

Course: Human Anatomy and Physiology (260753)  
**Introduction to Anatomy and Physiology ©2014**

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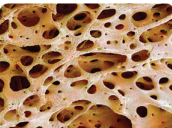
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**Memory Tip**  
The word *cortical* (coming from *cortex*) pertains to the outer layer of something. For example, the outer layer of the brain is known as the *cerebral cortex*. The outer layer of many structures and objects, including a plant stem or even a rock, is also known as its *cortex*. The type of bone tissue forming the outer layer of bone is therefore called *cortical* bone.

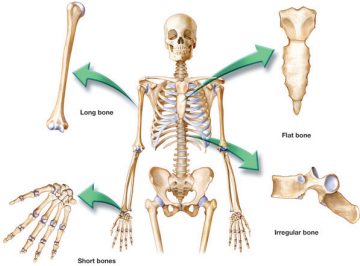
**Shape Categories of Bones**  
Because of the large variety of sizes and shapes of the bones in the human skeleton, for purposes of discussion bones are traditionally divided into four categories (Figure 4.3):

1. **Long bones** have a long, somewhat round shaft made of cortical bone, with bulbous knobs of trabecular bone encased in cortical bone at both ends. The shafts enclose the central hollow medullary cavity or canal. The major bones of the arms and legs are long bones.
2. **Short bones** are shaped like a cube and are composed mainly of trabecular bone. The bones of the wrists and ankles are short bones.
3. **Flat bones** are thin, relatively large in surface area, and generally curved to some extent. Structurally, they consist of two thin layers of cortical bone with a layer of trabecular bone in between. These bones function to protect underlying organs and also provide

**Figure 4.2 Properties of the Two Types of Bone Tissue**

	Cortical Bone	Trabecular Bone
<b>Structure</b>	dense	porous (honeycomb structure)
<b>Mineral content</b>	relatively high	relatively low
<b>Strength</b>	relatively high	low
<b>Flexibility</b>	low	relatively more
<b>Shock-absorbing ability</b>	low	relatively more
<b>Primary locations</b>	outer surfaces of all bones, long bones of limbs	interior of vertebrae, femoral neck, wrist, and ankle bones

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**Figure 4.3** The four shape categories of bones.

**Anatomical Structure of Long Bones**  
The **diaphysis** (digh-AF-i-sis) of a long bone is the hollow shaft of the bone composed of cortical bone (Figure 4.4 on the next page). A fibrous connective tissue membrane called the **periosteum** (PER-ee-AHS-tee-um) surrounds and protects the diaphysis. The periosteum contains blood and lymph vessels, as well as nerves. It is involved in bone growth, repair, and nutrition. The hollow center of the diaphysis, as discussed, is the medullary canal, or cavity. Beginning when a person is about five years old, this cavity is filled with yellow bone marrow, which has a rich supply of blood vessels and is a storehouse for fat. The medullary cavity is lined by a membrane known as the **endosteum** (en-AHS-tee-um).

**Check Your Understanding**

1. What percentage of bone weight comes from its mineral content?
2. What is collagen?
3. Where is cortical bone typically found?
4. Where is trabecular bone typically found?
5. List the four shape categories of bone.

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