An Introduction to the Human Body

Basic Anatomical Terminology

- Body Positions: Part of the human body assume that it is in a standard position of reference called anatomical position.
  - Prone Position: If the body is lying facedown.
  - Supine Position: If the body is lying faceup.
- Regional Names
  - Head
    - Skull
    - Face
  - Neck
  - Trunk
    - Chest
    - Abdomen
    - Pelvis
  - Upper Limb
    - Shoulder
    - Armpit
    - Arm
    - Forearm
    - Wrist
    - Hands
  - Lower Limb
    - Buttock
    - Thigh
    - Leg
    - Ankle
    - Foot
- Directional Terms
  - Superior: Toward the head
  - Inferior: Away from the head
  - Anterior: At the front of the body
  - Posterior: At the back of the body
- Plane and Sections
  - Sagittal or Parasagittal Plane: The plane which does not pass through midline.
  - Frontal or Coronal Plane: Divides the body into anterior and posterior portions.
  - Transvers Plane, Cross sectional or Horizontal Plane: Divides the body into superior and inferior portions.
  - Oblique Plane: Passes through the body at an oblique angle any angle other than 90 degree.
  - Section: Is a cut of the body.
- Body Cavities
  - 1. Cranial Cavity: Formed by cranial bones and contains brain. 2. Thoracic Cavity: Chest cavity; contains pleural and pericardial cavities and the mediastinum. 3. Abdominopelvic Cavity: Subdivided into abdominal and pelvic cavities.

Homeostasis: Is the maintenance of the relatively stable conditions in the internal environment.

- Homeostasis & Body fluids: Important aspect of homeostasis is maintaining the volume of body fluid.
  - Extracellular fluid (ECF) : Outside the body cell. ECF fills the narrow spaces between cells of tissues is known as interstitial fluid.
  - Intracellular fluid (ICF): Within the body cell.
- Homeostatic Imbalances: Is the fluctuation in the ability to maintain equilibrium and a constant environment within the body
- Control of Homeostasis: Homeostasis in the human body is continually being disturbed. Some disturbance come from external environment.
- Feedback System: A feedback system is a cycle of events in which the status of body is monitored. Each monitored variable is known as controlled condition whereas change in the controlled condition is known as stimulus.
  - 3 Basic components
    - Receptor: Monitors changes in controlled conditions & send input to the control center. This pathway is known as Afferent Pathway.
    - Control Center: Control center in the body is brain. Brain sets the point within which the controlled condition should be maintained. Output form the control center occurs in the form of nerve impulses or hormones. This pathway is Efferent Pathway.
    - Effector: Receives output from the control center and produces response.
  - Types of Feedback System
    - Positive feedback system: Tends to strengthen a change in one of the body's controlled conditions.
    - Negative feedback system: Reverses the changes in the controlled condition.

Levels of Structural Organization and Body Systems

- Chemical: It is a very basic level which includes atoms. 2 familiar molecules are found i.e. deoxyribonucleic acid (DNA) and glucose.
- Cellular: Molecules combine to form cells, the basic structural and functional unit of human body.
  - Muscle cells, Epithelial cells & Nerve cells.
- Tissue: Tissues are the group of cells & the material surrounding them work together to perform particular function.
  - Epithelial Tissue, Muscular Tissue, Connective Tissues & Nervous Tissues.
- Organ: At organ level different types of tissue combine together to form an organ. Organs are composed of 2 or more types of tissues which perform specific functions and have recognizable shape.
  - Brain, Bones, Stomach, Heart, Liver, Lungs
- System: A system is composed of related organs with the common function.
  - Integumentary System, Skeletal
  - System, Muscular System, Nervous
  - System, Endocrine System,
  - Cardiovascular System, Lymphatic
  - System & Immunity System,
  - Respiratory System, Digestive
  - System, Urinary System, Reproductive system.
- Organism: An organism is any living individual. All the parts of human body functioning together constitute total organism.

Characteristics of the Living Human Organism

- Responsiveness
- Metabolism
  - Catabolism: Breakdown of complex chemical substances into simple components.
  - Anabolism: Building up complex chemical substance from simpler components.
- Movement
- Growth
- Differentiation
- Reproduction

Anatomy: It is the science of the body structure and relationship among structure. Dissection is the carefully cutting apart of the body structure to study there relationship.

- Branches of Anatomy
  - Embryology
  - Developmental Biology
  - Cell Biology
  - Histology
  - Surface Anatomy
  - Pathological Anatomy

Physiology: It is the science about Body function.

- Branches of Physiology
  - Molecular Physiology
  - Neurophysiology
  - Endocrinology
  - Cardiovascular Physiology
  - Immunology
  - Renal Physiology

Radiography: Radiography is an imaging technique using X-rays, gamma rays, or similar ionozing radiation and non ionizing radiation to view the internal form of a human body.

Magnetic Resonance Imaging (MRI): A method of using a strong magnetic field to produce an image of the inside of a person's body.

Computed Tomography (CT): An X-ray image made using a form of tomography in which a computer controls the motion of the x-ray source & detectors, processes the data & produces the images.

Ultrasound Scanning: A procedure that uses high frequency sound waves to create an image of part of the inside of the body.

Coronary (Cardiac) Computed Tomography Angiography (CCTA) Scan: Is anoninvasive 3D imaging test that identifies plaque and blockages or narrowing of the coronary arteries

Endoscopy: A procedure in which an instrument is introduced into the body to give a view of its internal parts.

Radionuclide Scanning: A procedure that produces pictures of structures insidethe body including areas where there are cancer cells.

Positron Emission Tomography (PET): Is a functional imaging technique that uses radioactive substances known as radiotracers to visualize and mesure the changes in metabolic processes & other physiological activities.

Medical Imaging: Medical Imaging refers to techniques and procedures used to create images of the human body. They allow visualization of internal structures to diagnose structures to diagnose abnormal anatomy and deviations from normal physiology.

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Aging & Homeostasis: Aging produces observable changes in structure and function and increases the vulnerability to stress & disease.