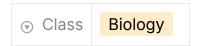


# **Chapter 30: The Human Body**



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## 30.1 — Organization of the Human Body

## **Organization of the Body**

Every cell in the human body is an independent unit and works with other cells to form an *organism*.

- Many cells organize into systems and work together for the body to function
  - Levels of Organization: cell, tissue, organ, organ system → organism

#### Cells

Cell: the basic unit of structure and function in living things

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Individual cells specialize based on tasks (ex. bone cells, blood cells)\

#### **Tissues**

**Tissue:** a group of cells that perform a single function

- **Epithelial Tissue:** tissue that lines the interior and exterior body surfaces (ex. skin, stomach lining)
- Connective Tissue: tissue that provides support for the body and connects its parts (ex. fat cells, bone cells)
- Nervous Tissue: tissue where nerve impulses are transmitted through
  - Neurons → cells that carry the impulses
  - Glial Cells → surround and protect neurons
- Muscle Tissue: tissue that allows for movement of the body
  - Voluntary → controlled by you
  - Involuntary → automatic movement (you don't control them)

### **Organs**

**Organ:** a group of different types of tissues that work together to perform a single function

• Ex. eye → made of all four types of tissue (function = sight)

### **Organ Systems**

Organ System: a group of organs that perform closely related functions

• Interact to maintain homeostasis

ORGAN SYSTEM	STRUCTURES	FUNCTIONS
Nervous System	Brain, spinal cord, nerves	- Recognizes & coordinates the body's response to stimuli
Integumentary System	Skin, hair, nails, sweat glands, oil glands	- Guards against infection, injury & ultraviolet radiation

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ORGAN SYSTEM	<u>STRUCTURES</u>	<u>FUNCTIONS</u>
		(from the Sun) - Helps to regulate body temperature
Immune (& Lymphatic) Systems	White blood cells (WBCs), thymus, spleen, lymph nodes, lymph vessels	<ul> <li>Helps protect the body</li> <li>from disease</li> <li>Collects fluid lost from</li> <li>blood vessels and returns it</li> <li>to the</li> <li>cardiovascular system</li> </ul>
Muscular System	Skeletal muscle, smooth muscle, cardiac muscle	<ul> <li>Works with skeletal</li> <li>system to produce</li> <li>voluntary movement</li> <li>Helps to circulate blood</li> <li>and move food through the</li> <li>digestive system</li> </ul>
Cardiovascular/Circulatory System	Heart, blood vessels, blood	<ul> <li>Transports oxygen,</li> <li>nutrients, and hormones to</li> <li>cells</li> <li>Removes cell waste</li> <li>Helps to regulate body</li> <li>temperature</li> </ul>
Skeletal System	Bones, cartilage, ligaments, tendons	<ul> <li>Supports the body</li> <li>Protects internal organs</li> <li>Allows for movement</li> <li>Stores mineral reserves</li> <li>Produces blood cells</li> </ul>
Respiratory System	Nose, pharynx, larynx, trachea, bronchi, bronchioles, lungs	<ul><li>Brings in oxygen needed</li><li>for cellular respiration</li><li>Removes excess carbon</li><li>dioxide from the body</li></ul>
Digestive System	Mouth, pharynx, esophagus, stomach, small intestine, large intestine, rectum	<ul><li>Breaks down food</li><li>Absorbs nutrients</li><li>Eliminates wastes</li></ul>
Excretory System	Skin, lungs, liver, kidneys, ureters, urinary bladder,	- Eliminates waste products from the body

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ORGAN SYSTEM	STRUCTURES	<u>FUNCTIONS</u>
	urethra	
Endocrine System	Hypothalamus, pituitary gland, thyroid, parathyroids, adrenals, pancreas, ovaries (F), testes (M)	<ul><li>Controls growth,</li><li>development, and</li><li>metabolism</li><li>Maintains homeostasis</li></ul>
Reproductive System	Males: testes, epididymis, vas deferens, urethra, penis Females: ovaries, Fallopian tubes, uterus, vagina	<ul><li>Produces gametes</li><li>Nurtures &amp; protects</li><li>developing embryo (</li><li>in females)</li></ul>

### Homeostasis

**Homeostasis** → keeping the internal environment of the body *stable* 

 Constant internal physical & chemical conditions that organisms maintain despite changes in internal/external environments

#### **Feedback Inhibition**

Body keeps internal conditions within a certain range.

- Feedback Inhibition (Negative Feedback): the process in which a stimulus produces a response that opposes the original stimulus
  - Creates stable environments

## Maintenance of Body Temperature

Hypothalamus → monitors the temperature of the skin and organs within the body

- Nerve cells sense temperature across the organism
  - Core temperature drops much below 37°C → body speeds up activities → generates heat
  - Core temperature rises too far above 37°C → slows down activities → reduces heat production → fatigue

## The Liver & Homeostasis

#### **Liver** → digestive system (also **maintains homeostasis**)

- Converts toxic ammonia → less-toxic urea
- Detoxifies substances

#### Regulating Blood Glucose Levels

- After eating → blood glucose levels rise → Liver stores excess glucose
- Blood glucose levels drop → Liver releases stored glucose

#### Proper glucose regulation is VITAL.

- Too little → unconsciousness
- Too much → cell damage, diabetes (a failure in homeostasis)