

HUMAN ANATOMY AND PHYSIOLOGY- 1

SUBJECT CODE: 101T

UNIT-1

CLASS-1

INTRODUCTION:

ANATOMY: The word anatomy is derived from a Greek word **Anatome** meaning to cut up. Anatomy deals with **Structure of the body (How the body parts organized).**

SUB SPECIALTIES OF ANATOMY:

Embryology: The first eight weeks of development after fertilization of a human egg.

Developmental biology: The complete development of an individual from fertilization to death.

Cell biology: Cellular structure and functions.

Histology: Microscopic structure of tissues.

Gross anatomy: Structures that can be examined without a microscope.

Systemic anatomy: Structure of specific systems of the body such as the nervous or respiratory systems.

Regional anatomy: Specific regions of the body such as the head or chest.

Surface anatomy: Surface markings of the body to understand internal anatomy through visualization and palpation (gentle touch).

Imaging anatomy: Internal body structures that can be visualized with techniques such as x-rays, MRI, CT scans, and other technologies for clinical analysis and medical intervention.

Pathological anatomy: Structural changes (gross to microscopic) associated with disease.

PHYSIOLOGY: Physio means nature, logy means study of physiology deal with **how the body parts work. (Functions & mechanism).**

SUB SPECIALTIES OF PHYSIOLOGY:

Molecular physiology: Functions of individual molecules such as proteins and DNA.

Neurophysiology: Functional properties of nerve cells.

Endocrinology: Hormones (chemical regulators in the blood) and how they control body functions.

Cardiovascular physiology: Functions of the heart and blood vessels.

Immunology: The body's defenses against disease-causing agents.

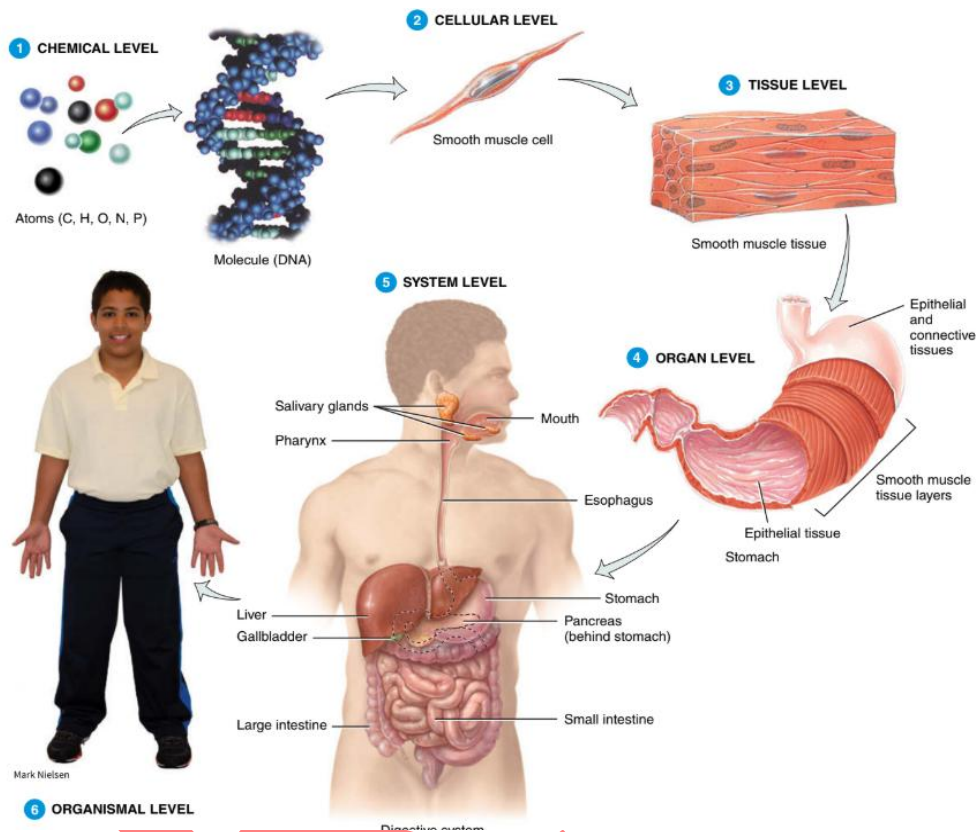
Respiratory physiology: Functions of the air passageways and lungs.

Renal physiology: Functions of the kidneys.

Exercise physiology: Changes in cell and organ functions due to muscular activity.

Pathophysiology: Functional changes associated with disease and aging.

➤ LEVELS OF STRUCTURAL ORGANIZATION AND BODY SYSTEMS:



The levels of structural organization are

- Chemical Level:** This very basic level can be compared to the letters of the alphabet and includes atoms, the smallest units of matter that participate in chemical reactions, and molecules, two or more atoms joined together. Certain atoms, such as carbon (C), hydrogen (H), oxygen (O), nitrogen (N), phosphorus (P), calcium (Ca), and sulfur (S), are essential for maintaining life.

- **Cellular Level:** molecules combine to form cells, the basic structural and functional units of an organism that are composed of chemicals. tissue level sense, cells are the smallest living units in the human body. among the many kinds of cells in your body are muscle cells, nerve cells, and epithelial cells.
- **Tissue Level:** Tissues are groups of cells and the materials surrounding them that work together to perform a particular function, similar to the way words are put together to form sentences. There are just four basic types of tissues in your body: epithelial tissue, connective tissue, muscular tissue, and nervous tissue.
- **Organ level:** At the organ level, different types of tissues are joined together. Similar to the relationship between sentences and paragraphs, organs are structures that are composed of two or more different types of tissues; they have specific functions and usually have recognizable shapes.
- **System Level:** A system consists of related organ with common function.
- **Organismal Level:** It is the highest level of organizational structure, All the parts of the human body functioning together constitute the total organism.

➤ THE ELEVEN SYSTEMS OF THE HUMAN BODY

1. INTEGUMENTARY SYSTEM:

Components: Skin and associated structures, such as hair, fingernails a toenail, sweat glands, and oil glands.

Functions: Protects body; helps regulate body temperature; eliminates some wastes; helps make vitamin D; detects sensations such as touch, pain, warmth, and cold; stores fat and provides insulation.

2. SKELETAL SYSTEM:

Components: Bones and joints of the body and their associated cartilages.

Functions: Supports and protects body, provides surface area for muscle attachments, aids body movements, houses cells that produce blood cells, stores minerals and lipids (fats).

3. MUSCULAR SYSTEM:

Components: Specifically, skeletal muscle tissue muscle usually attached to bones (other muscle tissues include smooth and cardiac).

Functions: Participates in body movements, such as walking, maintains posture, produces heat.

4. NERVOUS SYSTEM:

Components: Brain, spinal cord, nerves, and special sense organs, such as eyes and ears.

Functions: Generates action potentials (nerve impulses) to regulate body activities; detects changes in body's internal and external environments, interprets changes, and responds by causing muscular contractions or glandular secretions.

5. ENDOCRINE SYSTEM:

Components: Hormone-producing glands (pineal gland, hypothalamus, pituitary gland, thymus, thyroid gland, parathyroid glands, adrenal glands, pancreas, ovaries, and testes) and hormone-producing cells in several other organs.

Functions: Regulates body activities by releasing hormones (chemical messengers transported in blood from endocrine gland or tissue to target organ).

6. CARDIOVASCULAR SYSTEM:

Components: Blood, heart, and blood vessels.

Functions: Heart pumps blood through blood vessels; blood carries oxygen and nutrients to cells and carbon dioxide and wastes away from cells and helps regulate acid–base balance, temperature, and water content of body fluids; blood components help defend against disease and repair damaged blood vessels.

7. LYMPHATIC SYSTEM AND IMMUNITY:

Components: Lymphatic fluid and vessels; spleen, thymus, lymph nodes, and tonsils; cells that carry out immune responses (B cells, T cells, and others).

Functions: Returns proteins and fluid to blood; carries lipids from gastrointestinal tract to blood; contains sites of maturation and proliferation of B cells and T cells that protect against disease-causing microbes.

8. RESPIRATORY SYSTEM:

Components: Lungs and air passageways such as the pharynx (throat), larynx (voice box), trachea (windpipe), and bronchial tubes leading into and out of lungs.

Functions: Transfers oxygen from inhaled air to blood and carbon dioxide from blood to exhaled air; helps regulate acid–base balance of body fluids; air flowing out of lungs through vocal cords produces sounds.

9. DIGESTIVE SYSTEM:

Components: Organs of gastrointestinal tract, a long tube that includes the mouth, pharynx (throat), esophagus

(food tube), stomach, small and large intestines, and anus; also includes accessory organs that assist in digestive processes, such as salivary glands, liver, gallbladder, and pancreas.

Functions: Achieves physical and chemical breakdown of food; absorbs nutrients; eliminates solid wastes.

10.URINARY SYSTEM:

Components: Kidneys, ureters, urinary bladder, and urethra.

Functions: Produces, stores, and eliminates urine; eliminates wastes and regulates volume and chemical composition of blood; helps maintain the acid–base balance of body fluids; maintains body's mineral balance; helps regulate production of red blood cells.

11.REPRODUCTIVE SYSTEMS:

Components: Gonads (testes in males and ovaries in females) and associated organs (uterine tubes or fallopian tubes, uterus, vagina, and mammary glands in females and epididymis, ductus or (vas) deferens, seminal vesicles, prostate, and penis in males).

Functions: Gonads produce gametes (sperm or oocytes) that unite to form a new organism; gonads also release hormones that regulate reproduction and other body processes; associated organs transport and store gametes; mammary glands produce milk

Basic Life Processes

The existence of life is mainly based on certain functions and process which are important for a living being to stay healthy and survive and these basic essential activities that are performed by a living being are called Basic **Life Processes**.

They basically include:

1. Metabolism is the sum of all chemical processes that occur in the body.

Catabolism: It is the breakdown of complex chemical substance in to simpler components.

Anabolism: It is the building up of complex chemical substances from smaller, simpler components.

2. Responsiveness is the body's ability to detect and respond to Changes in external or internal environment.

3. Movement includes motion of the whole body, individual organs, single cells, and even tiny structures inside cells.

4. Growth is an increase in body size that results from an increase in the size of existing cells, an increase in the number of cells, or both.

5. Differentiation is the development of a cell from an unspecialized to a specialized state.

6. Reproduction the formation of new cells for tissue growth, repair, or replacement, or the production of a new individual.