

C1/30/15

BONE I

I. INTRODUCTION

- A. Osteology: - the study of bones
- B. Bones are organs (two or more tissue types in each bone)
- C. Adult skeleton: 206 bones
 - 1. Skeleton subdivided into:
 - a. Axial skeleton –bones of the head, neck and trunk
 - b. Appendicular skeleton – bones of upper and lower extremities

II. GROSS ANATOMY OF BONES

- A. Bone Shape
 - 1. Long Bones
 - a. longer than they are wide (fibula, tibia, phalanges, femur, etc)
 - 2. Short Bones
 - a. approx. as long as they are wide (carpel bones, tarsal bones, etc)
 - 3. Flat Bones
 - a. relatively thin, have broad surface (sternum, etc)
 - 4. Irregular Bones
 - a. have irregular and varied shapes
- B. Gross Anatomy of a Long Bone
 - 1. Diaphysis - cylindrical shaft (ex:dumbbell—thin shaft diaphysis)
 - 2. Medullary Cavity - hollow inside of diaphysis

- a. lined with **endosteum**
 - b. contains **yellow bone marrow** (adipose)
3. Epiphysis (plural: epiphyses) - ends of the bone
- a. outside layer of compact bone surrounding spongy bone
 - b. in the spaces of the spongy bone = **red bone marrow (hemopoietic tissue)**-for blood cell production
4. Articular Cartilage - hyaline cartilage on the epiphyses
- a. helps joints move easily
5. Epiphyseal Plate - hyaline cartilage plate between diaphysis and epiphysis
- a. Function: lengthwise bone growth
6. Periosteum - dense irregular connective tissue that covers outside of bone
- a. **exception:** periosteum not found on articular surfaces of bone
 - b. Sharpey's fibers (perforating fibers)
 - c. there are cells (osteoblasts) associate with the periosteum which are responsible for bone width growth

III. BONE HISTOLOGY

- A. 3 kinds of cells:
 - 1. Osteoblasts: create bone
 - 2. Osteocytes: maintain bone matrix (osteoblast that surrounds itself with bone)
 - 3. Osteoclasts: break down/reabsorb bone
- B. Compact bone: Made up of osteons = Haversian Systems
 - 1. Osteons (Haversian Systems) consist of:

a. Central Canal (Haversian Canal): opening that runs parallel to length of diaphysis; contains blood vessels/nerves

b. Concentric Lamellae: rings of bone matrix around a central canal (3 concentric rings)

2. Lamellae:

3. Osteocytes: mature bone cells

4. Lacunae: spaces where osteocytes reside

5. Canaliculi: tiny channels that radiate from lacunae. Contain cytoplasmic projections of osteocytes for diffusion of nutrients

6. Perforating (Volkmann's) Canals: canals that run perpendicular to the central canals (long axis); connect central canals (**have artery vein nerves in Volkmann canals**)

7. Interstitial Lamellae (Interstitial Systems): incomplete remnants of osteons

8. Circumferential Lamellae: rings of bone that run the entire circumference of the shaft; made by cells (osteoblasts) of periosteum.

All of the following are part of a Haversian (osteon) system **EXCEPT**:

- a. Lamellae
- b. Canaliculi
- c. Haversian canal
- d. Lacunae
- e. Periosteum****