Chapter 30: The Human Body

Class	Biology

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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

- 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

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

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

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)