Organization of the Human Body

Overview

- Anatomy and physiology defined
- Levels of structural organization
- Principal systems of the body
- Necessary life functions
- The scientific method
- Homeostasis
- The language of anatomy

Anatomy and Physiology

- Anatomy
  - The study of ***structure*** and relationships among structures
- Physiology
  - The study of the ***functions*** of the body
  - How the body parts work

Levels of Organization

- Chemical
- Cell
- Tissue
- Organ
- System
- Organism

Principal Systems of the Body

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

Integumentary System

- Structures
  - Skin, hair, nails, sweat & oil glands
- Functions
  - Helps regulates body temperature
  - Protects the body
  - Eliminates wastes
  - Helps make vitamin D
  - Receives stimuli - pain, pressure, temperature

Skeletal System

- Structures
  - All the bones, associated cartilages, & joints
- Functions
  - Supports and protects the body
  - Assists with body movement
  - Houses cells that produce red blood cells
  - Stores minerals

Muscular System

- Structures
  - Skeletal muscle tissue attached to bone
- Functions
  - Helps bring about movement
  - Maintains posture
  - Produces heat

Nervous System

- Structures
  - Brain, spinal cord, nerves, and sense organs
- Functions
  - Regulates body activities through nerve impulses
  - Detects changes in the environment
  - Interprets the changes
  - Responds to the changes

Endocrine System

- Structures
  - All glands and tissues that produce hormones
- Functions
  - Regulates body activities through hormones transported by the circulatory system to various target organs

Cardiovascular System

- Structures
  - Blood, heart, and blood vessels
- Functions
  - Distributes oxygen and nutrients to cells
  - Carries carbon dioxide and wastes from cells
  - Helps maintains acid-base balance of the body
  - Protects against disease
  - Helps regulate body temperature

Lymphatic and Immune System

- Structures
  - Lymph, lymphatic vessels, lymphoid organs
- Functions
  - Returns protein & plasma to circulatory system
  - Transports fat from intestines to circulatory system
  - Serves as site for development of certain white blood cells
  - Produces antibodies

Respiratory System

- Structures
  - Lungs and associated passageways
- Functions
  - Supplies oxygen
  - Eliminates carbon dioxide
  - Helps regulates the acid-base balance of the body
  - Helps produces vocal sounds

Digestive System

- Structures
  - Gastrointestinal tract and associated organs
- Functions
  - Breaks down and absorbs food for use by cells
  - Eliminates solid and other wastes

Urinary System

- Structures
  - Kidneys, ureters, urinary bladder, and urethra
- Functions
  - Regulates the volume and composition of blood
  - Eliminates wastes
  - Regulates fluid & electrolyte balance & volume
  - Helps maintain acid-base balance of the body
  - Helps regulate red blood cell production

Reproductive System

- Structures
  - Organs that produce reproductive cells, & organs that transport, store, & nourish reproductive cells
- Functions
  - Reproduces the organism
  - Produces hormones that regulate metabolism

Necessary Life Functions

- Maintaining Boundaries
- Movement
- Responsiveness
- Digestion
- Metabolism
- Excretion
- Reproduction
- Growth

Survival Needs

- Nutrients
- Oxygen
- Water
- Body temperature
- Atmospheric pressure

What is Science?

- A way of understanding the natural world.
- A process involving observations and experiments that leads to explanations about how the world works.

The Scientific Method

- Observation
- Hypothesis
- Experiment
- Conclusion

Experimental Design

- Title
- Hypothesis
- Independent variable
- Dependent variable
- Control
- Number of trials
- Constants

Homeostasis

A state of balance or equilibrium in which the body's internal environment remains within certain physiological limits.

Examples of Homeostasis

- Blood pressure
- Heart rate
- Blood sugar
- Body temperature
- Breathing rate
- Mineral contents

Feedback System Components

- Receptor
- Control center
- Effector

Types of Feedback Systems

- Negative feedback system
  - Most common
  - Requires frequent monitoring & adjustment
  - Examples
    - Regulation of blood pressure, blood sugar,& body temperature
- Positive feedback system
  - Examples
    - Blood clotting & labor contractions

The Language of Anatomy

- Anatomical Position
- Directional Terms
- Body Planes
- Body Cavities

Directional Terms

- Superior
- Inferior
- Anterior
- Posterior
- Medial
- Lateral
- Proximal
- Distal
- Superficial
- Deep

Planes of the Body

- Frontal
- Transverse
- Sagittal
- Oblique

Body Cavities

- Dorsal
  - Cranial
  - Vertebral
- Ventral
  - Thoracic
  - Abdominopelvic

Themes

1. Function relates to structure.
2. All body systems are interrelated.
3. All body systems are maintained within narrow limits.

The End