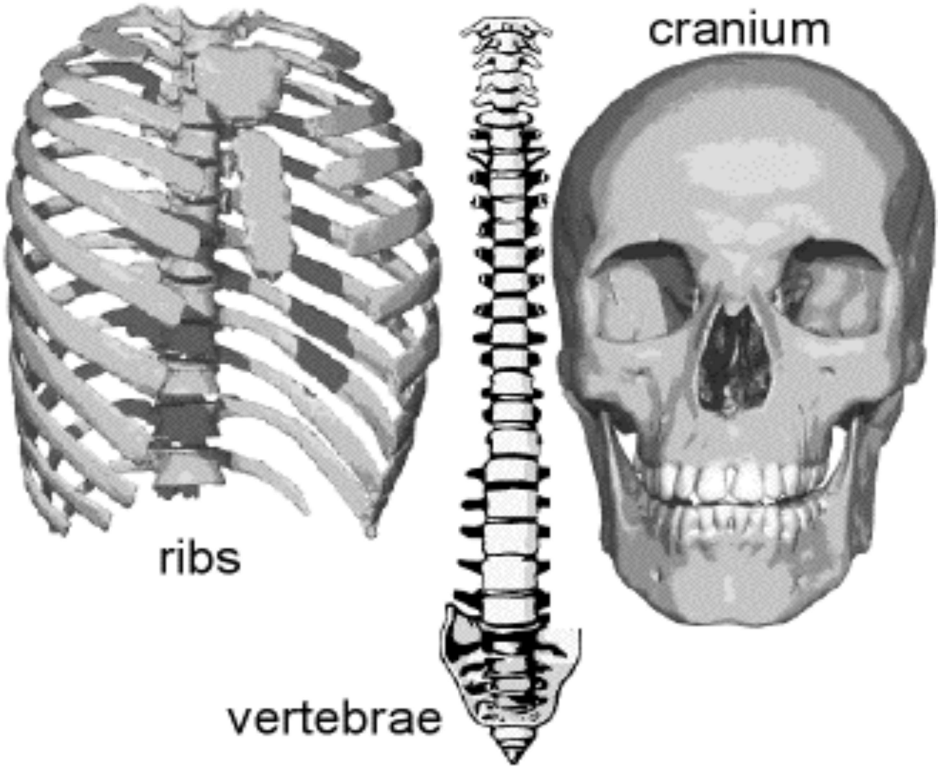
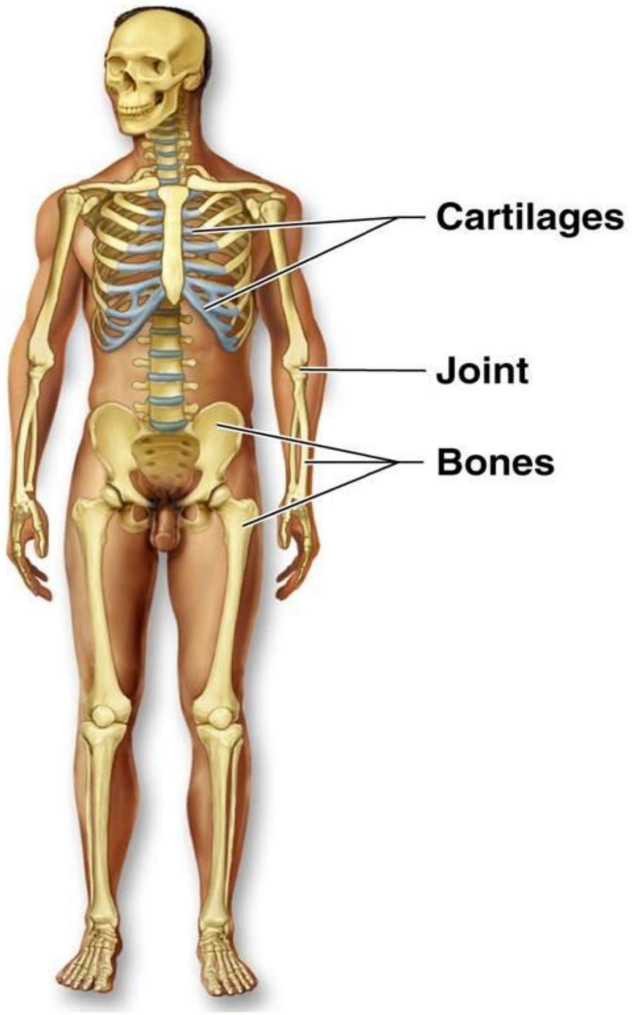


SKELETAL SYSTEM

Parts of the Skeletal System

- Bones
- Joints
- Cartilages
- Ligaments (bone to bone) and tendons (bone to muscle)



Functions of the Skeletal System

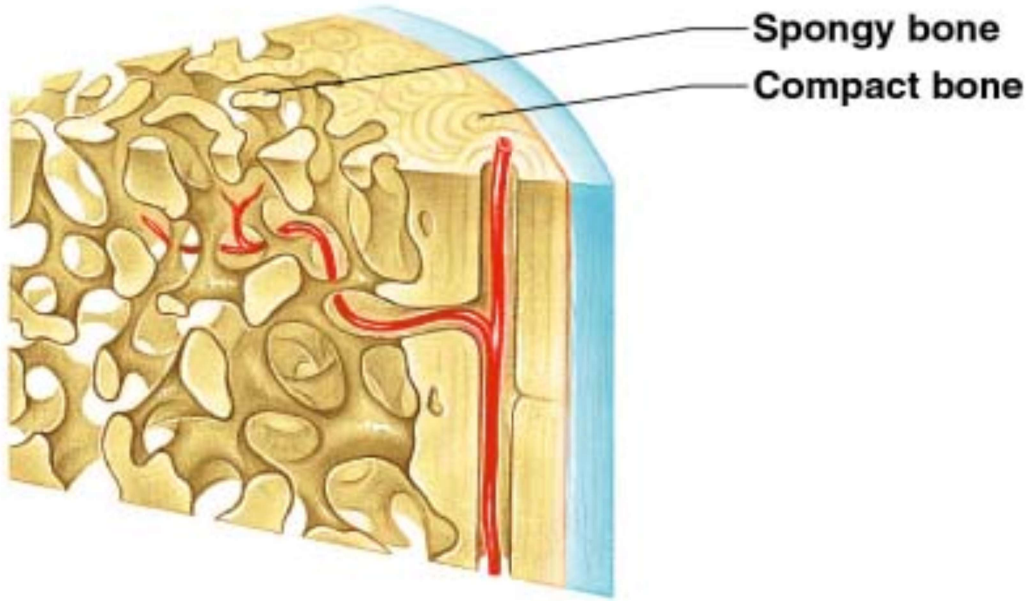
1. Movement
2. Support
3. Protection
4. Make blood cells
5. Store minerals

2 Major Parts of Skeleton

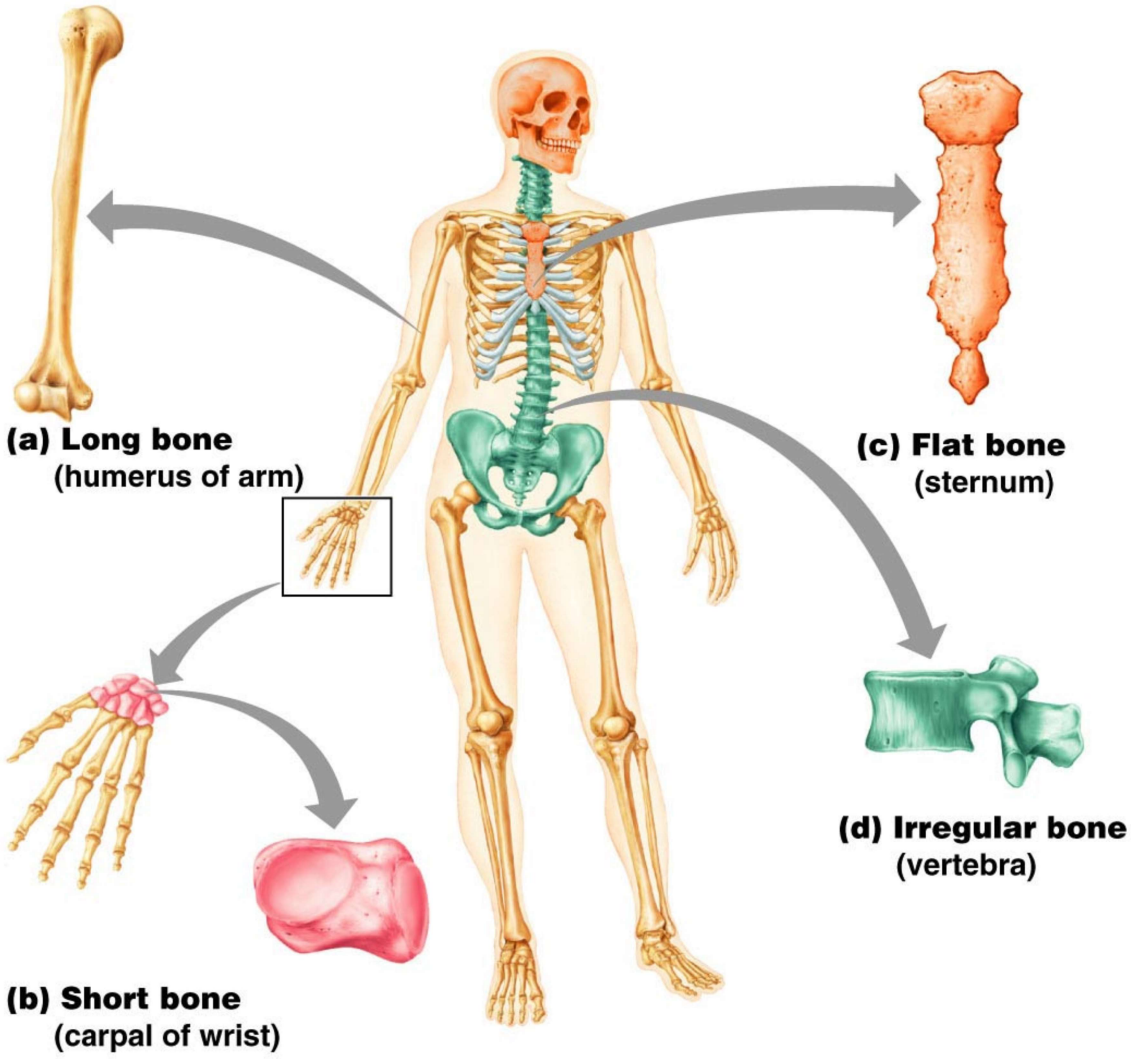
1. **Axial Skeleton**
   - Includes skull, spine, ribs, sternum
2. **Appendicular Skeleton**
   - Includes appendages of the body (shoulders, arms, hips, and legs)

Bones

- Adult skeleton has 206 bones
- Two basic types of bone tissue:
  1. **Compact bone-** dense throughout
  2. **Spongy bone**- many open spaces

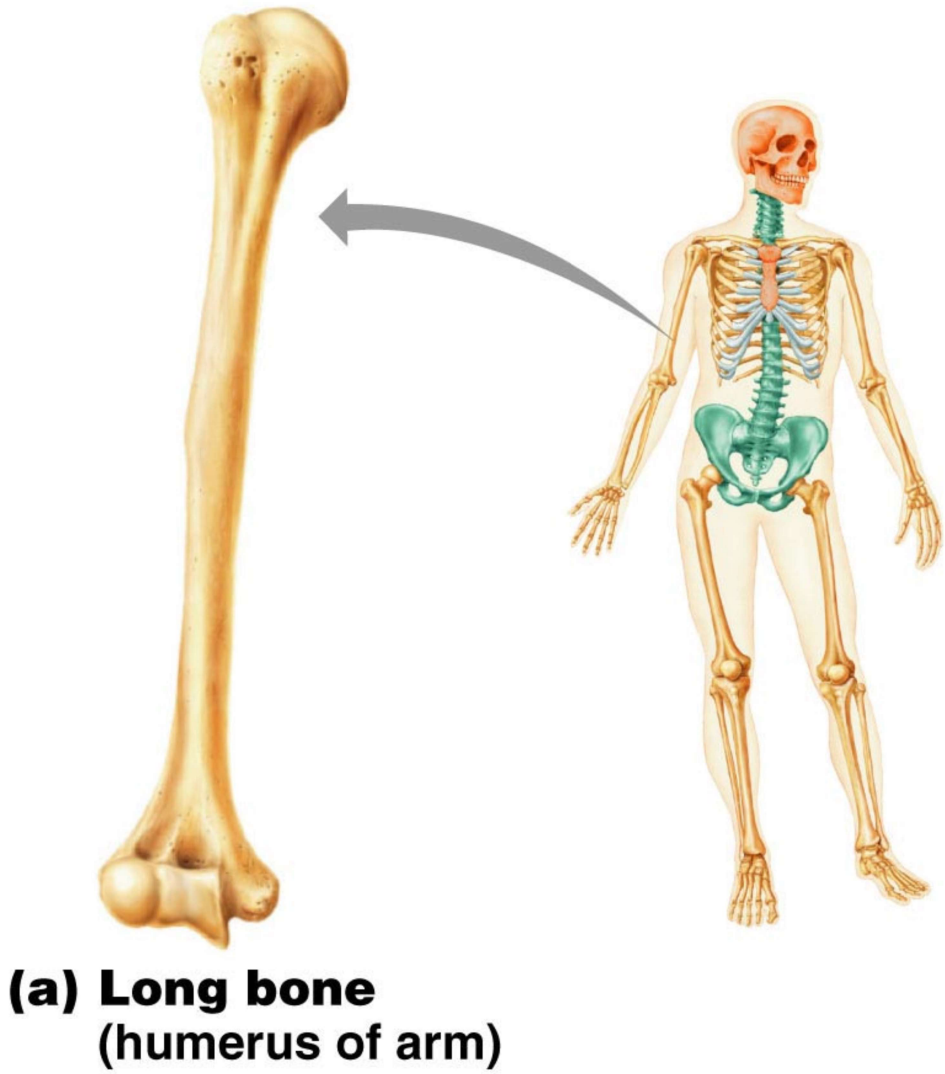


Classification of Bones



Long Bones

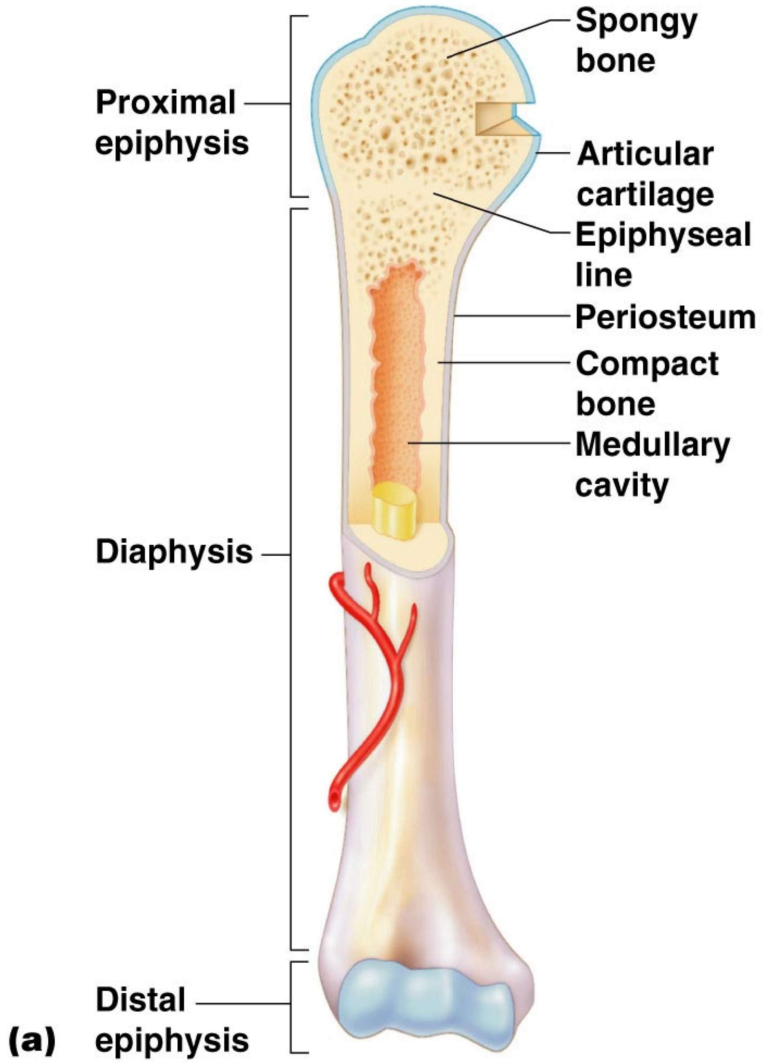
- Long in shape
- Shaft with heads at both ends
- Mostly compact bone
- Example: Femur, humerus



(a) Long bone
(humerus of arm)

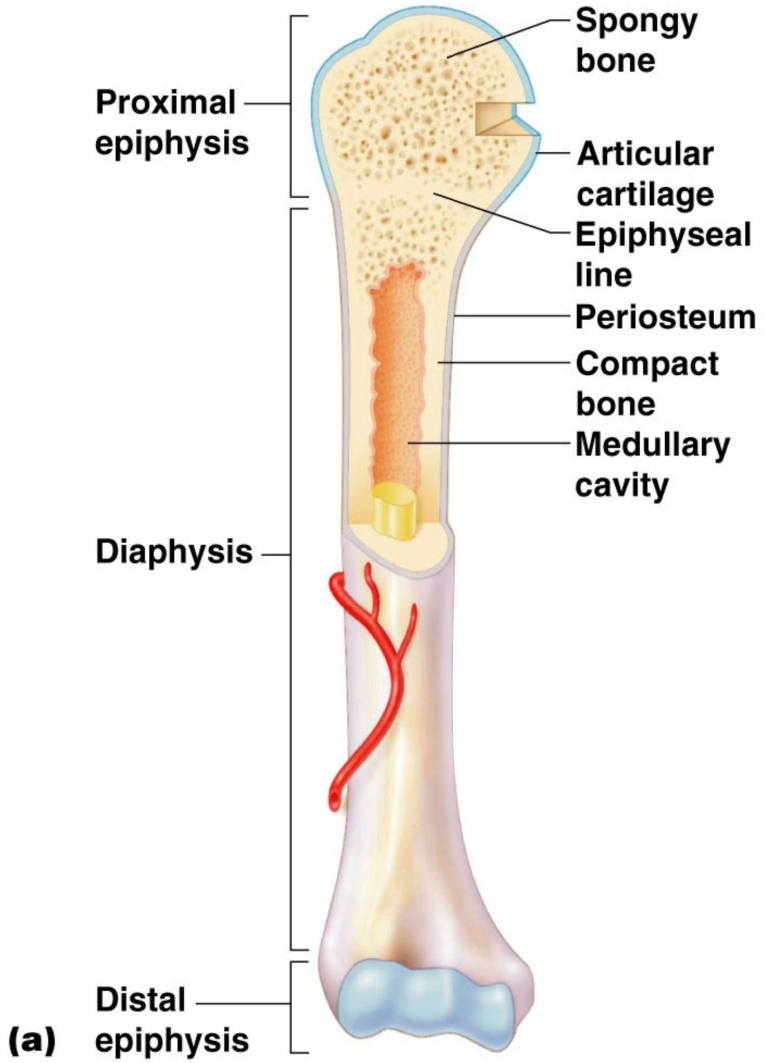
Anatomy of Long Bones

- **Diaphysis**- Length of bone made of compact bone
- **Epiphysis**- Ends of bone made of mostly spongy bone
- **Epiphyseal line/plate**- In the epiphysis, where bone grows from
- **Articular cartilage**- covers surface of epiphysis to reduce friction



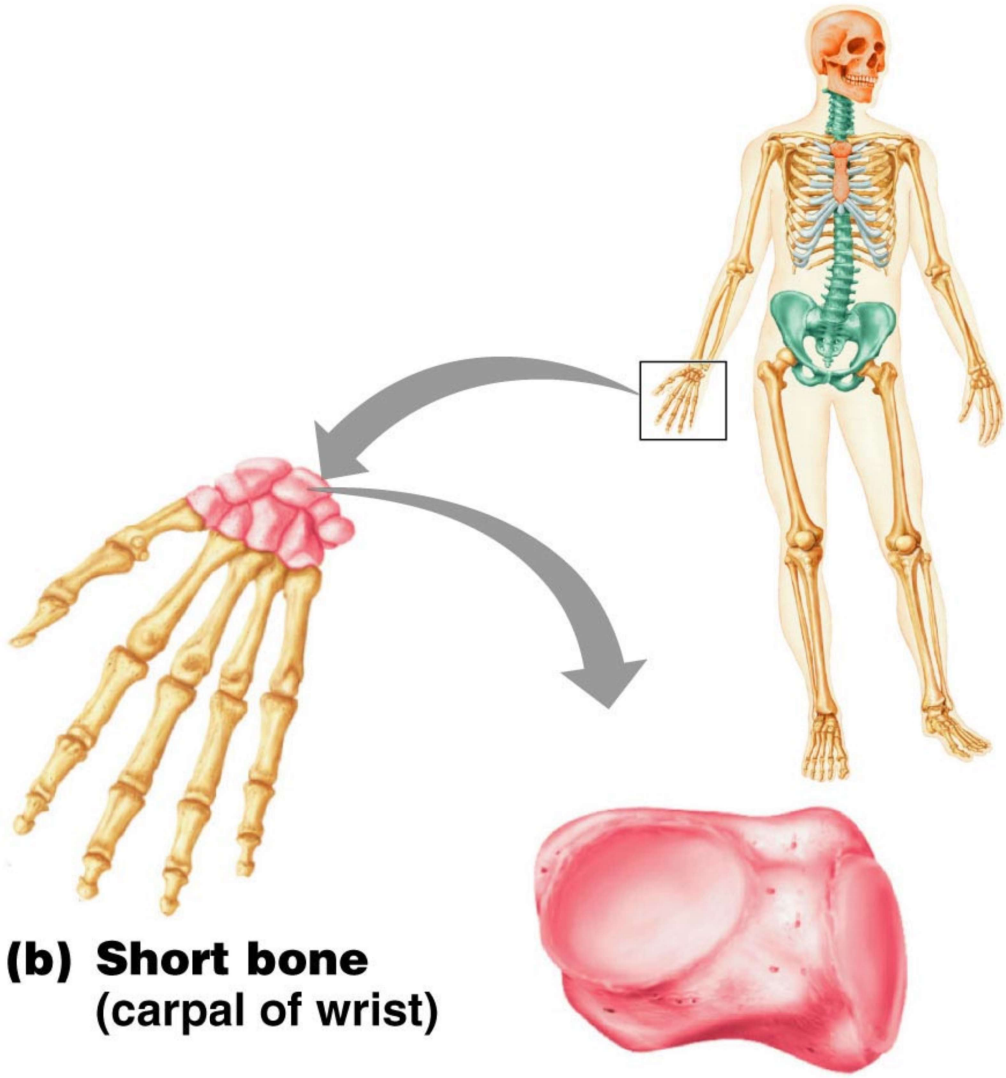
Anatomy of Long Bones

- **Periosteum**- covers diaphysis
- **Endosteum**- lines the inside of diaphysis
- **Medullary cavity**- cavity inside the shaft; contains yellow marrow (fat) and red marrow (for blood cell formation)



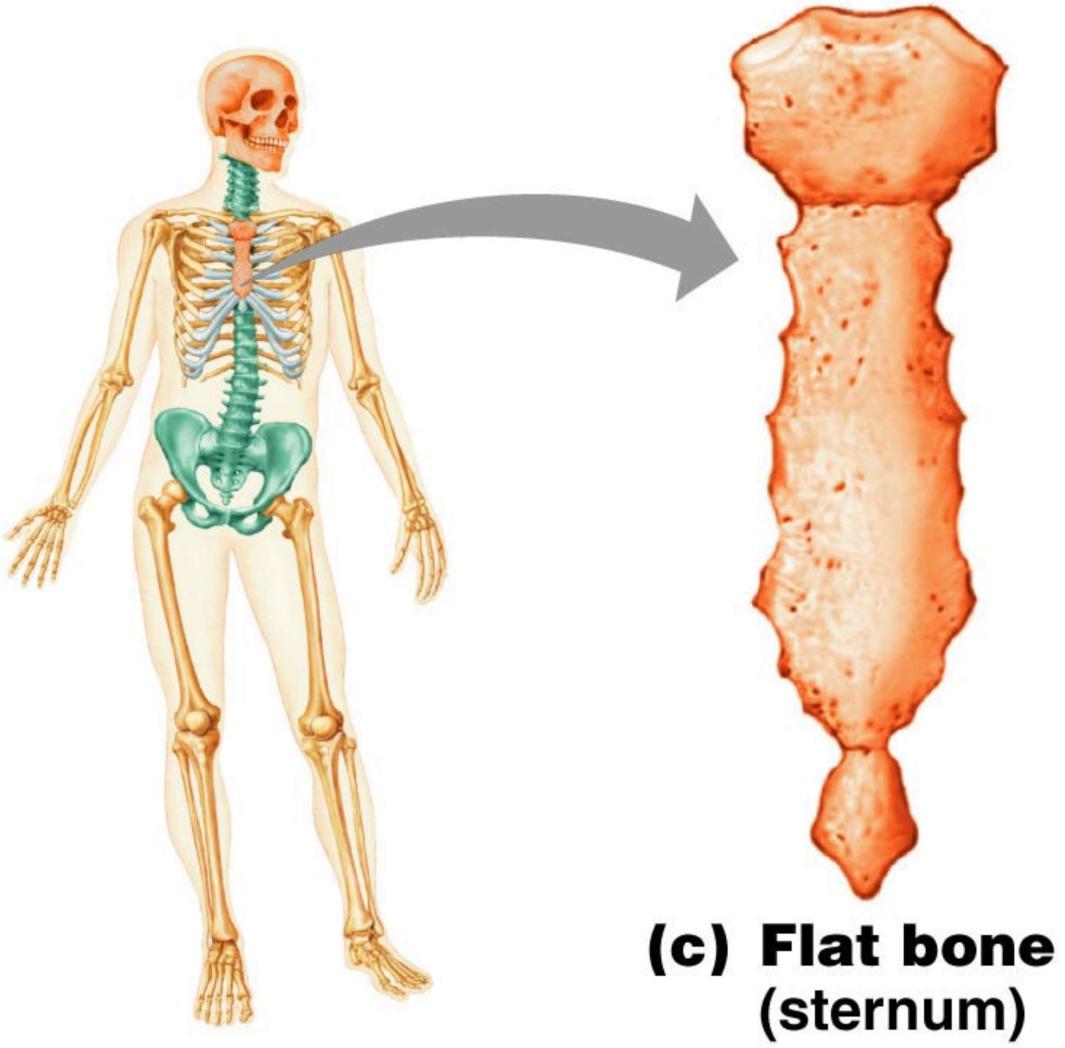
Short Bones

- Cube-shape
- Mostly spongy bone
- Example: carpals, tarsals



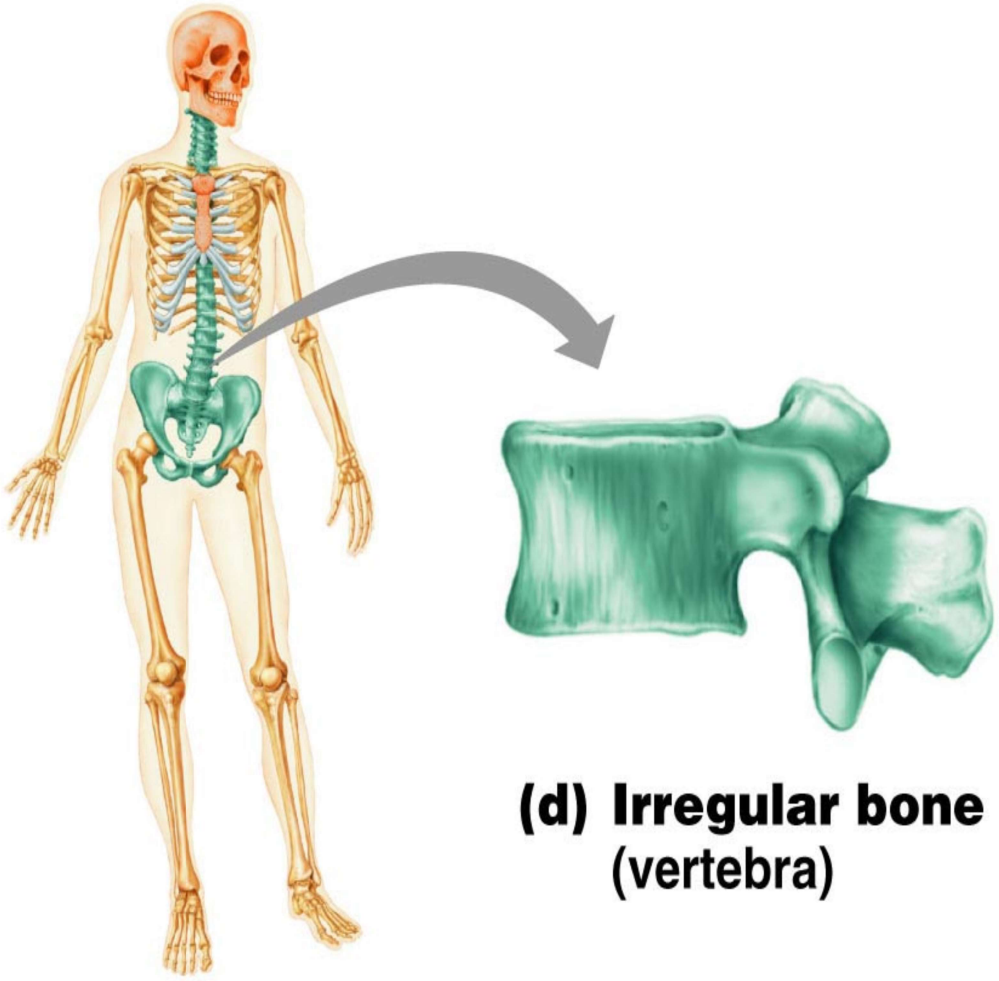
Flat Bones

- Thin, flat, usually curved
- Two thin layers of compact bone on outside
- Layer of spongy bone on inside
- Example: skull, ribs, sternum



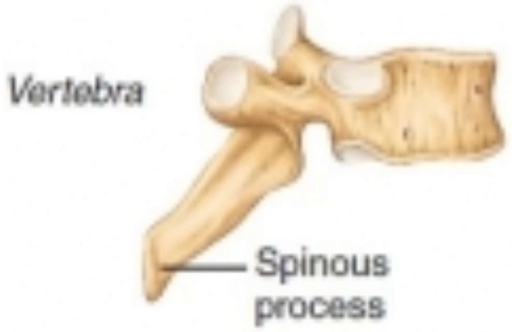
Irregular Bones

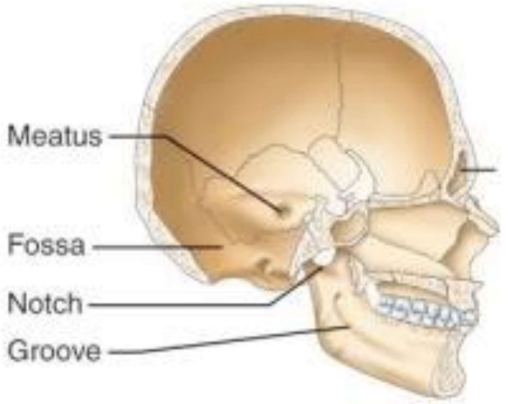
- Irregular shape
- Don't fit into other bone categories
- Example: hip bones, vertebrae



Bone Markings

- Bone markings are features of bones where muscles, tendons, a ligaments can attach, as well as passages for nerves and blood vessels.
- **Projection/Process**- Grow out from the bone surface
- **Depression/Cavity**- Indentations in the bone



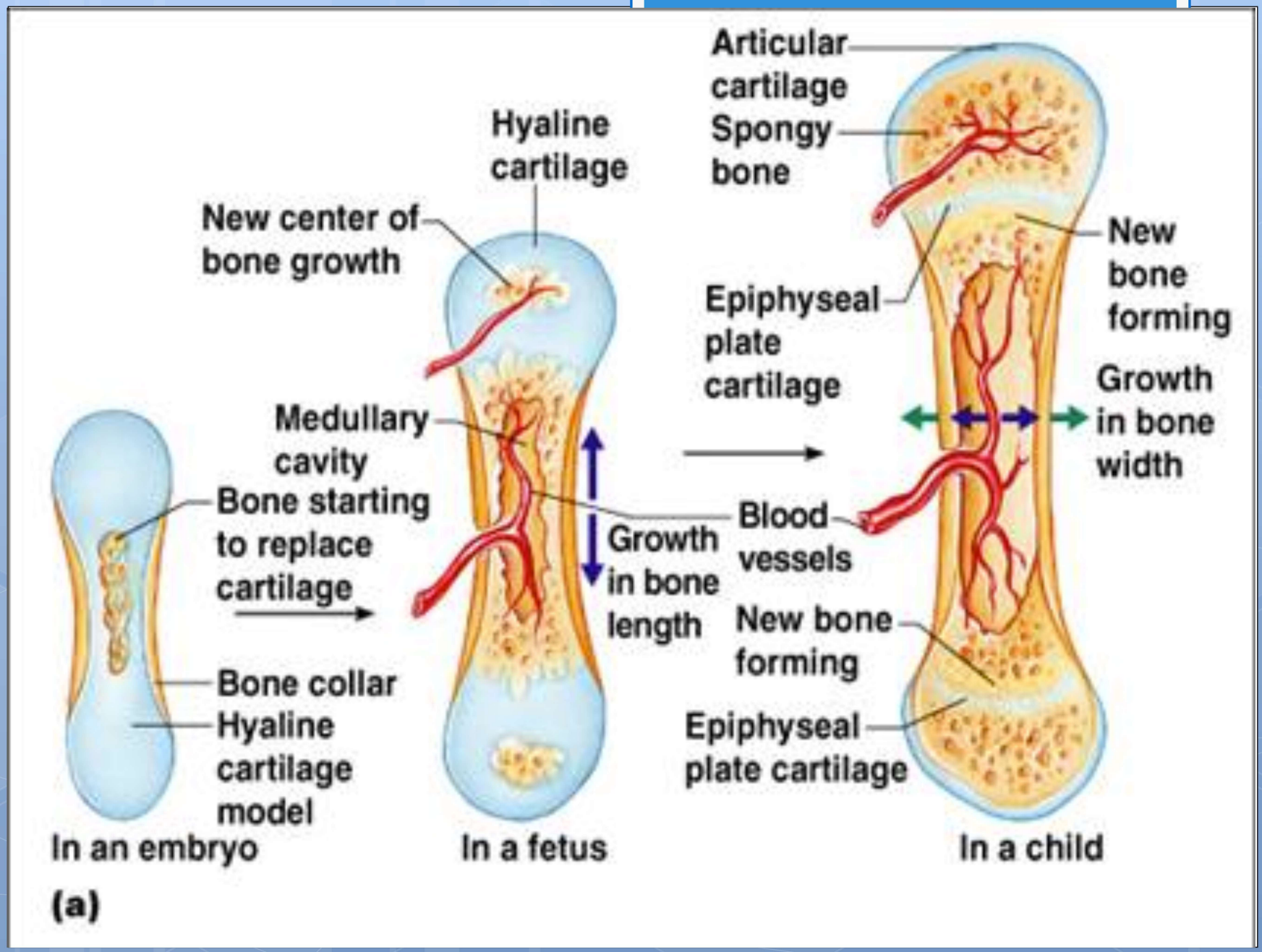


Bone Growth & Development

- **Ossification-** The process of forming the bones of the body
- BIRTH- bones are mostly cartilage; soft
- INFANTS & CHILDREN- Calcium and phosphorus are laid down to form bone.
- TEENS- bones grow longer; occurs at growth (epiphyseal) plates
- EARLY 20s- Growth stops (earlier for females)
- 20s & ON- Bone does not grow longer, but will continue to break down and form new bone

Bone Growth Steps Summary

- Cartilage from early years is broken down
- Bone replaces cartilage- **ossification**
  - Growth of long bones from **epiphyseal plates**
- Bone remodeling happens throughout life due to:
  - Calcium levels in blood
  - Pull of gravity and muscles on the bones


Articular cartilage
Spongy bone
Hyaline cartilage
New center of bone growth
New bone forming
Epiphyseal plate cartilage
Growth in bone width
Medullary cavity
Bone starting to replace cartilage
Blood vessels
Growth in bone length
New bone forming
Bone collar
Hyaline cartilage model
Epiphyseal plate cartilage
In an embryo
In a fetus
In a child
(a)

Bone Cells

- **Osteocytes**- Mature bone cells
- **Osteoblasts**- Bone-forming cells
- **Osteoclasts-** Bone-destroying cells. Break down bone matrix for remodeling and release of calcium