

An anatomical illustration of the human torso, showing the internal organs and blood vessels. The heart is centrally located, with red and blue vessels branching out. The lungs are visible on either side, and the digestive system is partially shown. The illustration is overlaid on a dark background with a white border.

Human Anatomy and Physiology

Chapter 1

The Human Body: An Orientation

Anatomy

Structure



Shape

Parts

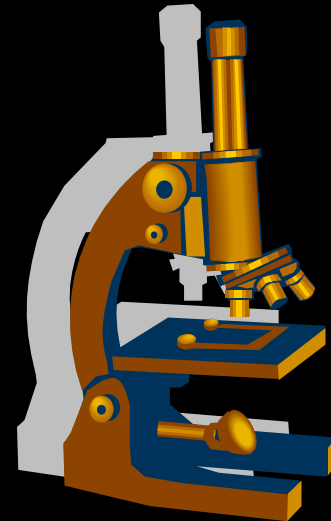
Physiology



Functions

- Gross Anatomy

- Microscopic Anatomy



Why Is This Important?

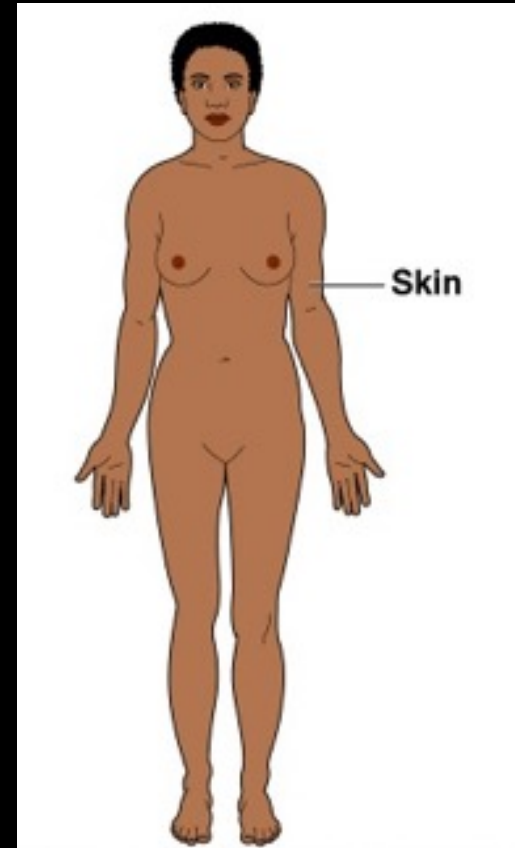


11 Major Systems of the Body

- Integumentary
- Skeletal
- Muscular
- Nervous
- Endocrine
- Cardiovascular
- Lymphatic
- Respiratory
- Digestive
- Urinary
- Reproductive

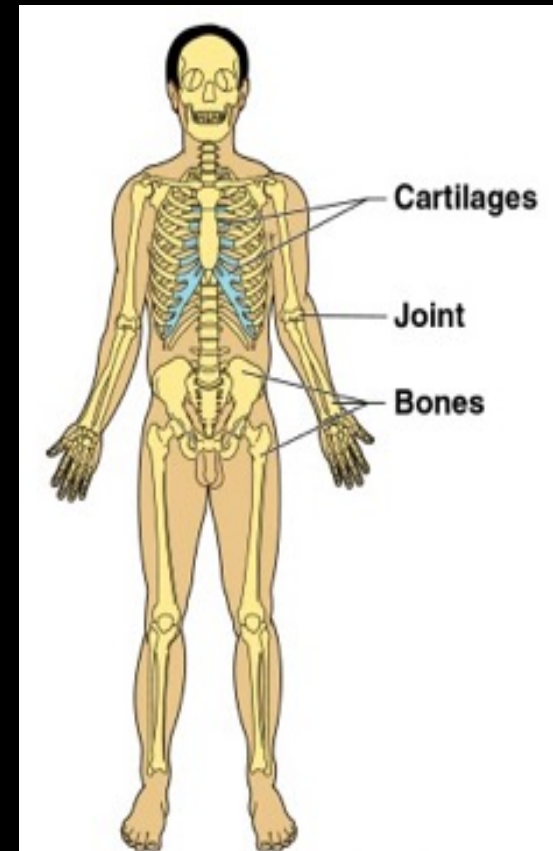
Integumentary System

- **Forms** the external body **covering**
- **Protects** deeper tissue from injury
- Synthesizes vitamin D
- Location of cutaneous nerve receptors



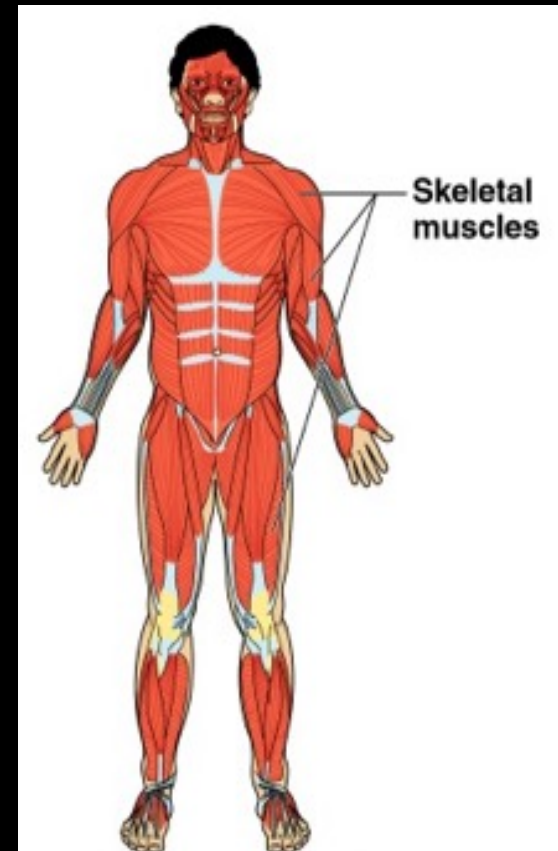
Skeletal System

- Protects and supports body organs
- Provides muscle attachment for movement
- Site of blood cell formation
- Stores minerals



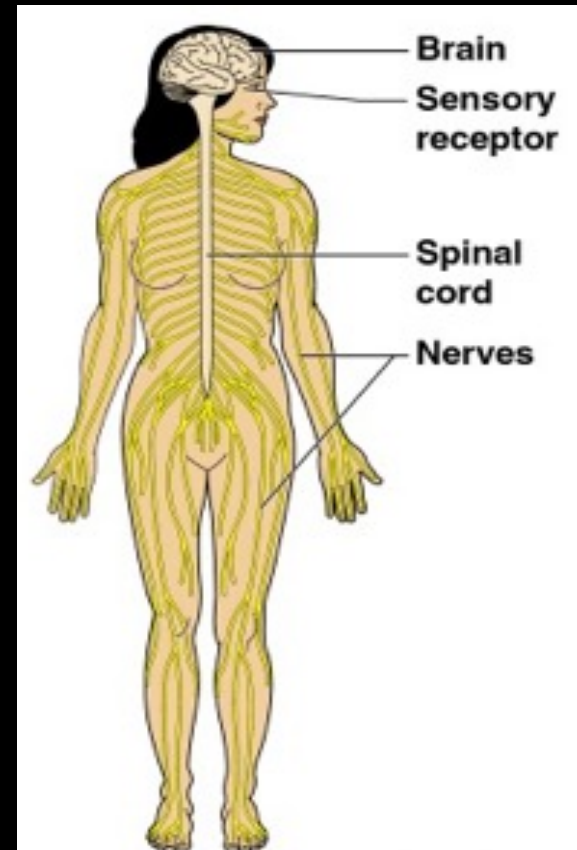
Muscular System

- Allows locomotion
- Maintains posture
- Produces heat



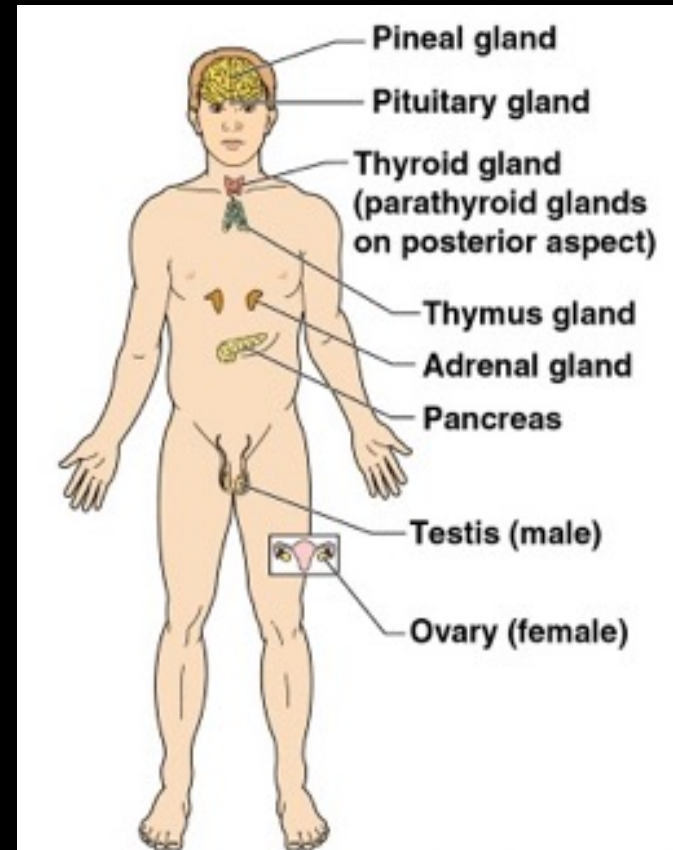
Nervous System

- Fast-acting control system
- Responds to internal and external change
- Activates muscles and glands



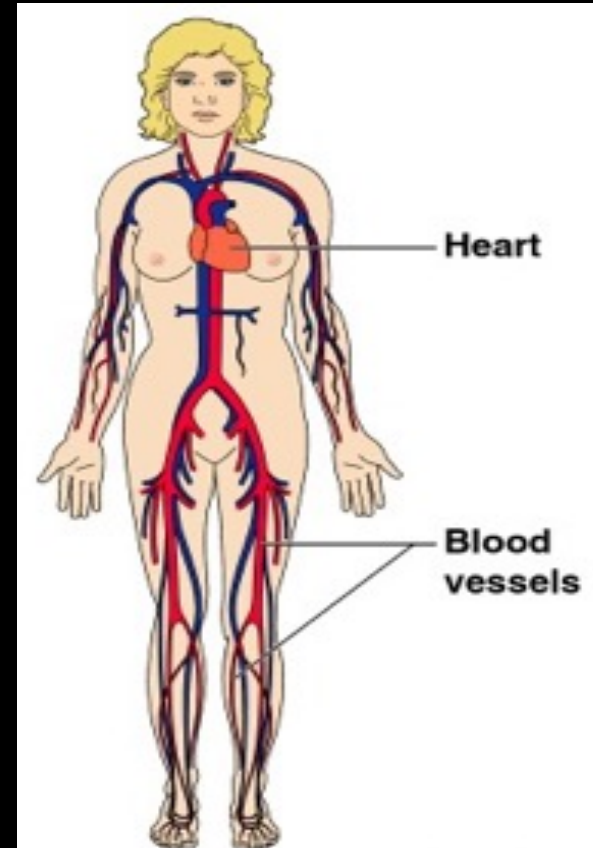
Endocrine System

- **Secretes** regulatory hormones
 - Growth
 - Reproduction
 - Metabolism



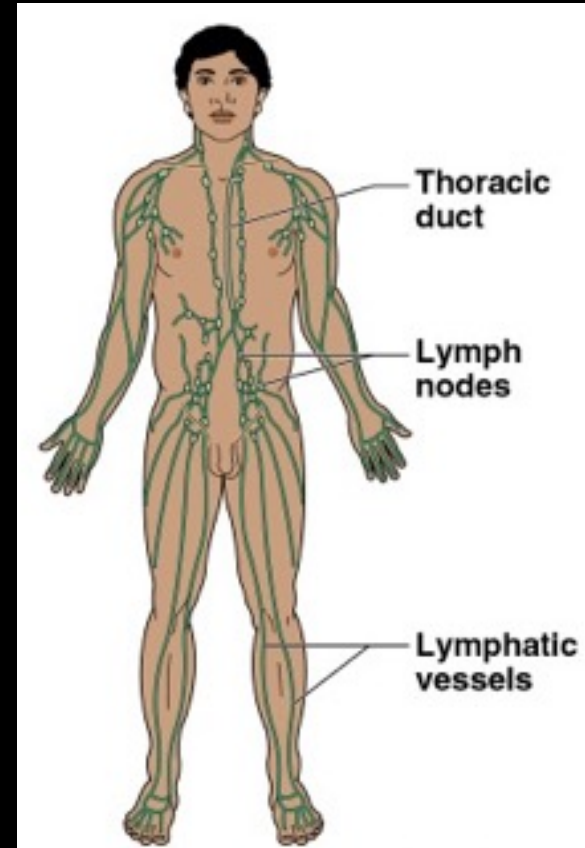
Cardiovascular System

- **Transports materials** in body **via blood** pumped by heart
 - Oxygen
 - Carbon dioxide
 - Nutrients
 - Wastes



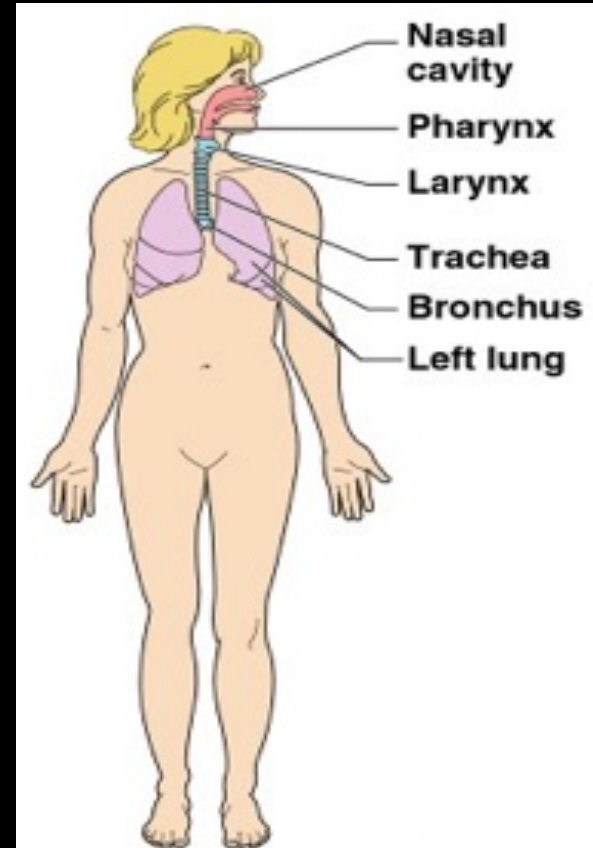
Lymphatic System

- Returns fluids to blood vessels
- Disposes of debris
- Involved in immunity



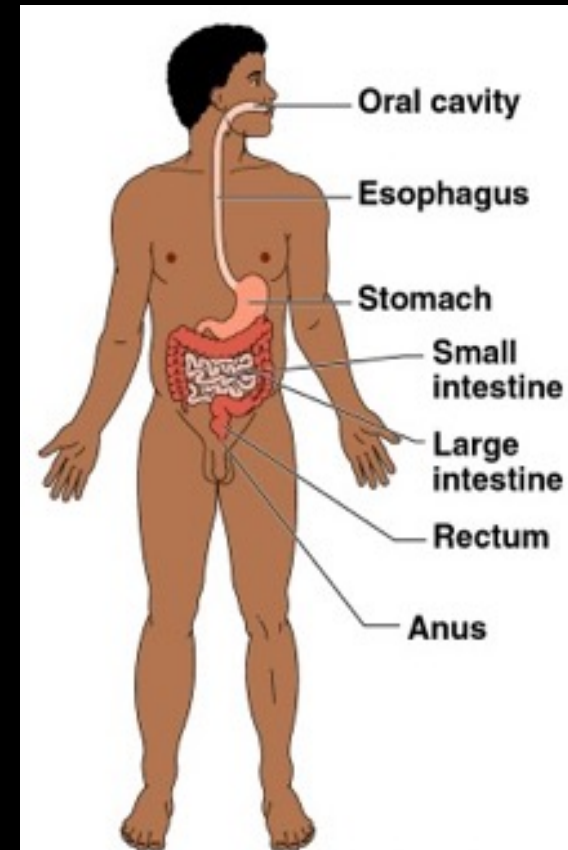
Respiratory System

- Keeps blood supplied with oxygen
- Removes carbon dioxide



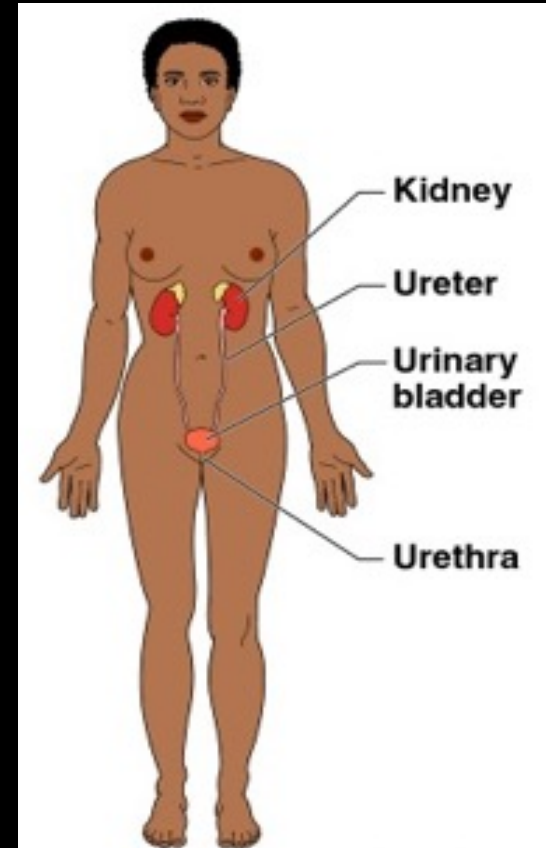
Digestive System

- Breaks down food
- Allows for nutrient absorption into blood
- Eliminates indigestible material



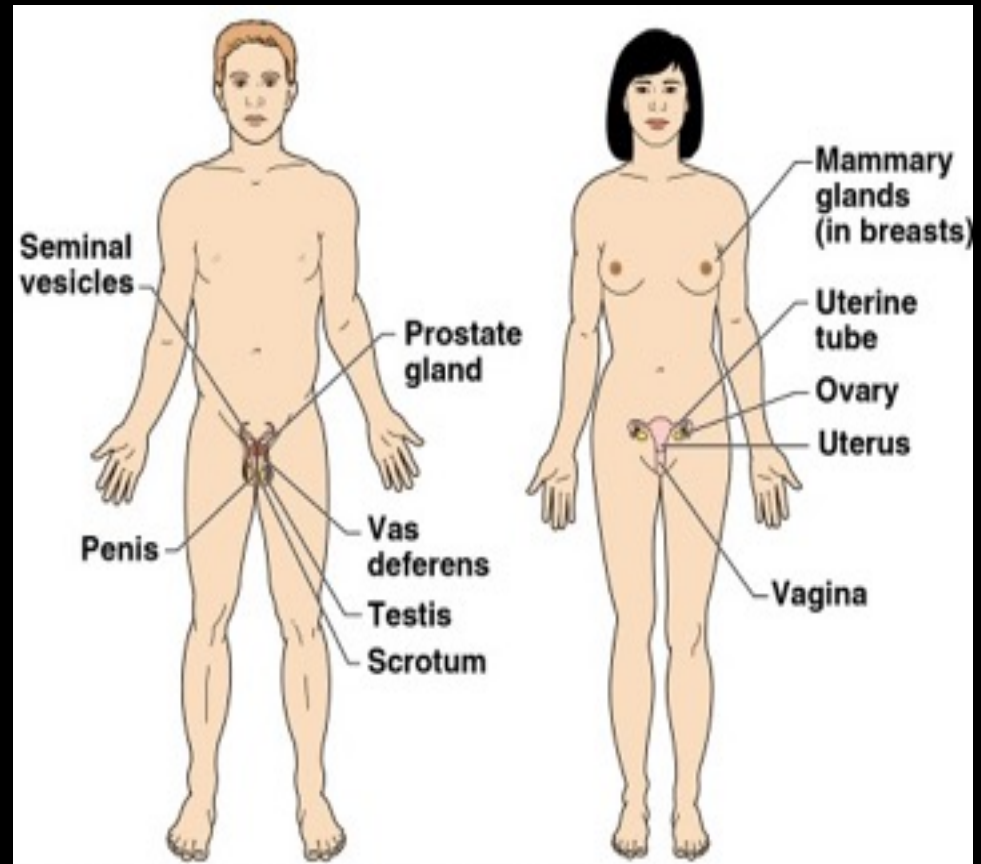
Urinary System

- Eliminates nitrogenous wastes
- Maintains acid – base balance
- Regulation of materials
 - Water
 - Electrolytes



Reproductive System

- Production of offspring
- Development



Necessary Life Functions

- Maintain Boundaries
- Movement
 - Locomotion
 - Movement of substances
- Responsiveness
 - Ability to sense changes and react
- Digestion
 - Break-down and delivery of nutrients

Necessary Life Functions

- **Metabolism** – chemical reactions within the body
 - Production of energy
 - Making body structures
- **Excretion**
 - Elimination of waste from metabolic reactions

Necessary Life Functions

- **Reproduction**
 - Production of future generation
- **Growth**
 - Increasing of cell size and number

Survival Needs

- **Nutrients**

- Chemicals for energy and cell building
- Includes carbohydrates, proteins, lipids, vitamins, and minerals

- **Oxygen**

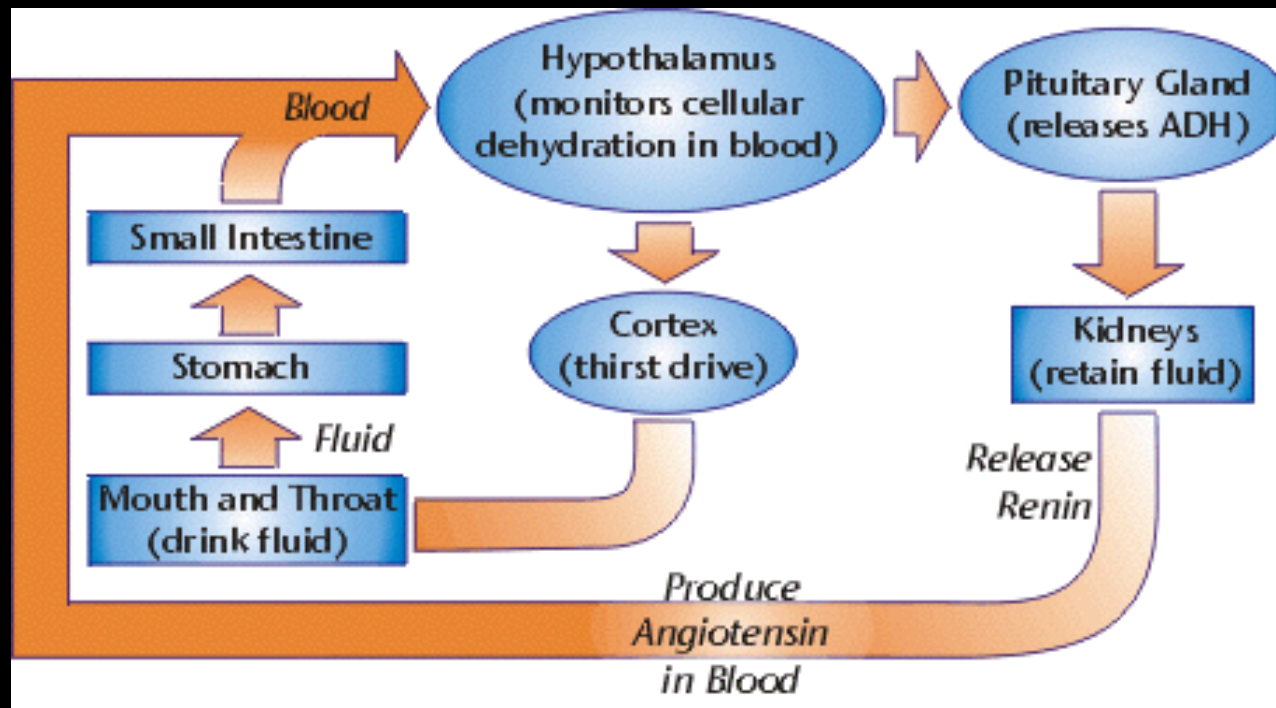
- Required for chemical reactions

Survival Needs

- **Water**
 - 60–80% of body weight
 - Provides for metabolic reaction
- **Stable body temperature**
- **Atmospheric pressure must be appropriate**

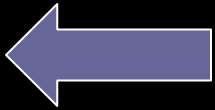
Homeostasis

- Maintenance of a stable internal environment = a dynamic state of equilibrium



Set Point Range

Cold



Comfy



Comfy



Hot

Homeostasis

- Homeostasis must be maintained for normal body functioning and to sustain life
- Homeostatic imbalance – a disturbance in homeostasis resulting in disease



Feedback Control Loop

Hello
It's Hot



Feedback Control Loop: Basic Components

Sensor mechanism



Integrating or control center



Effector mechanism

Direction of Signals



Feedback Control Loop: Basic Components

Sensor mechanism (neural or hormonal)



Afferent signal

Integrating or control center

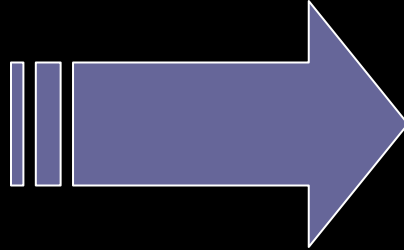


Efferent signal

Effector mechanism

Negative Feedback Loop

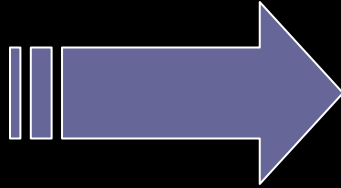
Cold



Heat

Positive Feedback Control Loop

Cold



Cold