

Skeletal System



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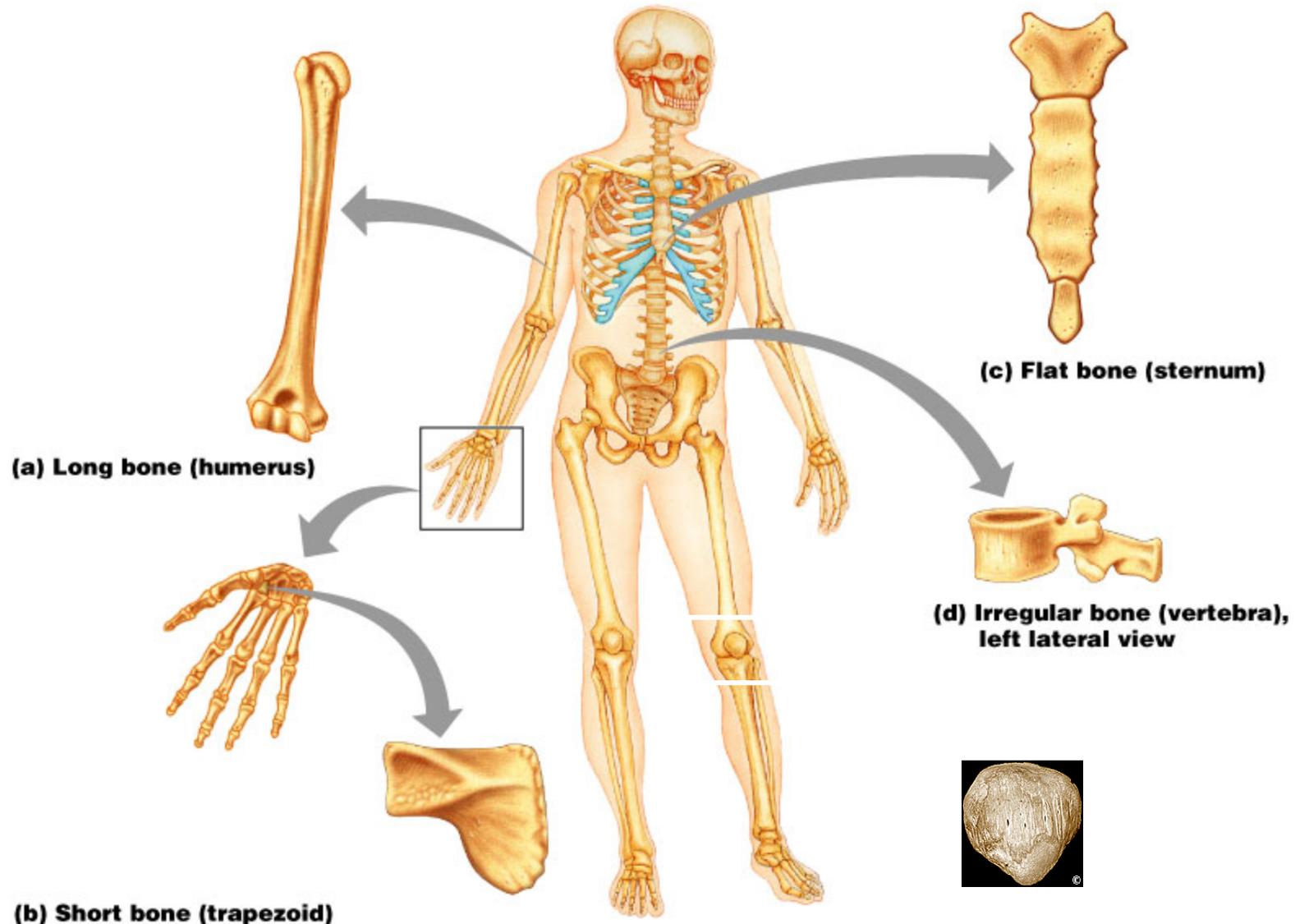
Function of the Skeletal System

- Support- framework that supports body and cradles its soft organs
- Protection- for delicate organs, heart, lungs, brain
- Movement- bones act as levers for muscles
- Mineral storage- calcium & phosphate
- Blood cell formation- hematopoiesis

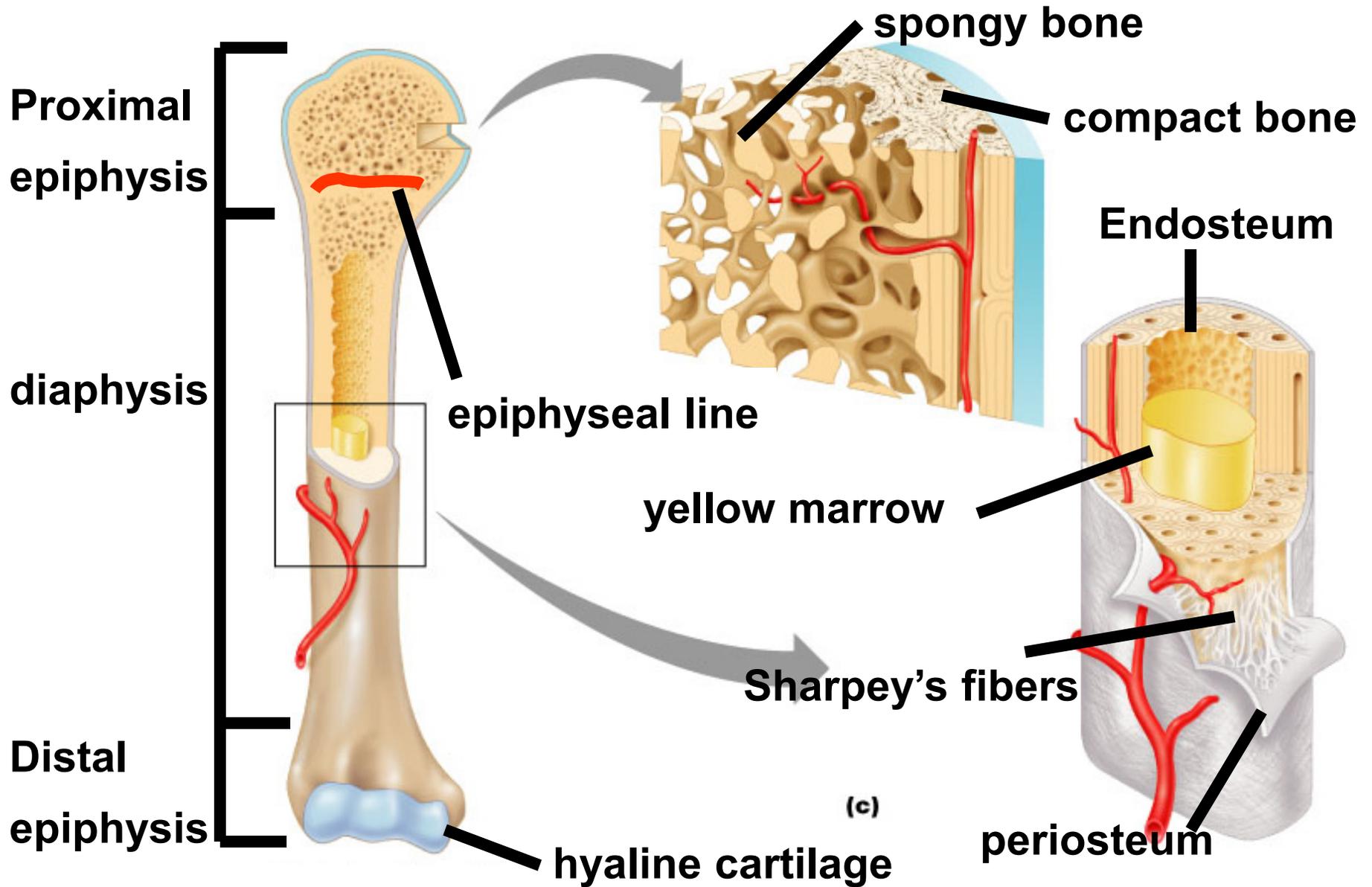
Types of Bones

- Long Bones- metacarples, metatarsals, phelanges, humerus, ulna, radius, tibia, fibula
- Short Bones- carpals, tarsals
- Flat Bones- rib, scapula, skull, sternum
- Irregular Bones- vertebrae, some facial bones
- Sesamoid- patella

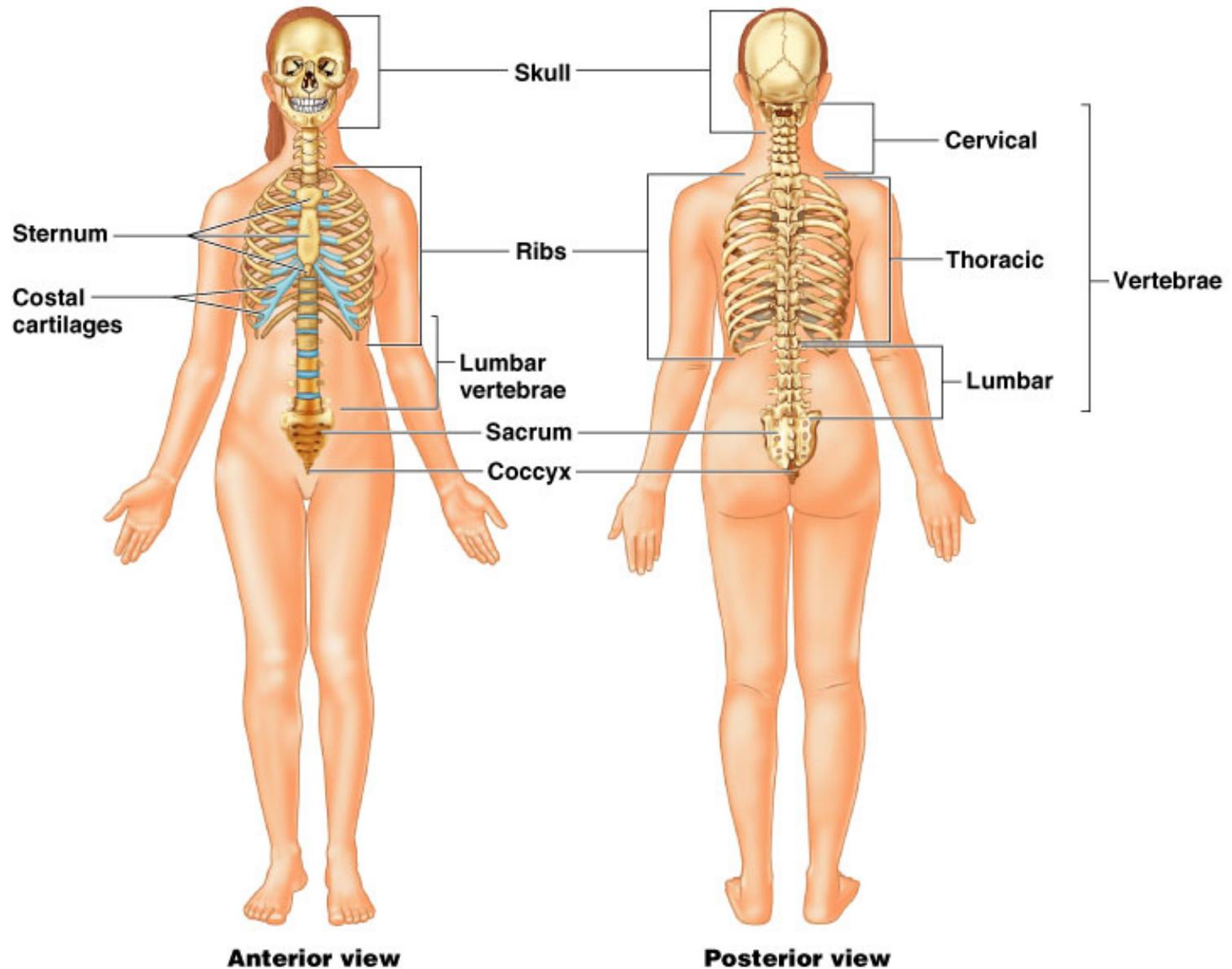
Bone Classification



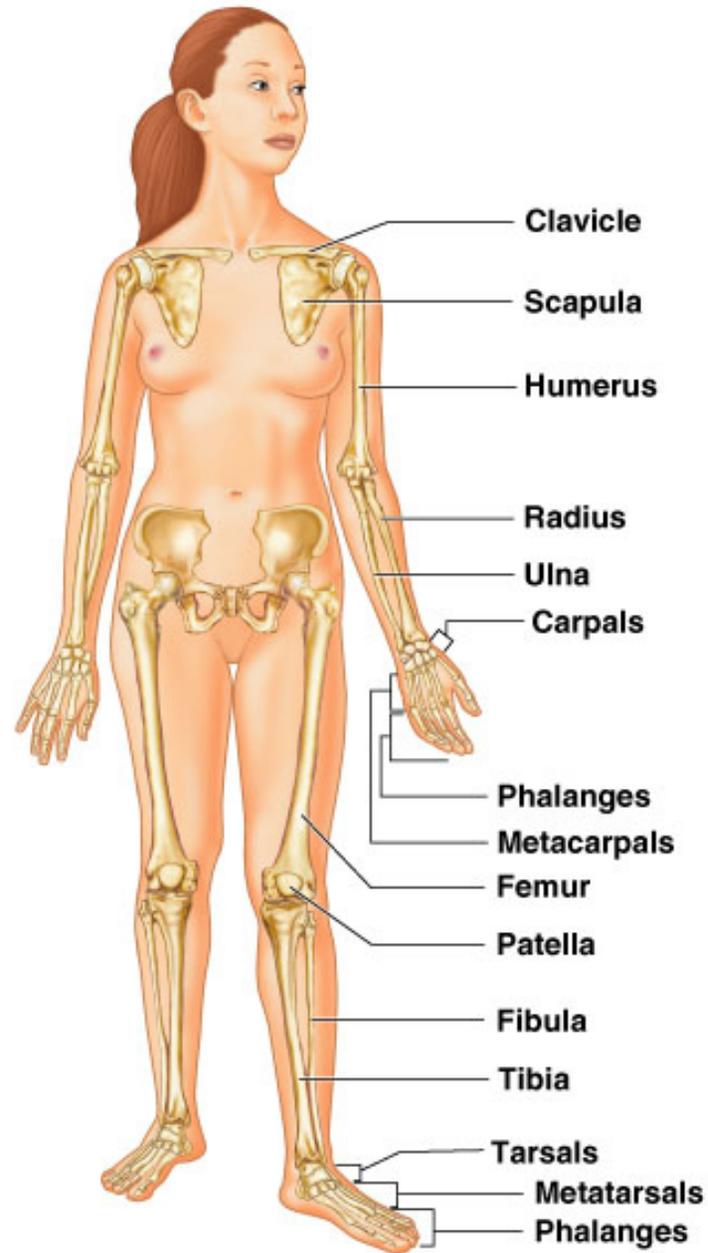
Anatomy of a Long Bone



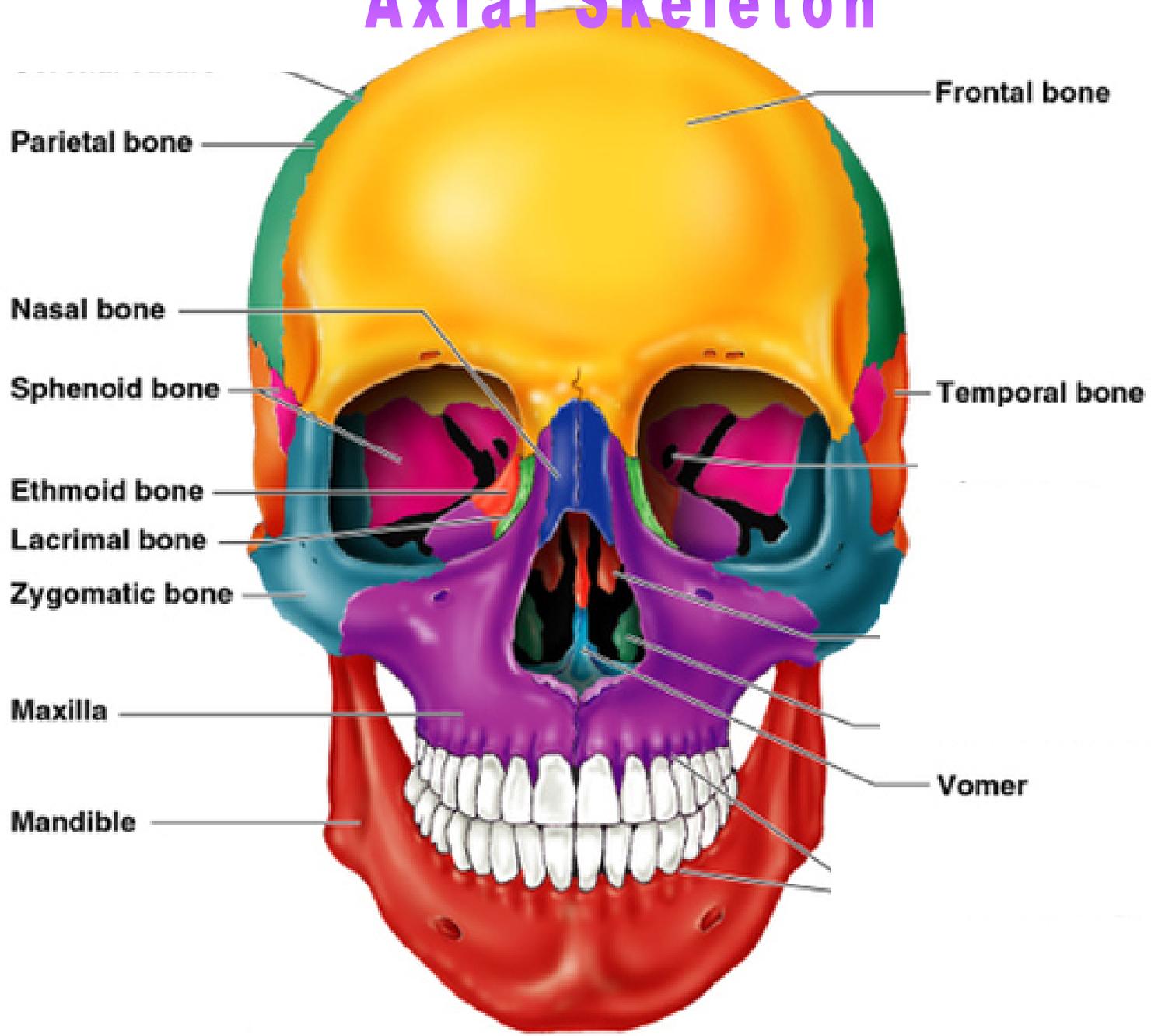
Axial Skeleton



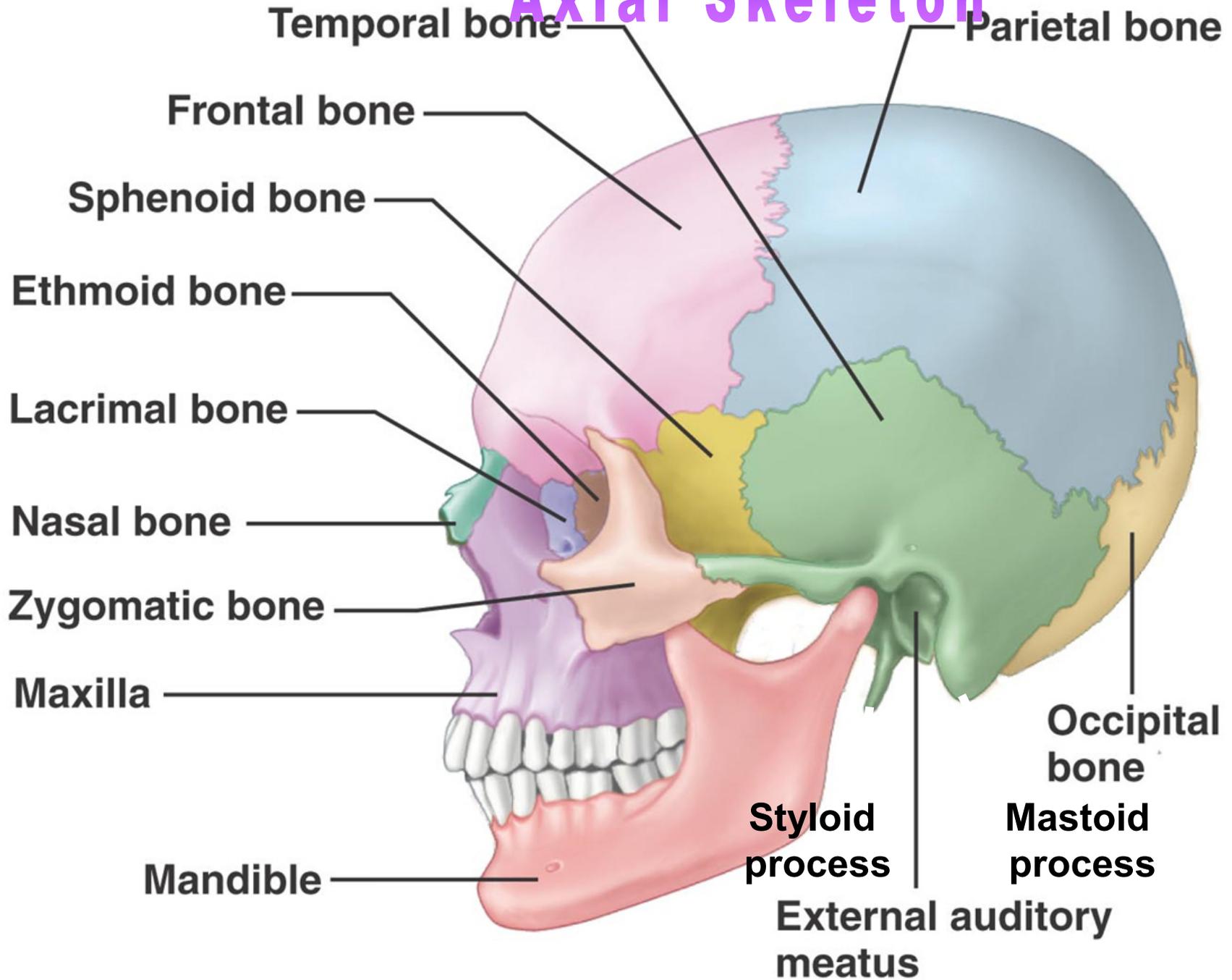
Appendicular Skeleton



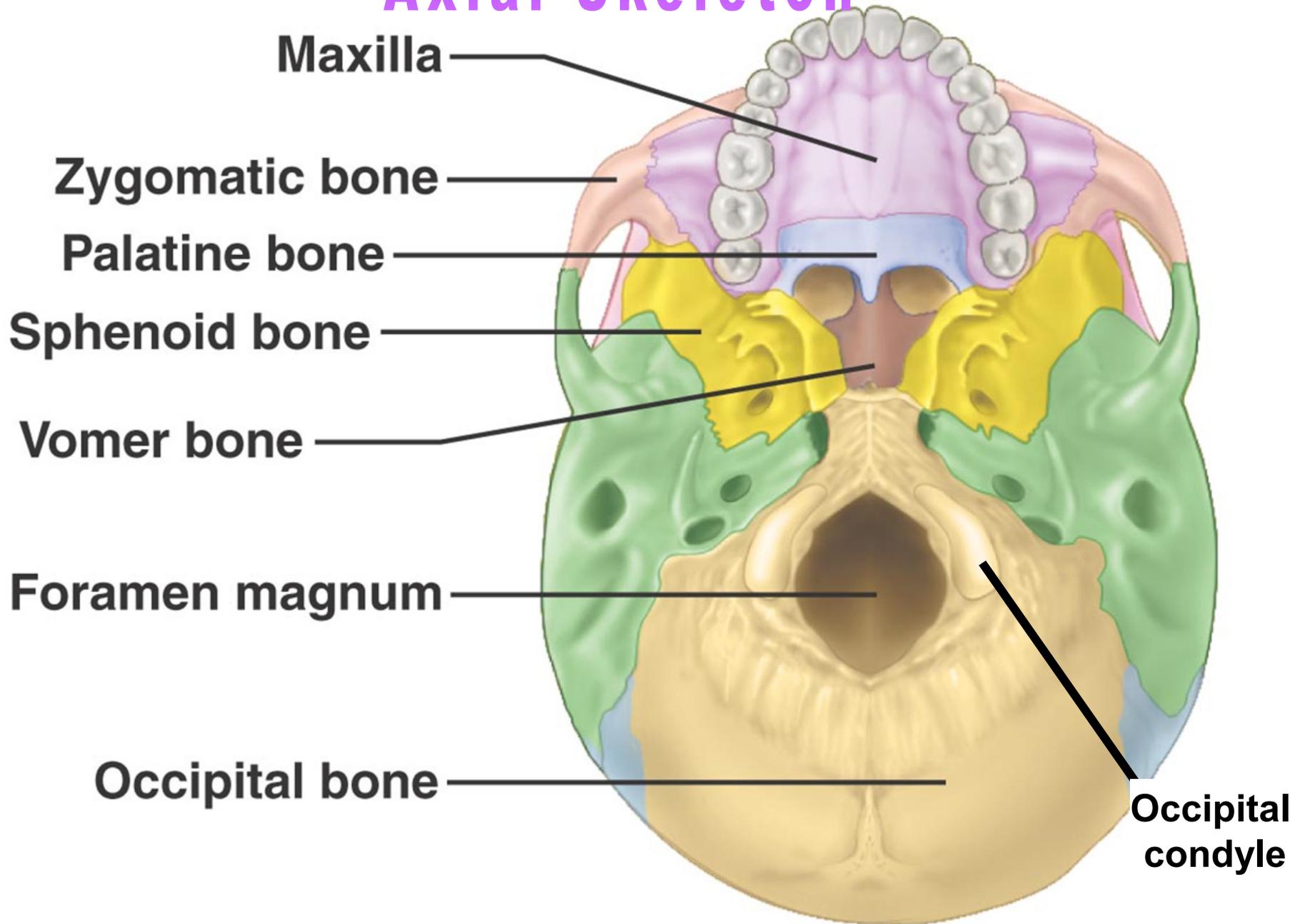
Axial Skeleton



Axial Skeleton

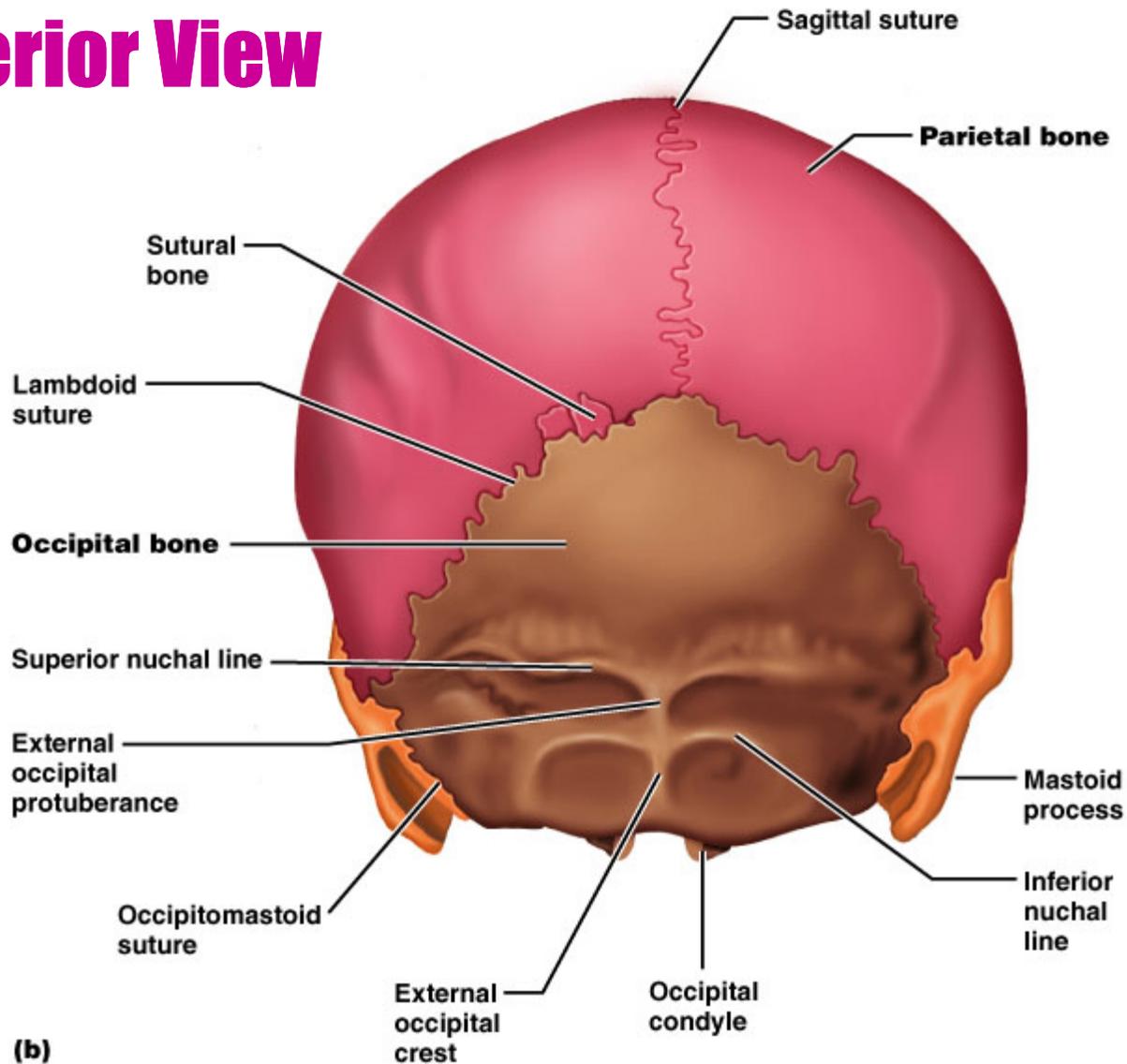


Axial Skeleton

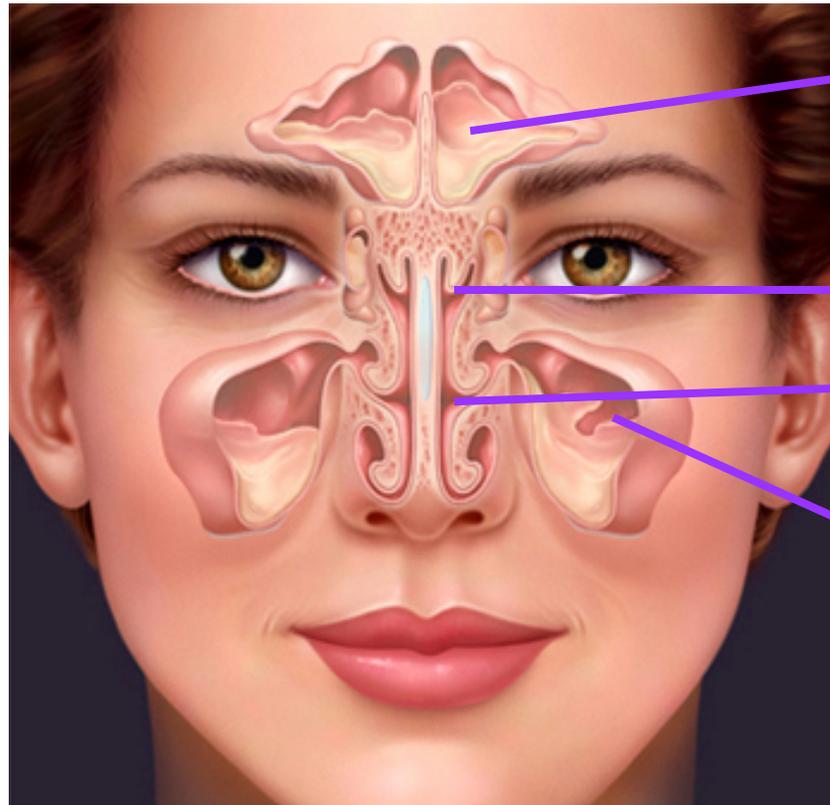


Axial Skeleton

Posterior View



Sinal Cavities



Frontal Sinus

Ethmoid Sinus

Sphenoid Sinus

Maxillary Sinus

Axial Skeleton

The Vertebral Column

Cervical Vertebrae

(7)

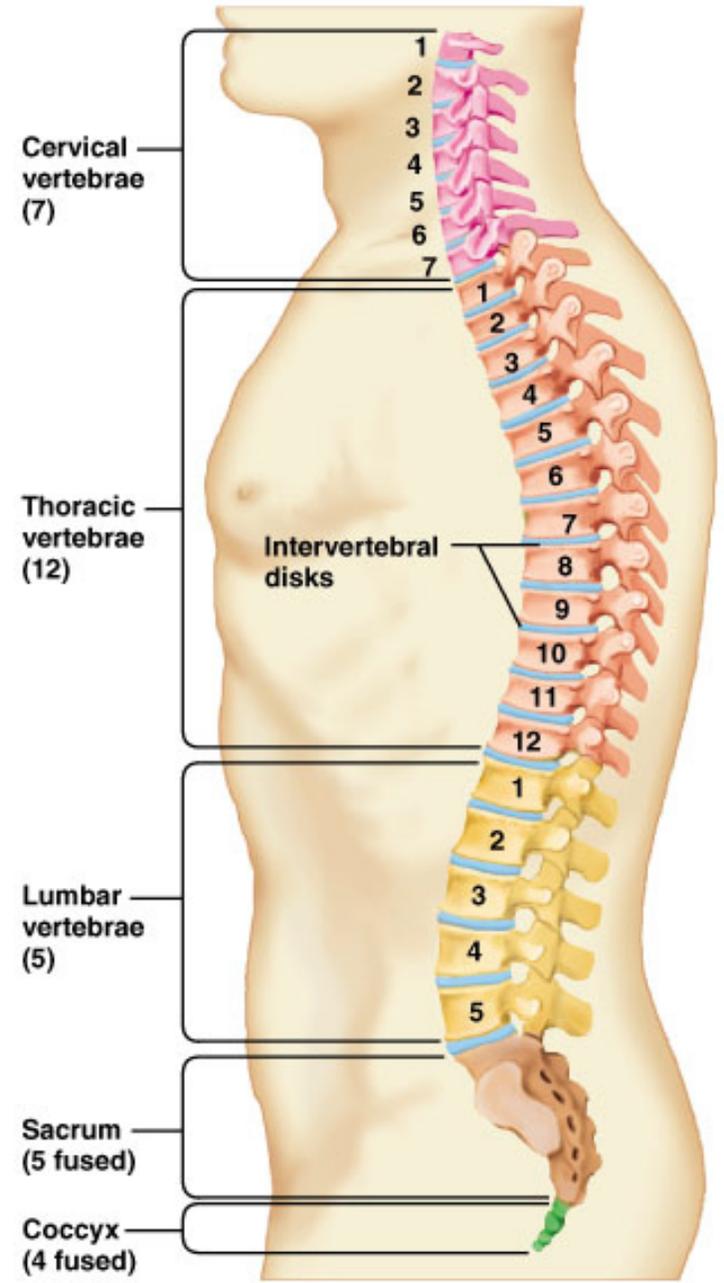
Thoracic Vertebrae

(12)

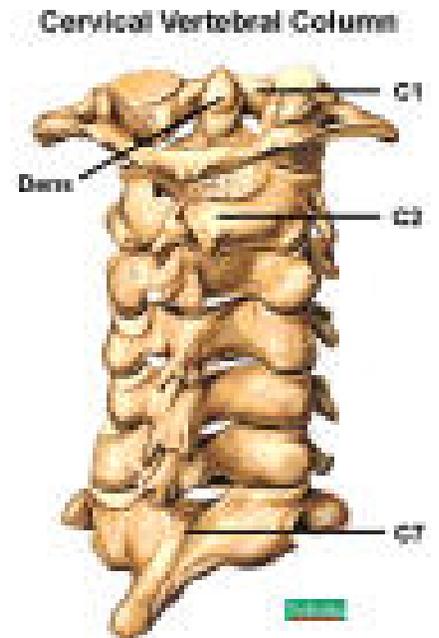
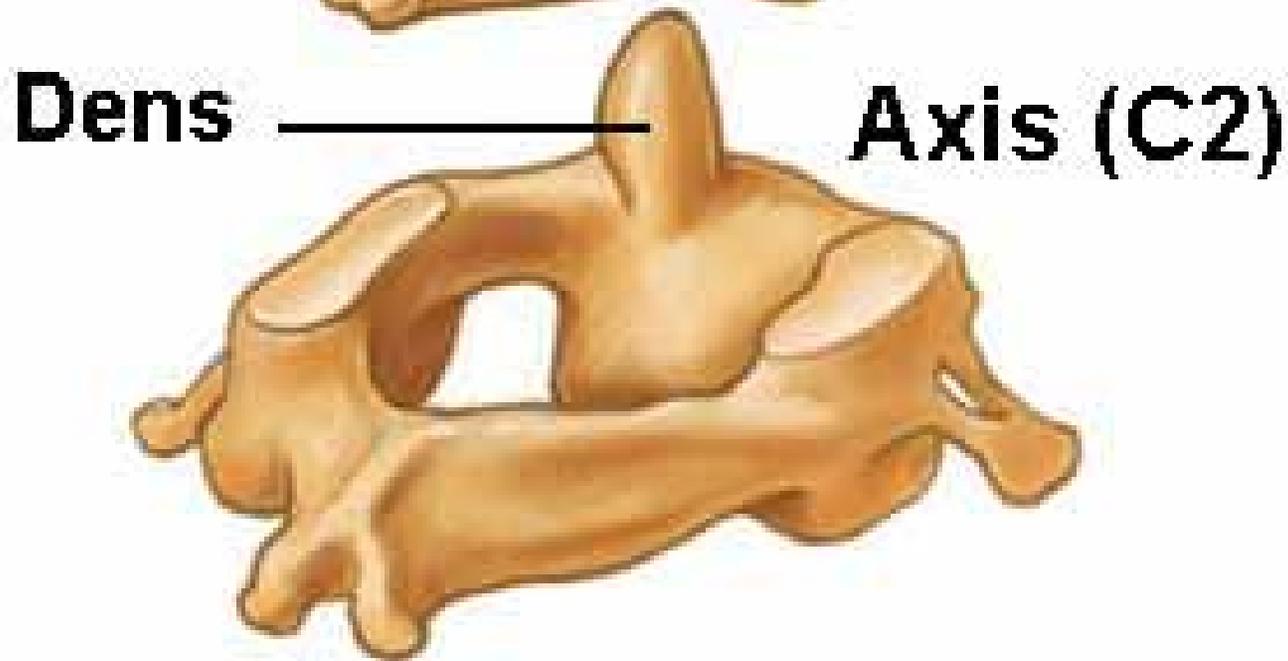
Lumbar Vertebrae (5)

Sacrum

Coccyx



Cervical Vertebrae



Thoracic Vertebrae

Axial (Overhead) View

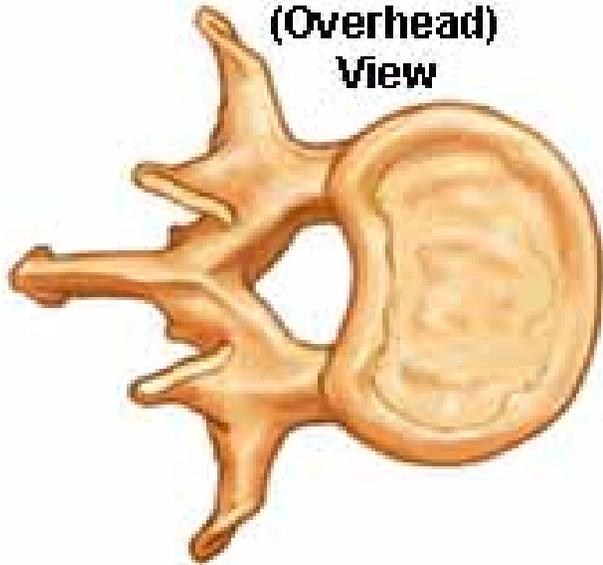


Lateral (Side) View



Lumbar Vertebrae

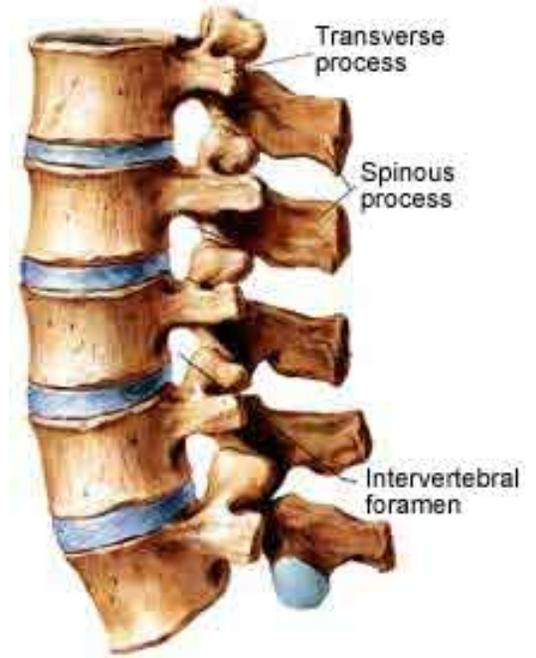
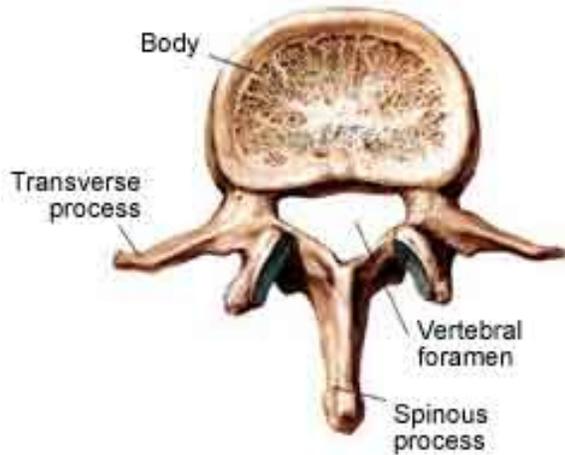
**Axial
(Overhead)
View**



**Lateral
(Side)
View**

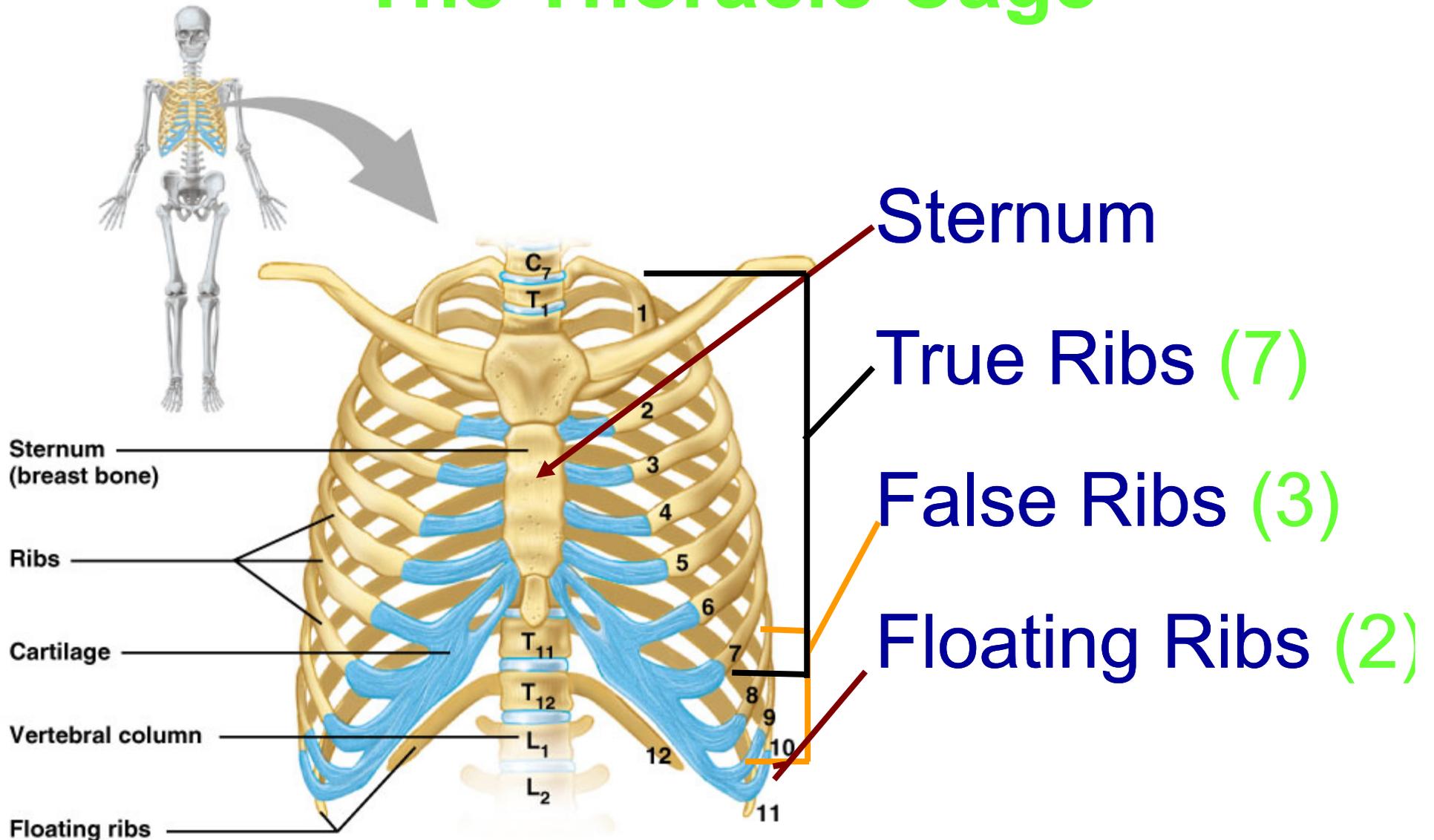


**Annulus
fibrosus** **Nucleus
pulposus**



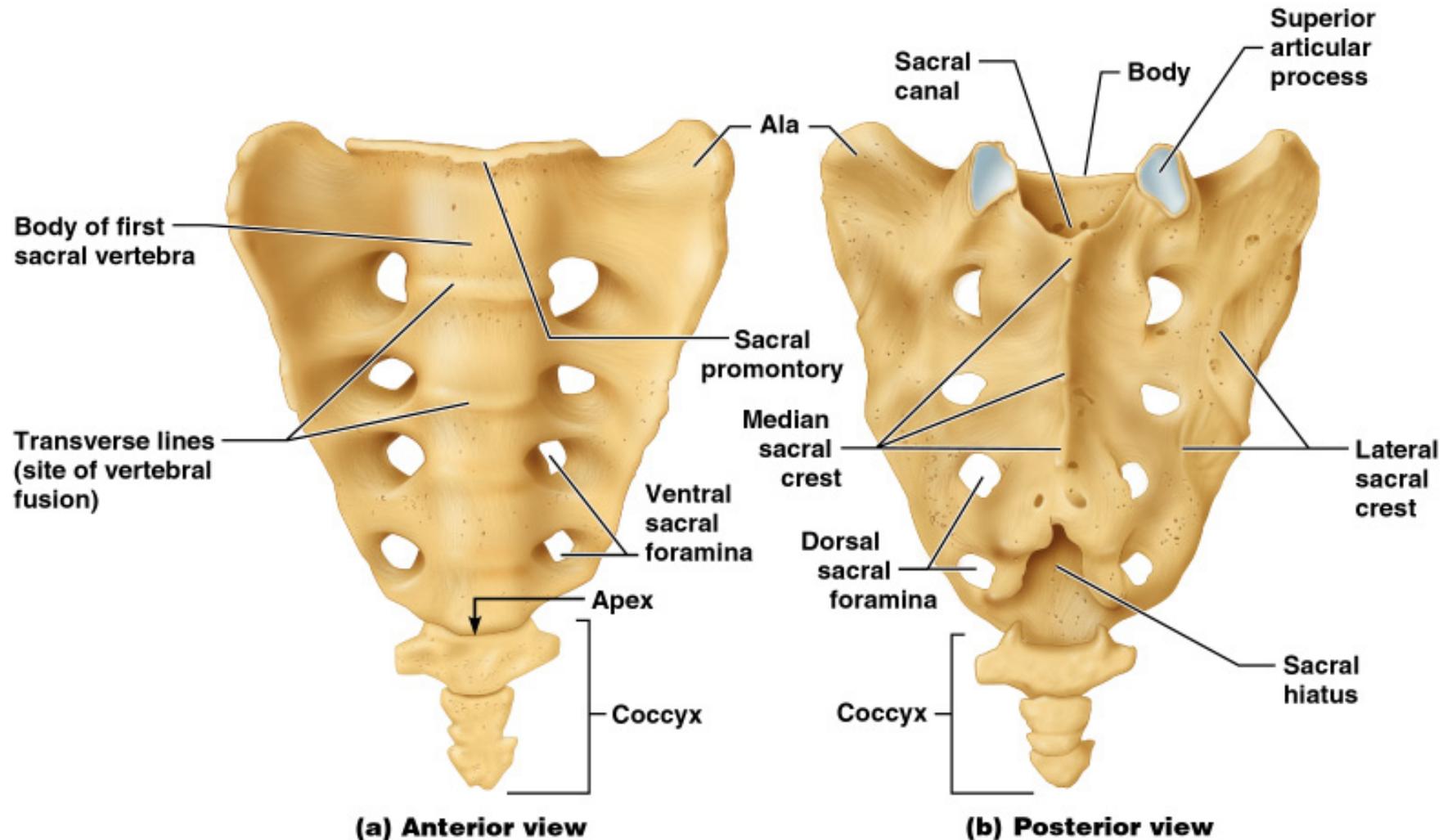
Axial Skeleton

The Thoracic Cage



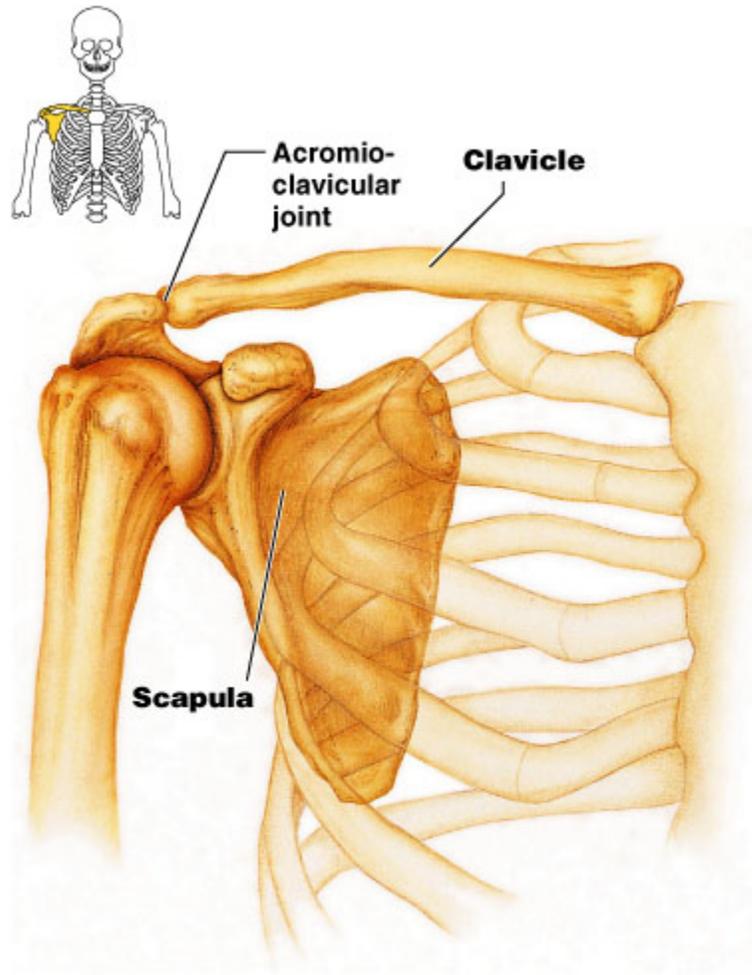
Axial Skeleton

Sacrum & Coccyx

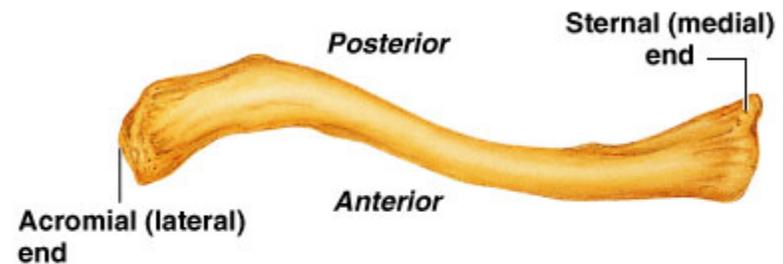


Appendicular Skeleton

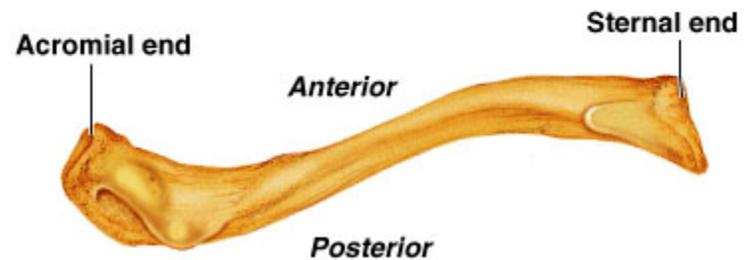
Bones of the Pectoral Girdle



(a) Articulated pectoral girdle

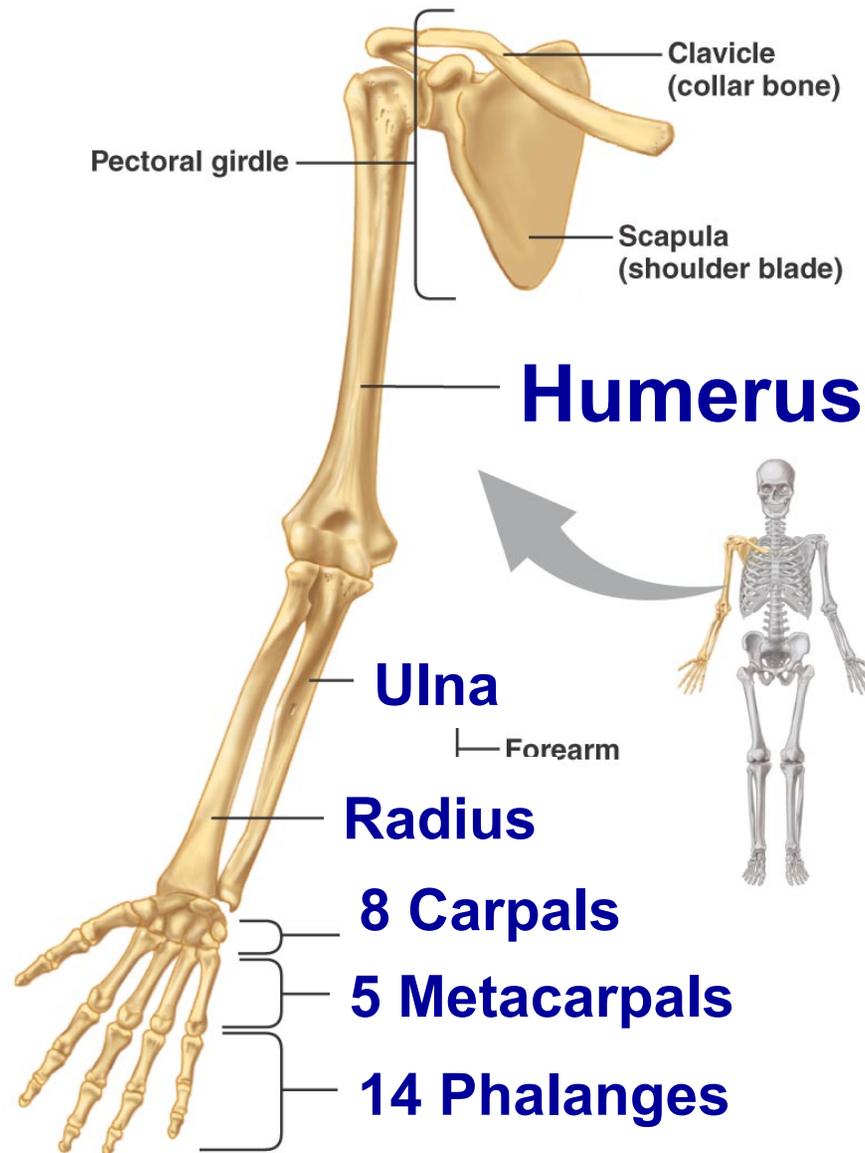


(b) Right clavicle, superior view

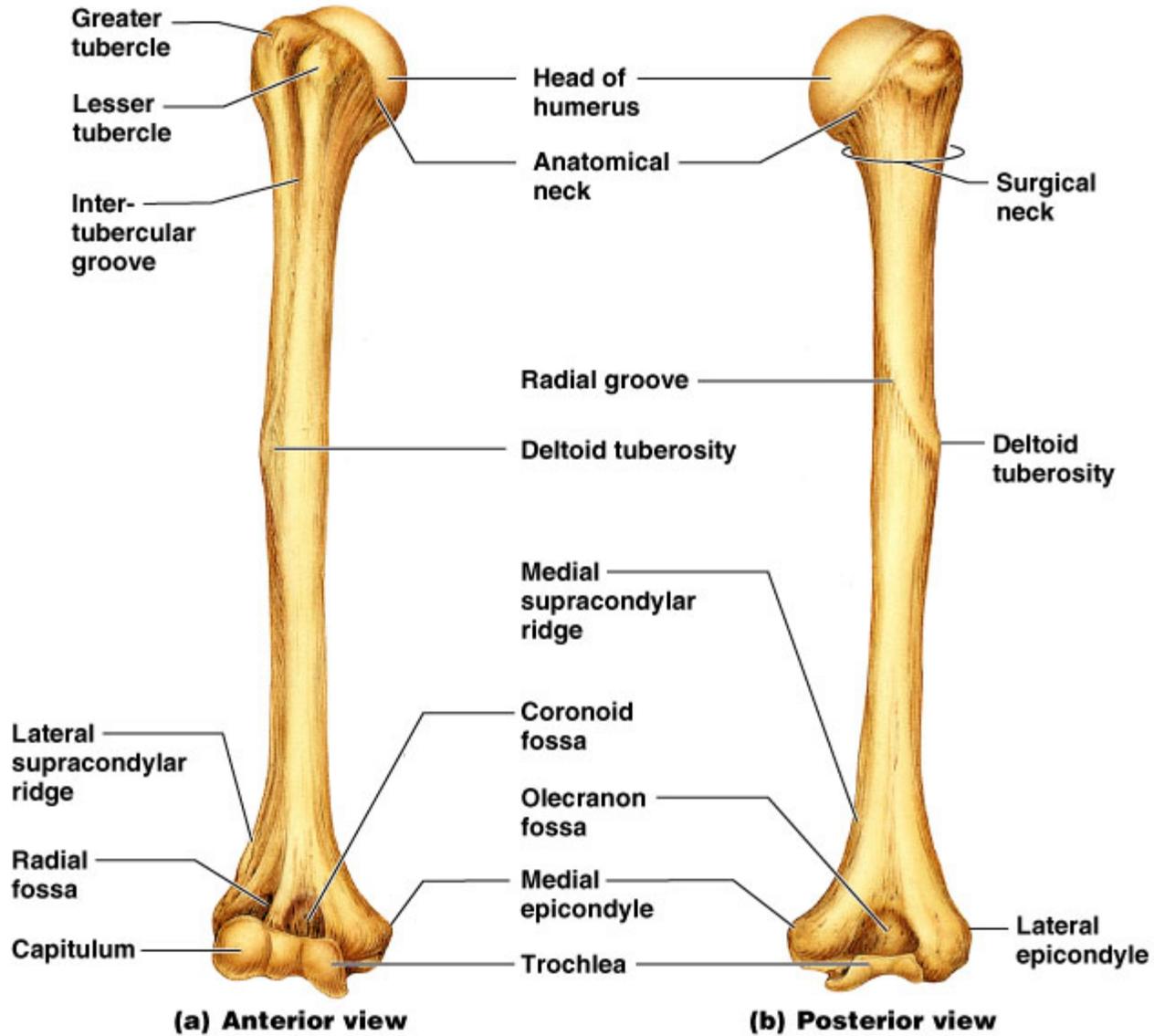


(c) Right clavicle, inferior view

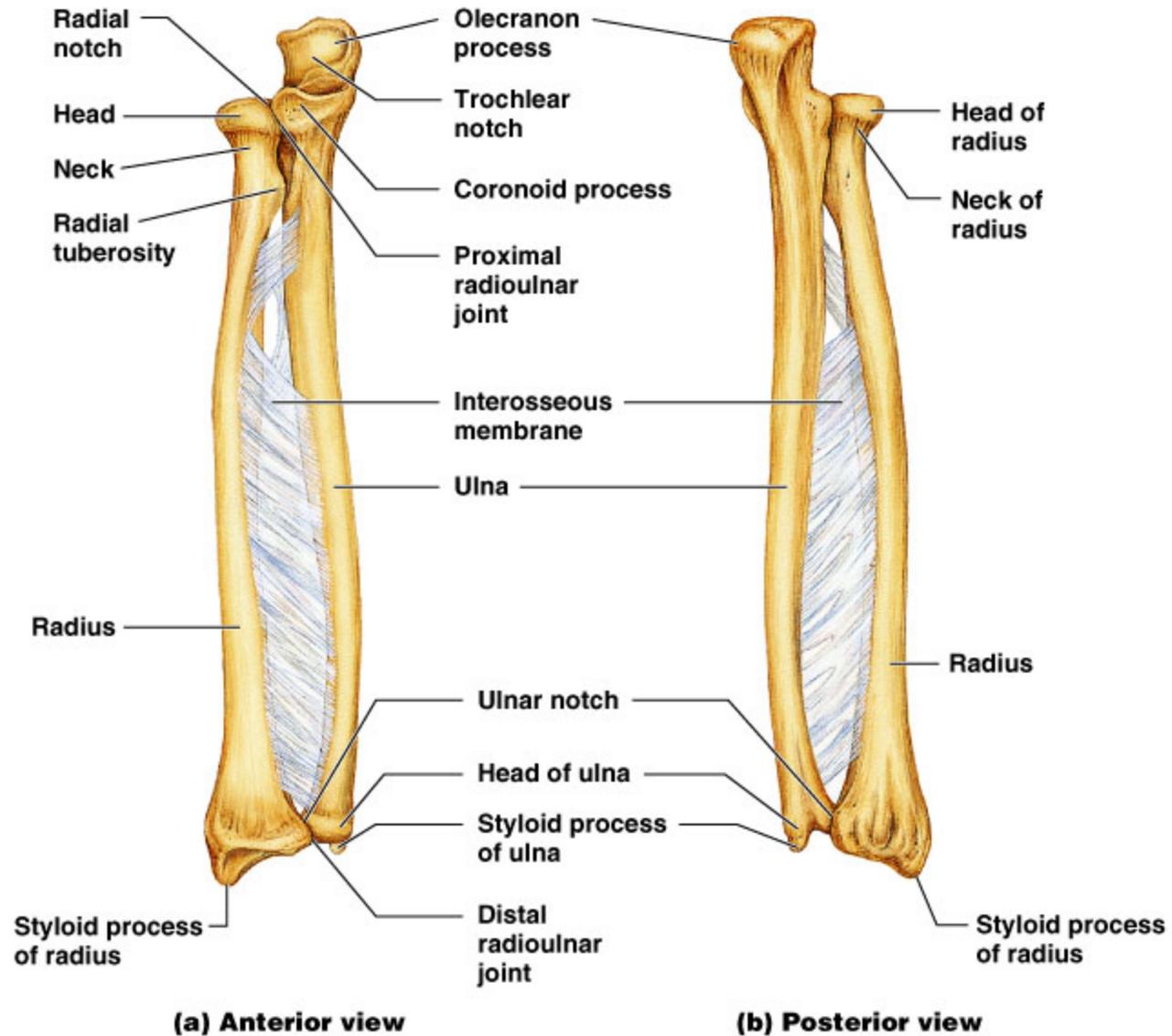
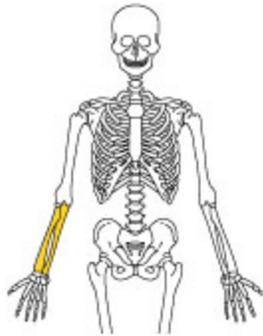
Appendicular Skeleton



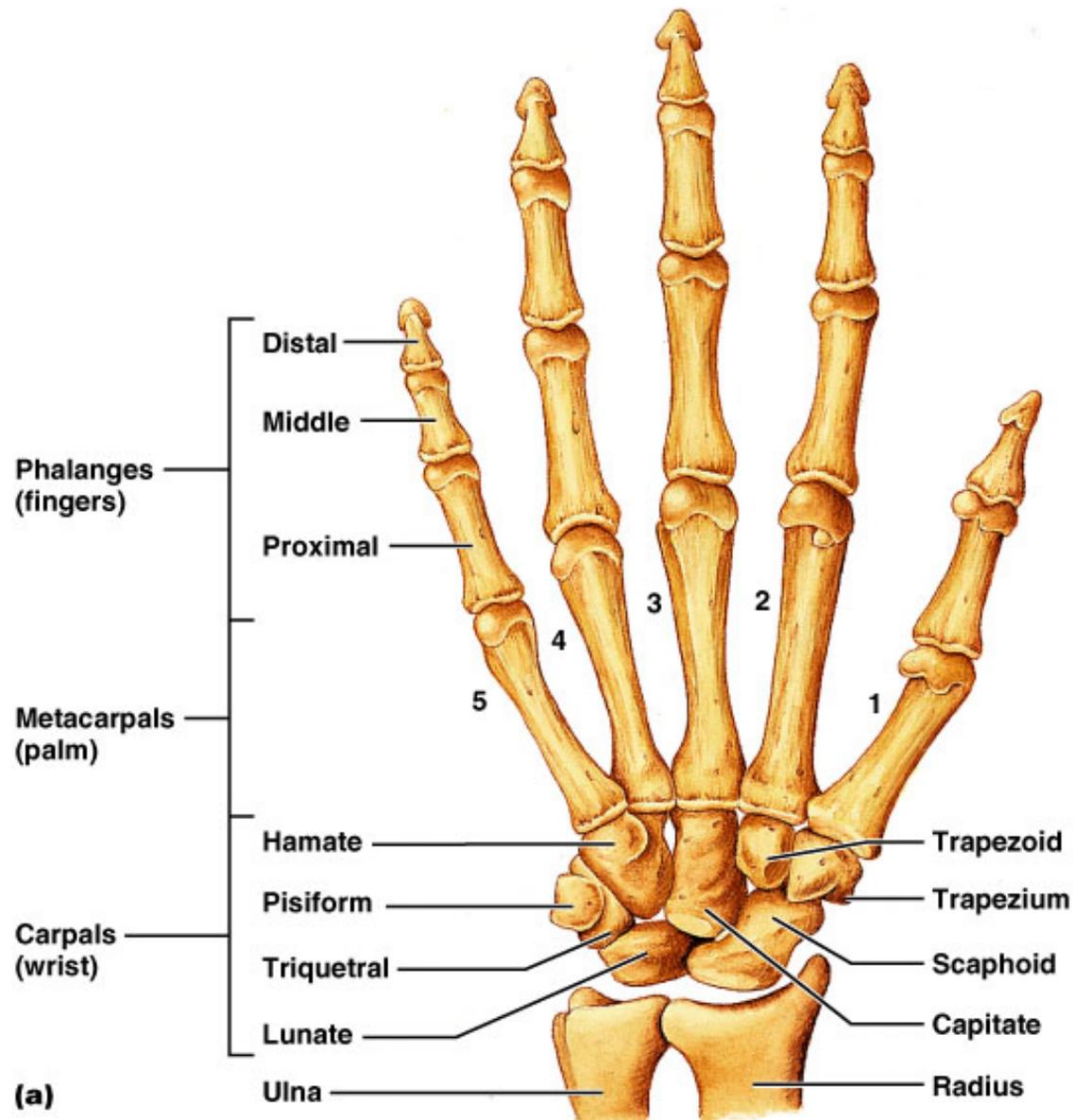
Humerus



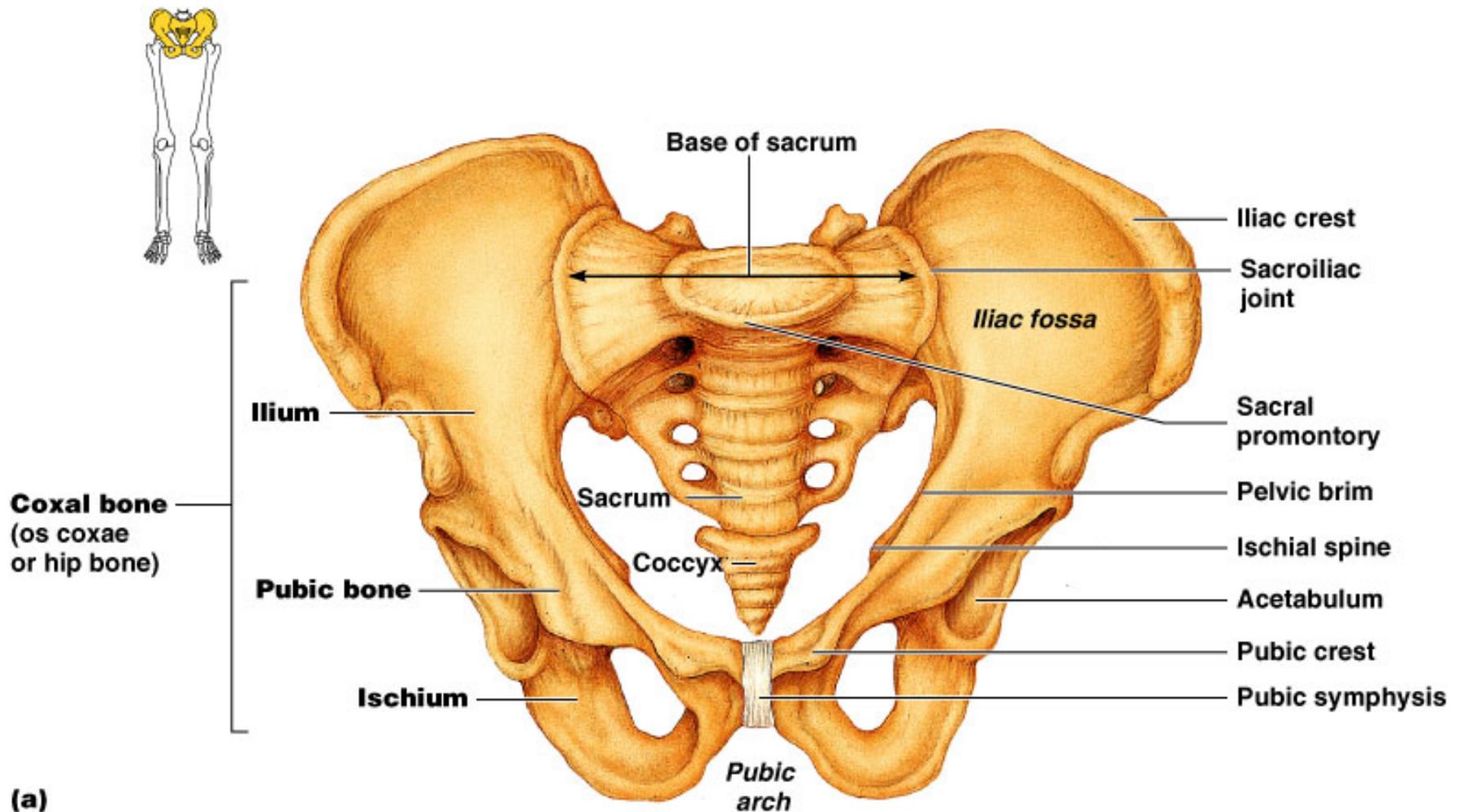
Ulna & Radius



Hand Bones



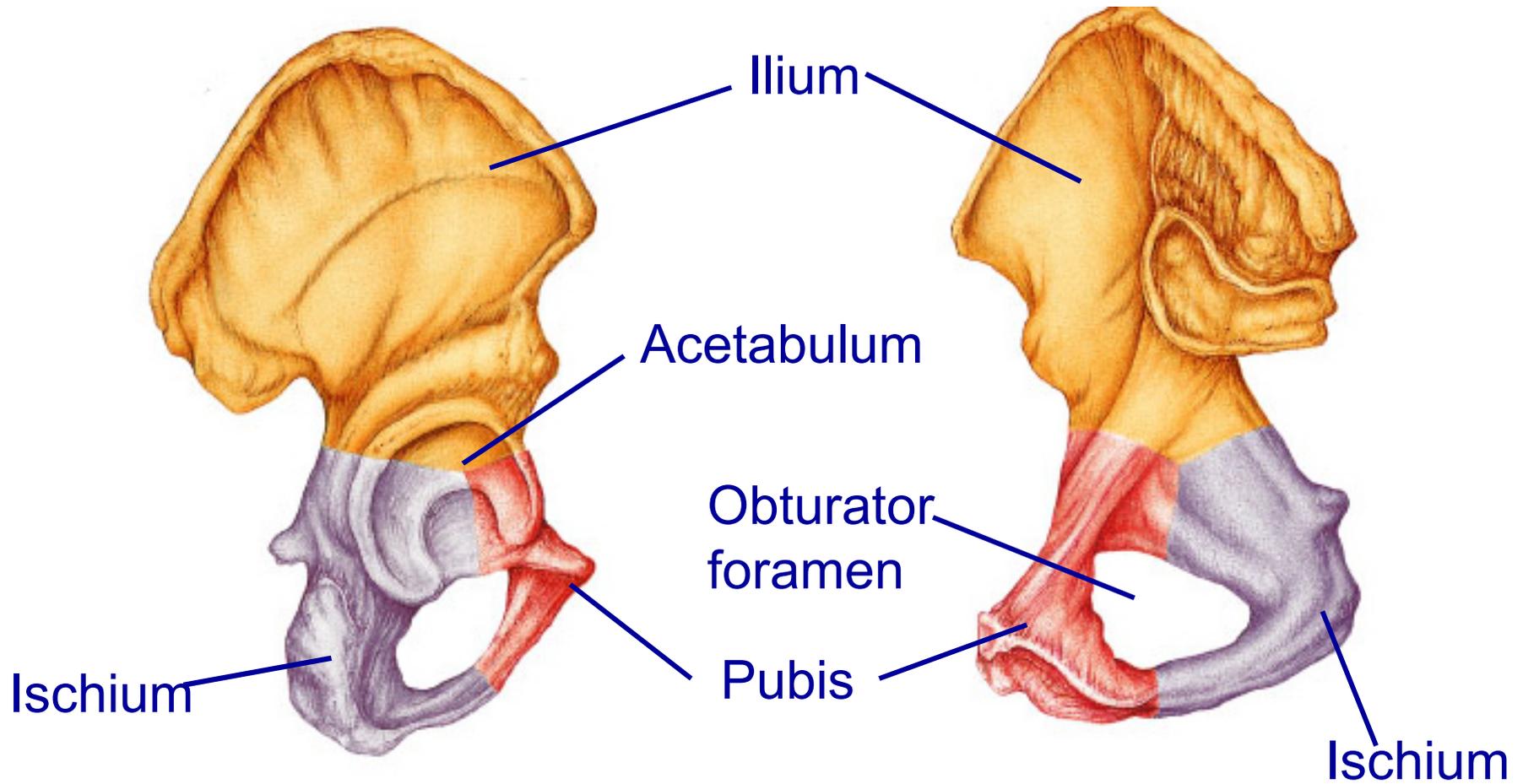
Appendicular Skeleton



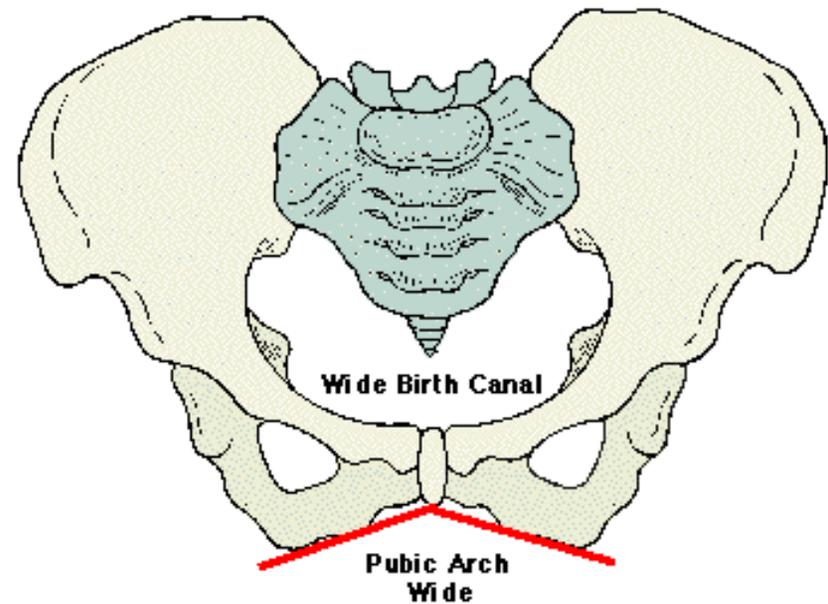
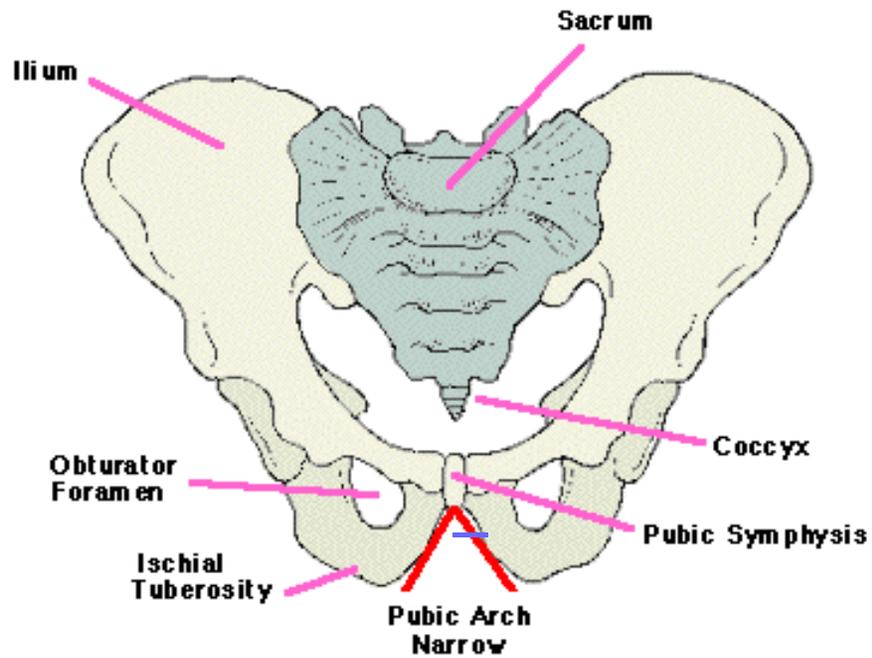
(a)

Appendicular Skeleton

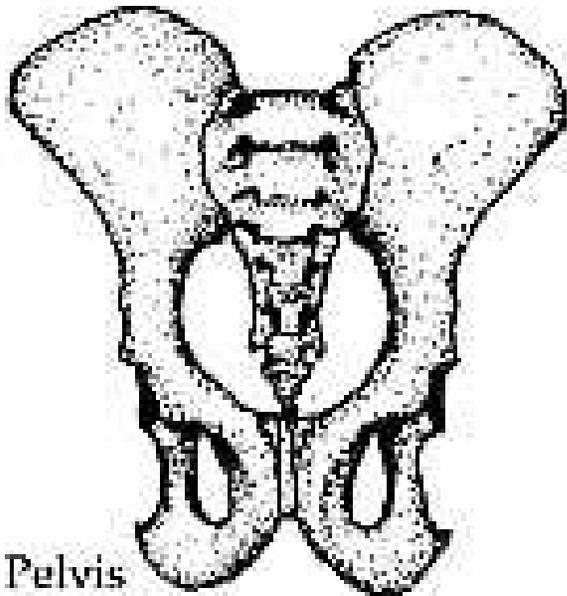
Pelvis (lateral view)



Male vs Female Pelvis

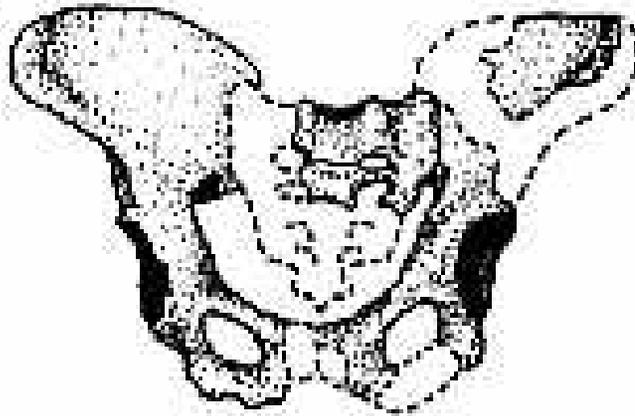


CHIMPANZEE

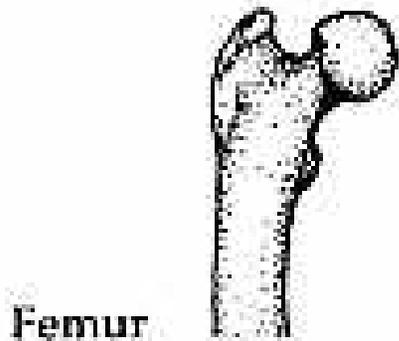
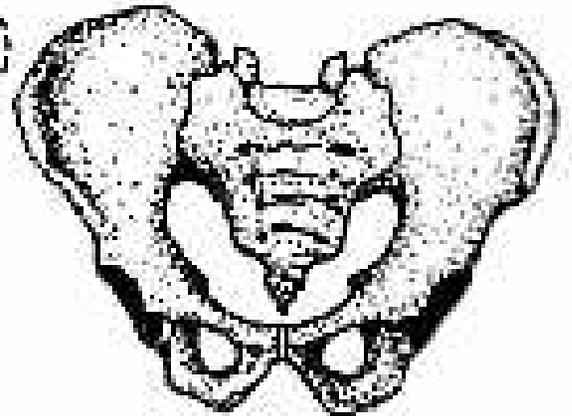


Pelvis

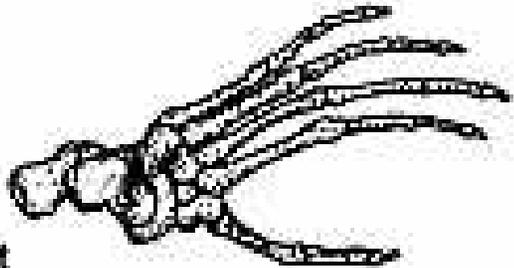
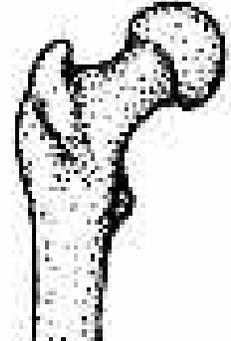
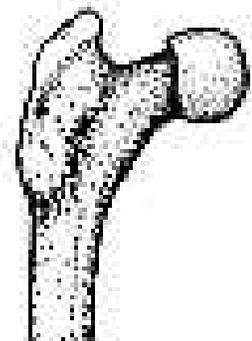
AUSTRALOPITHECUS
AFRICANUS



HUMAN



Femur

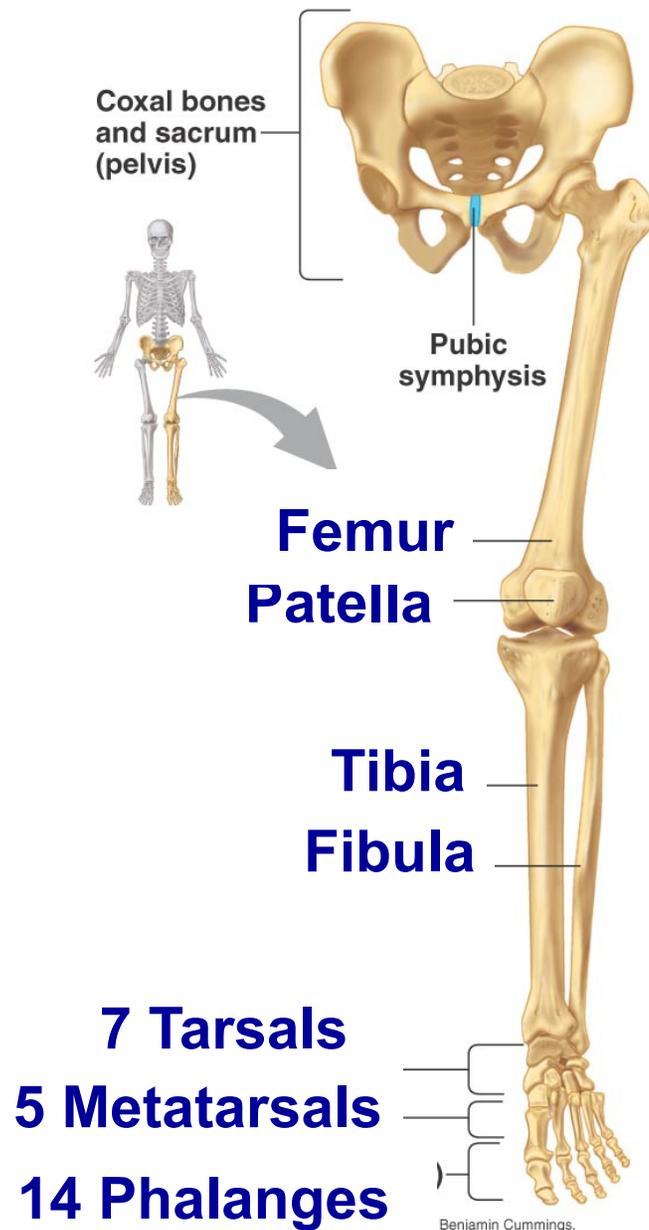


Foot

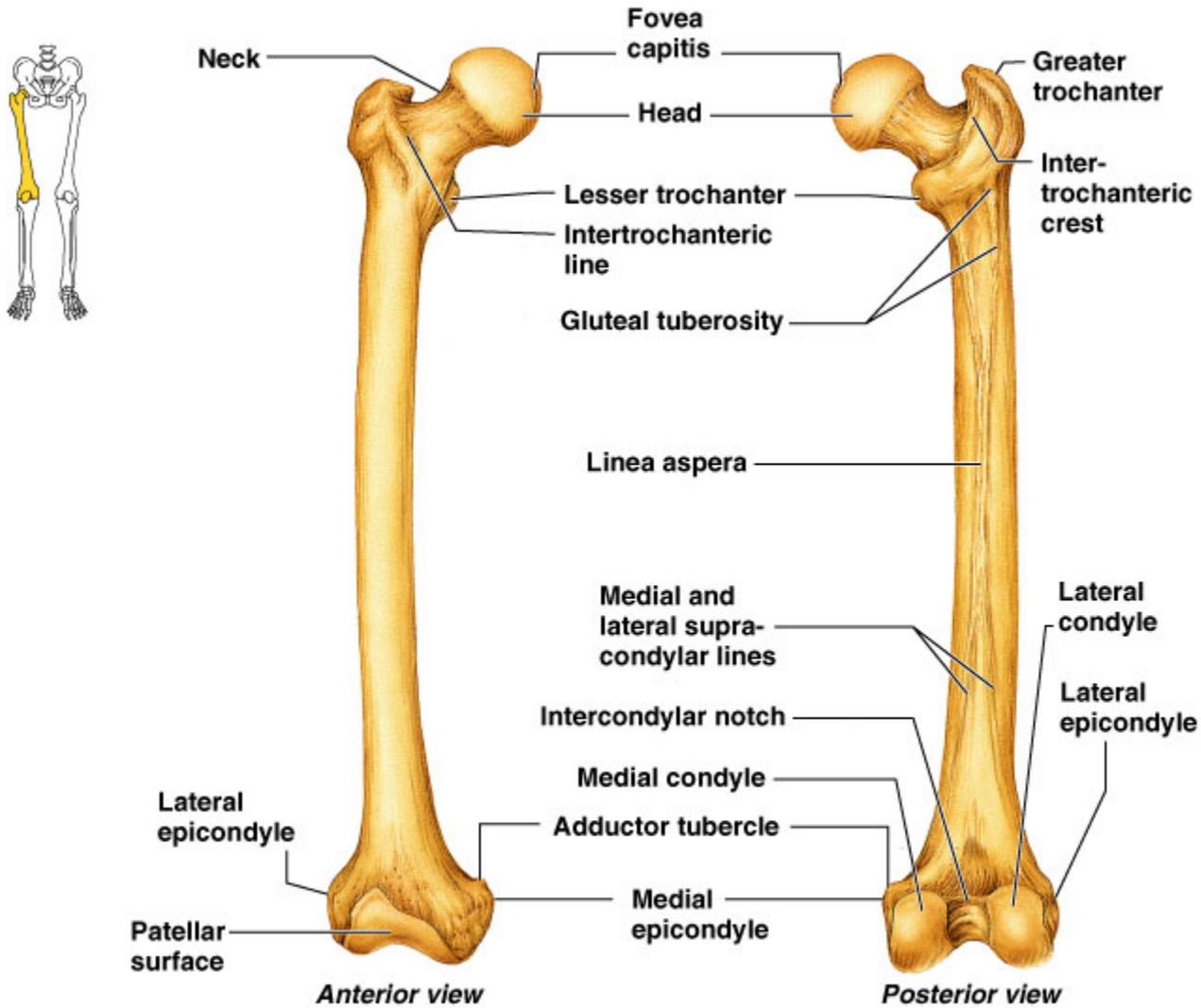


Appendicular Skeleton

The Lower Limb (Legs)

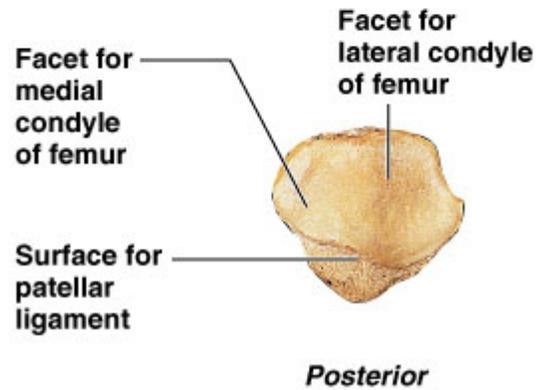
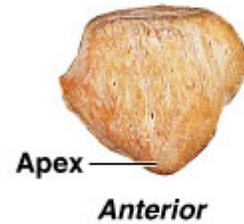
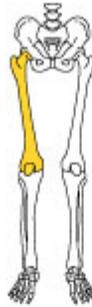


Femur

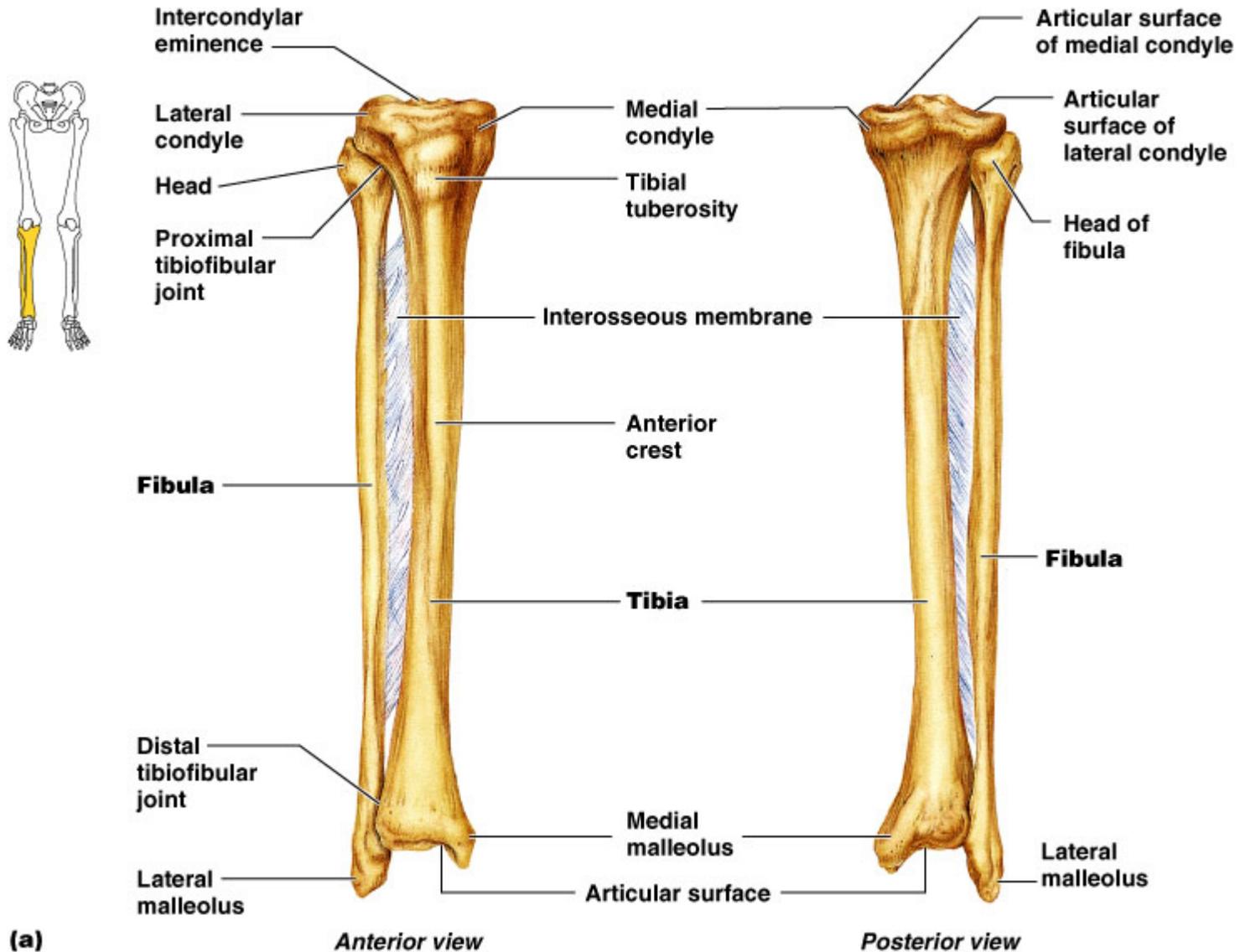


(b) Femur

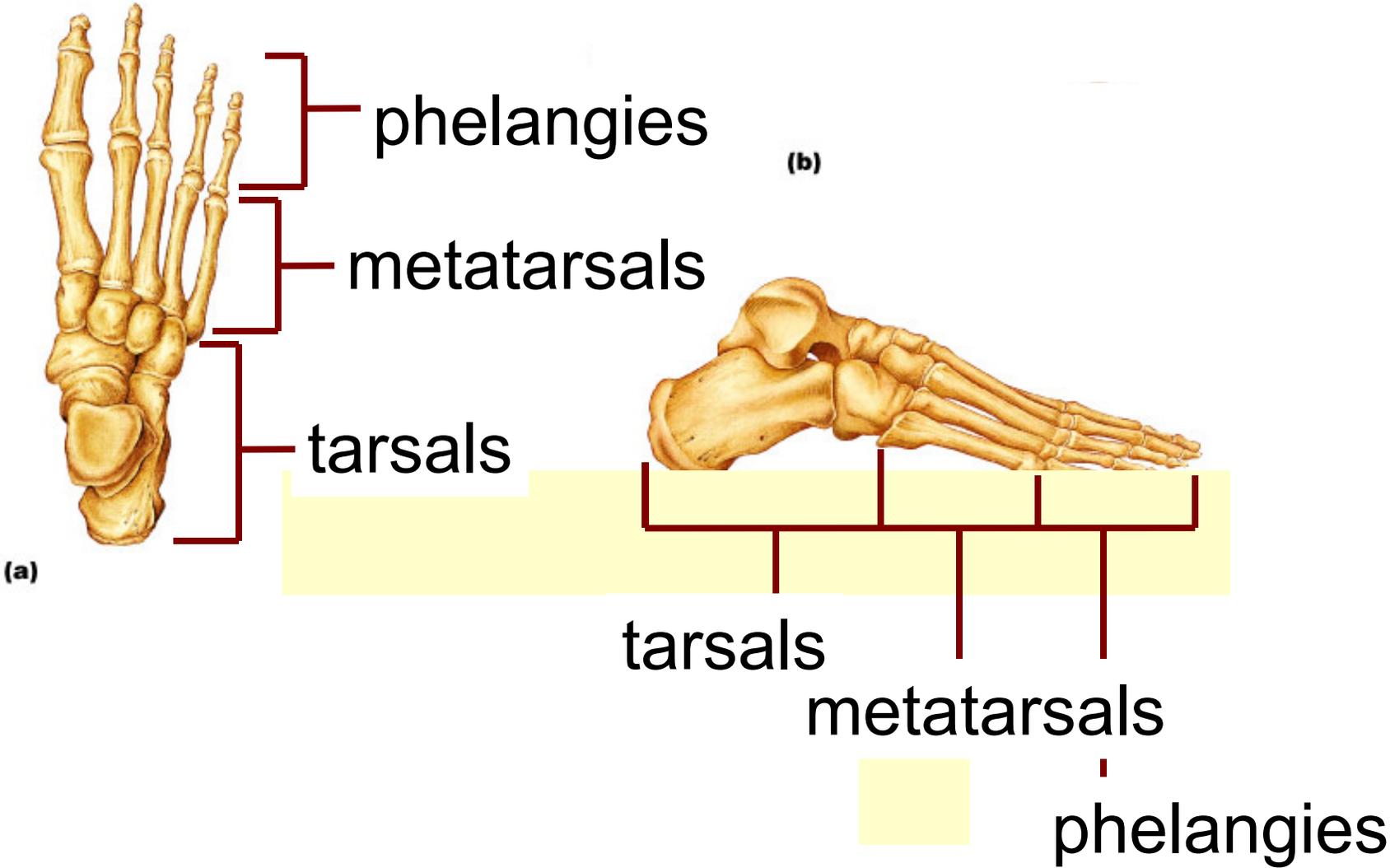
Patella



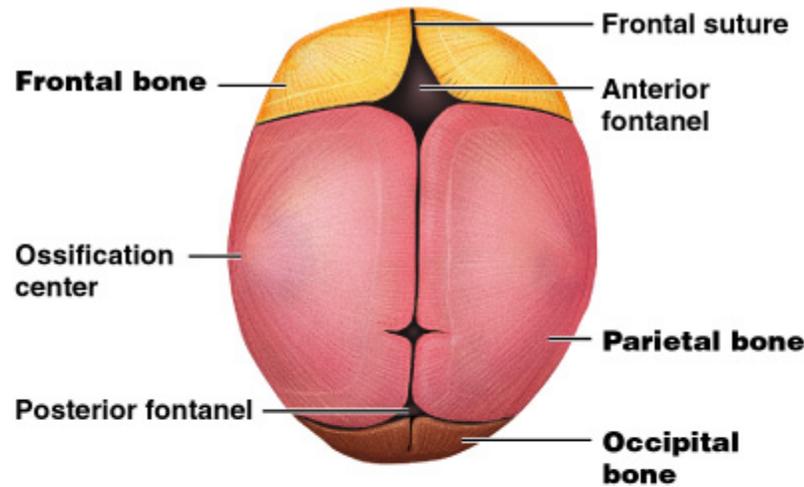
Tibia & Fibula



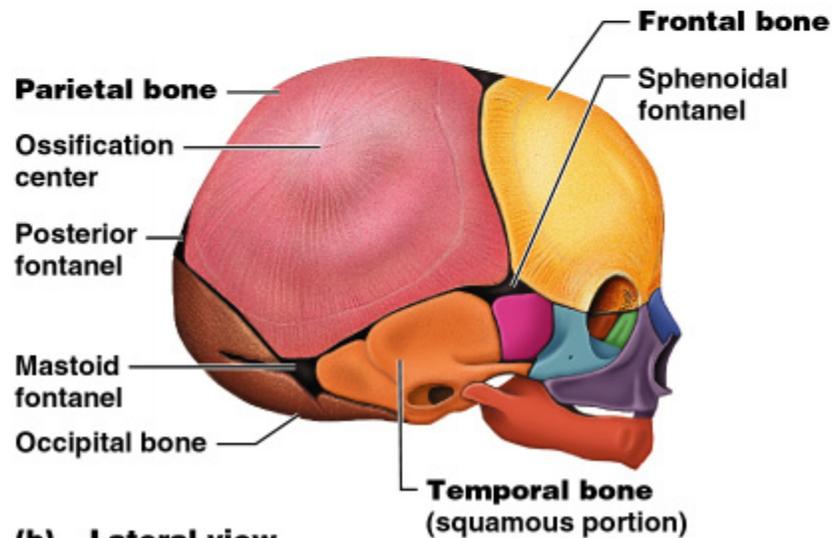
Foot



Fetal Skull



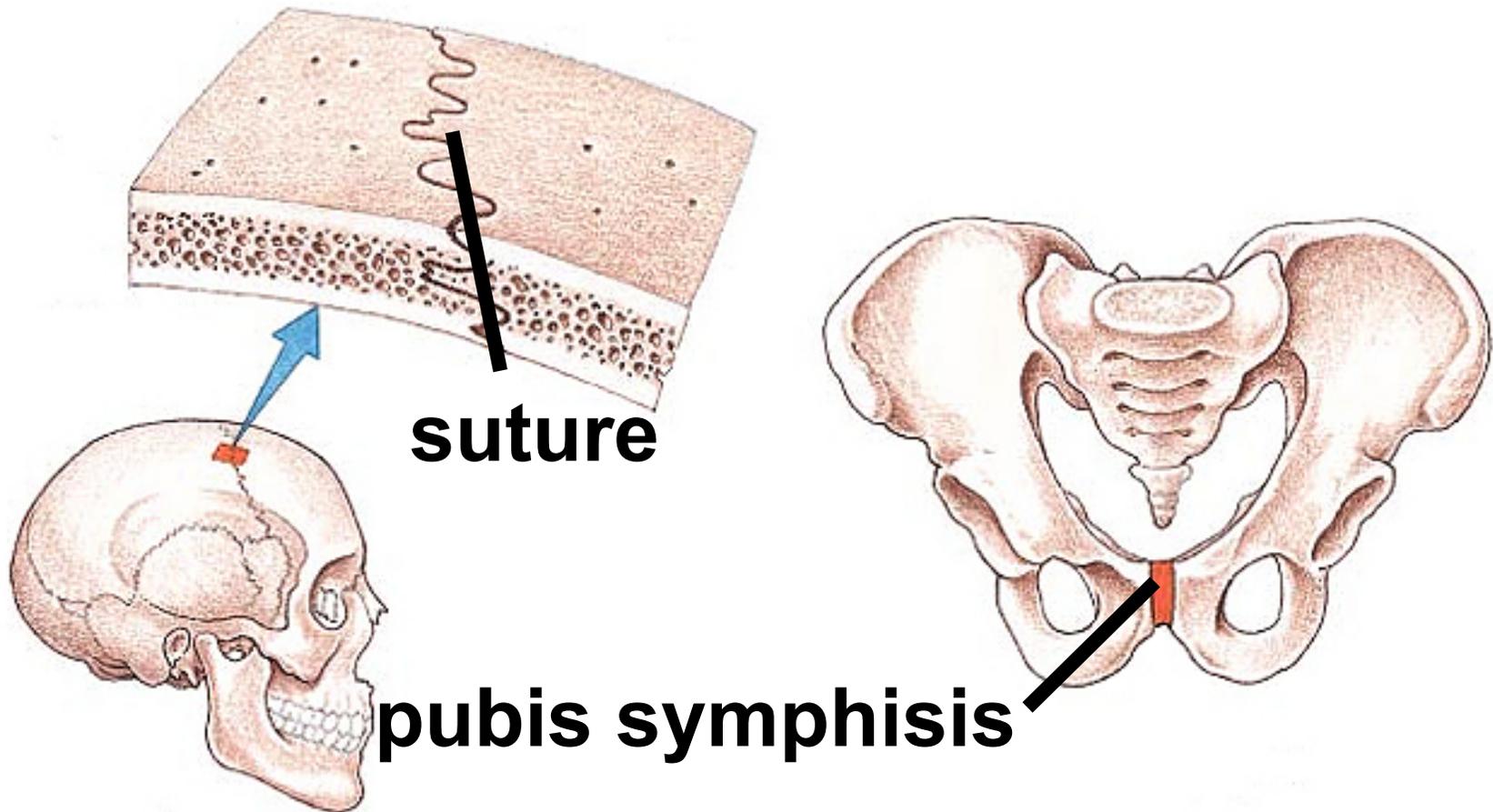
(a) Superior view



(b) Lateral view

Fibrous Joints

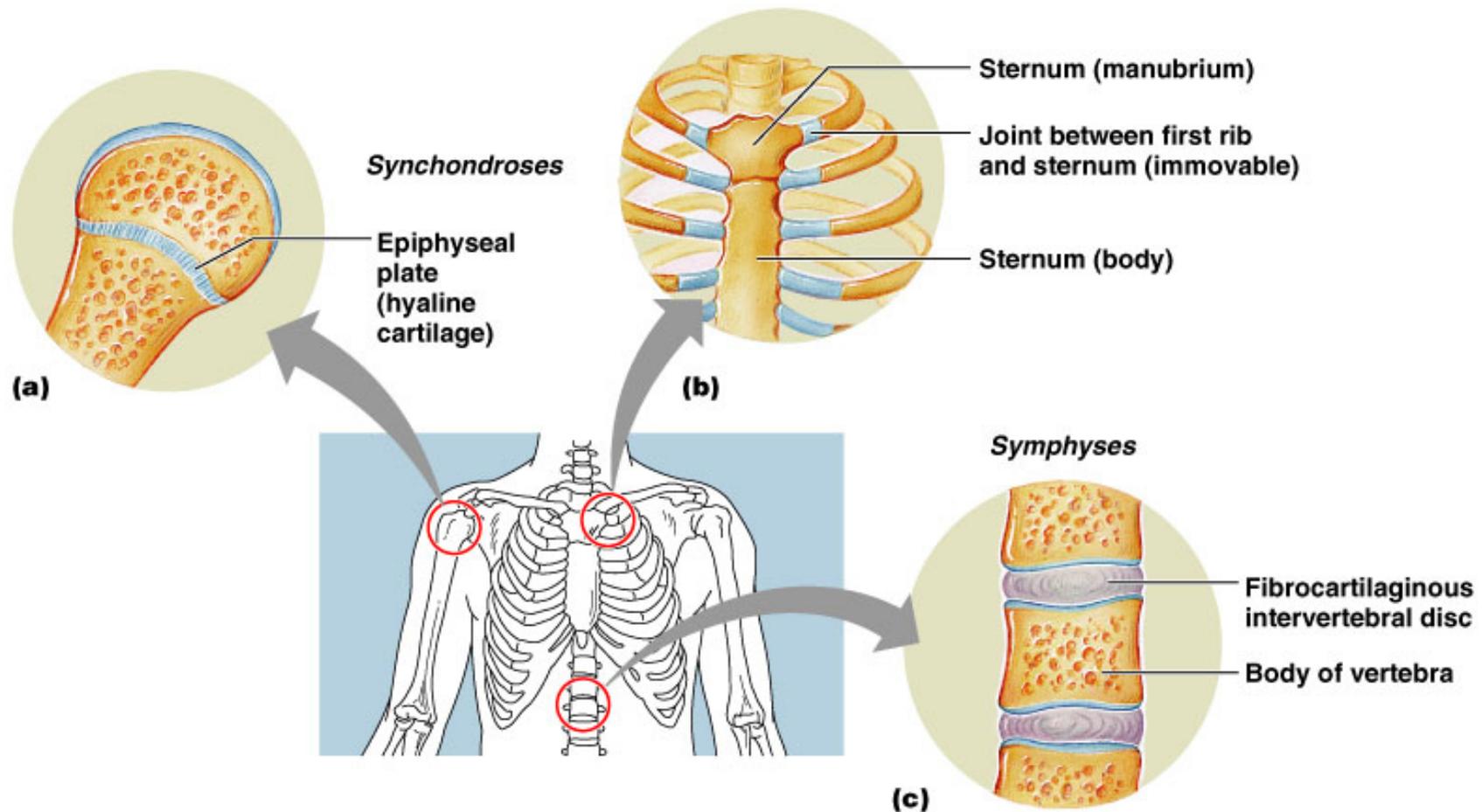
Immovable Joints (synarthrosis)



Cartilagenous Joints

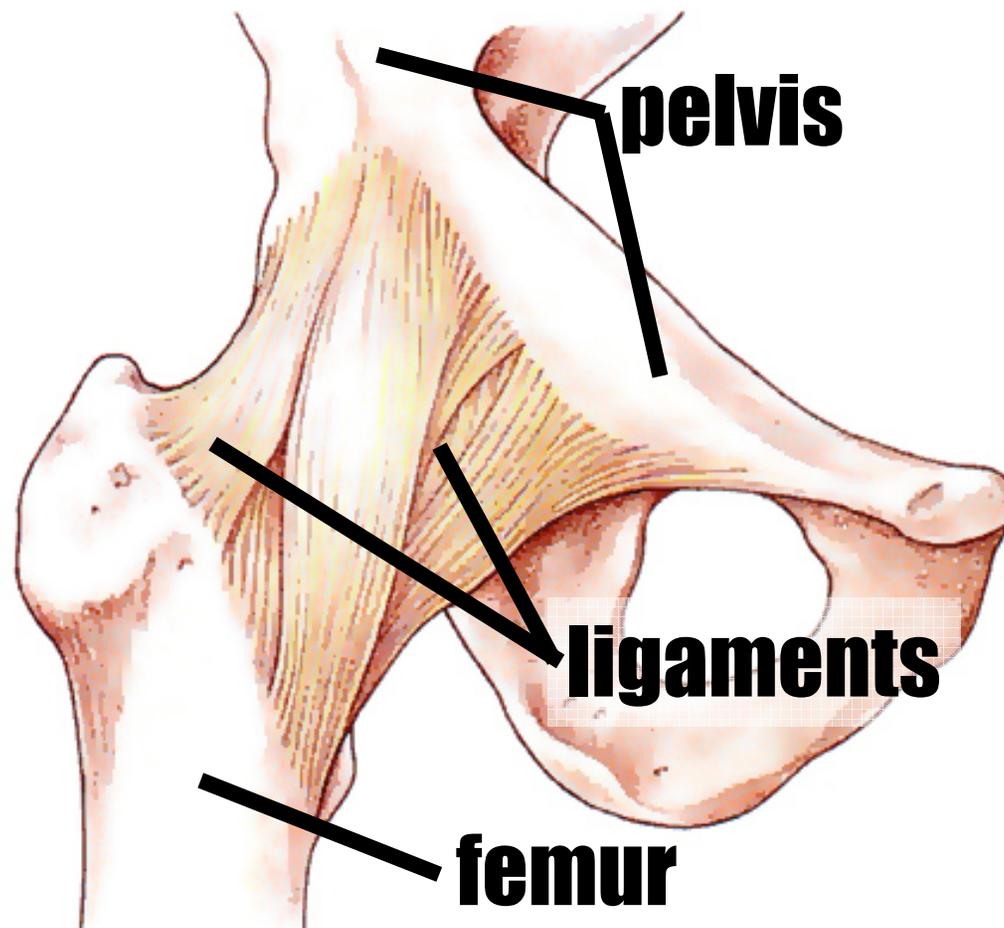
Slightly Movable Joint

(amphiarthrosis)

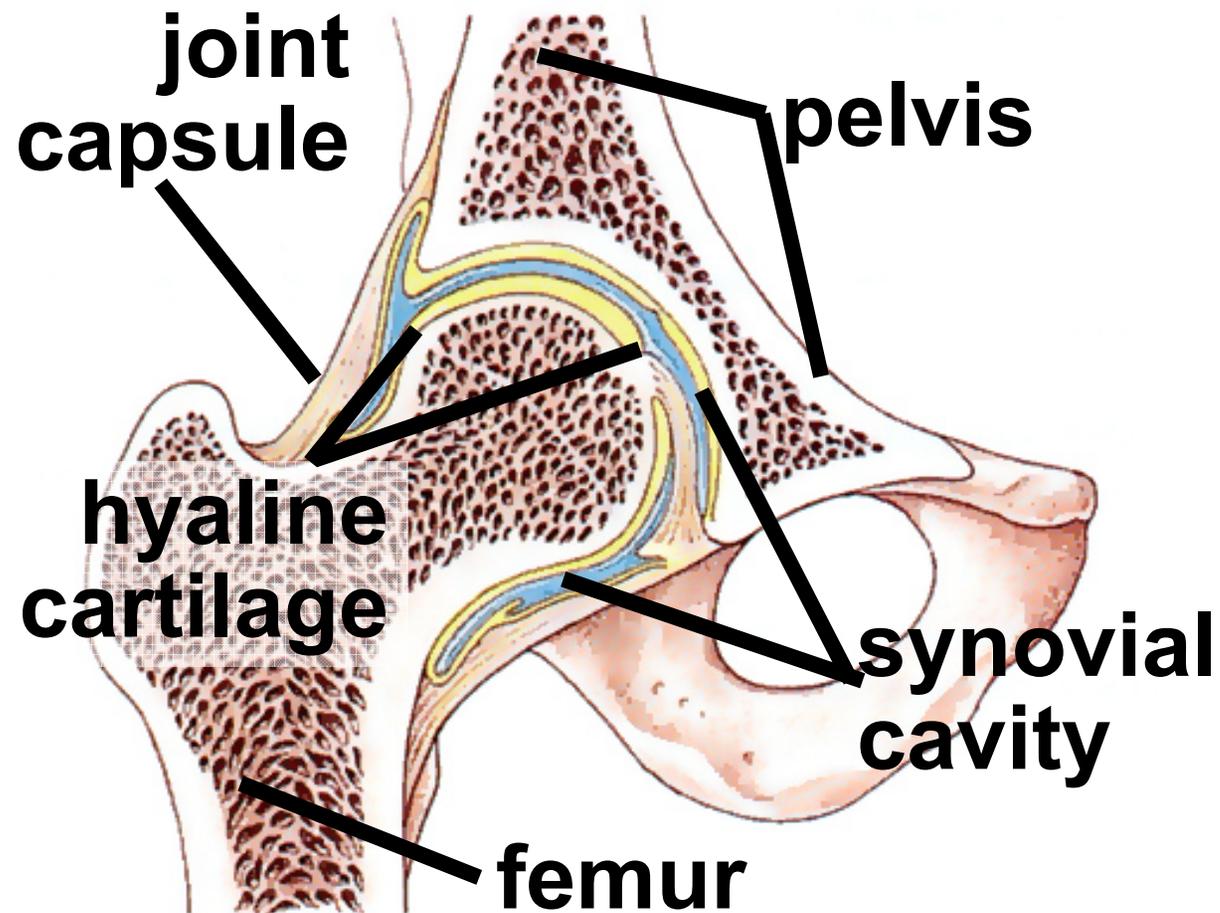


Synovial Joints

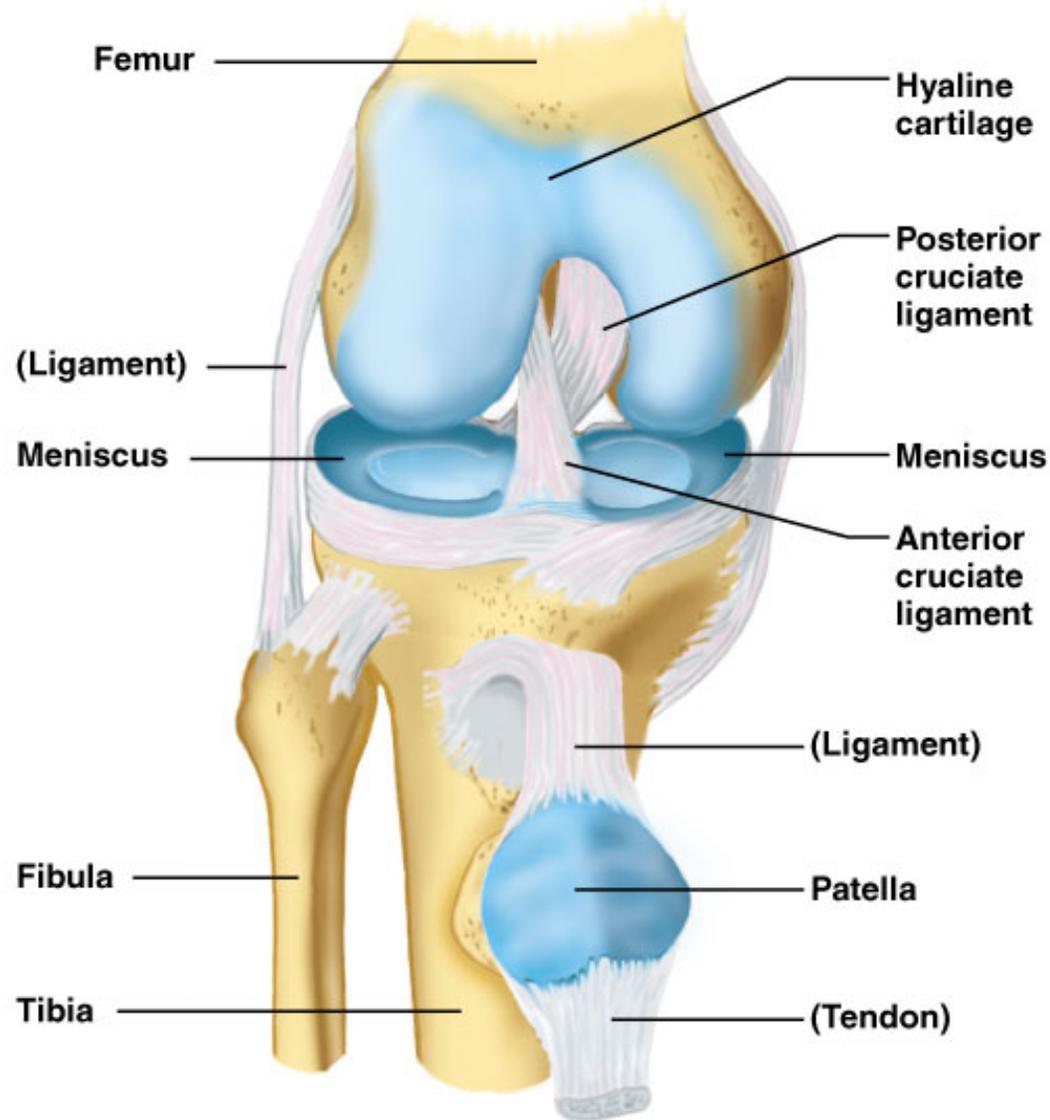
(diarthrosis)-



Synovial Joints



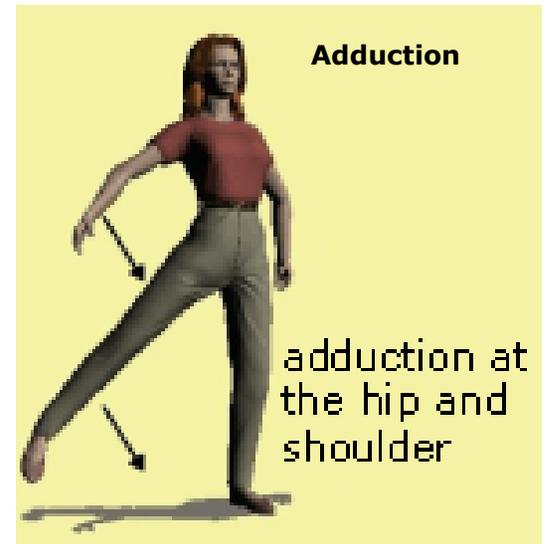
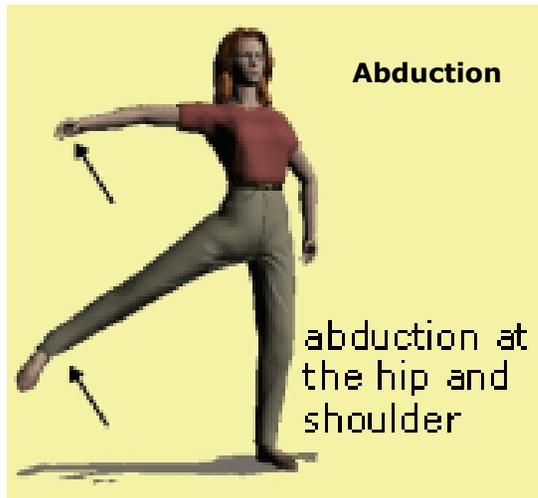
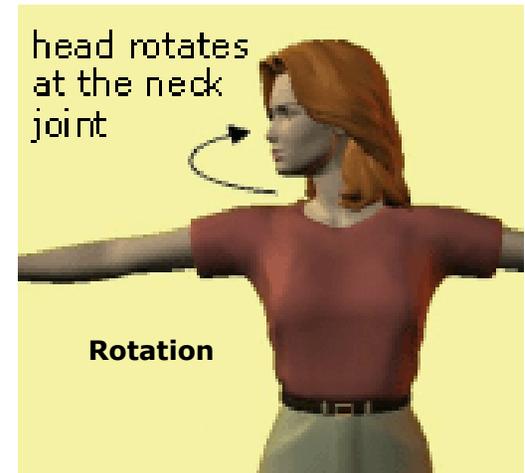
Knee Joint



(a)

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Synovial Joint Movement



Fetal Skeleton

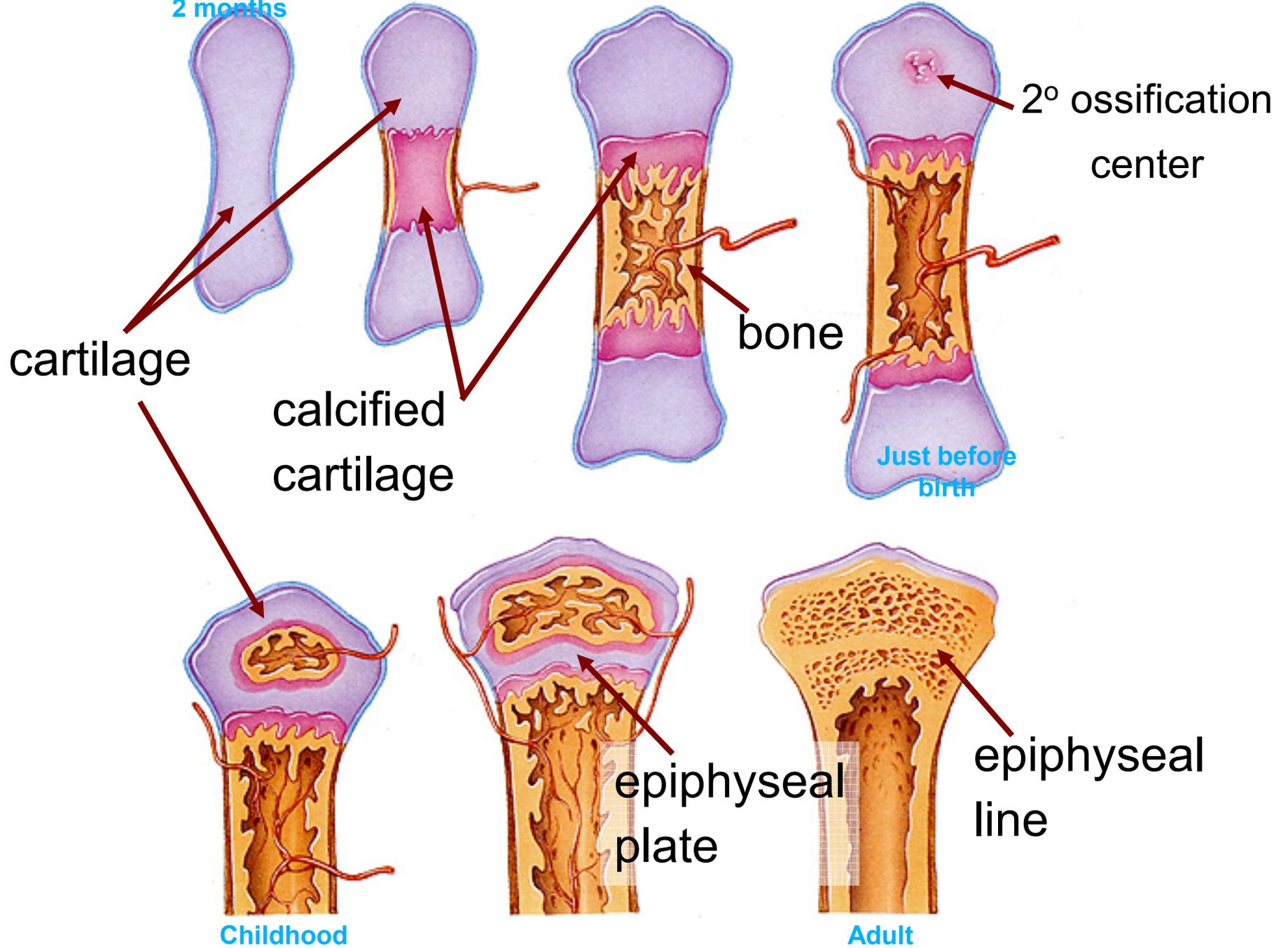
275 bones

12 weeks (6-9
inches long)



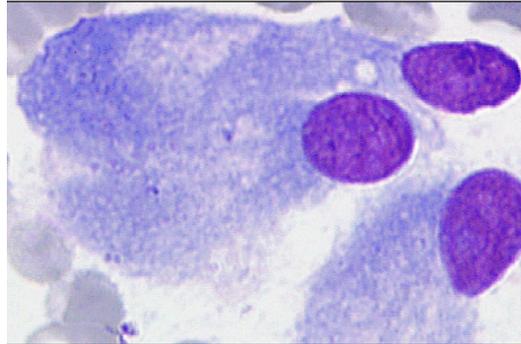
Fetus: 1st
2 months

Endochondral Ossification



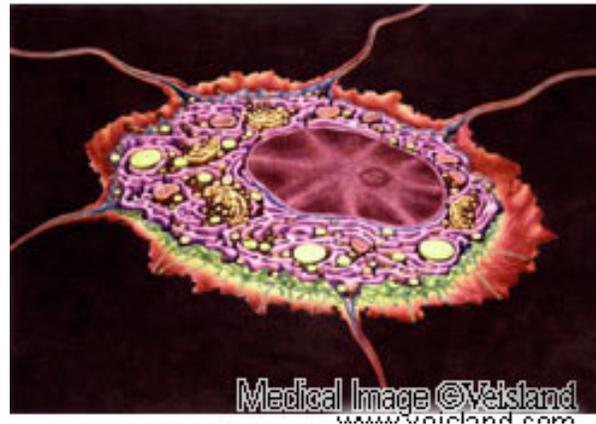
Bone cells that aid in remodeling

Osteoblast



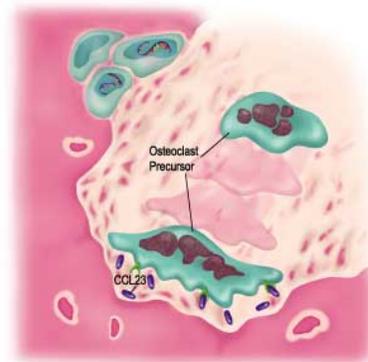
Builds new bone

Osteocyte



Mature bone cell

Osteoclast



Eats bone

Bone Repair:

1. Electrical stimulation of the fracture site:

- Increases speed and completeness of healing
- The e- stimulation inhibits PTH and slow osteoclasts down from reabsorbing bone

2. Ultrasound treatment:

- Daily treatments reduce healing time of broken bones by 25-35%

3. Free vascular fibular graft technique:

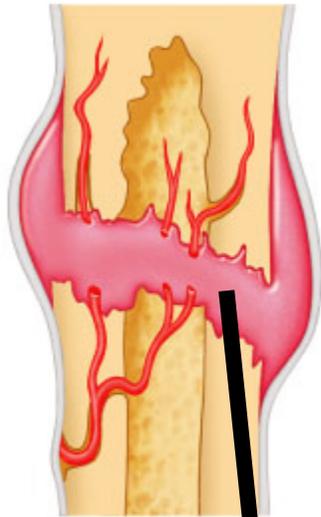
- Transplant fibula in arm
- Gives good blood supply not available in other treatments

4. Bone substitutes:

- Crushed bone from cadaver- but risk of HIV and hepatitis
- Sea bone- coral
- Artificial bone- ceramic



Repair of Fractures



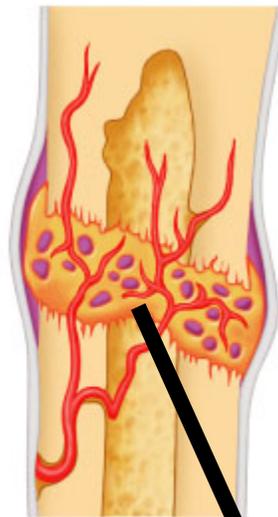
①

hematoma



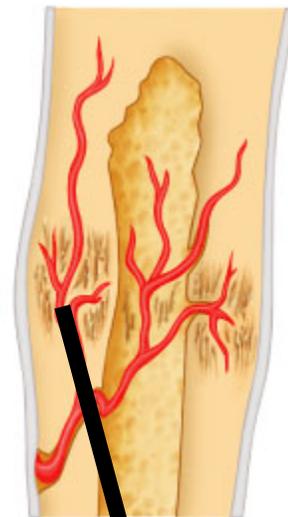
②

callus



③

bony callus



④

bone remodeling

Diseases of the Skeletal System:

Osteoporosis- bone reabsorption outpaces bone deposit; bones become lighter and fracture easier

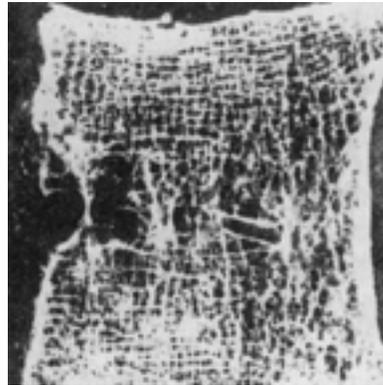
Factors:

- age, gender (more in women)
- estrogen and testosterone decrease
- insufficient exercise (or too much)
- diet poor in Ca^{++} and protein
- abnormal vitamin D receptors
- smoking

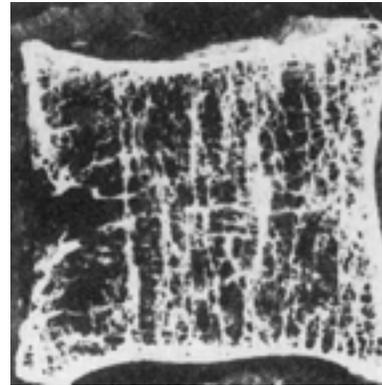
Osteoporosis



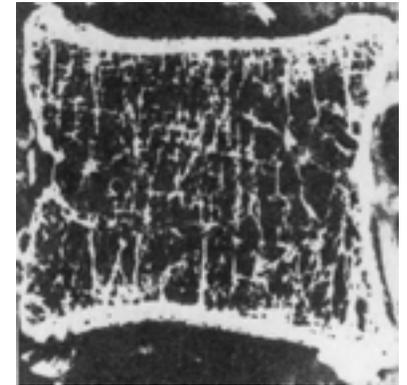
29



40



84



92

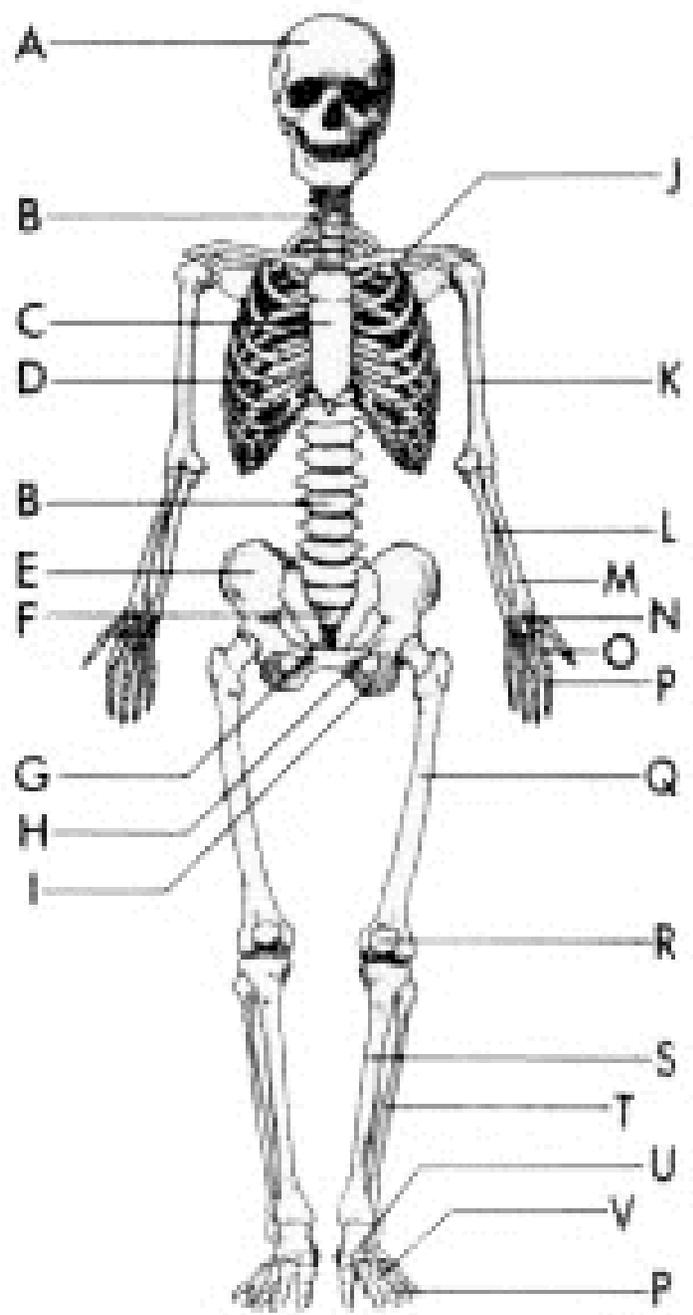
Diseases of the Skeletal System:

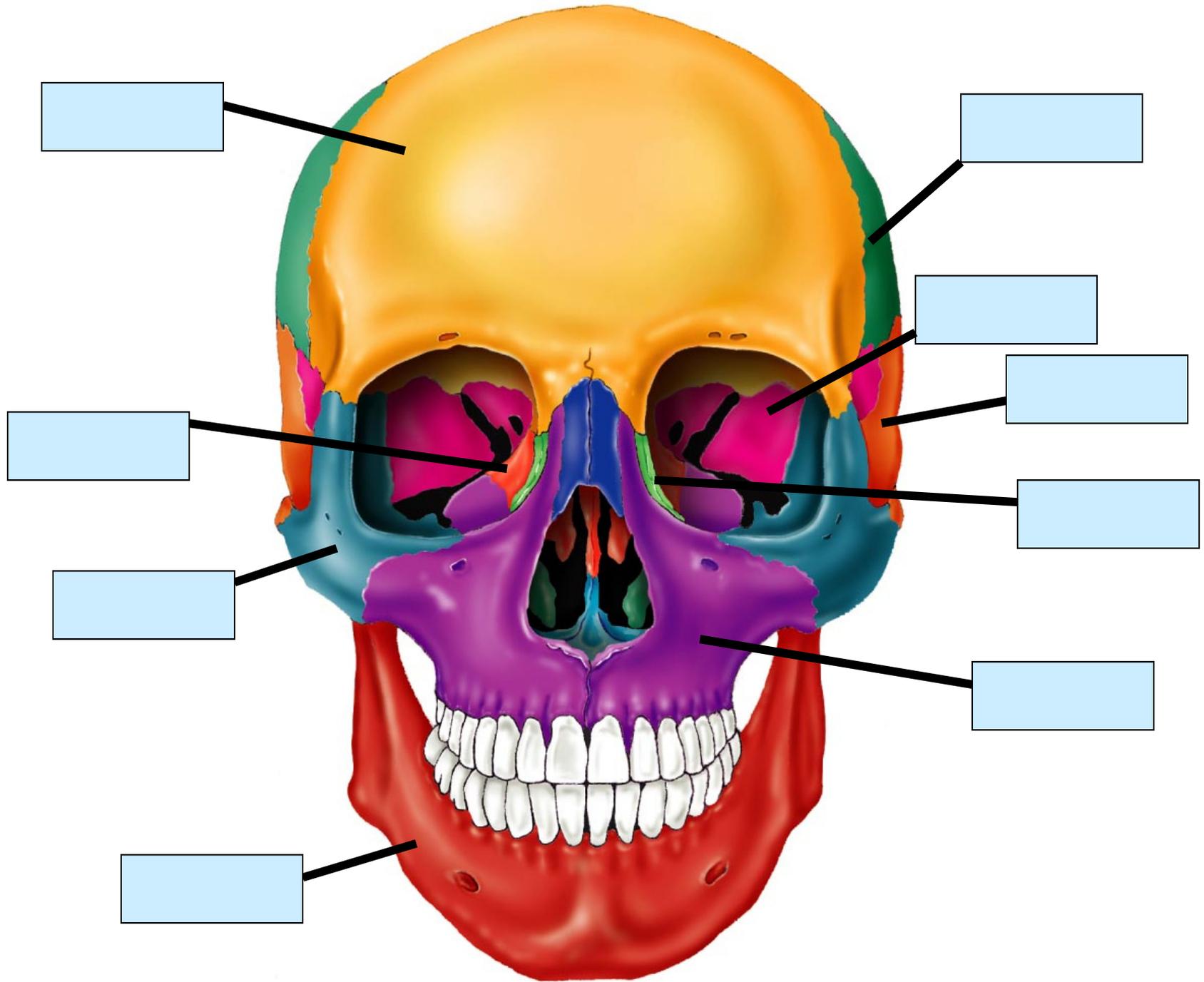
Rickets- vitamin D deficiency

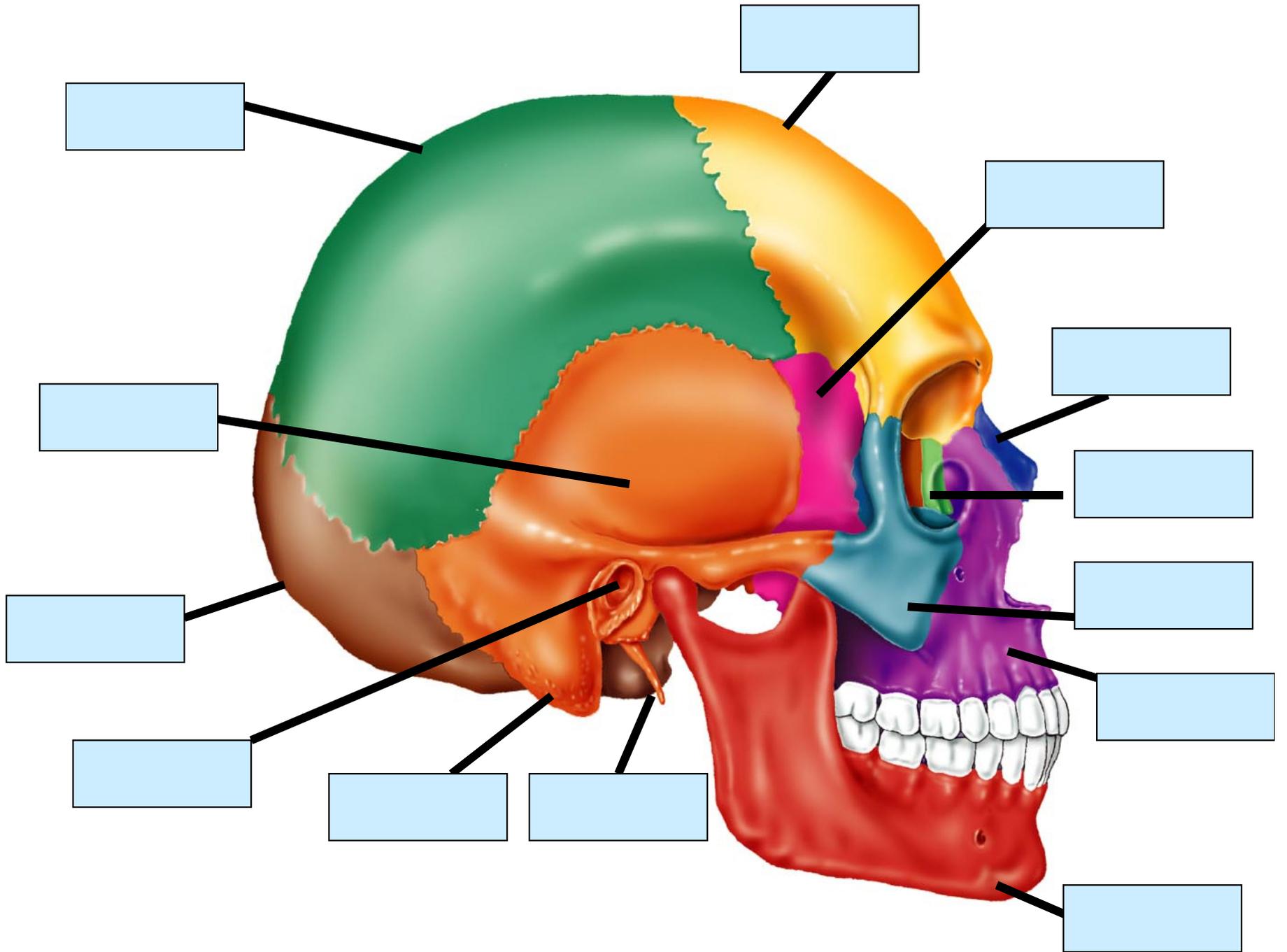
Osteomalacia- soft bones, inadequate mineralization in bones, lack of vitamin D

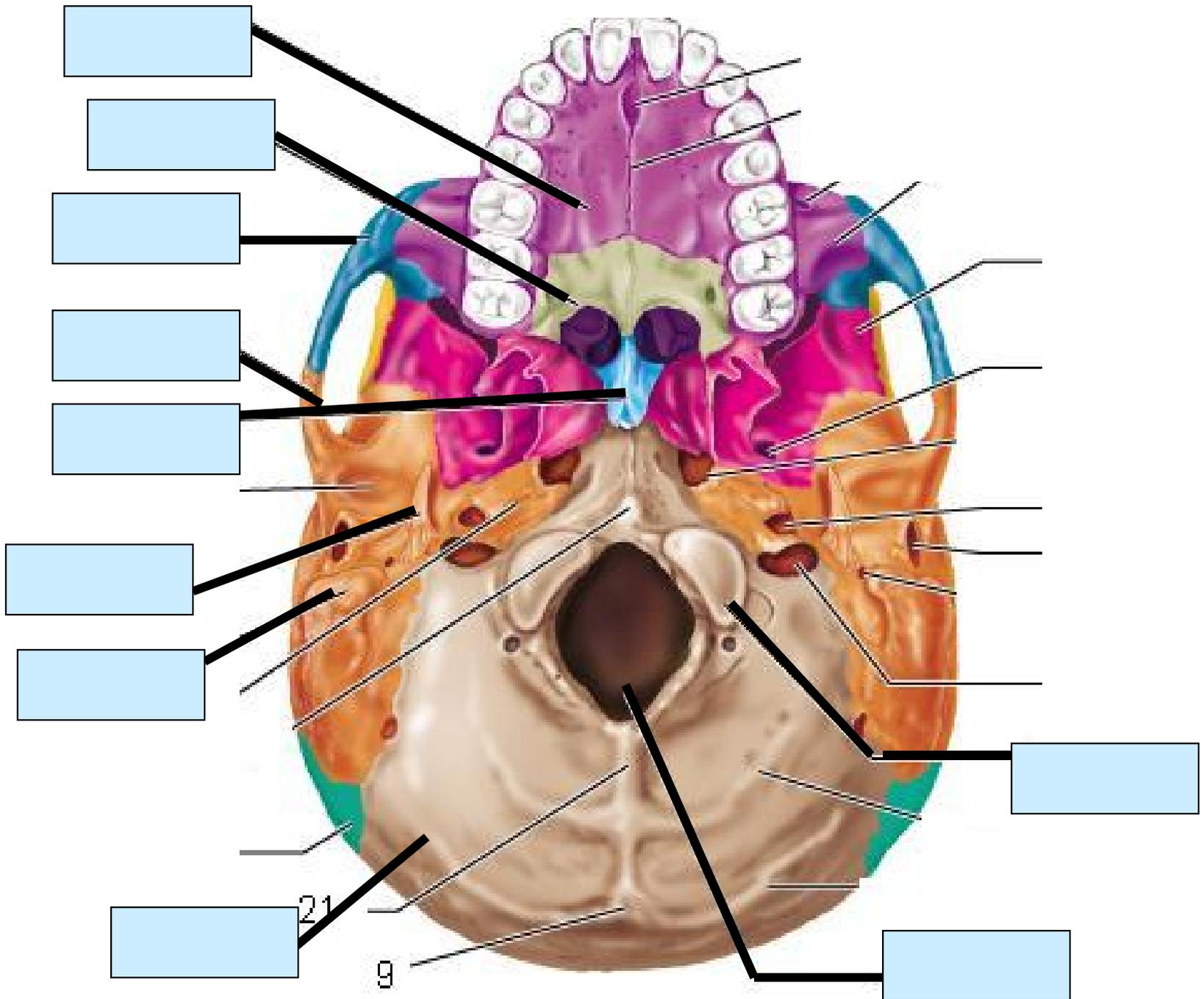
Pagets Disease- spotty weakening in the bones, excessive and abnormal bone remodeling

Rheumatoid arthritis- autoimmune reaction

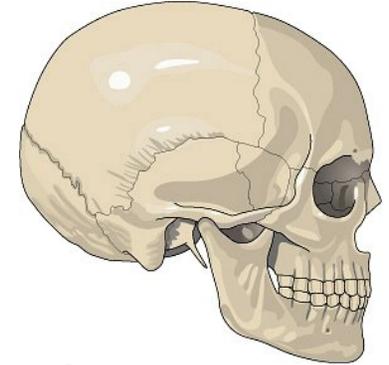








INQUIRY



1. What is a fontanel?
2. How many bones in the adult skeleton?
3. What is the difference between the appendicular and axial skeleton?
4. What is a meniscus?
5. Demonstrate adduction.
6. Weight bearing vertebrae are called?
7. What does an osteoclast do?

Extra Credit: 1-page reaction paper on bipedalism and problems associated with our human frame. Attach article. Turn in 1-week from today.

<http://www.youtube.com/watch?v=DSHoonPWwXQ>