**Types of Bones**

* **Long bones:** longer than wide  
  🡪 consist of a shaft and a variable number of ends/epiphyses  
  🡪 made mostly of compact bone in their diaphyses but have spongy bone in their epiphyses   
  ex. femur, tibia, fibula, humerus
* **Short bones:** somewhat cubed shaped; nearly equal in length and width   
  🡪 consist of spongy bone except at the surface, which has a thin layer of compact bone   
  ex. carpal and tarsal bones
* **Flat bones:** generally thin and composed of two nearly parallel plates of compact bone tissue enclosing a layer of spongy bone tissue  
  🡪 provide extensive area for muscle attachment and protection  
  ex. cranial bones, sternum, ribs, scapulae
* **Irregular bones:** have complex shapes and cannot be grouped into any other category   
  ex. vertebrae, hip bones, certain facial bones, calcaneus
* **Sesamoid bones:** (from: sesame seeds) develop in certain tendons where there is considerable friction, tension, and physical stretch  
  ex. patella
* **Sutural bones:** small bones located in joints/sutures between certain cranial bones

General Bone Structure

* **Epiphyses:** ends of the bone
* **Epiphyseal growth plate:** layer of hyaline cartilage where the bone grows in length
  + When a bone stops growing, the cartilage is replaced with bone
* **Metaphyses:** regions between the diaphysis and epiphyses
* **Diaphysis:** bone shaft/body; makes up the long, cylindrical portion of the bone
* **Articular cartilage:** thin layer of hyaline cartilage covering the part of the bone that forms a joint (articulation)
* **Periosteum:** tough connective tissue sheath that surrounds the bone surface wherever it is not covered by articular cartilage
* **Medullary cavity** (aka marrow cavity): hollow cylindrical space containing fatty yellow bone marrow
* **Endosteum:** thin membrane that lines the medullary cavity

Bone Cytology

* **Osteoprogenitor cells:** unspecialized bone stem cells
  + Only bone cells undergoing cell division
* **Osteoblasts:** bone-building cells
  + **Bone deposition**: make collagen fibers and ECM of bone tissue and starts calcification (hardening)
  + **B**lasts **b**uild **b**one
* **Osteocytes**: mature bone cells (main cells in bone)
  + Maintain daily metabolism
* **Osteoclasts:** bone-degrading cells
  + **Bone resorption**: digestion of bone by release of lysosomal enzymes and acids
  + Huge cells concentrated in the endosteum (lining the medullary cavity)
  + Start life as a white blood cell
  + **C**lasts **c**arve

Compact Bone Tissue

* **Compact bone tissue:** provides protection and support
  + **location:** outside of bones, beneath the periosteum
  + **structure: osteons** (aka haversian systems): repeating tree-like structural units

Spongy Bone Tissue

* **Spongy bone tissue:** lightweight; provides tissue support
  + **location:** in the interior of the bone, protected by a covering of compact bone
  + **structure:** **trabeculae:** consists of irregular pattern of sponge/web-like layers of bone tissue (lamellae) supports red and yellow bone marrow

Bone Marrow

* **Red bone marrow:**   
  🡪 located between the trabeculae of certain bones (ex. ribs, sternum, vertebrae, long bones)  
  🡪 primary source of new blood cells
* **Yellow bone marrow:**  
  🡪 located in diaphysis of long bones like the femur, tibia, and humerus   
  🡪 comprised of adipocytes

Compact vs. Spongy Bone

Compact vs. Spongy Bone

Depressions and Openings Vocab

* **Fissure:** narrow slit between adjacent parts of bone thru which nerves/vessels pass
* **Foramen:** large opening that blood vessels/nerves/ligaments pass thru
* **Fossa:** shallow depression
* **Sulcus:** furrow along bone surface that accommodates blood vessels/nerves/tendons
* **Meatus:** tube-like opening

Joint Processes Vocab

* **Condyle:** large, round projection/protuberance with a smooth articular surface at end of bone
* **Facet:** smooth, flat, slightly concave or convex articular surface
* **Head:** rounded articular projection supported on narrower neck on bone

Attachment Processes Vocab

* **Crest:** prominent ridge or elongated projection
* **Epicondyle:** rough projection above condyle
* **Line:** long narrow ridge or border (less prominent than a crest)
* **Spinous process:** sharp, slender projection
* **Trochanter:** very large projection
* **Tubercle:** variably sized round projection
* **Tuberosity:** variable sized projection that has rough bumpy surface