

- ← Go to **medical school library** in learning resource center and look at the bones in the boxes
- ← Sunday afternoon 3<sup>rd</sup> floor from 1-3 to review
- ← Practice exam goes up sunday
- ←
- ← Function of the Skeleton
  - Support
    - Structural support
    - Attachment of muscles
    - Weight and work with work with muscles to produce control
  - Storage of mineral
    - Maintains normal concentration in the body fluids
    - Calcium- 98%
    - Phosphates
  - Blood Cell production
    - In red bone marrow
  - Protection
    - Skull and rib cage
  - Leverage
- ← Bone as Tissue
  - Dense connective tissue

## □ Cells

- Osteoblasts- develops into an osteocyte
  - Immature bone-forming cells
  - Synthesize osteoid- organizes components of matrix calcifies to form hard matrix
  - Produces new bone- osteogenesis
- Osteoclasts
  - Large multi-nucleated cells
  - Dissolves bony matrix (osteolysis)
  - Regulate  $\text{Ca}^{2+}$  and phosphate concentrations
- Osteoprogenitor cells
  - Mesenchymal (embryonic) stem cells
  - Produces osteoblasts
  - Play a role in fracture repair
  - Larger than osteoblast and not always seen
- Osteocytes- is the cell of the bone
  - Mature bone cells
  - Completely surrounded by hard bone matrix
  - Maintain and monitor both protein and mineral content of matrix
  - Found in lacunae
    - Interconnected by canaliculi layers of matrix= lamellae
- Osteoblast vs. osteoclasts

- Blast- secrete bony matrix to make bone strong
- Clast- dissolves the bony matrix which releases  $Ca^{2+}$  into the body fluids
  - Keeps the bone strong and in balance
- Blast- deposit  $Ca^{2+}$  faster than the clasts removes them → stronger and larger bones
- Clasts- remove  $Ca^{2+}$  faster than blast → weak brittle bone

#### □ Matrix

- o Collagen fibers- 1/3 weight of the bone- tough and flexible
- o Surrounded by calcium salts
- o Calcium phosphate joins with calcium hydroxide- 2/3 of the weight of the bone
- o Osteocytes make up 2%

#### ← Types of bones

##### □ Compact- Dense and solid- on outside all around

- o Collagen fibers switches each layer giving more strength to resist cracking
- o Osteon is the basic functional unit- (looks like a bulls-eye)
- o Osteocytes arranged in concentric layers around
  - central canal which contain vessels
    - need vessels to supply blood otherwise bone dies
  - Perforating canals connect central canals
- o Lamellae
  - Cylindrical and parallel to long axis of bone
    - Concentric lamellae- the bulls-eye