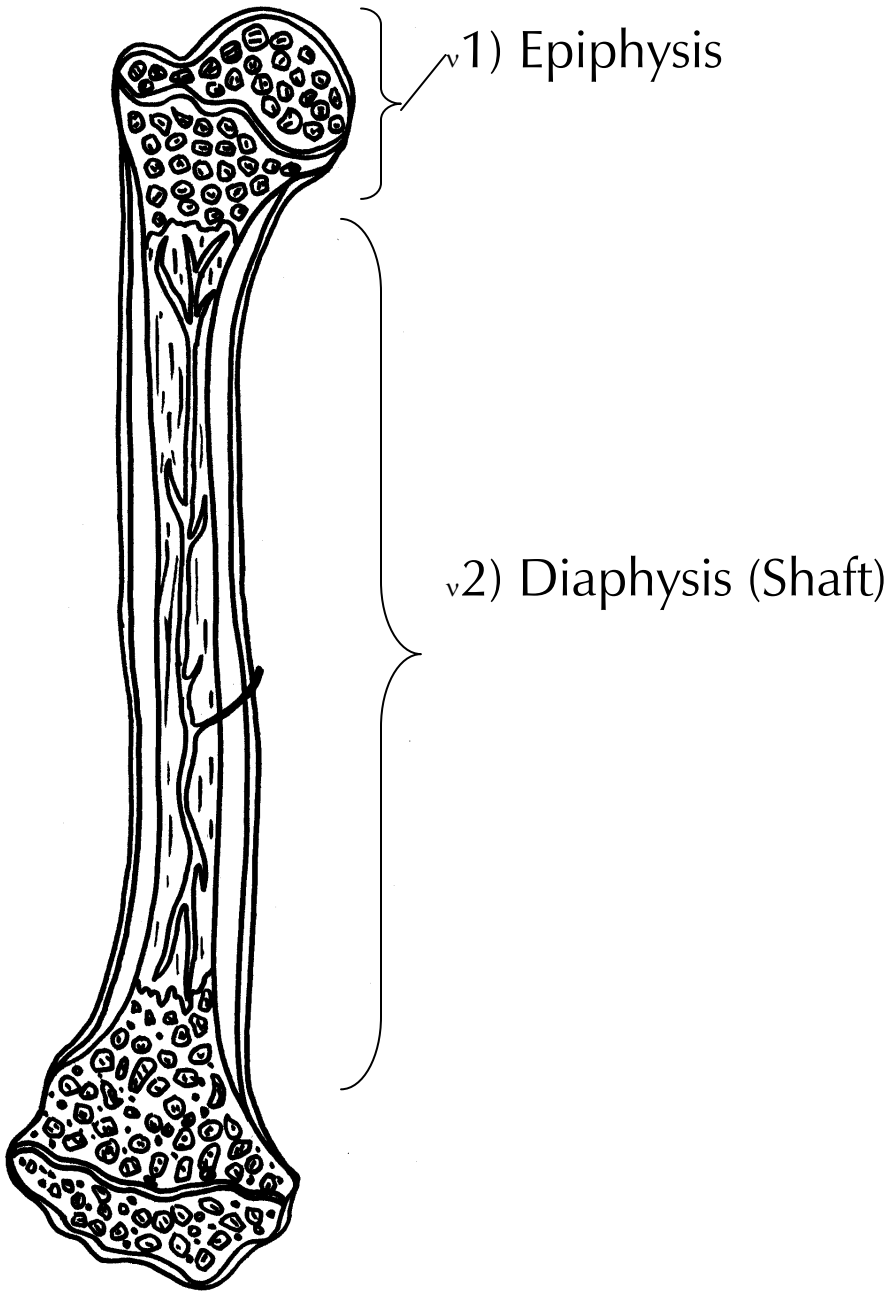
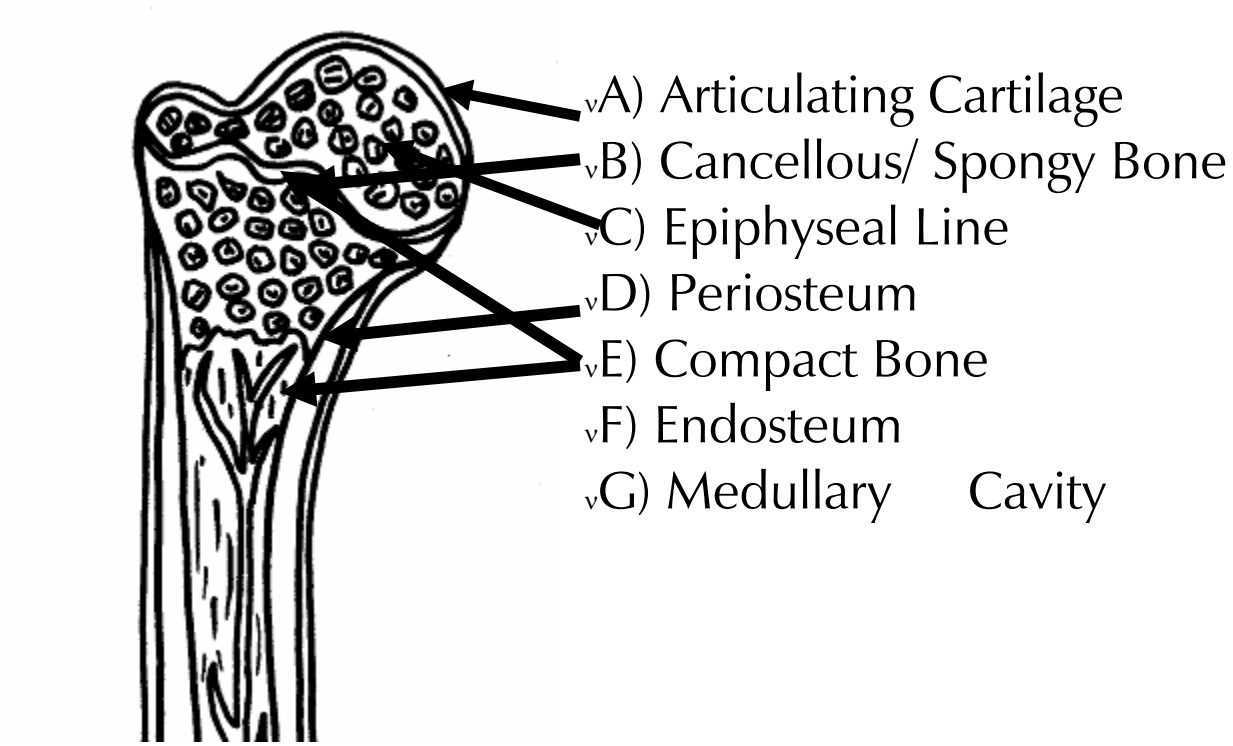
5:2a Gross/Macroscopic Anatomy of Long Bones



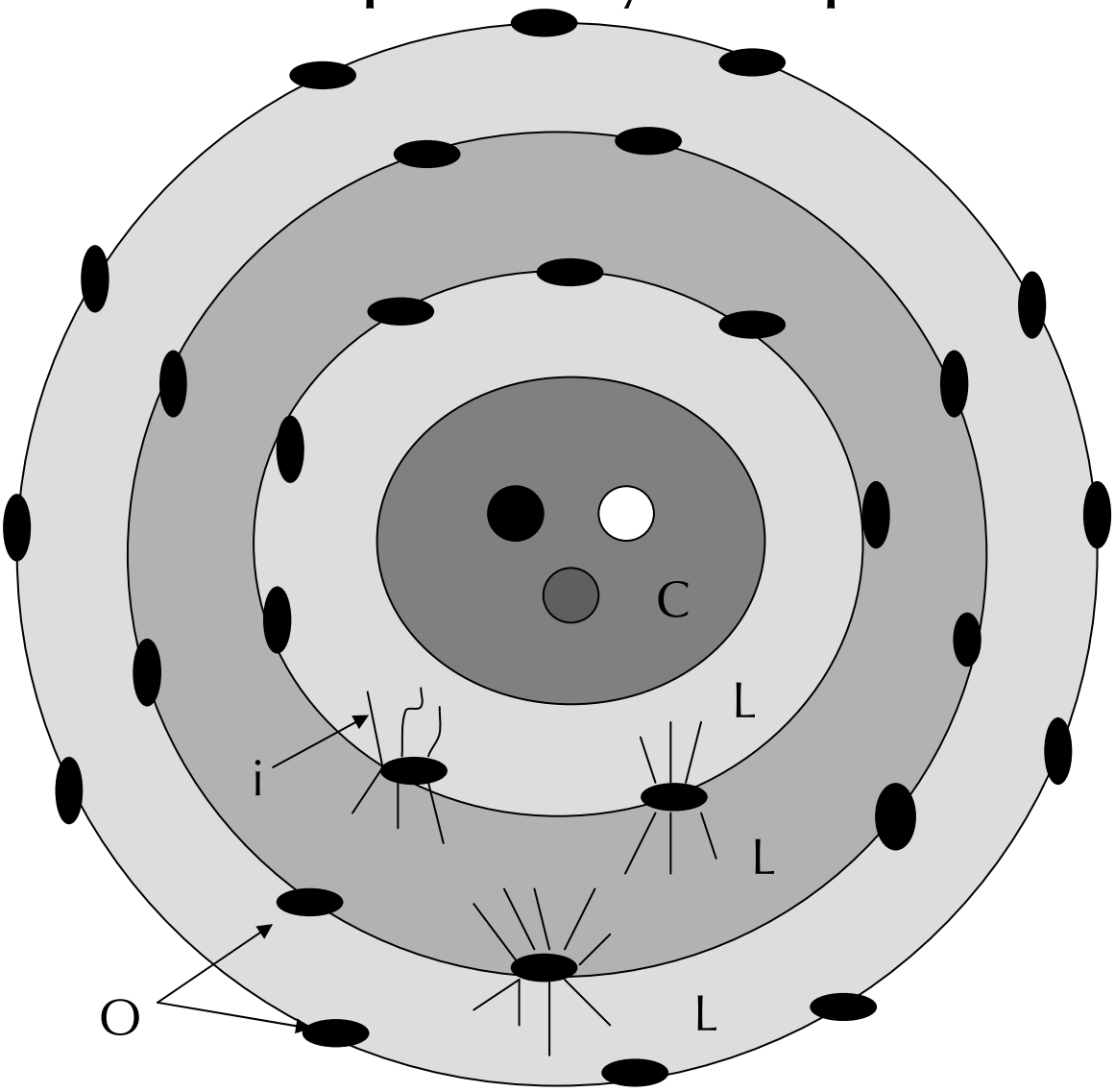
5:2b Gross/Macroscopic Anatomy of Long Bones

Epiphyseal Structures:



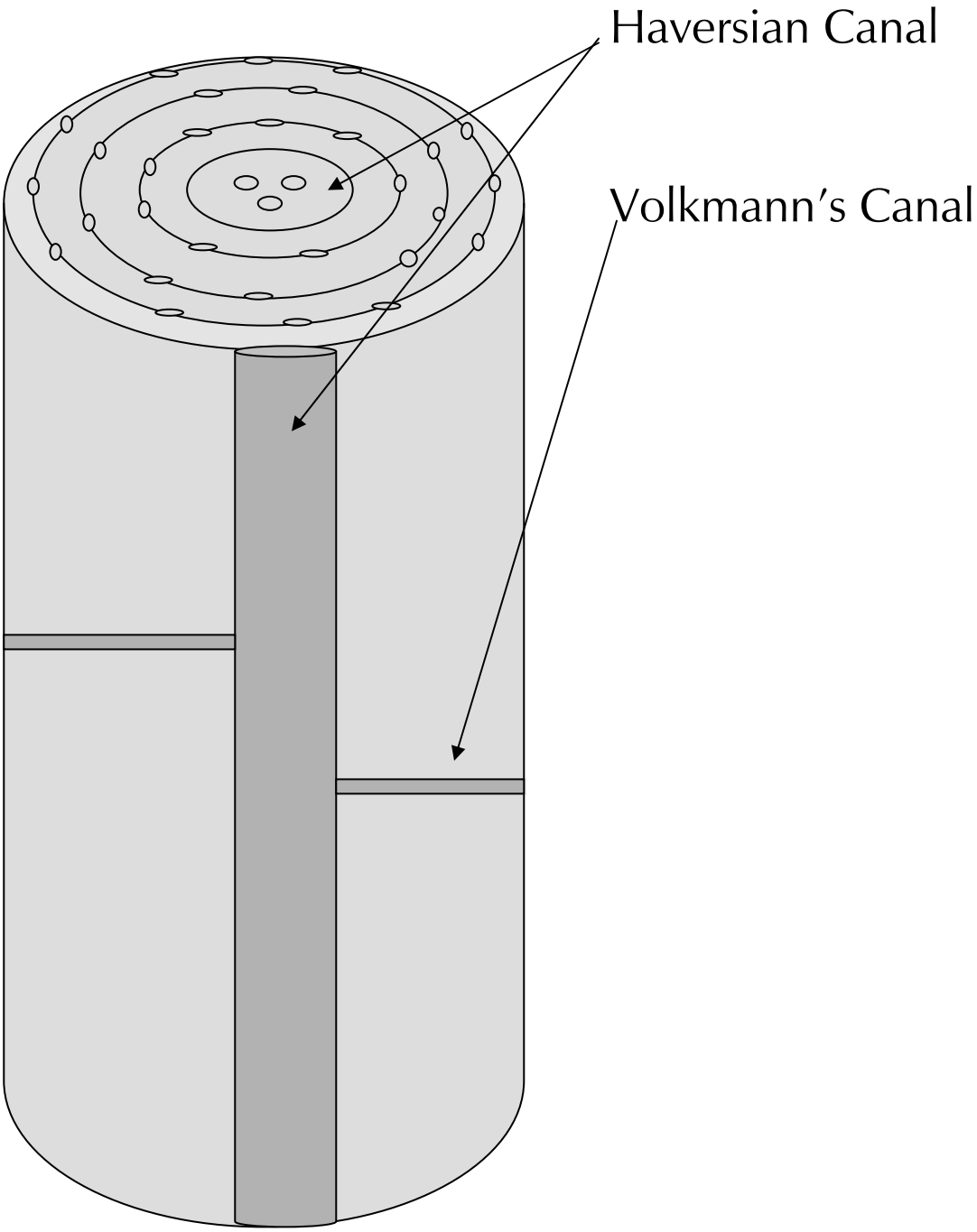
5:2c Gross/Macroscopic Anatomy of Long Bones

Microscopic Anatomy of Compact Bone



Osteon (Haversian System) – Entire Image Above
Concentric Lamellae = L
Haversian Canal = C
Lacuna = Not Visible (Depression w/in L)
Osteocyte = O
Canaliculi = i

5:2d Gross/Macroscopic Anatomy of Long Bones



5:2e Gross/Macroscopic Anatomy of Long Bones

Chemical Composition of Bone:

"Nerves of Steel?"
The cliché' should be "Bones of Steel."
Due to its chemical composition – bone can resist half the compression of steel and as much tension!
Bone consists of two elements:

- organic
- inorganic

The organic elements include all of the "bone cells" identified in the histology unit:

- Osteoblasts
- Osteocytes
- Osteoclasts
- Organic portion of the matrix called osteoid.

What is Osteoid?

1/3 of the matrix is secreted by the osteoblasts and consists of collagen fibers and ground substance.
The organic portion of the matrix helps keep bones flexible and gives it its tensile strength.

5:2f Gross/Macroscopic Anatomy of Long Bones

Chemical Composition of Bone:

The Inorganic Portion of the Matrix

The remaining 65% of bone mass is made up of mineral salts, called hydroxyapatites.

They form sizeable crystals that pack together and give bone its hardness.

Bone Markings

Bone markings are specific sites on bones that serve specific functions.

Markings can be classified into one of three categories:

- Projections that allow for attachment of muscle and ligament
- Projections that form joints
- Openings or depressions that allow for passageway of blood vessels and nerves

5:2g Gross/Macroscopic Anatomy of Long Bones

Common Bone Markings that Serve as Muscle Attachment

- Crest
- Epicondyle
- Line
- Process
- Spine
- Trochanter
- Tubercle
- Tuberosity

Common Bone Markings that Serve to Form Joints

- Condyle
- Facet
- Head
- Ramus

Common Bone Markings that Allow Passage Way

- Fissure
- Foramen
- Fossa
- Groove
- Meatus
- Sinus

5:2h Gross/Macroscopic Anatomy of Long Bones

Ossification

- Ossification is the conversion of fibrous structures or cartilage into osseous tissue.
- Occurs in embryonic development to produce our skeleton.
- Allows for growth and occurs throughout infancy, childhood, and into early adulthood.
- Remodeling of osseous tissue is the main purpose of ossification in adults.
- Fibrous membranes and cartilage bony "models" form our very first embryonic skeleton.
- At approximately 8 weeks, these structures begin to convert into bone tissue.
- Bones forming from fibrous membranes are often referred to as membrane bones and the process is called Intramembraneous ossification.
- Bones forming from cartilage models are often called cartilage bones and the process is referred to as endochondral ossification.
- Bones developing from intramembraneous ossification include bones of the skull and our clavicles – note: they are all flat bones.
- Essentially, all other bones in the body develop from endochondral ossification.

5:2i Gross/Macroscopic Anatomy of Long Bones

- A majority of the long bones are ossified at birth, except for the epiphyses.
- After birth, growth occurs at the epiphyseal plate.
- In children, bone formation predominates resorption.
- Bone formation and resorption are balanced in early adulthood.
- As we age, resorption occurs faster than bone formation.