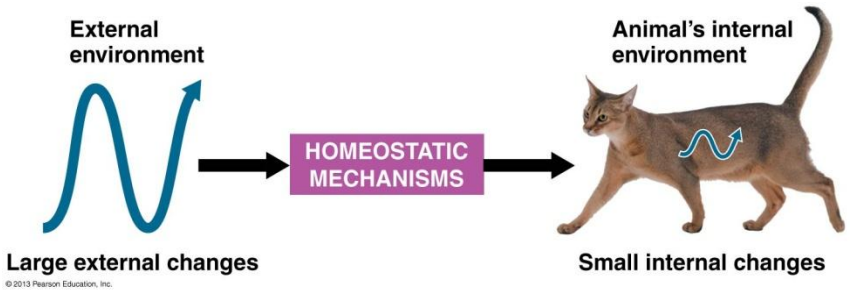
Feedback Mechanisms & Nerve Types

51-3 p. 1038-1040

Homeostasis

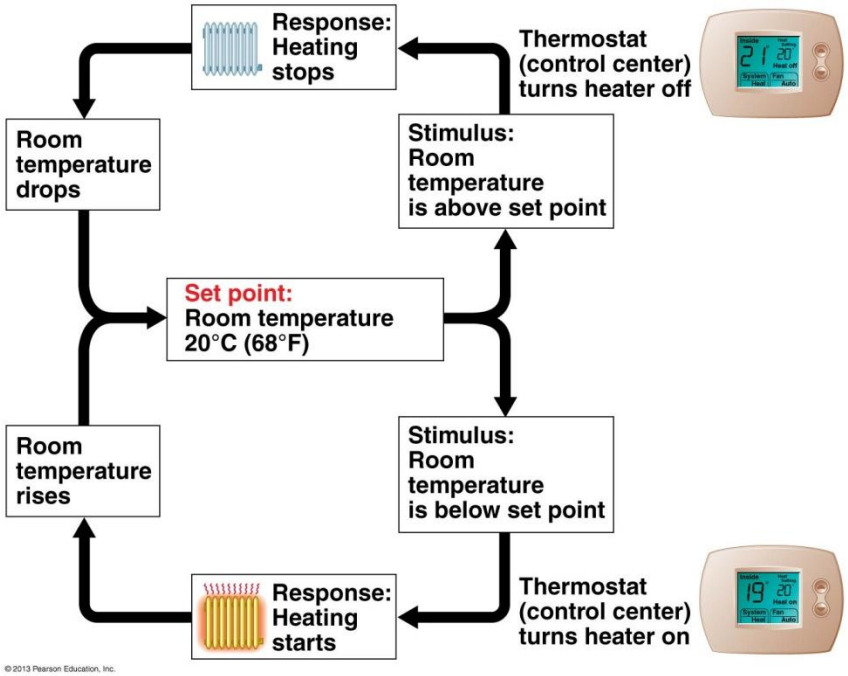


- All organisms must maintain relatively stable <u>internal</u> conditions
- The internal environment of all organisms fluctuates slightly
  - Must keep within a specific range

Feedback Mechanisms

- A form of regulation
  - The body detects a change in internal environment & responds to the change
- 2 Types of Feedback Mechanisms:
  - Negative feedback
  - Positive feedback

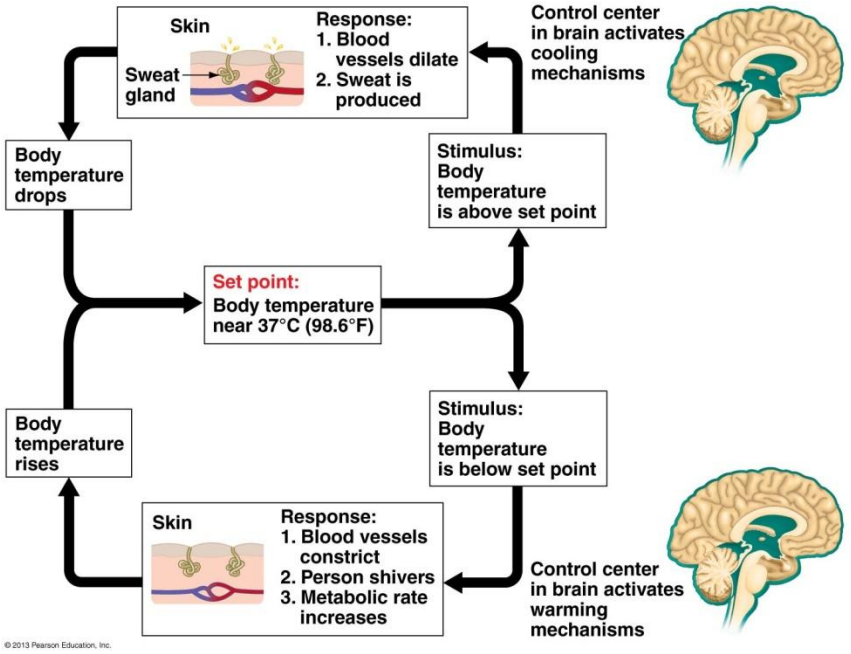
Negative Feedback



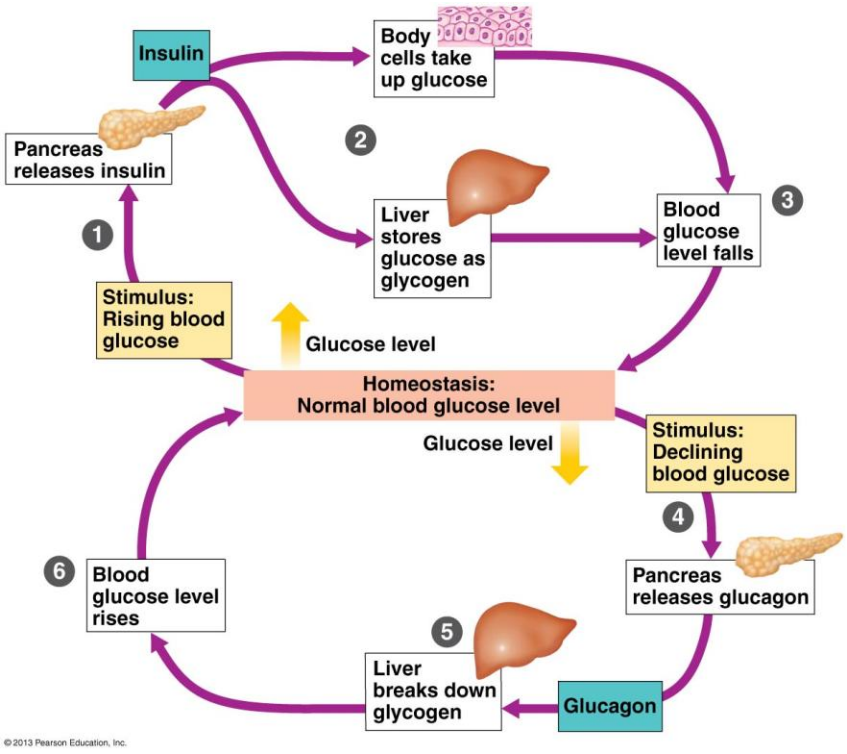
- *Most common mechanism for homeostasis
  - The results of the process stop the process from continuing (self-limiting)
  - Maintains conditions within a certain range
- Nonliving example = thermostat

Example: Thermoregulation

- When the body gets too warm:
  - Blood vessels dilate
  - Sweat is produced
  - Cools body
  - Dilation & sweating stops



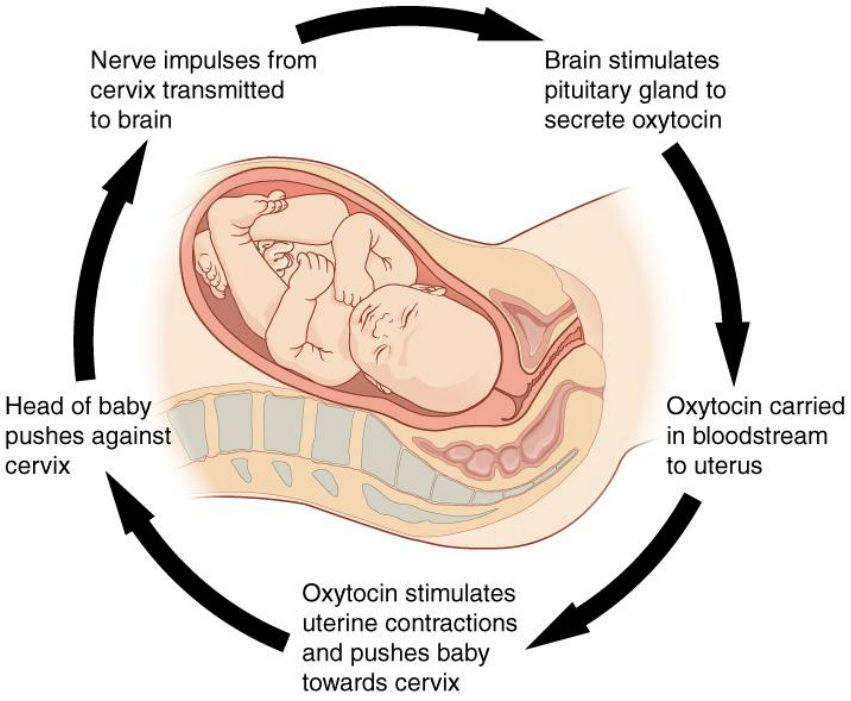
Example: Regulating Blood Sugar (glucose)



- When blood sugar is high:
  - Insulin is released into blood
  - Causes cells to absorb glucose & liver to store excess glucose
  - Blood sugar level falls
  - Insulin levels drop
  - Which causes liver to release glucose
  - Which causes insulin to be released into blood, etc etc.

Positive Feedback

- Less common in animals is positive feedback
  - The results of this process intensify the process/conditions
  - Ex: Birth



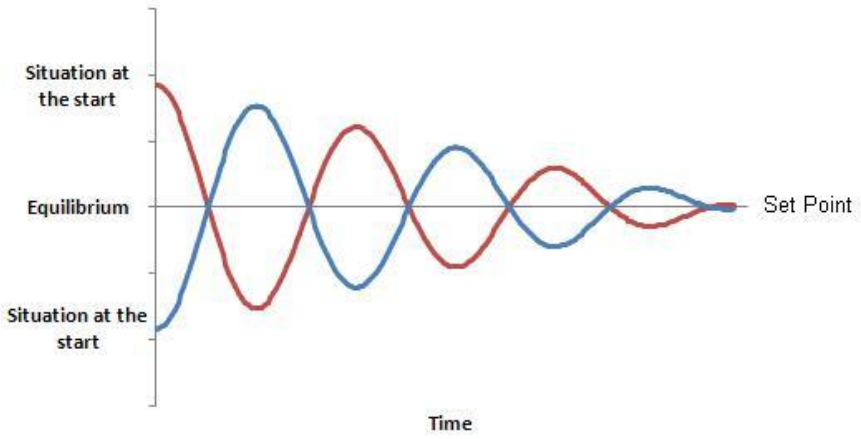
Positive Vs. Negative Feedback

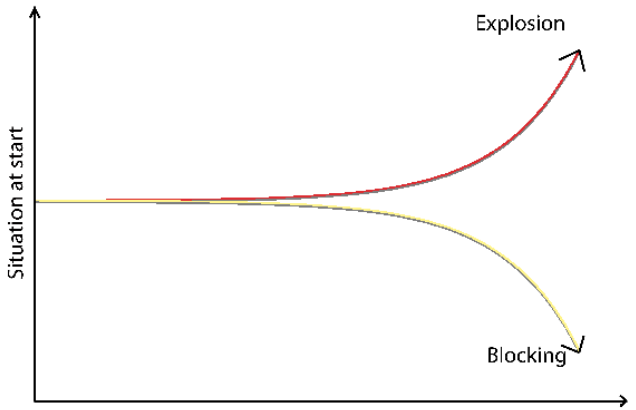
Negative Feedback ☺:

- Maintains conditions within certain limits
- Self-limiting
- Most common mechanism for maintaining homeostasis

Positive Feedback:

- Intensifies conditions
- Self-perpetuating
- Less common process in organisms

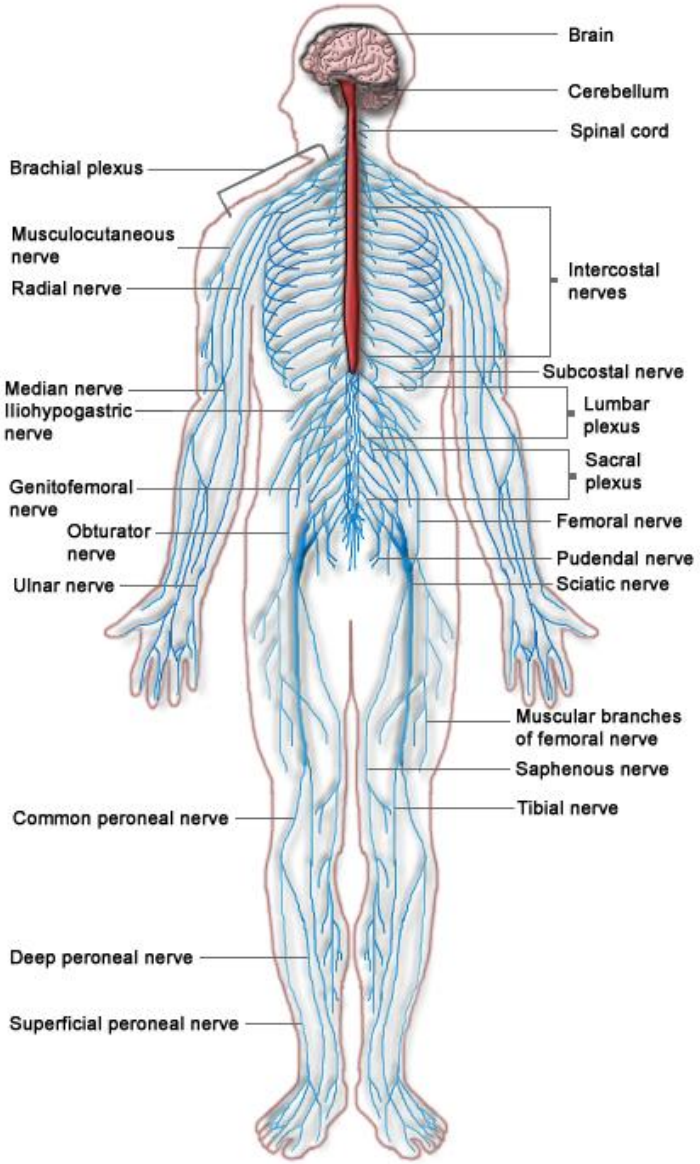




How does our body know?

- All of these feedback mechanisms must be connected.
- What are the signals that our cells receive to complete these feedback mechanisms
- The system that controls these processes is the nervous system

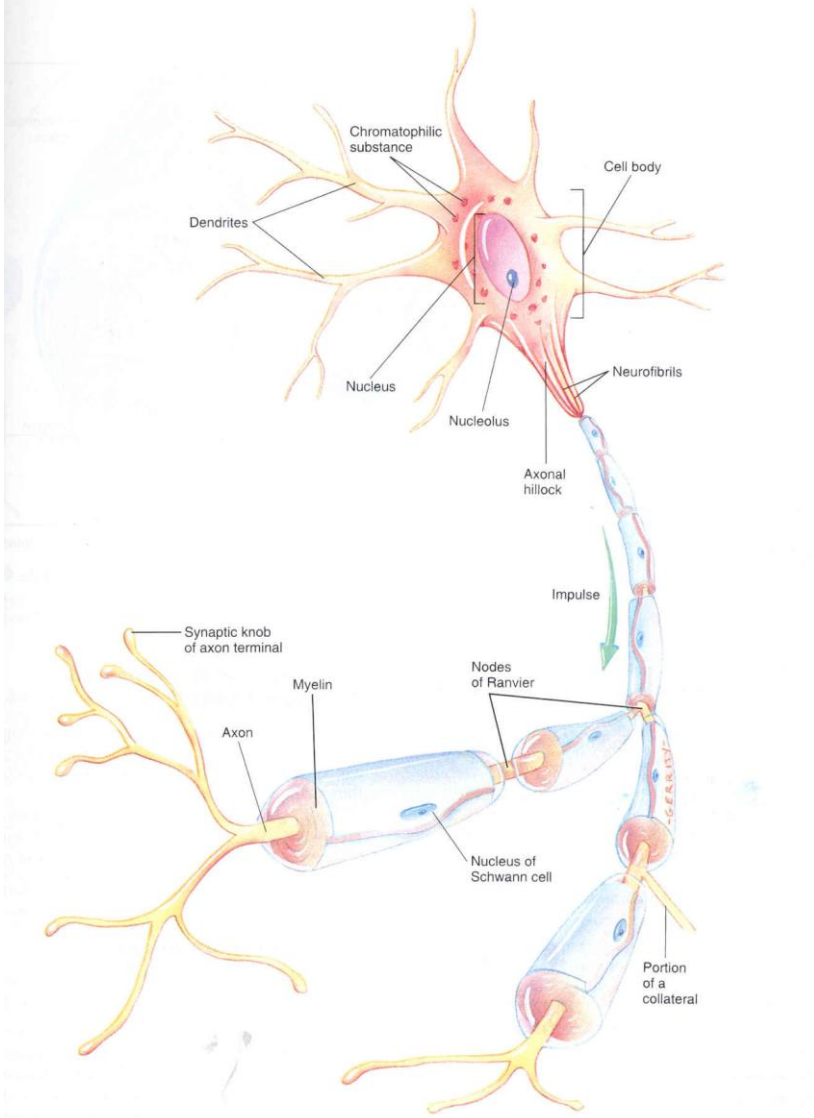
Nervous System



Function: Sends, receives and process information throughout the body and from the environment.

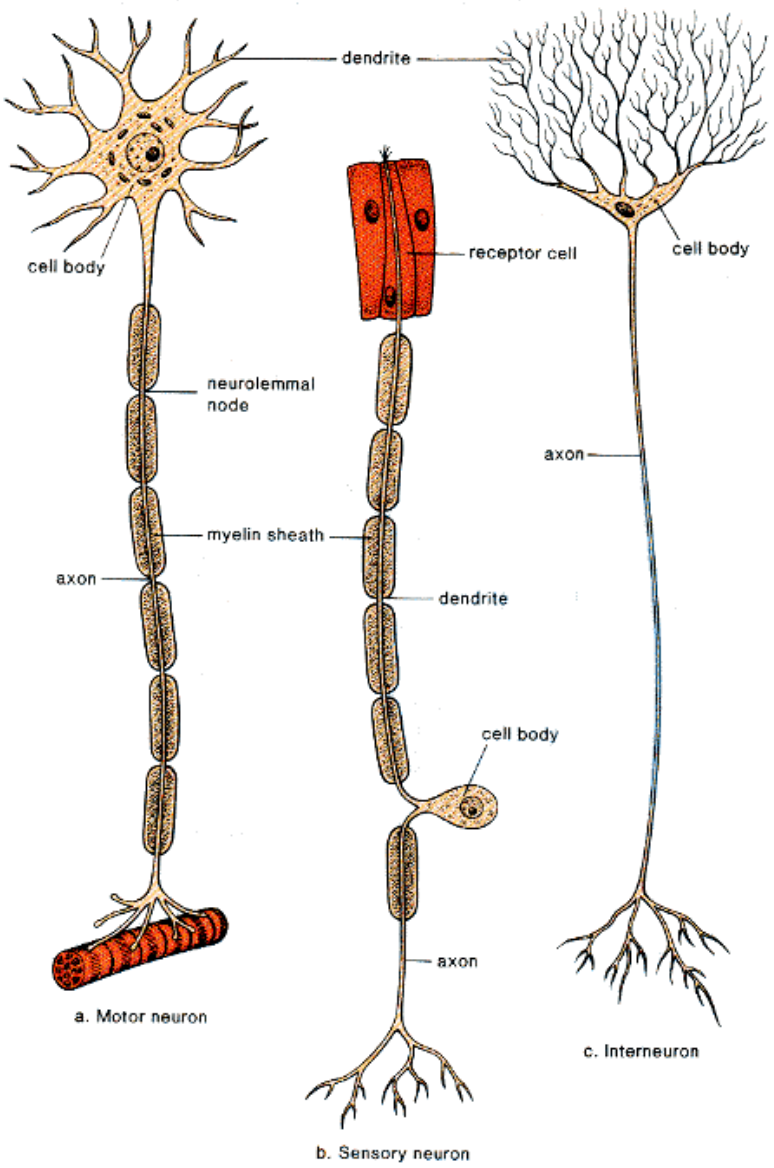
Parts: Brain, spinal cord and nerves.

Nerve Cell = Neuron



- Parts of the Neuron
  - **Dendrite** = Receives information and passes it to the cell body
  - **Cell Body** = Location of nucleus and organelles
  - **Axon** = Single portion that carries information away from cell body
- Think of your hand and forearm as what a neuron might look like

3 Types of Neurons



- **<u>Sensory Neuron</u>** – receives information.
- **<u>Interneuron</u>** – processes information.
  - – Brain and spinal cord
- **<u>Motor Neuron</u>** – cause <u>action</u> in muscles or glands.
  - – Make things “move”

Types of Sensory Neurons

Types	Description	Location	Senses involved
Mechanoreceptors	responds to movement & pressure	Skin	Touch, hearing
Thermoreceptors	responds to heat loss/gain	Skin	Touch
Pain Receptors	responds to tissue damage	Skin	Touch
Chemoreceptors	respond to chemicals	Nose, mouth	Taste, Smell
Photoreceptors	Respond to light	Eyes	Sight

Essential Questions

1. Describe the difference between positive and negative feedback mechanisms.
2. Give an example of a negative feedback mechanism that helps to maintain homeostasis in the human body.
3. How does a neuron's structure allow it to receive and send messages?
4. How do the different types of receptors help you sense your environment?
5. How do the three different types of neurons work together to help you process environmental information?