Anatomy of The Long Bone

(Text Pg 12)

Bones consists of non-living materials as well as living cells:

A) Non-Living Materials

Component	Function
Calcium carbonate ($CaCO_3$)	adds stiffness & resists compression
Calcium phosphate (Ca_3PO_4)	adds stiffness & resists compression
Collagen	adds flexibility & resists tension

B) 3 Types of Living Cells

1. Osteoblasts:
- a. Bone forming/reconstructing cells
- b. Deposits osteoid (un-calcified bone matrix) into the bone matrix to build up cortical bone

2 Osteocytes:
- a. Mature bone cells

3. Osteoclasts:
- a. Cells that break down and reabsorb bone
- b. Secrete acids and enzymes to dissolve calcium and organic matrix of the bone.

Homeostasis of Bone Cell Activity:

• The activity of osteoblasts and osteoclasts are interconnected (i.e. the activity of one is influenced by the other)
• These cells must be is a state of **HOMEOSTASIS** in order to maintain proper bone formation and remodeling!!!

Anatomy of the Long Bone:

Periosteum

- A fibrous, cellular, vascular and highly sensitive life support sheath covering the length of the bone (not ends).
- Allows for ligaments and tendons to attach to the bone.

Diaphysis

- The shaft or central part of a long bone.

Medullary Cavity

- The cavity of the diaphysis that contains red and yellow marrow.

Epiphysis

- The ends of the long bone.
- Outer surface made up of cancellous bone.
- Articulates (i.e. makes contact) with adjacent bones.

Articular Cartilage

- Covers the end (Epiphysis) of the long bone.
- Smooth, slippery, porous, malleable, insensitive, and bloodless surface that makes contact with adjacent bones.

Nutrient Artery

- The principal artery and major supplier of oxygen and nutrients to the shaft of a bone.

2 Types of Bone

1. Cancellous (Spongy) Bone

- Consists of interwoven beams (trabeculae) of bone
- The spaces are filled with marrow.

2. Compact (Cortical) Bone

- Dense bone that forms in the walls of the diaphysis.
- Provides structural integrity

2 Types of Bone Marrow

1. Red Marrow

- A gelatinous substance where blood cell formation occurs (red and white).

2. Yellow Marrow

- Fatty connective tissue that no longer produces blood cells (with age red marrow becomes yellow).