

Overview of Human Anatomy and Physiology

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Designed for quick reference and deeper study

1. Foundations

Concept	Definition	Why It Matters
Anatomy	Study of the body's structure (organs, tissues, cells).	Provides the map for locating functions, diagnosing disease, and performing procedures.
Physiology	Study of the body's function (how structures work together).	Explains the mechanisms behind health, performance, and pathology.
Homeostasis	Dynamic equilibrium maintained by feedback systems.	Keeps internal conditions (e.g., temperature, pH, glucose) within narrow limits essential for survival.
Levels of Organization	Chemical ? Cellular ? Tissue ? Organ ? Organ system ? Organism	Each level builds on the previous; understanding one level aids comprehension of the whole.

2. Major Organ Systems (Structure?+?Key Functions)

System	Primary Organs & Structures	Core Functions
Integumentary	Skin (epidermis, dermis, hypodermis), hair, nails, glands	Protection, temperature regulation, sensation, vitamin?D synthesis
Skeletal	206 bones, cartilage, ligaments, joints	Support, movement (via levers), mineral storage, blood?cell formation (hematopoiesis)
Muscular	Skeletal, cardiac, smooth muscle fibers	Voluntary & involuntary movement, posture, heat production
Nervous	Brain, spinal cord, peripheral nerves, sensory receptors	Rapid communication, integration of information, control of behavior

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System	Primary Organs & Structures	Core Functions
Endocrine	Glands (pituitary, thyroid, adrenal, pancreas, gonads, etc.)	Hormone secretion ? long-term regulation of metabolism, growth, reproduction
Cardiovascular	Heart, blood vessels (arteries, veins, capillaries), blood	Transport of nutrients, gases, wastes; immune defense; temperature control
Lymphatic/Immune	Lymph nodes, vessels, spleen, thymus, tonsils, lymphoid tissue	Fluid balance, immune surveillance, absorption of dietary fats
Respiratory	Nasal cavity, pharynx, larynx, trachea, bronchi, lungs	Gas exchange (O ₂ ? CO ₂), acid-base balance, vocalization
Digestive	Mouth, esophagus, stomach, small & large intestines, liver, pancreas, gallbladder	Ingestion, digestion, absorption, elimination of waste
Urinary	Kidneys, ureters, bladder, urethra	Filtration of blood, excretion of waste, water-electrolyte balance, acid-base regulation
Reproductive	Gonads (testes/ovaries), ducts, accessory glands, external genitalia	Production of gametes, sex hormones, support of fetal development (in females)

3. Cellular & Tissue Foundations

Tissue Type	Main Characteristics	Representative Organs
Epithelial	Tightly packed cells, avascular, lines surfaces & cavities	Skin epidermis, intestinal lining
Connective	Extracellular matrix (fibers, ground substance), varied cell types	Bone, cartilage, blood, adipose
Muscle	Contractile proteins (actin, myosin), excitability	Skeletal muscle (biceps), cardiac muscle (myocardium), smooth muscle (intestinal wall)
Nervous	Neurons (signal transmission) + gl	