Structure and Classification of Bone
Laboratory Exercise 11

Background

A bone represents an organ of the skeletal system. As such, it is composed of a variety of tissues including bone tissue, cartilage, dense connective tissue, blood, and nervous tissue. Although various bones of the skeleton vary greatly in size and shape, they have much in common structurally and functionally.

Materials Needed

- Textbook
- Compound light microscope
- Dissecting microscope
- Prepared slide of compact bone
- Models of long, short, flat, sesamoid, and irregular bones
- Fresh animal bones sectioned longitudinally and transversely

Purpose of the Exercise

Review the way bones are classified and examine the structure of a long bone.

Procedure

1. Examine the microscopic structure of bone tissue by observing a prepared microscope slide of compact bone. Identify the following features: osteon, central (osteonic) canal, lamella, osteocyte in lacunae, canaliculus.
2. Label figure 11.1.
3. Observe the models of bone and identify the long, short, flat, irregular, and sesamoid bones.
4. Label figure 11.2.
5. Complete Part A.
6. Examine the sectioned long bones and locate the following: epiphysis (proximal and distal), epiphyseal plate, articular cartilage, diaphysis, periosteum, compact bone, spongy bone, medullary cavity, endosteum, yellow marrow, red marrow.
7. Use the dissecting microscope to observe the compact bone and spongy bone of the sectioned specimens. Also examine the marrow in the medullary cavity and the spaces within the spongy bone of the fresh specimens.
8. Complete Part B.
Figure 11.1 Label the features associated with the microscopic structure of bone.

Figure 11.2 Label the major structures of this long bone (femur).
**Part A**

Complete the following statements. (*Note: Questions 1-6 pertain to bone classification by shape.*)

1. A bone that is platelike is classified as a (an) _______________ bone.
2. The bones of the wrist are examples of _______________ bones.
3. The bone of the thigh is an example of a (an) _______________ bone.
4. Vertebrae are examples of _______________ bones.
5. The patella (kneecap) is an example of a large _______________ bone.
6. The bones of the skull that form a protective covering of the brain are examples of _______________ bones.
7. Distinguish between the epiphysis and the diaphysis of a long bone.
8. Describe where cartilage is found on the surface of a long bone.
9. Describe where dense connective tissue is found on the surface of a long bone.
10. Distinguish between the periosteum and the endosteum.

**Part B**

1. What differences do you notice between the structure of compact bone and spongy bone?
2. How are these structural differences related to the locations and functions of these two types of bone?

3. From your observations, how does the marrow in the medullary cavity compare with the marrow in the spaces of the spongy bone?

**Critical Thinking Application**

Explain how bone cells embedded in a solid ground substance obtain nutrients and eliminate wastes.