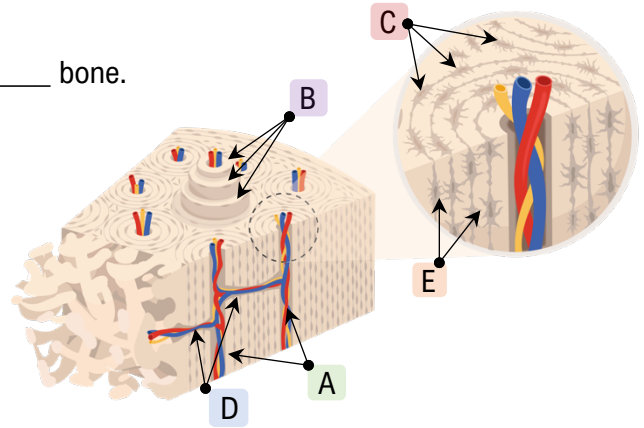


TOPIC: MICROSCOPIC ANATOMY OF BONES: THE OSTEON

- **Osteon:** (*Haversian System*) structural unit of _____ bone.
- Osteon is comprised of:
 - A. Central Canal:** contains blood vessels and nerves.
 - B. Lamellae:** concentric _____ of matrix.
 - C. Lacunae:** chambers that contain _____

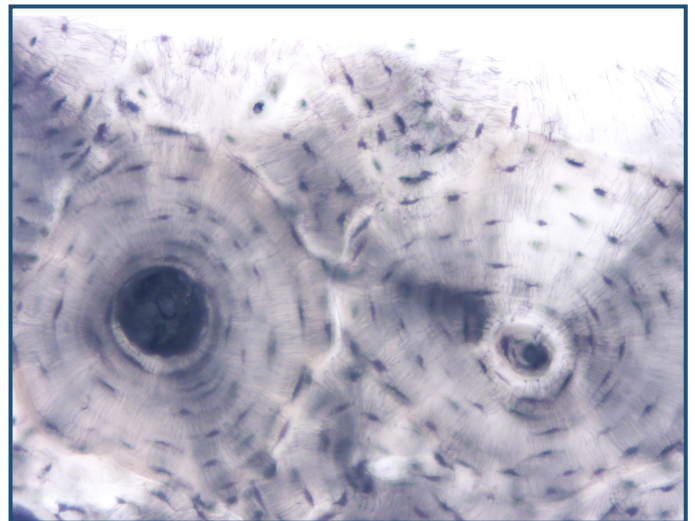


- Canals and Canaliculi:

| Type | Position | Function | Size |
|-------------------------------|---|--|-------|
| Central Canals (A) | Center of osteon; Parallel to _____ of the bone. | Supply blood and house nerve fibers. | Large |
| Perforating Canals (D) | Perpendicular to _____ canals. | _____ the central canal to other blood vessels and nerves. | Large |
| Canaliculi (E) | _____ directions. | Communication and transport between osteocytes. | _____ |

EXAMPLE: Label the following image as instructed below.

- Circle one **osteon**.
- Draw arrows pointing to at least 3 **lacunae**.
- Draw dotted lines along 2 **lamellae**.
- Draw a star on the **central canal**.



TOPIC: MICROSCOPIC ANATOMY OF BONES: THE OSTEON

PRACTICE: Choose the words that best complete the follow statement: The structural unit of compact bone is the _____ which is comprised of concentric _____.

- | | |
|---------------------|---------------------|
| a) Lacuna: Osteons | c) Lamella: Lacunae |
| b) Osteon: Lamellae | d) Osteon: Lacunae |

PRACTICE: What would be one possible result if bone developed without canaliculi?

- a) Bones would lose their strength; they would remain rigid, but would become brittle.
- b) Blood vessels could not pass through the bone, meaning bone cells would not receive nutrients.
- c) Bone could not be remodeled as osteoblasts and osteoclasts could no longer travel through the bone tissue.
- d) Osteocytes could not receive nutrients or send signals as they would not be in contact with other cells.

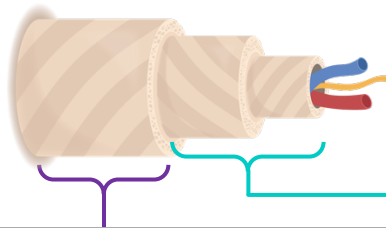
PRACTICE: Which statement about central canals and perforating canals is correct?

- a) The central canal runs through the center of the osteon, while perforating canals allow nutrients to diffuse from the central canal to the osteocytes in lacunae.
- b) Because the blood vessels in central canals all run parallel, perforating canals are necessary to connect them.
- c) Perforating canals carry the nerve supply for the bone, while central canals carry the blood supply.
- d) Perforating canals run parallel to the osteon, while the central canals connect perforating canals to the medullary cavity in the center of the bone.

TOPIC: MICROSCOPIC ANATOMY OF BONES: THE OSTEON

Structure of Lamellae

- *Recall:* collagen gives bone strength, while hydroxyapatite crystals give bone its hardness.
- Arrangement of lamellae gives bones _____ in multiple directions.



| | Within Lamella | Between Adjacent Lamellae |
|-----------------------|------------------|---------------------------|
| Direction of Collagen | _____ direction. | _____ direction. |
| Effect | _____ strength. | Resist the _____. |

PRACTICE: Collagen fibers run in alternate directions between lamellae. What would the effect on bone be if all of the collagen fibers were oriented in the same direction?

- The bone would lose its hardness and would bend easily.
- The bone would break more easily if stress were applied from a different direction.
- The structure of the osteon could not form; lamellae arise naturally from the alternating directions of collagen.
- The periosteum could not attach properly as the perforating fibers rely on the alternating pattern of collagen.