

Introduction to Human Anatomy and Physiology

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Key concepts, terminology, and organizational levels

1. What Is Anatomy & Physiology?

Discipline	Focus	Typical Questions
Anatomy	The structure of the body and its parts	Where is the heart located? What are the layers of skin?
Physiology	The function of those structures	How does the heart pump blood? How do muscles contract?
Integrated view	How form and function interrelate	Why does the shape of the alveoli aid gas exchange?

2. Levels of Structural Organization

1. **Chemical Level** – atoms & molecules (e.g., H₂O, proteins, DNA)
2. **Cellular Level** – basic unit of life (e.g., neuron, erythrocyte)
3. **Tissue Level** – groups of similar cells + extracellular matrix
 - **Epithelial** – lining surfaces, protection, absorption
 - **Connective** – support & transport (bone, blood, adipose)
 - **Muscle** – contraction (skeletal, cardiac, smooth)
 - **Nervous** – signal transmission (neurons, glia)
4. **Organ Level** – two or more tissue types performing a specific task (e.g., stomach)
5. **Organ System Level** – organs working together to accomplish a major function (e.g., digestive system)
- 6 **Organismal Level** – the complete human being

(Mnemonic for the tissue types: **Every Cool Musician Needs Equipment** ? Epithelial, Connective, Muscle, Nervous)

3. Major Body Systems – Quick Overview

System	Primary Organs/Structures	Main Functions
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Integumentary	Skin, hair, nails, glands	Protection, temperature regulation, sensation
Skeletal	Bones, cartilage, joints	Support, movement, mineral storage, blood cell formation
Muscular	Skeletal, cardiac, smooth muscle	Body movement, posture, heat production
Nervous	Brain, spinal cord, peripheral nerves, sense organs	Sensory input, integration, motor output
Endocrine	Glands (pituitary, thyroid, adrenal, etc.)	Hormone secretion ? regulation of metabolism, growth, reproduction
Cardiovascular	Heart, blood vessels, blood	Transport of nutrients, gases, wastes; immune defense
Lymphatic/Immune	Lymph nodes, vessels, spleen, thymus	Fluid balance, defense against pathogens
Respiratory	Nasal cavity, trachea, lungs	Gas exchange (O ₂ ? CO ₂)
Digestive	Mouth, esophagus, stomach, intestines, liver, pancreas	Ingestion, digestion, absorption, elimination
Urinary	Kidneys, ureters, bladder, urethra	Filtration of blood, waste excretion, fluid/electrolyte balance
Reproductive	Gonads, ducts, accessory glands	Production of gametes, hormones, support of offspring

4. Anatomical Directional Terms

Term	Meaning	Example
Superior	Toward the head (up)	The shoulder is superior to the elbow
Inferior	Toward the feet (down)	The stomach is inferior to the diaphragm
Anterior (ventral)		