

Microscopic Anatomy of Bone

1. List and describe the 4 stages of bone healing.
2. Define:
 - Lamina
 - Canaliculi
 - perforating canal
 - central canal
 - osteon
3. How do the individual osteocytes receive nourishment and get rid of waste products?
4. What kinds of things enter the bone marrow via arteries?
5. What kinds of things exit the bone marrow via veins?

Answers:

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1. List and describe the 4 stages of bone healing.
 - **Hematoma forms**
 - **The periosteum builds a cartilage/bone splint. The periosteum contains chondroblasts and osteoblasts. The chondroblasts produce temporary cartilage and the osteoblasts produce “woven bone”. It looks disorganized, but is quick to make.**
 - **Trabecular/spongy bone replaces the woven bone.**
 - **Lamellar/compact bone replaces the trabecular bone (this final step may take several years)**
2. Define:
 - **lamina: circular sheets of bone matrix**
 - **canaliculi: tunnels connecting osteocytes between lamina and providing nourishment to all the osteocytes in an osteon**
 - **perforating canal: larger cross-sectional tunnel that pierces the entire width of the compact bone to reach the bone marrow and allow blood to reach bone marrow.**
 - **central canal: longitudinal tunnel coming off of perforating canals that pierces the length of the bone to reach the osteon and provide blood supply to each osteon**
 - **osteon: Functional unit of compact bone, consisting of a central canal surrounded by layers of lamina.**
3. How do the individual osteocytes receive nourishment and get rid of waste products?

Blood is delivered to the bone in arteries; a large artery passes through each perforating canal. Smaller blood vessels branch off at each osteon by entering a central canal. Blood eventually reaches each osteocyte by passing through the canaliculi that cut through the lamina. Waste products then return the opposite way—through canaliculi, and then they enter veins that go down the central canal, and join up with a larger vein in the perforating canal and then exit the bone, eventually returning the blood to the heart via large veins.
4. What kinds of things enter the bone marrow via arteries?

nutrients, hormones such as Erythropoietin, vitamin B12, iron, etc.
5. What kinds of things exit the bone marrow via veins?

waste products, newly formed blood cells