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# Unit-1

## Introduction to human body

### Definition and scope of anatomy and physiology

**Anatomy:** Study of the structure of the body and physical relationships involved between them.

The term anatomy comes from Greek words meaning to cut (tomy) apart (ana.)

**Anatomy includes many different divisions such as:**

Cellular anatomy: Cellular anatomy is the study of the structure, function, pathology, life cycle, and life history of the cells.

Developmental anatomy: Developmental anatomy is the study of the structural development of the embryo.

Gross anatomy: Gross anatomy is the study of the structures which can be seen with the unaided eye (the macroscopic structure of tissues and organs).

Histological anatomy: Histological anatomy is the study of the structures microscopically, and function of tissues.

Regional anatomy: Regional anatomy is the study of specific portions of the body (regions).

Systemic anatomy: Systemic anatomy is the study of the structure of the body systems.

**Physiology:** Study of the working of the parts of the body and the way they coordinate with another to maintain the health of a person.

Physio=nature, ology= the study of

Physiology is the study function of the living body and its parts.

**Physiology includes many divisions such as:**

**Cell Physiology:** Cell Physiology is the of the function of cells (a branch of cytology).

Pathology: Pathology is the study of disordered functions or disease.

**Systemic physiology:** Systemic physiology is the study of the function of the body's system. **Special (organ) physiology:** Special (organ) physiology is the study of specific organs of the body.

**Relationship between anatomy and physiology**

Anatomy and physiology are always inter-related. Structure determines what functions can take place. Structure (anatomy) and function (physiology) of the human body have complementarity. Complementarity refers to the interrelationship of Structure (anatomy) and function (physiology).

**Level of Structural organization**

It is divided into: chemical and biological

Chemical: it is the lowest level of organization. It is made up of atoms and molecules. Atoms are the smallest and simplest. Atoms combine to form molecules.

Biological: It is made up of cells, tissues, organs, organ systems. Cell are the smallest independent units. Many cells combine to form tissues and a number of tissues combine to form organs and organs in turn unite to form organ system and a large number of organ systems form a human being.

**Body system:** There are total eleven system in human body. Each coordinate with one another for effective functioning of human body.

**1. Integumentary System:** It contains skin and associated structures like hair and sweat glands, oil glands.

**Function:**

- Body protection
- Regulation of temperature
- Elimination of waste
- Synthesis of Vitamin D
- Sensation of cold, touch, temperature and warmth

**2. Skeletal System:** It Comprises bones, cartilages and associated joints.

**Function:**

- Support and protect the body

- Provides surface for muscle attachment

**3. Muscular System:** It comprises Skeletal, smooth, and cardiac muscles.

**Function:**

- It helps in body movement and maintenance of postures.

**4. Nervous System:** It consists of Brain and Spinal Cord and nerves.

**Function:**

- Action potential Generation and conduction of nerve impulses.

**5. Endocrine System:** It contains hormone producing glands and their secretions.

**Function:**

- Regulation of body activities through hormones

**6.Cardiovascular system:** It Comprises heart, blood and blood vessels.

**Function:**

- Pumping of Blood and transport of gases

**7. Lymphatic system:** It contains lymphatic fluids and vessels, spleen, thymus.

**Function:**

- Defencing

**8. Respiratory System:** It consists of lungs, pharynx, larynx, and trachea.

**Function:**

- Transport of respiratory gases

**9. Digestive System:** It involves GIT (mouth, pharynx, oesophagus, stomach, small intestine & large intestine).

**Function:**

- Physical and chemical digestion of food

**10. Urinary System:** It consists of kidneys, ureter, urinary bladder and urethra.

**Function:**

- Filtration of fluids

**11. Reproductive system:** It consists of a pair of testis, a scrotum, a pair of epididymis, a pair of vas-deferens, ejaculatory duct, urethra, penis and sex glands (pair of seminal vesicles), a prostate gland and pair of Cowper's gland as part of male reproductive system and it comprises pair of ovaries, pair of oviduct, uterus, vagina, hymen, and clitoris, as part of female reproductive system.

**Function:**

- Production of sperm in male and ova in female

**Basic Life Processes:** There are major six life processes

1. Metabolism: sum of all chemical processes that occur in the human body.
   Catabolism: Breck down of complex compounds in to simpler ones.
   Anabolism: Building of complex molecules from simpler ones.
   e.g. Digestion of proteins is catabolic process while use of amino acids to build proteins is anabolic process
2. Responsiveness: Ability of body to detect and respond to changes.
3. Movement: Motion of whole body
4. Growth: Increase in body size
5. Differentiation: Development of specialized cell from unspecialized group of cells.
6. Reproduction: Formation of new cells

**Homeostasis:** Homeostasis refers to stability, balance, or equilibrium within a cell or the body. It is an organism's ability to keep a constant internal environment. Homeostasis is an important characteristic of living things. Keeping a stable internal environment requires constant adjustments as conditions change inside and outside the cell. The adjusting of systems within a cell is called homeostatic regulation.

**Basic anatomical terminology:**

**Superior or cranial** - toward the head end of the body; upper (example, the hand is part of the superior extremity).

**Inferior or caudal** - away from the head; lower (example, the foot is part of the inferior extremity).

**Anterior or ventral** - front (example, the kneecap is located on the anterior side of the leg).

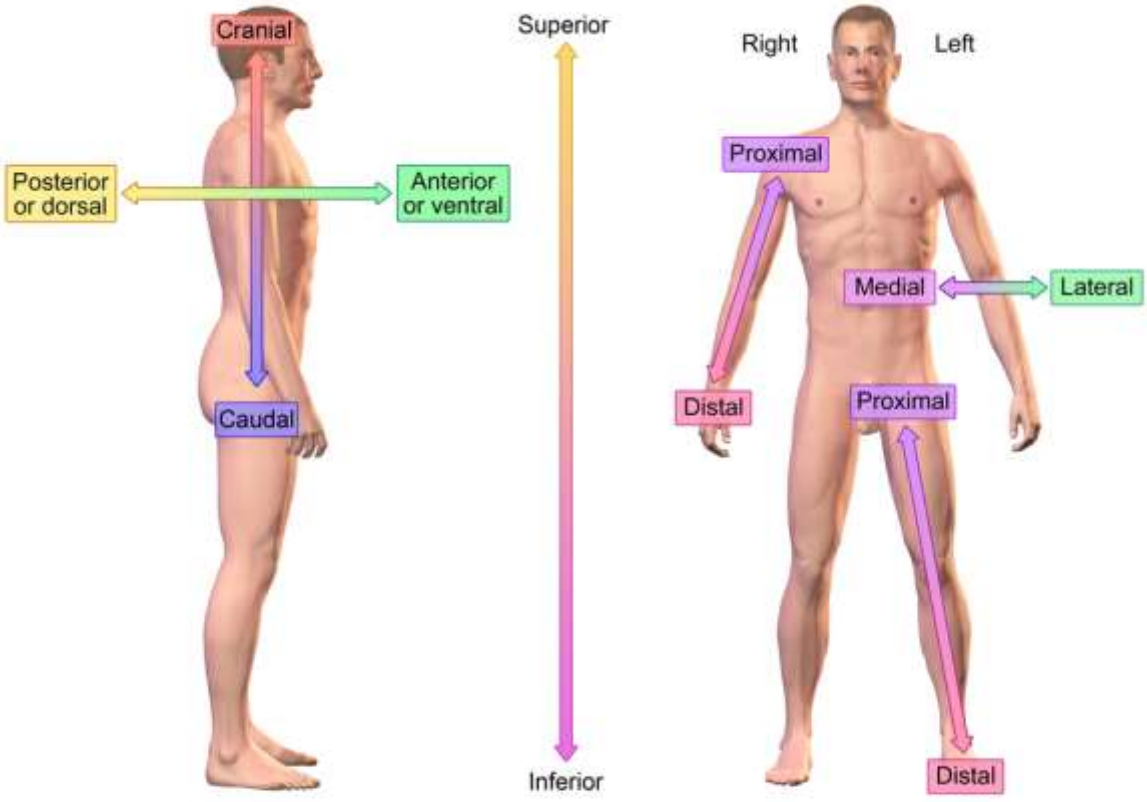
**Posterior or dorsal** - back (example, the shoulder blades are located on the posterior side of the body).

**Medial** - toward the midline of the body (example, the middle toe is located at the medial side of the foot).

**Lateral** - away from the midline of the body (example, the little toe is located at the lateral side of the foot).

**Proximal** - toward or nearest the trunk or the point of origin of a part (example, the proximal end of the femur joins with the pelvic bone).

**Distal** - away from or farthest from the trunk or the point or origin of a part (example, the hand is located at the distal end of the forearm).




**Directional References**

**Reference:** Mittal, P., Gaswami, M. Human Anatomy and Physiology-I, Published by S. Vikas and Company, 2020 page no. 1-7.