



## Bone and bone marrow

Bone is a specialized connective tissue composed of **calcified intercellular material**, the **bone matrix**, and **three cell types**:

- 1- **Osteoclasts** are large cells that dissolve the bone
- 2- **Osteoblasts** are the cells that form new bone
- 3- **Osteocytes** are cells inside the bone

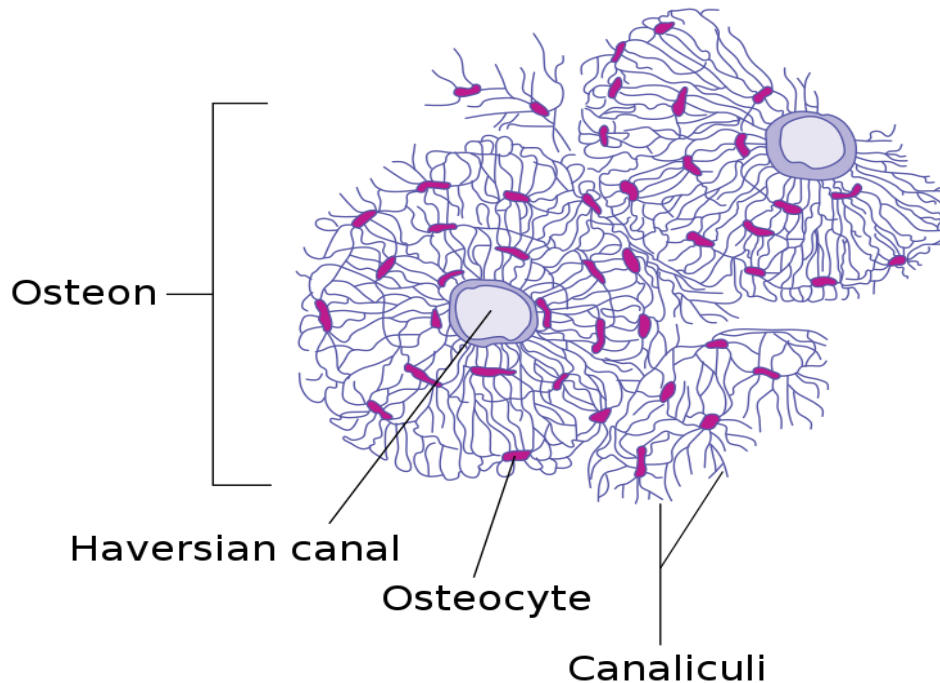
There are two types of bone: -

### 1-Compact bone

The structural unite in compact bone matrix are the **osteons (Haversian system)** .

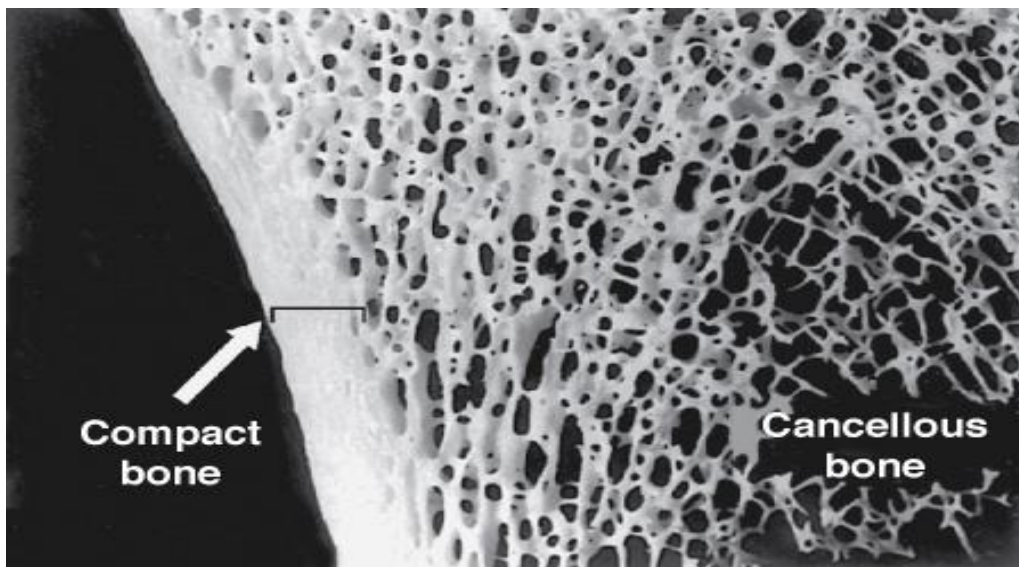
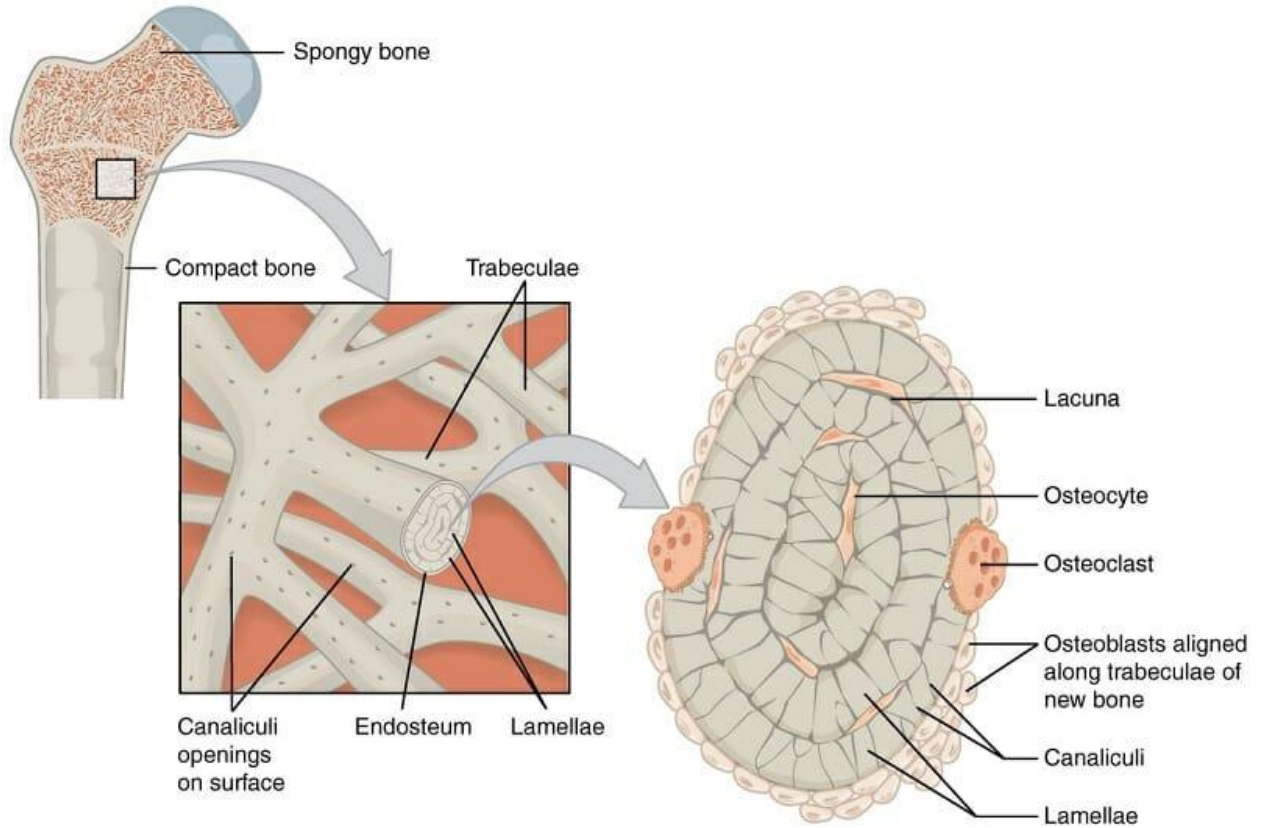
Each Haversian System (unit) has a cylindrical structure that consists of four parts:

- 1- A central tube called a **Haversian Canal**, which contains blood vessels and nerves. The Haversian Canal is surrounded by alternate layers of:
- 2- **Lamellae** are concentric rings of a strong matrix formed from mineral salts including calcium and phosphates and collagen fibers. The mineral salts result in the hardness of the bone structure, while the collagen fibers contribute its strength.
- 3- **Lacunae** are the small spaces between the lamellae in which contain the bone cells (called "osteocytes") are located.
- 4- The lacunae are linked together by minute channels called **canaliculi**. The canaliculi provide routes by which nutrients can reach the osteocytes and waste products can leave them.



## 2-Spongy Bone

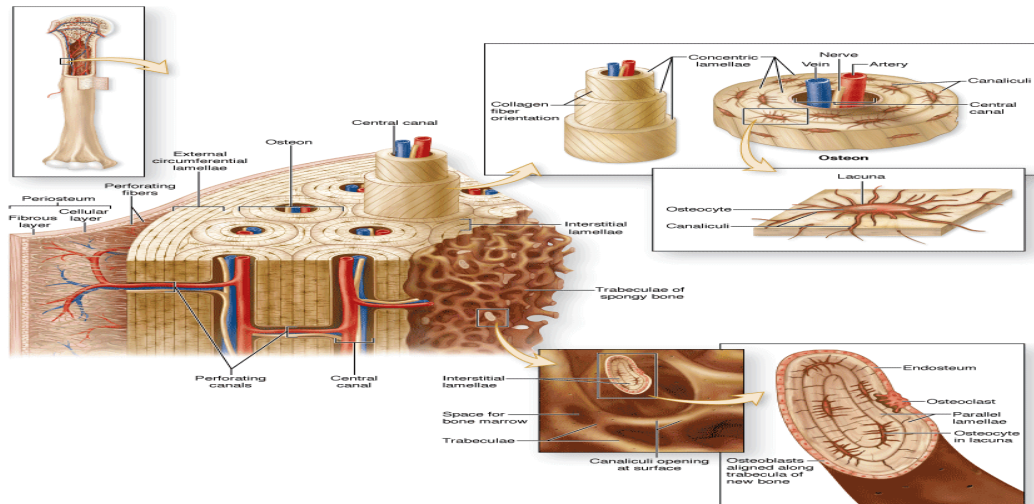
Spongy bone, also known as cancellous bone or trabecular bone, is a very porous type of bone found in the body. It is highly vascularized and contains red bone marrow. Spongy bone is usually located at the ends of the long bones, with the harder [compact bone](#) surrounding it. It is also found inside the vertebrae, in the ribs, in the skull and in the bones of the joints. Spongy bone is softer and weaker than compact bone, but is also more flexible. It is characterized by a lattice-like matrix network called trabeculae that gives it its spongy appearance.



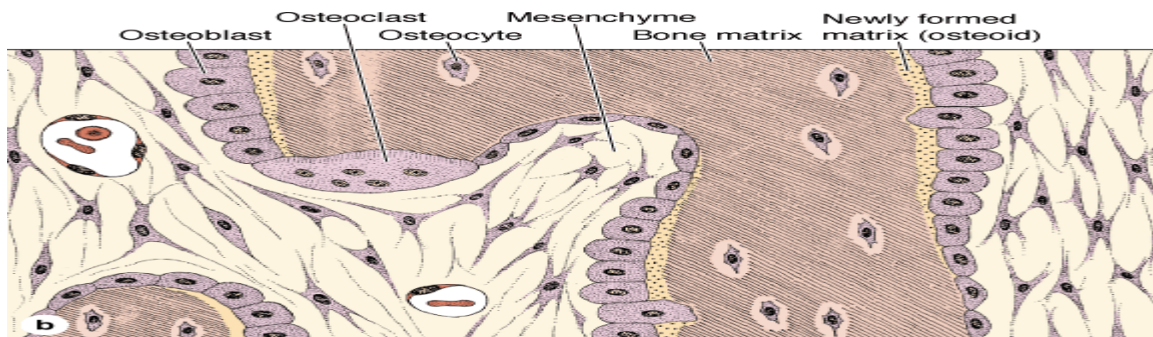
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## Functions of bone

- 1- Bone tissue supports fleshy structures
- 2- Protects vital organs such as those in the cranial and thoracic cavities
- 3- Harbors the bone marrow, where blood cells are formed
- 4- Bone also serves as a reservoir of calcium, phosphate



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