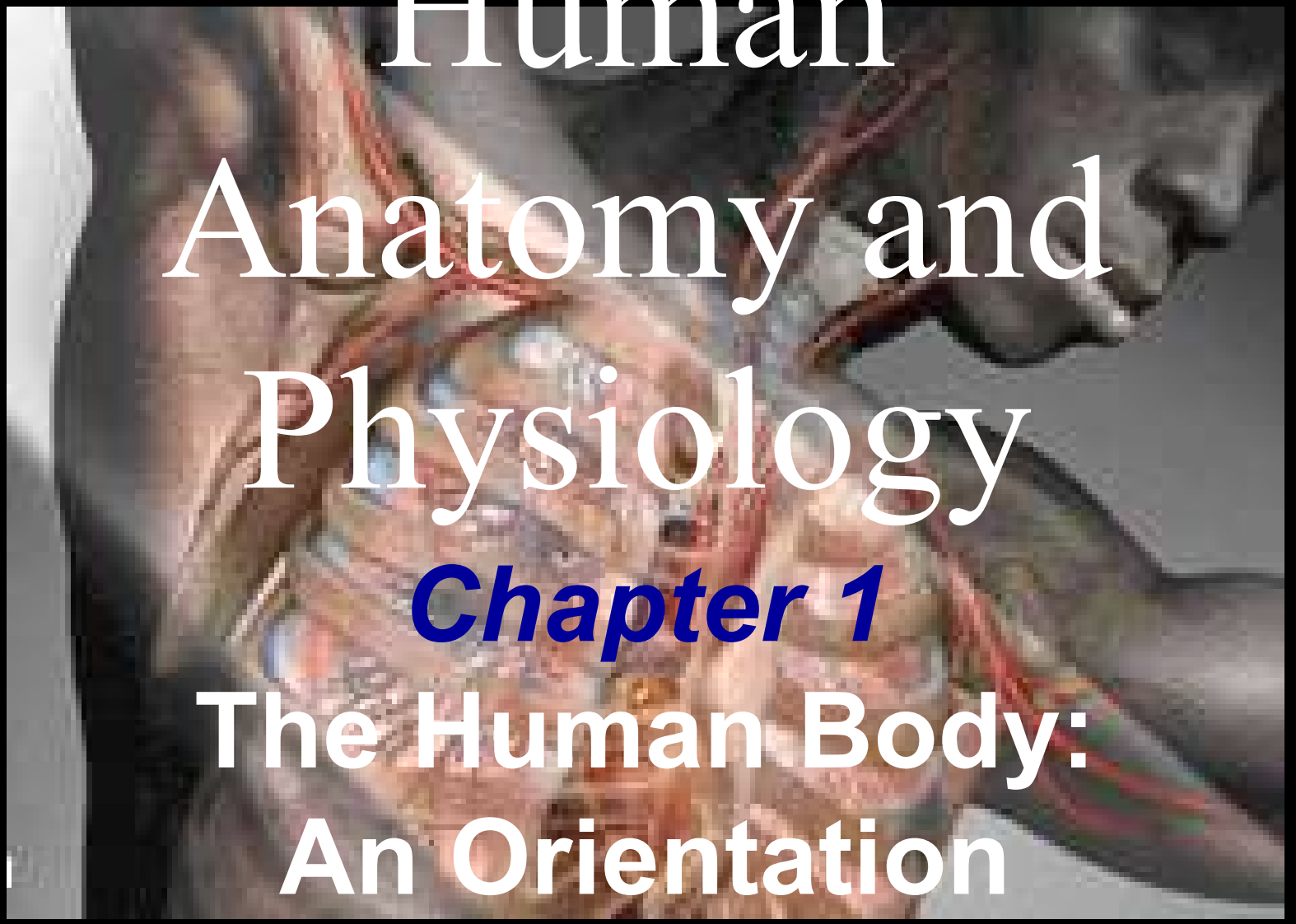


Human Anatomy and Physiology

Chapter 1

The Human Body: An Orientation

Anatomy

Structure

Parts

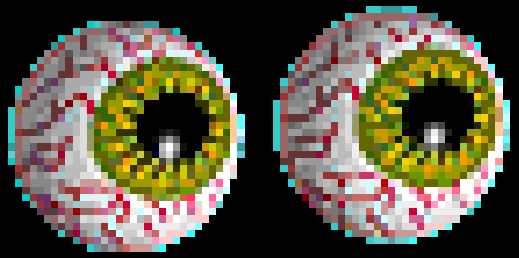
Shape

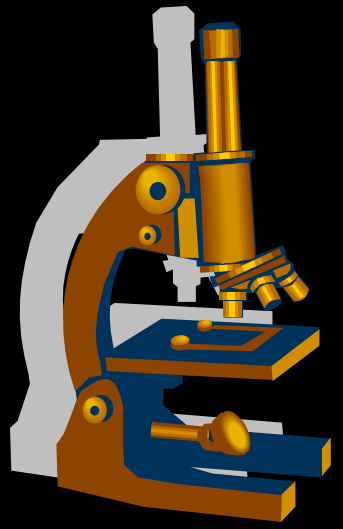
Physiology

Functions

Gross Anatomy

- Microscopic Anatomy





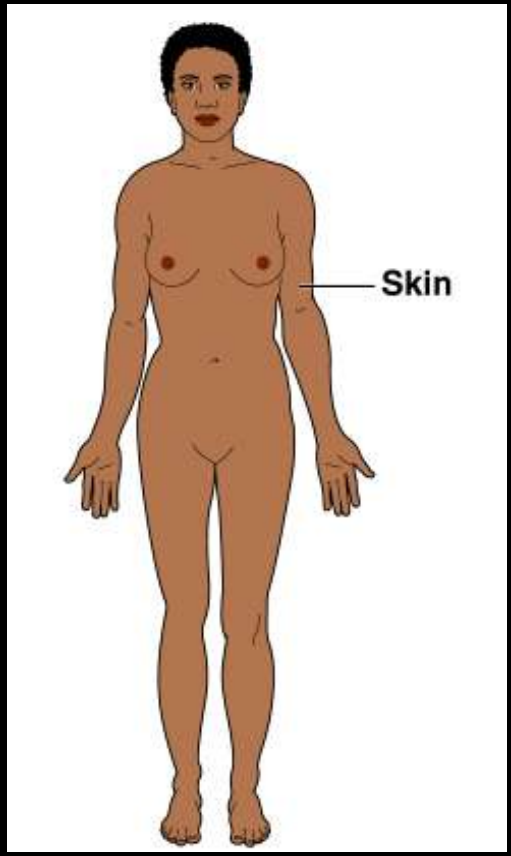
Why Is This Important?

11 Major Systems of the Body

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

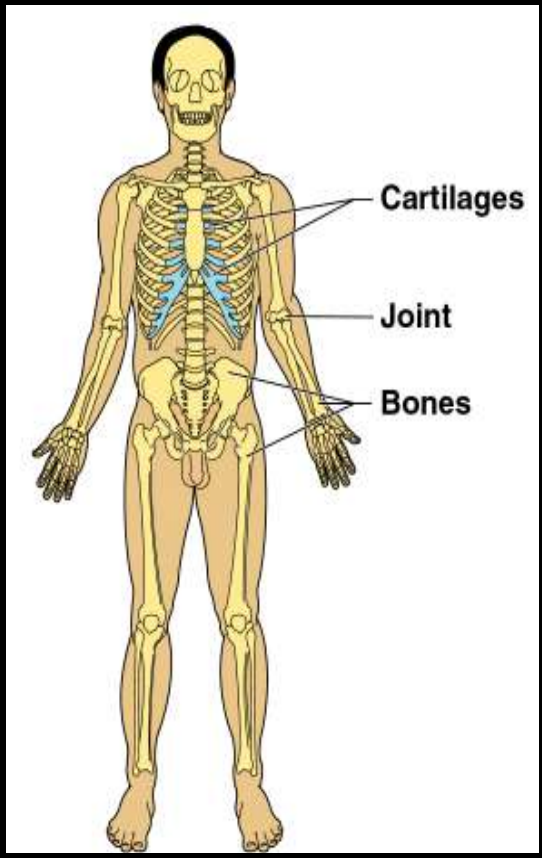
Integumentary System

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



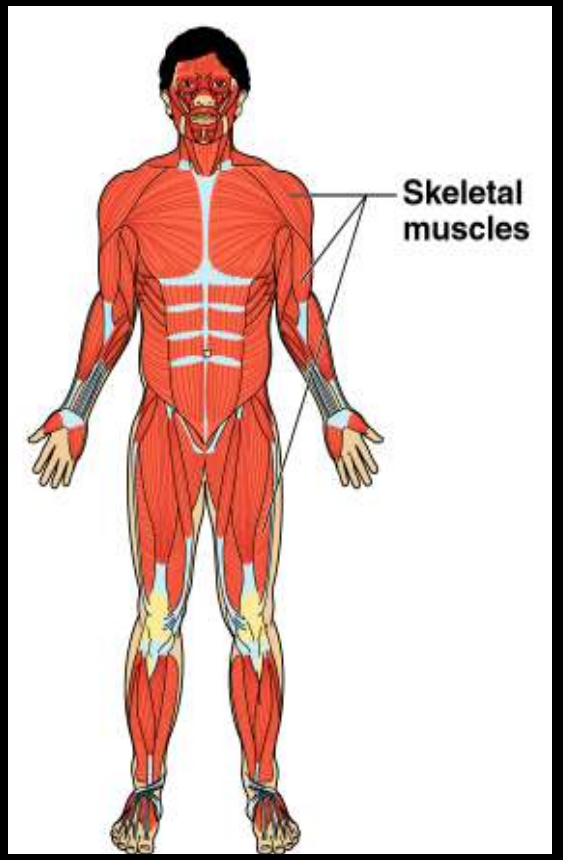
Skeletal System

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



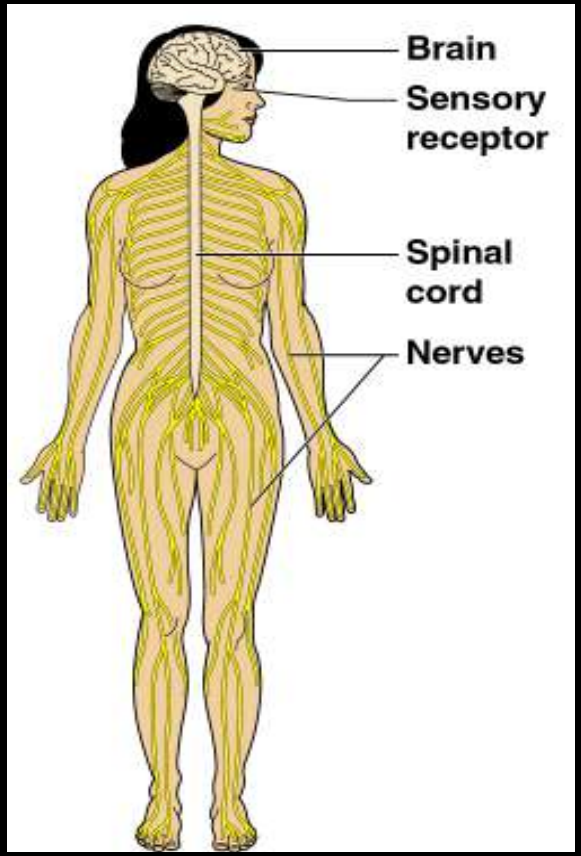
Muscular System

- **Allows locomotion**
- **Maintains posture**
- **Produces heat**



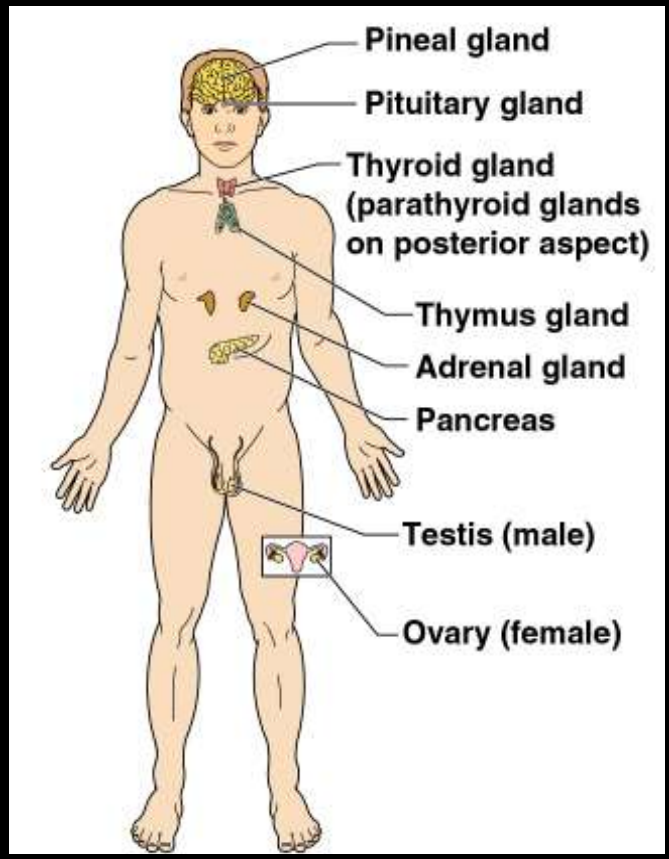
Nervous System

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



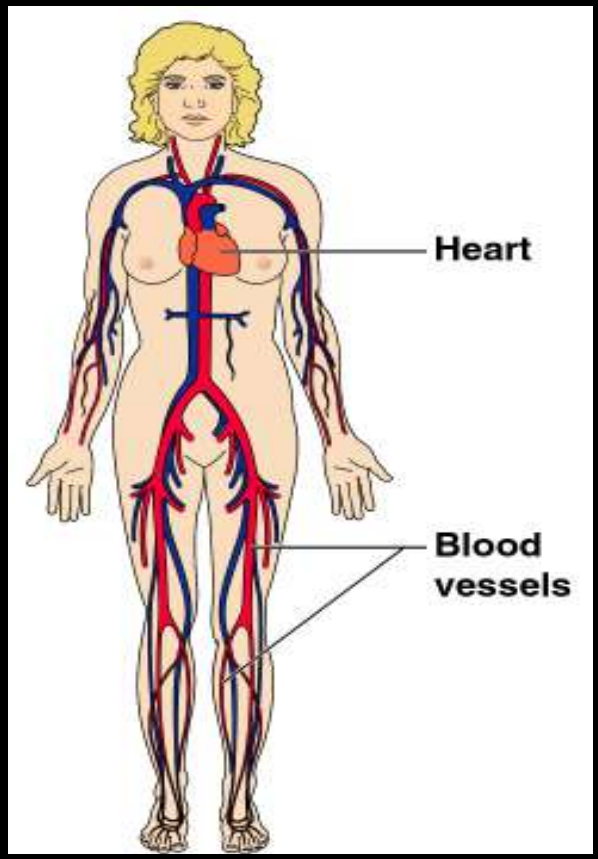
Endocrine System

- Secretes regulatory hormones
  - Growth
  - Reproduction
  - Metabolism



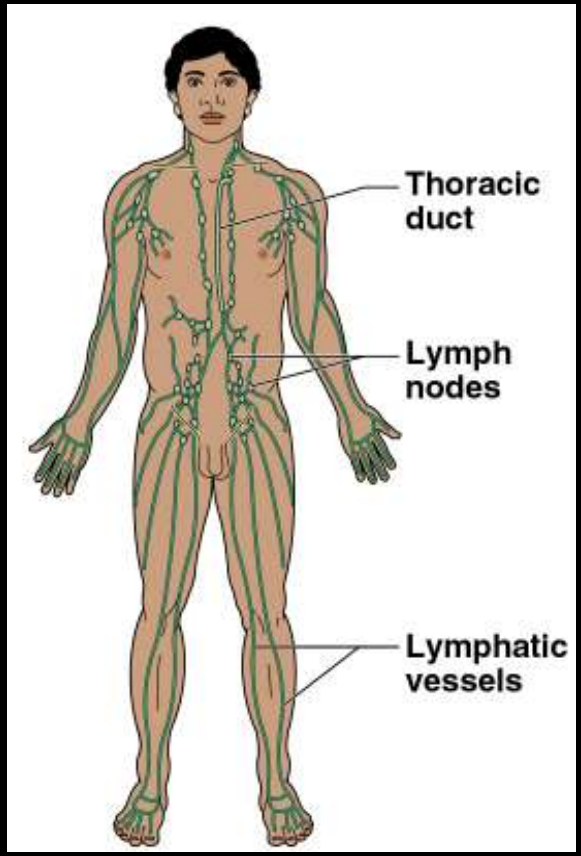
Cardiovascular System

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



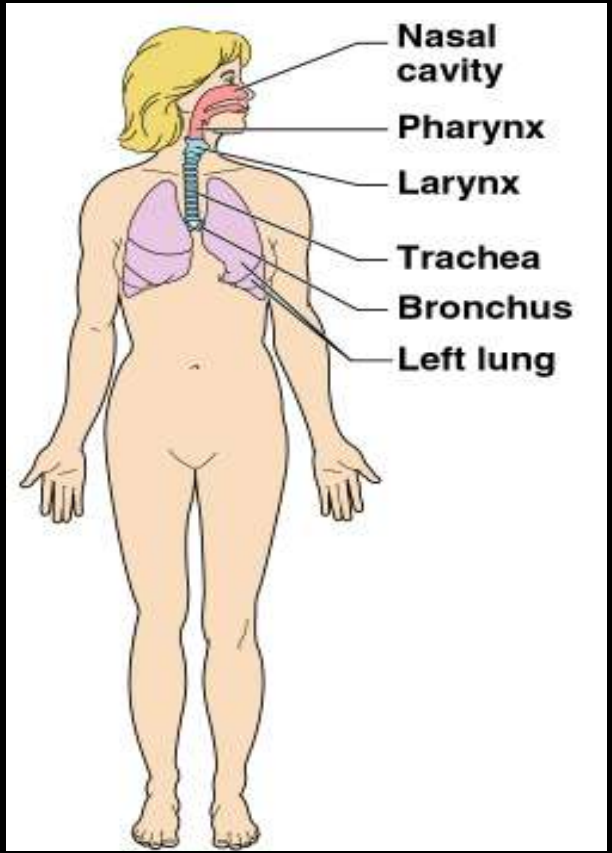
Lymphatic System

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



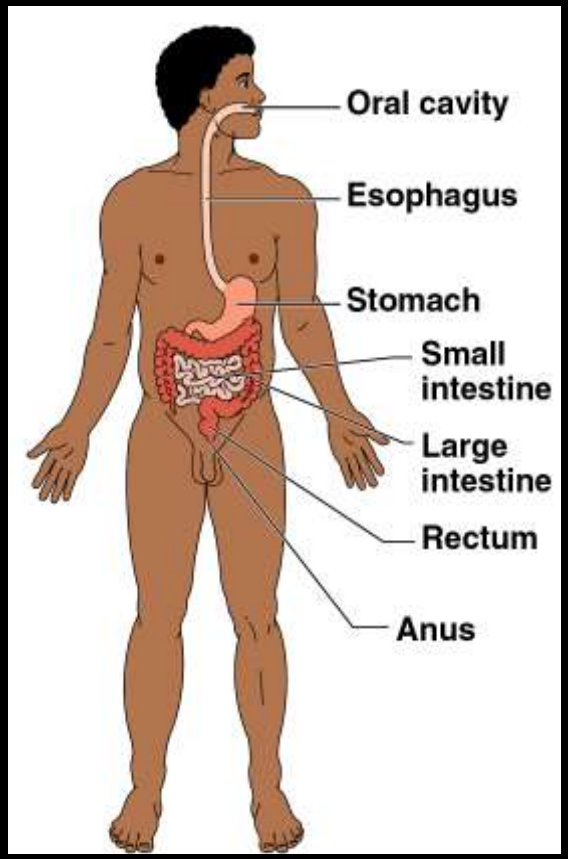
Respiratory System

- Keeps blood supplied with oxygen
- Removes carbon dioxide



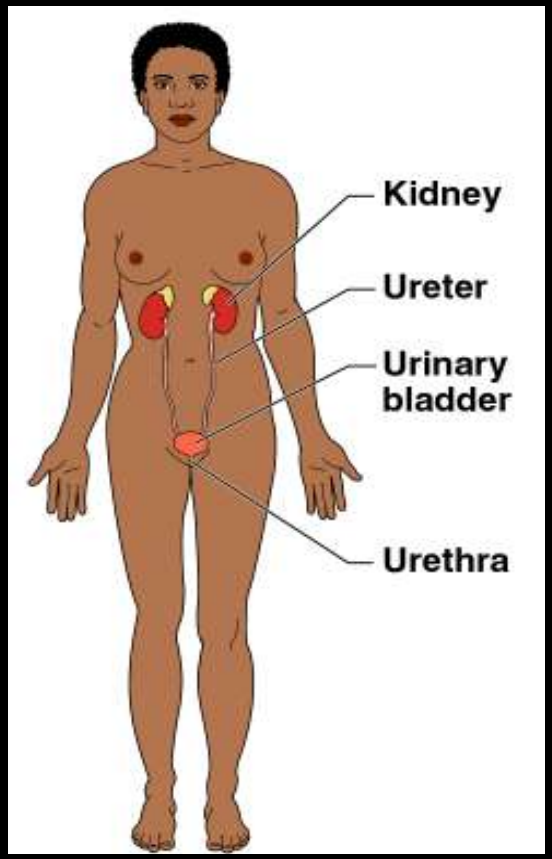
Digestive System

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



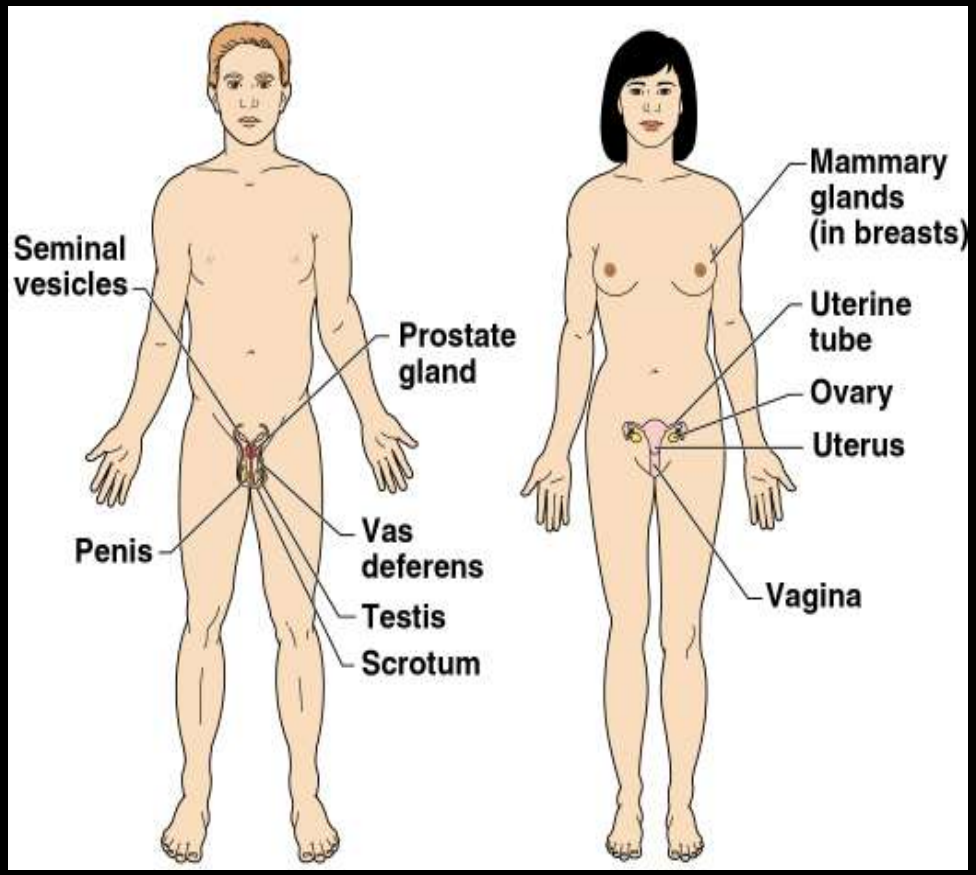
Urinary System

- 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

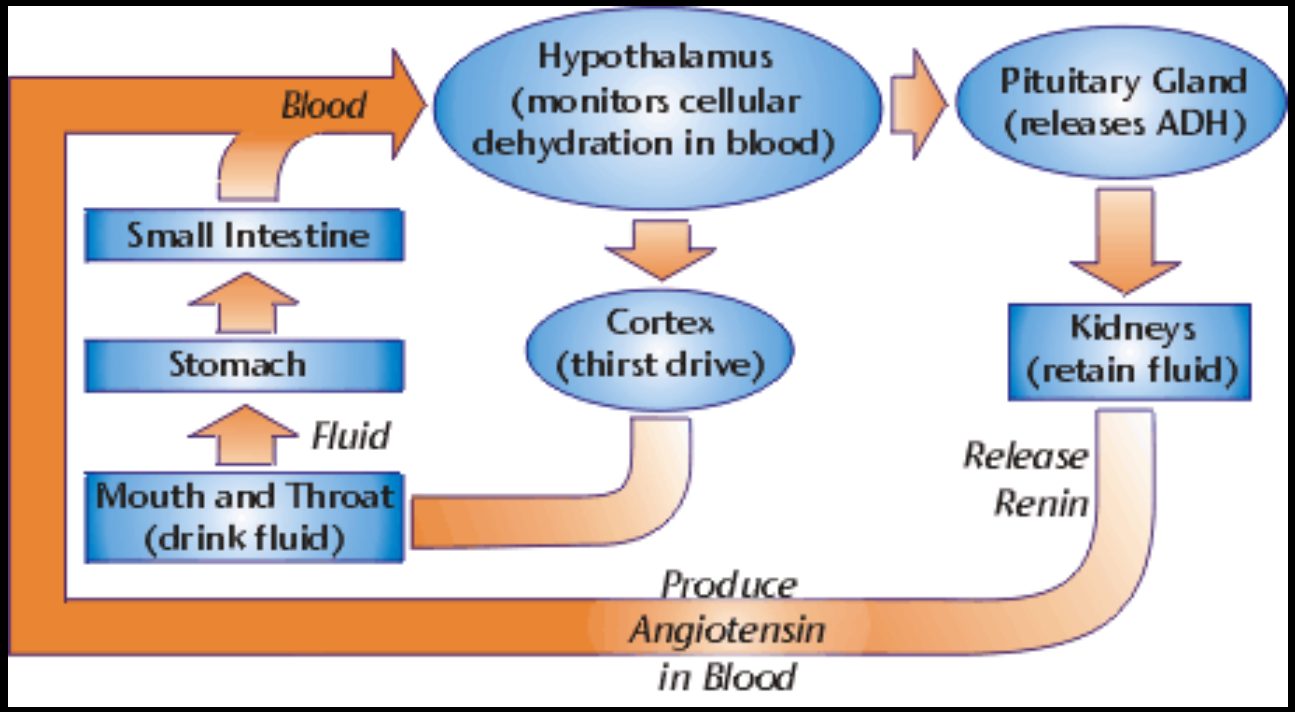
- Nutrients
  - Chemicals for energy and cell building
  - Includes carbohydrates, proteins, lipids, vitamins, and minerals
- Oxygen
  - Required for chemical reactions

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

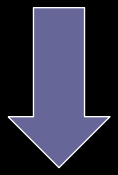
Homeostasis

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

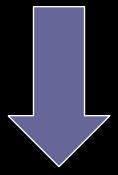
Feedback Control Loop

Feedback Control Loop: Basic Components

Sensor mechanism

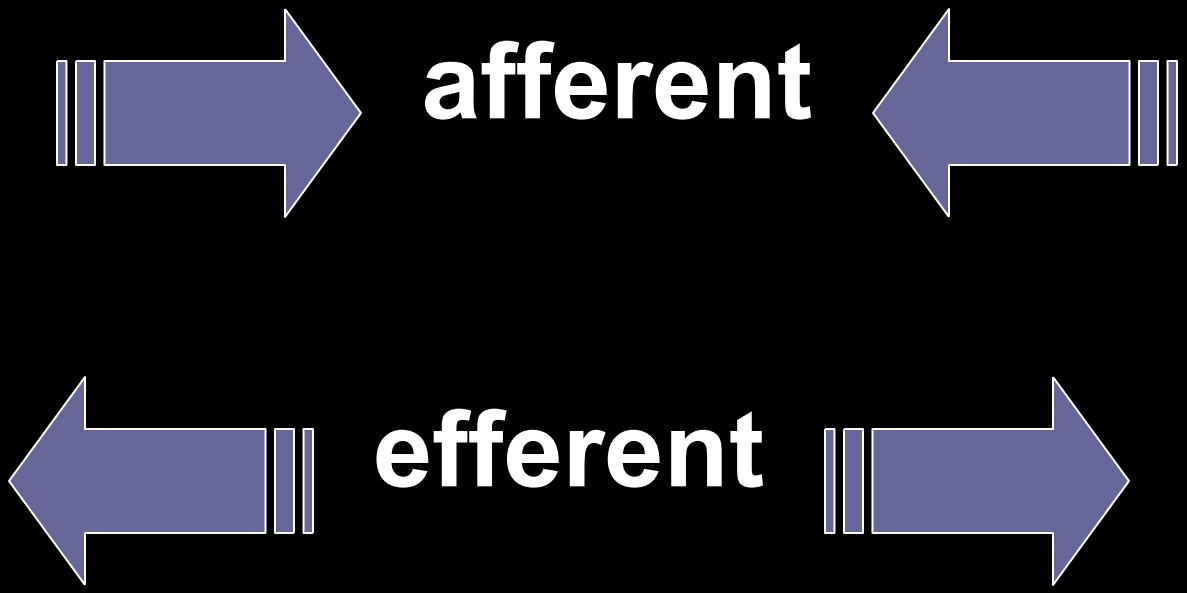


Integrating or control center



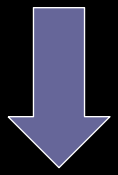
Effector mechanism

Direction of Signals



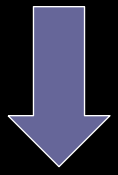
Feedback Control Loop: Basic Components

Sensor mechanism (neural or hormonal)



Afferent signal

Integrating or control center

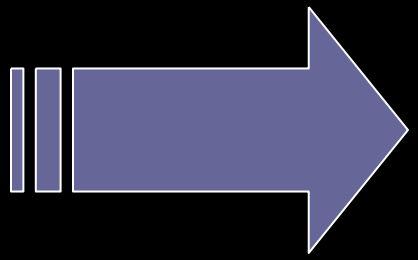


Efferent signal

Effector mechanism

Negative Feedback Loop

Cold



Heat

Positive Feedback Control Loop