SKELETAL SYSTEM

Bone Tissue :- .continuously growing, remodeling and repairing itself.

- The entire framework of bones and their cartilages with ligaments and tendons constitute the skeletal system.
- The study of bone structures and treatment of bone disorders is called osteology.
- The word skeleton derived from Greek word skeletos means "dried up" body.
- This system is specific in structure and is made up of bone & cartilage along with tendons and ligaments.
- Nearly 18% of body weight composed of bone tissues.

Functions of Bone & skeletal system :-

(1) **Support :-** The skeleton serves as structural framework for the body by supporting soft tissues.

- It provides Attachment points for tendons of most skeletal muscles.

(2) **protection :-**

- protects most Internal organs from Injury.

For e.g :- (1) Cranial bones protect brain Vertebrae ('back bones') protect spinal cord.

(2) Rib cage protects Heart & lungs.

(3) **Assistance in Movement :-**

- Most skeletal Muscles Attach to bones.
  - ↳ When these muscles contract they pull on bones to produce Movement.

- They use bones to move the body parts.

(4) Mineral Homeostasis (storage & release):-

- Bone tissue stores several minerals → especially calcium & phosphorus
  ↓ contribute to the strength of bones.
- stores about 99% of the body calcium.
- on demand, bone releases minerals into blood to maintain Critical Mineral Balance (Homeostasis)
  ↓
  Distribute minerals to other parts of the body.

(5) Blood cell production :-

- In some bones, a connective tissue, called Red bone Marrow produce RBC, WBC, platelets by a process called Hemopoiesis.
  Blood Making
- Red Bone Marrow consists of developing blood cells, adipocytes, fibroblasts and Macrophages within a network of reticular fibers.

(6) Triglyceride storage:-

- Yellow bone Marrow consists of adipose cells which store triglyceride ('Energy' reserve)
- In a New born, all bone marrow is red (involved in Haemo-poiesis)
  ↓
  With increasing age much of bone Marrow change from red to yellow.

STRUCTURE OF BONE

- A typical long bone (Humerus, arm bone) consists of following parts :-

(i) **Diaphysis** :- Bone shaft/body long, cylindrical, main portion of bone.

(ii) **Epiphysis** :- It is proximal & distal ends of bone.

(iii) **Metaphysis** :- It is the region btw diaphysis and epiphysis.

- In growing bone, each metaphysis contain an Epiphyseal (growing) plate (a layer of Hyaline cartilage) that allow diaphysis to grow in length.
- When bone end to grow (age 18-21) cartilage in epiphyseal plate change to bone called Epiphyseal line.

(iv) **Periosteum** :- The periosteum surround the External bone surface. where it is not covered by Articular cartilage.

- It is composed of → an outer fibrous layer of dense Irregular CT.
  ↓
  an inner osteogenic layer consists of cells.
- protect the bone, Assists in fracture repair, Nourish bone & serves as an Attachment point for ligaments and tendons.

(v) **Medullary cavity** :- Medullary cavity / Marrow cavity is a Hollow, cylindrical space within the diaphysis
  ↓
  Contain yellow bone marrow in Adult.

(vi) Endosteum :- It is a thin membrane that lines the internal bone surface.

- It contains single layer of cells & small amount of CT.