

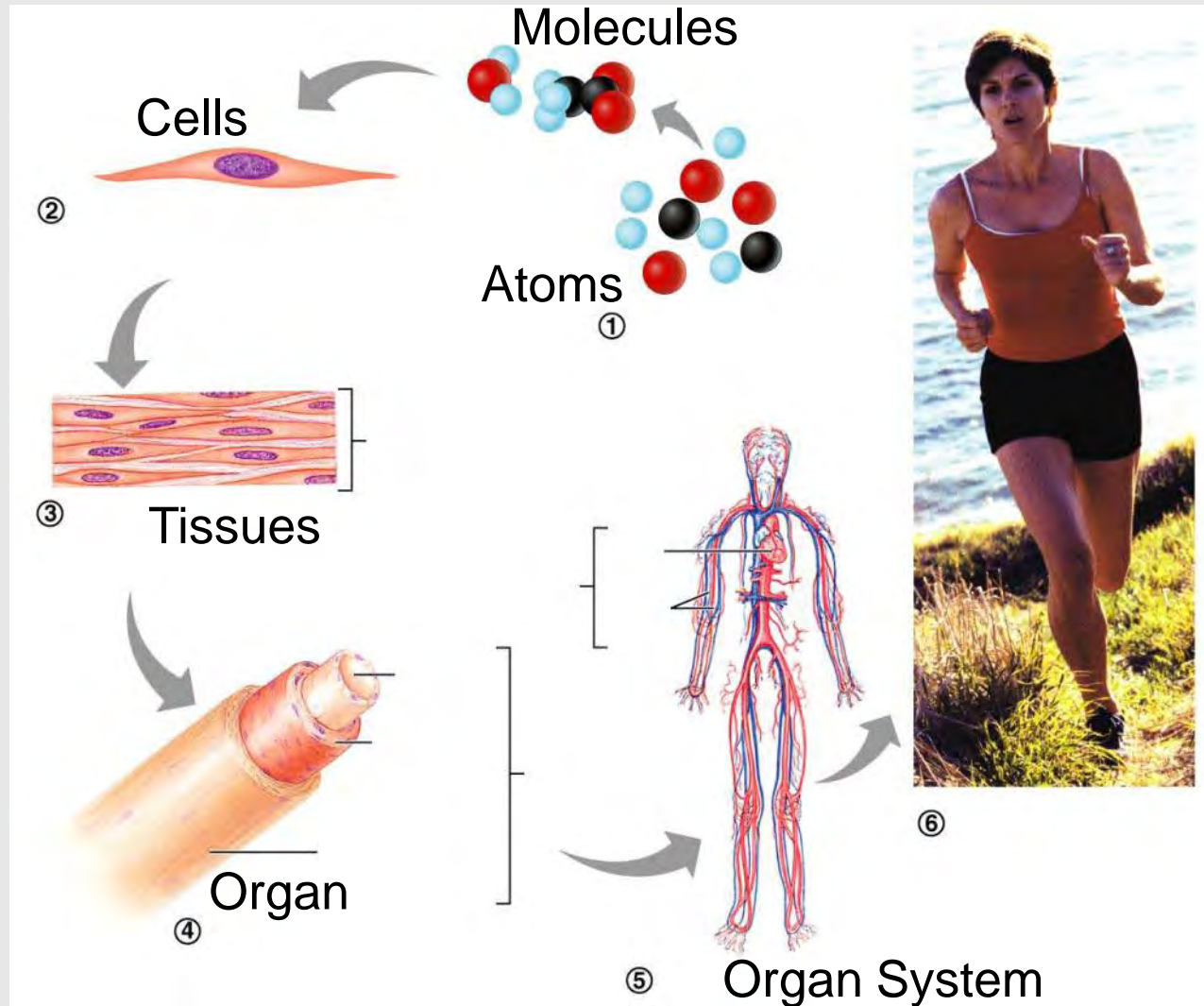
Human Anatomy and Physiology

BIOL&241

Content: Structure & Function

- **Anatomy:** Naming stuff; studying their connections
 - What's the name of this muscle? Where does it originate and attach?
- **Physiology:** Figuring out how stuff works.
 - How does that muscle contract? Where does the energy to do that come from? What forces does it exert on my skeleton?

Levels of organization

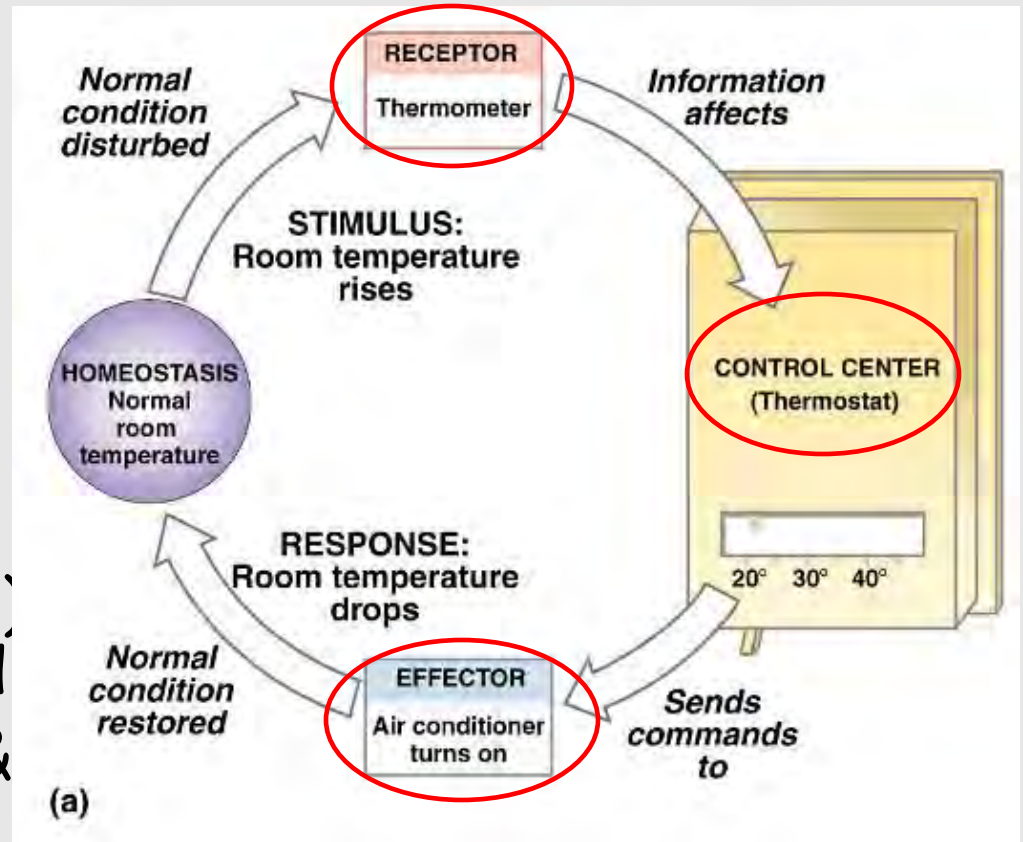


Dynamic Homeostasis

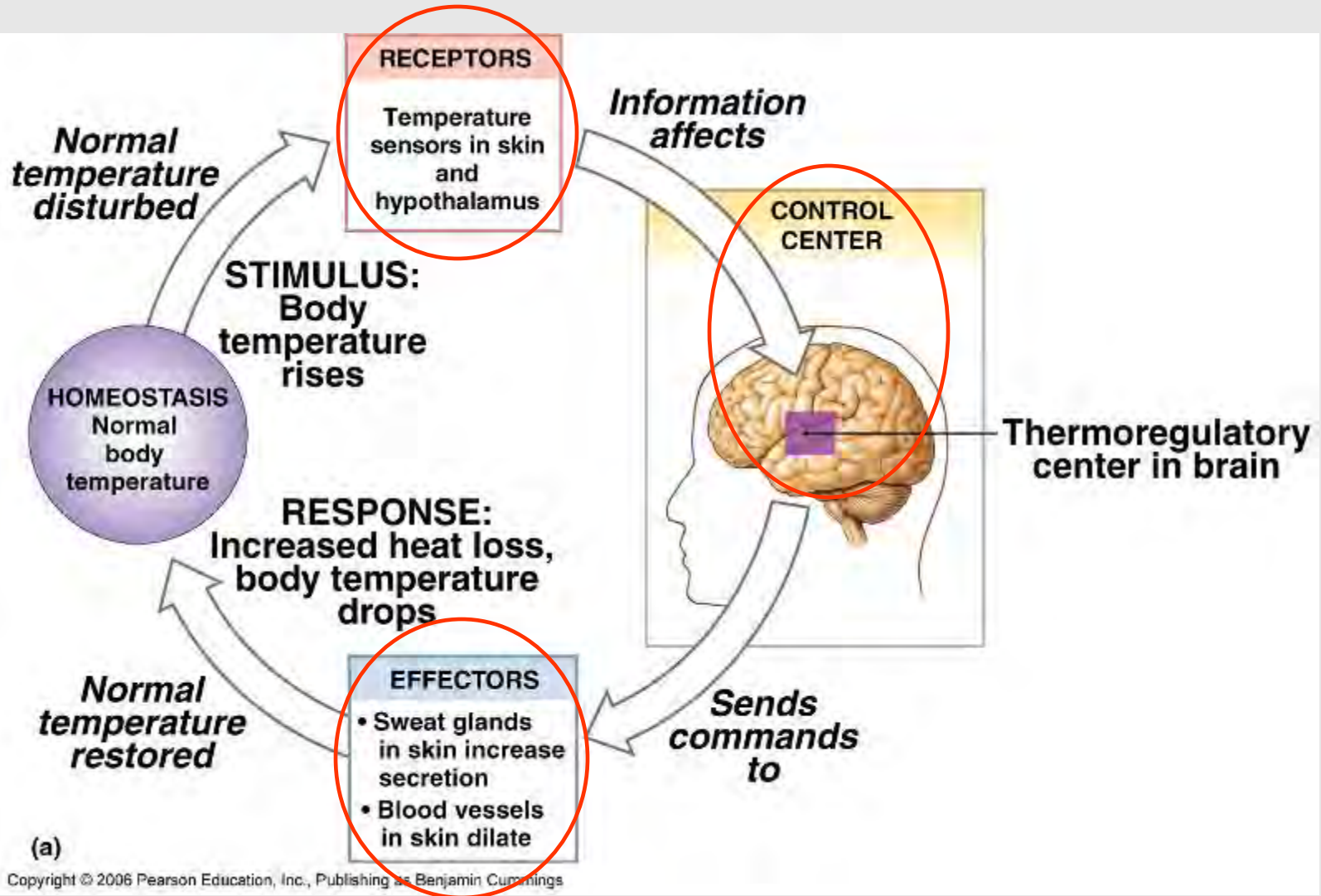
- Constantly maintaining body systems within set of upper and lower boundaries
- Blood pressure
- Nutrient levels
- Body temperature

Homeostatic Regulation

- Thermostat
- 3 components
 1. **Receptor** - receives and transmits stimuli
 2. **Integrator** (Control Center) - processes stimuli (decides on appropriate response) & transmits command
 3. **Effector** - receives & executes command



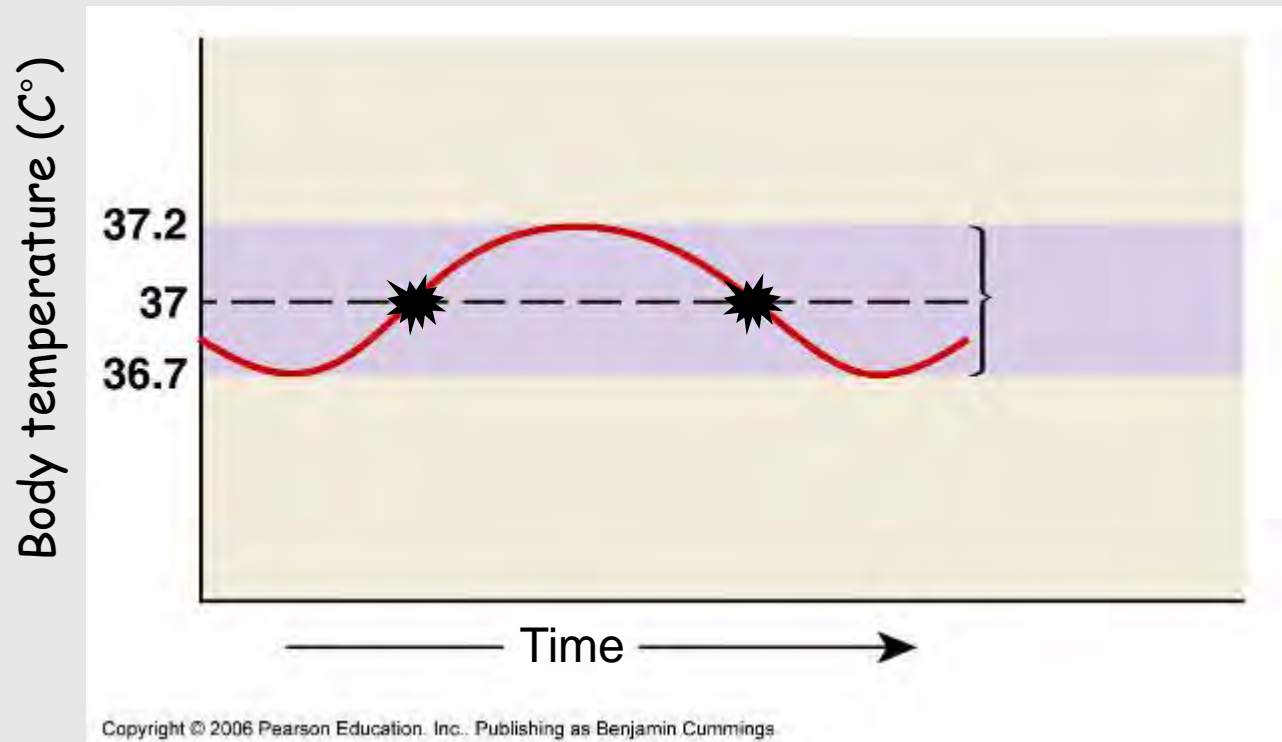
Human thermostat



Body Temp. Regulation

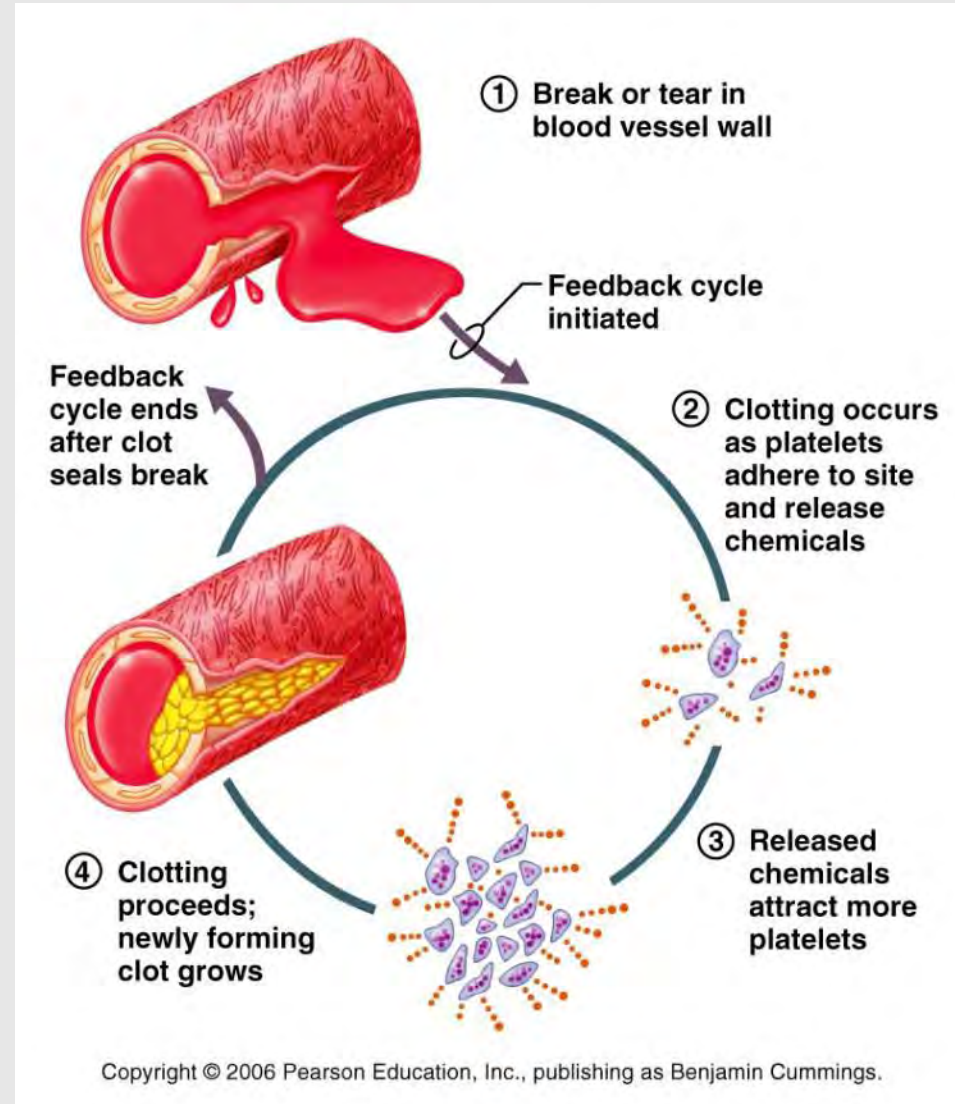
- Receptor
- Integrator
- Effector

Negative feedback



Feedback loops

- **Negative** - Opposes initial stimulus; most homeostatic regulatory mechanisms
- **Positive** - Enhances initial stimulus; used to complete infrequent, potentially dangerous tasks
 - Ex: Childbirth, blood clotting



4 Types of Tissues

- **Epithelial** - faces external environment
 - **Connective** - bind us & store energy
 - **Muscle** - contract to provide movement
 - **Neural** - process & transmit stimuli
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- We will study these as a unit, and revisit each with each specific system.

Stem Cells and Pluripotency



Stem Cell

- PRIMITIVE AND THUS UNSPECIALIZED
- SELF-RENEWING
- CAN DIFFERENTIATE INTO CELLS WITH SPECIFIC FUNCTIONS



Ectoderm

Skin
Hair
Brain
Nerves
Etc.

Mesoderm

Cardiac
Skeletal
Renal
Muscle
Blood
Etc.

Endoderm

Lung
Gut
Thyroid
Pancreas
Etc.

Mesoderm - Connective Tissues

