

Bone Tissue

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Functions of Bone Tissue

Skeletal structure
Protection of vital organs
Hematopoietic bone marrow
Store of calcium and phosphate and therefore calcium homeostasis.

Remodelling and reorganization is due to:

- Mechanical stimuli
- Metabolic cause (lack of dietary calcium, illness, aging,...)
- Endocrine changes, &
- Effects of drugs

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Macroscopic Structure of Bone

There are two categories of bone

- Spongy bone, &
- Compact Bone

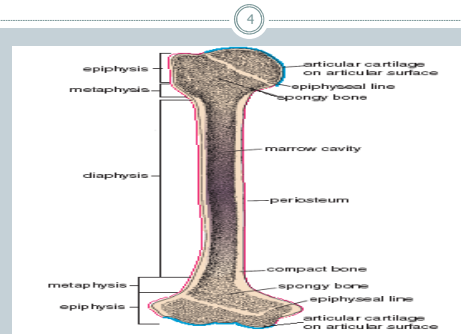
Anatomical Classification of bones is thus:

- Long bones
- Flat bones, &
- Irregular bones

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Structure of a typical bone



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Microscopic Structure of Bone

- The bone matrix has two main components:
 - Organic matrix
 - Type I collagen fibers (about 95%) embedded in an amorphous substance consisting of:
 - Sulfated glycosaminoglycan, &
 - Bone proteins (osteocalcin).
 - Inorganic salts (main calcium deposits in the bone matrix) which are crystals of hydroxyapatite

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Bone cells

- 4 different types of cells are found in the developing bone.

- Osteoprogenitor cells
- Osteoblasts
- Osteocytes, &
- Osteoclasts

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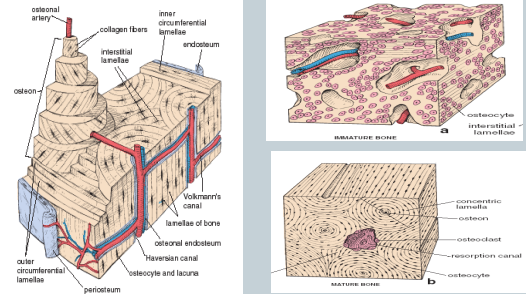
OSTEOGENESIS

- Bone formation
- Primary bone
- Lamellar bone (mature, secondary bone)
 - Osteons (Haversian Systems)
 - Circumferential Systems, &
 - Interstitial Systems

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Osteons (Haversian Systems), Imature and Mature Bone



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Osteogenesis

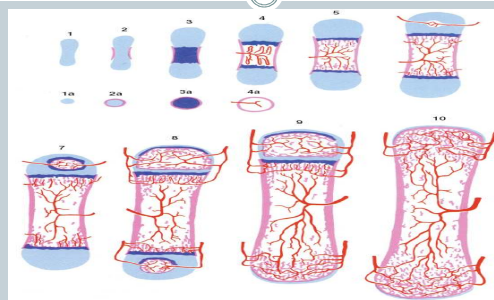
- Bone formation
- Two types exist
 - Intramembranous ossification, &
 - Endochondrial ossification

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Schematic representation of bone development



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Histopathology and Histophysiology of Bone.

- Bone fracture and repair
- Synovial joints
- Physiology of bone
 - Calcium homeostasis through the effects of
 1. Parathyroid hormone
 2. Calcitonin, &
 3. Vitamin D₃

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