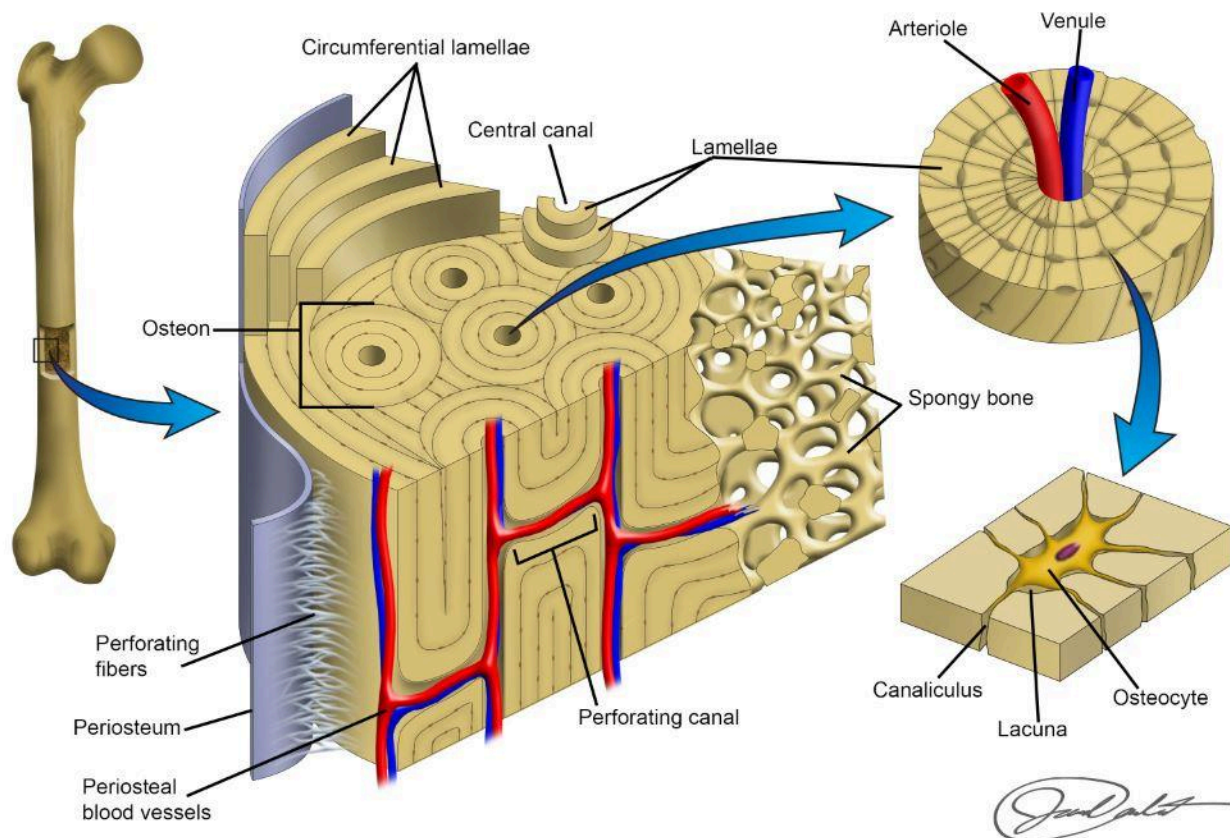


6.1.2

Bone Characteristics

Bone is a type of connective tissue and as such is made up predominantly of an extracellular matrix that is produced by cells. The bulk of the extracellular matrix (65% of the bone weight) is composed of inorganic material, mainly calcium phosphate crystals which surround collagen fibers (35% of the bone weight). The calcium phosphate provides the weight bearing strength to the bone, allowing it to support our body weight, and the collagen fibers provide tensile strength, allowing the bones to bend (to a point) without breaking. This combination of collagen and hydroxyapatite gives bone a relatively hard, but light weight and slightly flexible composite material. An imbalance in the ratio of either one of these materials can result in susceptibility to fractures (a decrease in collagen) or excessive bending (a decrease in hydroxyapatite).

Compact and Spongy Bone



Compact Bone. *BYU-Idaho image, created Winter 2015*

Structurally, there are two types of bone, **compact or cortical bone** and **cancellous or spongy bone**. Compact bone (as shown above) is composed of densely packed **haversian systems (osteons)** whereas cancellous or spongy bone is

composed of a network of bony shafts (**trabeculae**) with spaces between them (see next illustration).

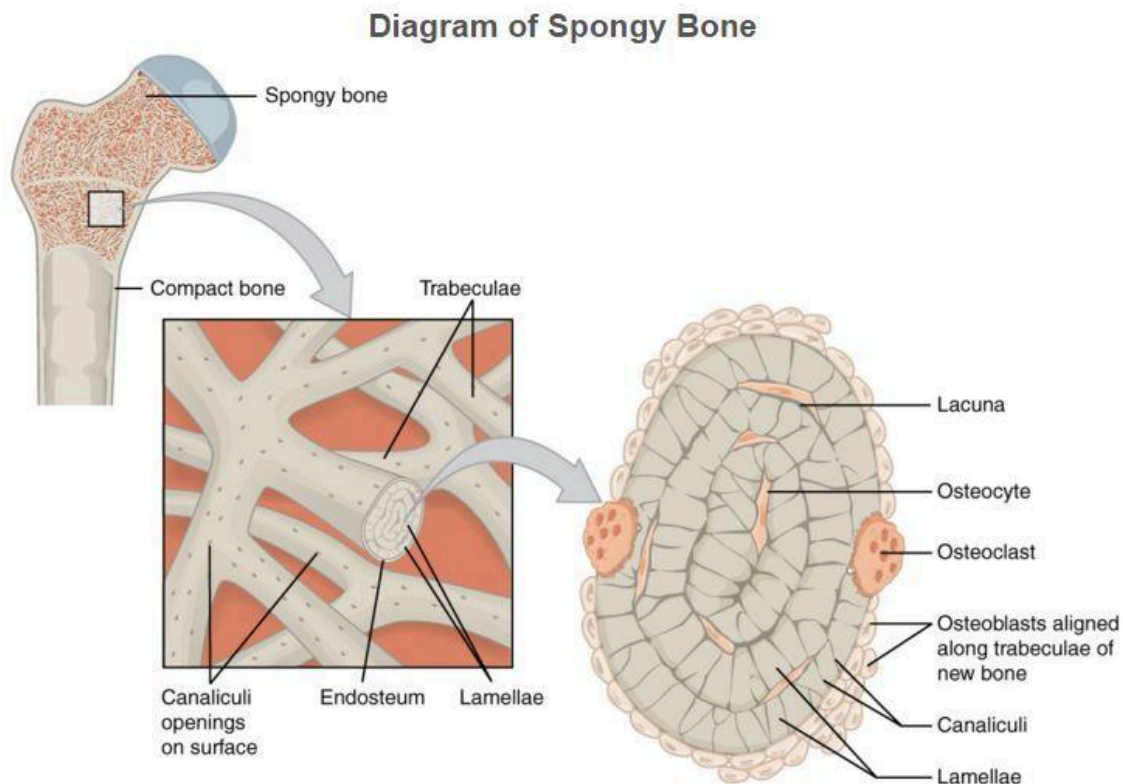


Diagram of Cancellous (Spongy) Bone. Title: Bone Structure; Author: OpenStax; License: Creative Commons Attribution 4.0
License Site: <http://cnx.org/contents/FPtK1zmh@7.25:kwbeYj9S@4/Bone-Structure>

The distribution of these two types of bone varies considerably among the different types of bone, however, the outer surface of all bones is compact bone and the innermost layer of all bones is cancellous bone. We will discuss the distribution of compact vs cancellous bone in different types of bone later.

Check out the following video on bone biology:

- [Introduction to Bone Biology: https://youtu.be/inqWoakkiTc](https://youtu.be/inqWoakkiTc)
- (Transcript).



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