Difference Between Lamellae and Lacunae

www.differencebetween.com

Key Difference – Lamellae vs Lacunae

The skeletal system forms the mechanical framework of the body and provides a shape and structure to the body. The skeletal system is also involved in providing protection to some vital organs such as heart, lung and liver. The skeletal system is composed of bones formed from different types of connective tissue. The bone tissue is classified as compact bone and spongy bone. This classification is dependent on the organization of the bone matrix and cells. The compact bone forms the outer layer of most bones and provides protection and support. The main functional unit of the compact bone is the osteon. The osteon is composed of 4 different components. They are Harvesian canal, Lamellae, Lacunae and canaliculi. **The lamellae are the concentric circles around the Haversian canal; they are a bone matrix formed from calcium, phosphorus salts and fibres. The lacunae are small spaces in the lamellae which provide an area for bone cells or osteocytes.** This is the key difference between lamellae and lacunae.

What are Lamellae?

The lamella of a bone provides the fibrillar matrix of the bone. A lamella is composed of a number of bundles of fibrils. These fibrils are arranged in concentric circles in the same plane around the Haversian canal. Lamellae receive a good supply of blood via the Haversian canal. Lamellae are arranged parallel to each other and have different angles. They are rich in collagen fibres. The fibre density of the lamellae is lower at the borders, and the tissue appears as a lamellar structure under the microscope. The thickness of the lamellae is greatly varied from point to point. Lamellae are arranged into inner circumferential, outer circumferential and interstitial lamellae.

Lamellae can be mainly divided as homogenous lamellae or striated lamellae. These two types of lamellae are observed in the longitudinal and the transverse sections of the bone. The striated lamellae are a result of the passage of little tissue bridges which lie between the homogenous lamellae distributed in the bone matrix.

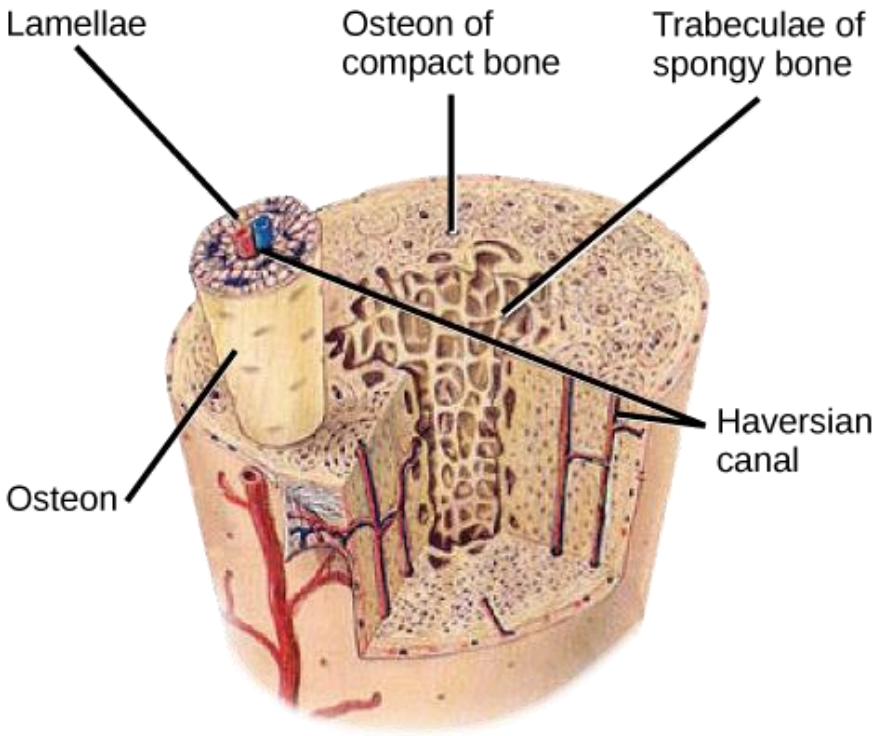

Figure 01: Structure of a Compact Bone

The matrix is primarily composed of fibres and mineral salts. Mineral salts which are in the bone lamellae mainly include salts of calcium and phosphate. These calcium and phosphate salts are used in the bone mineralization process of bone formation. These salts in the matrix help to maintain rigidity and strength of the bone.

What are Lacunae?

Lacunae are small spaces or holes in the lamellae which house osteocytes. Osteocytes are encased in these small lacunae. The cellular, cytoplasmic extensions of osteocytes called canaliculi connect the osteocyte with the bone matrix. These canaliculi facilitate the transfer of substances including nutrients and waste products from osteocytes to the external environment via diffusion. Osteocytes are capable of bone deposition and resorption. Bone remodelling is also initiated by osteocytes. Osteocytes transmit signals from one osteocyte to the other in response to bone deformations. Osteocyte is capable of bone deposition and resorption. It is also involved in bone remodelling by transmitting signals to other osteocytes in response to even slight deformations of bone. Osteocytes also aid in calcium homeostasis.

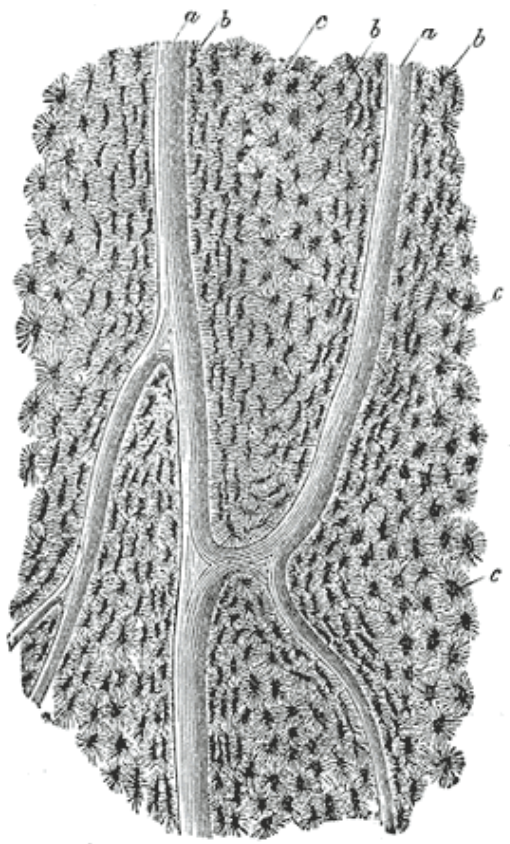

Figure 02: Lacunae

What are the similarities between Lamellae and Lacunae?

- Lamellae and Lacunae form the Haversian system or the osteon in compact bones.
- Both are connected by canaliculi.
- Both are microscopic structures.

What is the difference between Lamellae and Lacunae?

Lamellae vs Lacunae	
Lamalla is the fibrillar matrix of the bone.	Lacunae are small spaces in the lamellae.
Functions	
Lamellae act as the matrix of the compact bone.	Lacunae act as an encase or hollow space for osteocytes or bone cells.

Components	
Components of lamellae are salts of calcium, phosphate and fibres (mainly collagen).	Lacunae are hollow spaces, and canaliculi arise from osteocytes inside the lacunae.
Physiology	
Lamellae are arranged as concentric circles around the Haversian canal.	Lacunae are irregularly spread in the matrix.
Striations	
Striations are present in lamellae.	Striations are absent in lacunae.

Summary – Lamellae vs Lacunae

Bone is a specialized connective tissue and is important in providing support and strength to the inner organs and organ systems. The compact bone is made up of functional units known as Haversian systems or osteons and lacunae, and lamellae are two important ultra-structures present in the osteon. Lamellae are the fibrillar network or matrix of the osteon whereas lacunae bear the bone cells in it. This is the difference between lamellae and lacunae.

References:

1. Birch, De B. "The Constitution and Relations of Bone Lamellæ, Lacunæ, and Canaliculi, and some Effects of Trypsin Digestion on Bone." The Journal of Physiology, U.S. National Library of Medicine, July 1880, Available here. Accessed 11 Sept. 2017.
2. "Bone Tissue." Bone Tissue – Structure and Functions of Human Tissue Types, Available here. Accessed 11 Sept. 2017.
3. Slomianka, Lutz. Blue Histology – Skeletal Tissues – Bone, Available here. Accessed 11 Sept. 2017.

Image Courtesy:

1. "Figure 38 02 04" By CNX OpenStax (CC BY 4.0) via Commons Wikimedia
2. "Gray74" By Henry Vandyke Carter – Henry Gray (1918) Anatomy of the Human Body (See "Book" section below) Bartleby.com: Gray's Anatomy, Plate 74 (Public Domain) via Commons Wikimedia

How to Cite this Article?

APA: Difference Between Lamellae and Lacunae. (2017, September 15). Retrieved (date), from http://differencebetween.com/difference-between-lamellae-and-vs-lacunae/

MLA: "Difference Between Lamellae and Lacunae" *Difference Between.Com*. 15 September 2017. Web.

Chicago: "Difference Between Lamellae and Lacunae." *Difference Between.Com*. http://differencebetween.com/difference-between-lamellae-and-vs-lacunae/accessed (accessed [date]).