



# **The Skeletal System**

# The Skeletal System

- Parts of the skeletal system
  - Bones (skeleton)
  - Joints
  - Cartilages
  - Ligaments (bone to bone)
  - (tendon=bone to muscle)
- Divided into two divisions
  - Axial skeleton
  - Appendicular skeleton – limbs and girdle



# Functions of Bones

- Support of the body
- Protection of soft organs
- Movement due to attached skeletal muscles
- Storage of minerals and fats
- Blood cell formation

# Bones of the Human Body

- The skeleton has 206 bones
- Two basic types of bone tissue
  - Compact bone
    - Homogeneous
  - Spongy bone
    - Small needle-like pieces of bone
    - Many open spaces

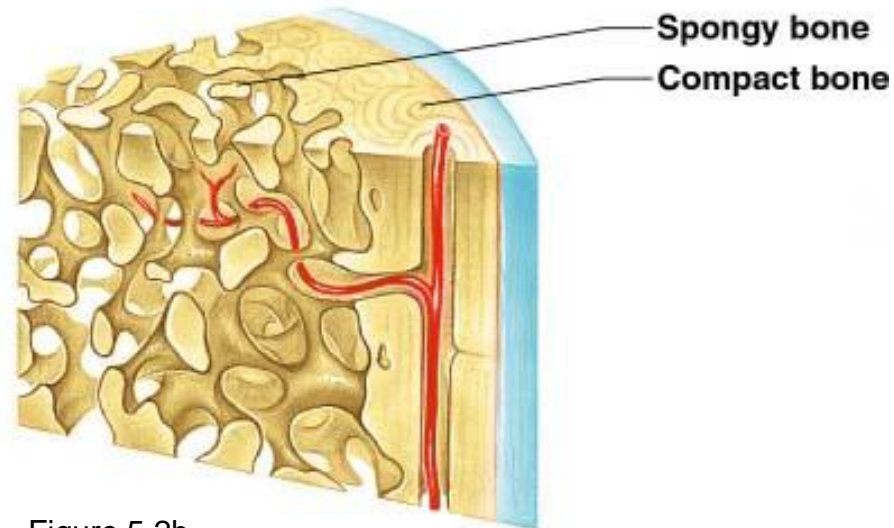


Figure 5.2b

# Classification of Bones

- Long bones
  - Typically longer than wide
  - Have a shaft with heads at both ends
  - Contain mostly compact bone
    - Examples: Femur, humerus

# Types of Bone Cells

- Osteocytes
  - Mature bone cells
- Osteoblasts
  - Bone-forming cells
- Osteoclasts
  - Bone-destroying cells
  - Break down bone matrix for remodeling and release of calcium
- Bone remodeling is a process by both osteoblasts and osteoclasts

# Bone Fractures

- A break in a bone
- Types of bone fractures
  - Closed (simple) fracture – break that does not penetrate the skin
  - Open (compound) fracture – broken bone penetrates through the skin
- Bone fractures are treated by reduction and immobilization
  - Realignment of the bone

# Common Types of Fractures







Fracture type	Illustration	Description	Comment
Comminuted		Bone breaks into many fragments.	Particularly common in the aged, whose bones are more brittle.
Compression		Bone is crushed. (i.e., osteoporotic bones).	Common in porous bones
Depressed		Broken bone portion is pressed inward.	Typical of skull fracture.
Impacted		Broken bone ends are forced into each other.	Commonly occurs when one attempts to break a fall with outstretched arms
Spiral		Ragged break occurs when excessive twisting forces are applied to a bone.	Common sports fracture.
Greenstick		Bone breaks incompletely, much in the way a green adults.	Common in children, whose bones are more flexible than those of

Table 5.2

# Stages in the Healing of a Bone Fracture

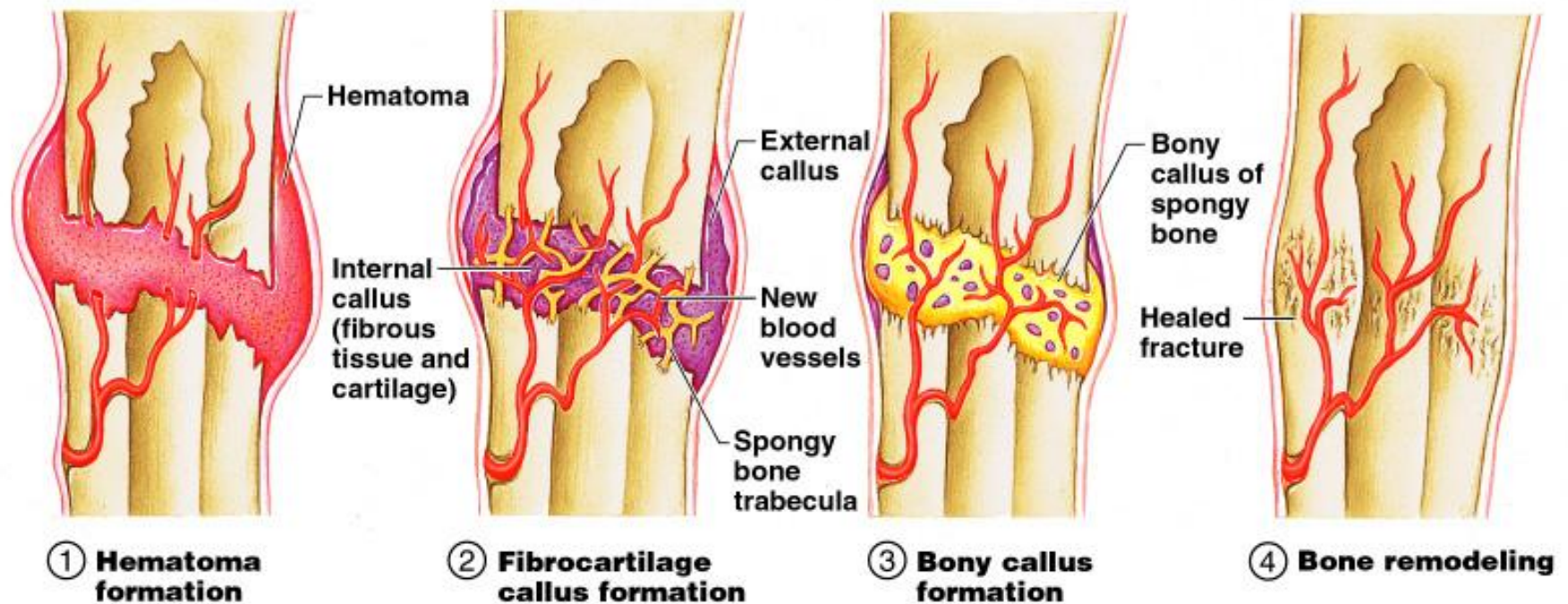


Figure 5.5

# The Hyoid Bone

- The only bone that does not articulate with another bone
- Serves as a moveable base for the tongue

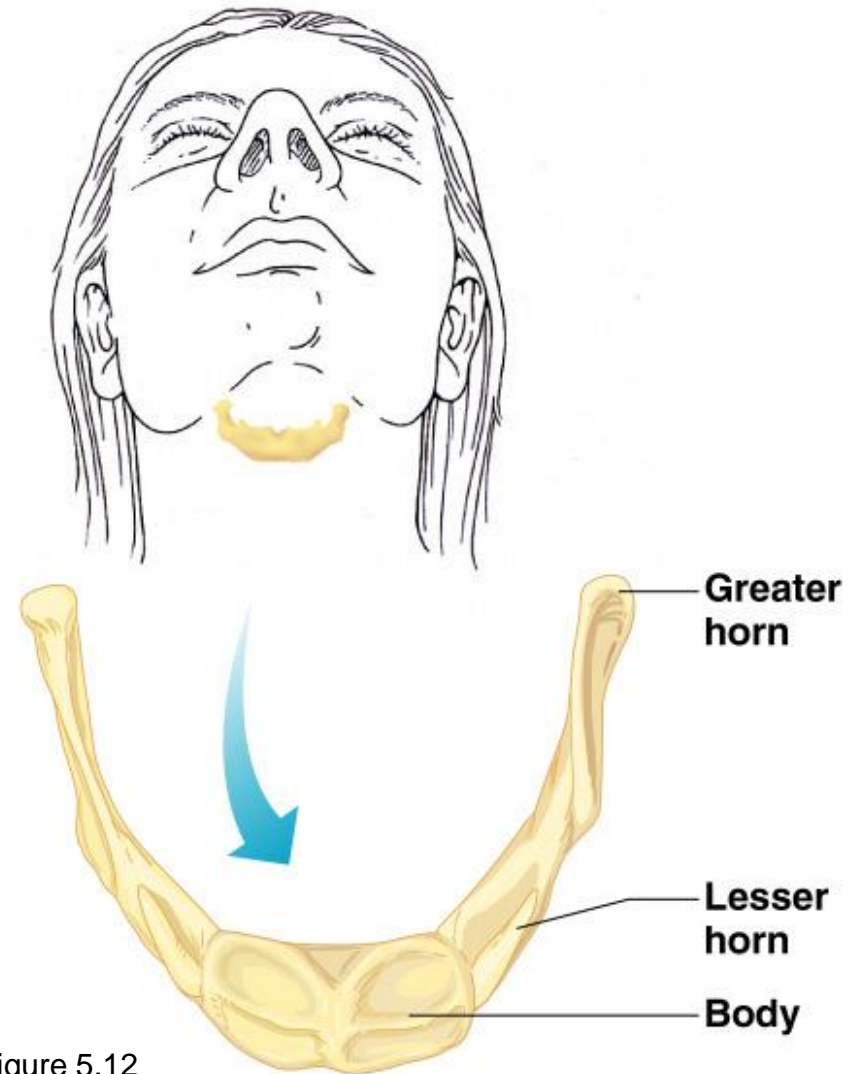


Figure 5.12

# Bones of the Upper Limb

- The arm is formed by a single bone
  - Humerus

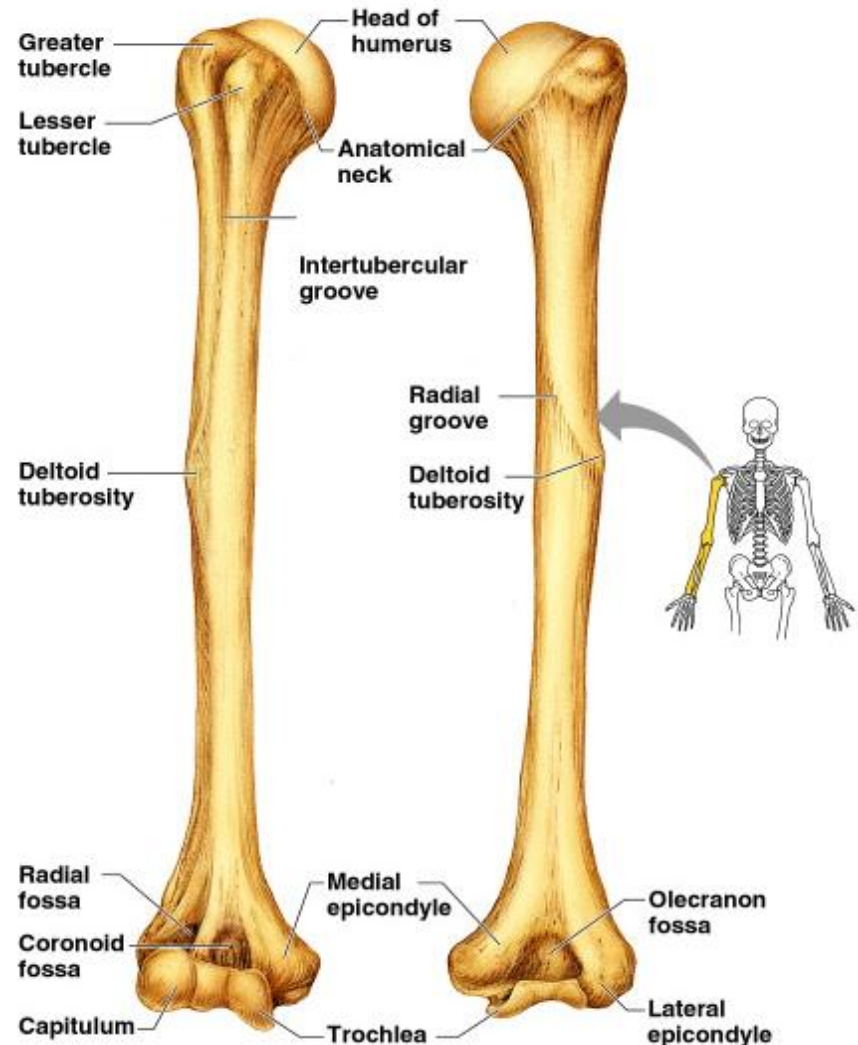


Figure 5.21a, b

# Bones of the Upper Limb

- The forearm has two bones
  - Ulna
  - Radius

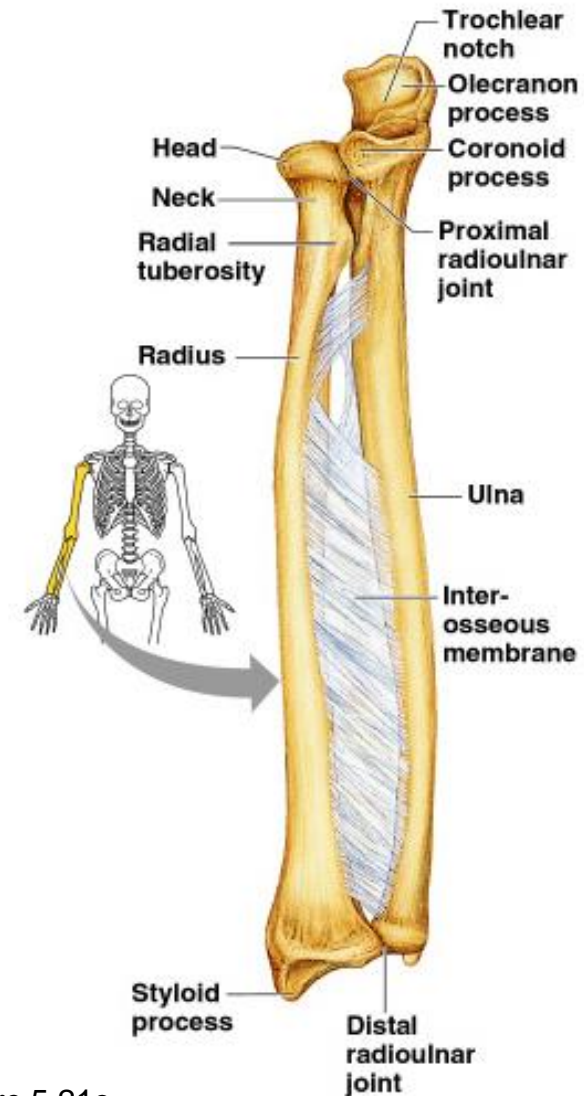


Figure 5.21c

# Bones of the Upper Limb

- The hand
  - Carpals – wrist
  - Metacarpals – palm
  - Phalanges – fingers

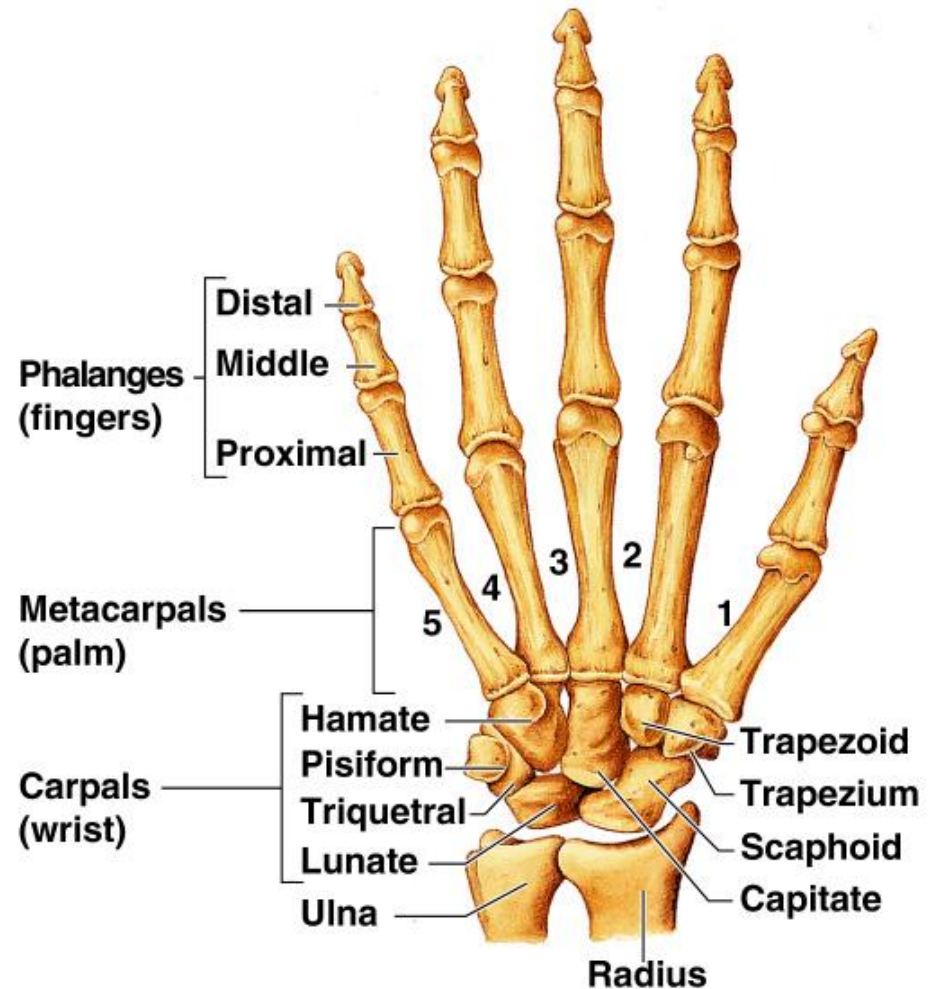


Figure 5.22

# Bones of the Pelvic Girdle

- Hip bones
- Composed of three pair of fused bones
  - Ilium
  - Ischium
  - Pubic bone
- The total weight of the upper body rests on the pelvis
- Protects several organs
  - Reproductive organs
  - Urinary bladder
  - Part of the large intestine

# The Pelvis

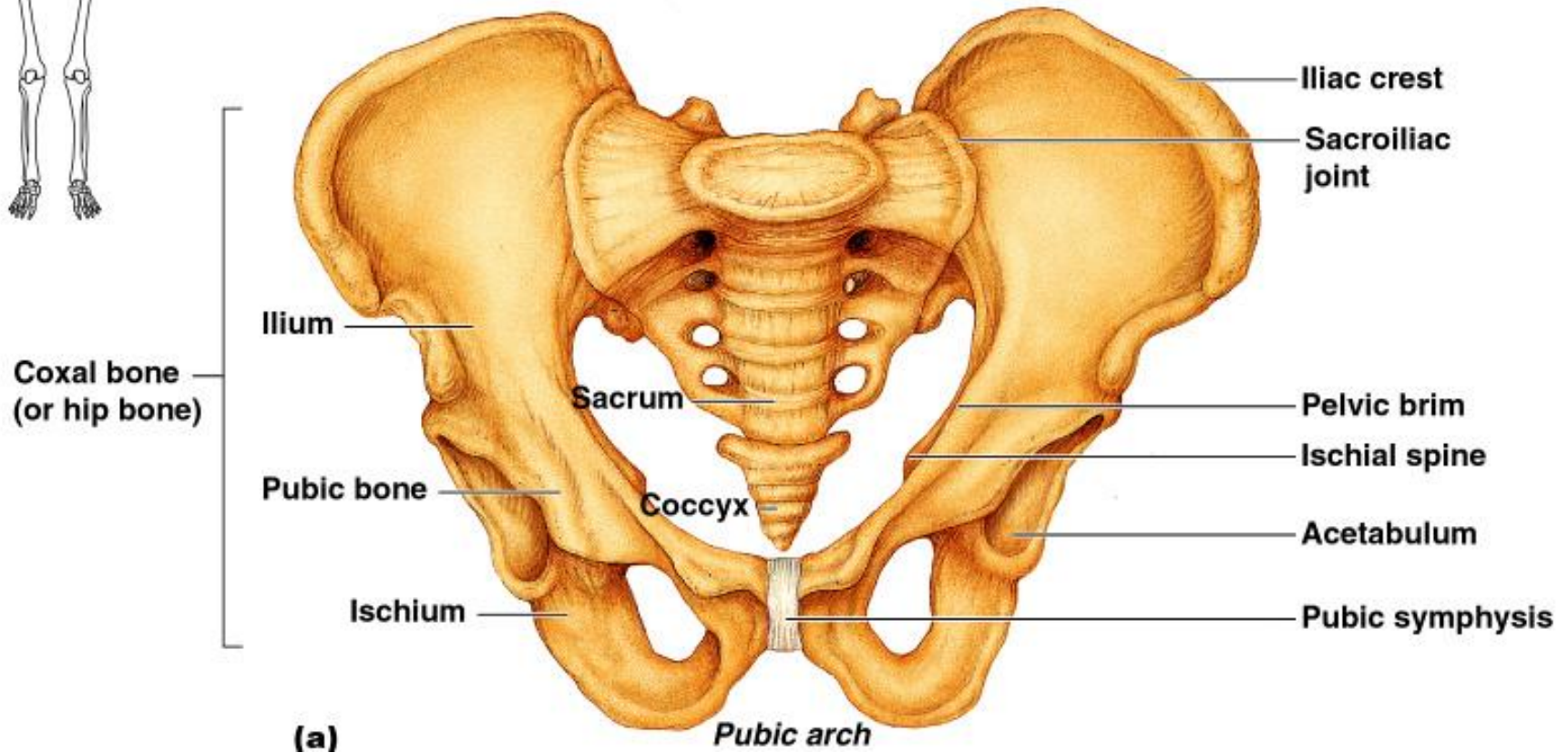


Figure 5.23a

# Gender Differences of the Pelvis

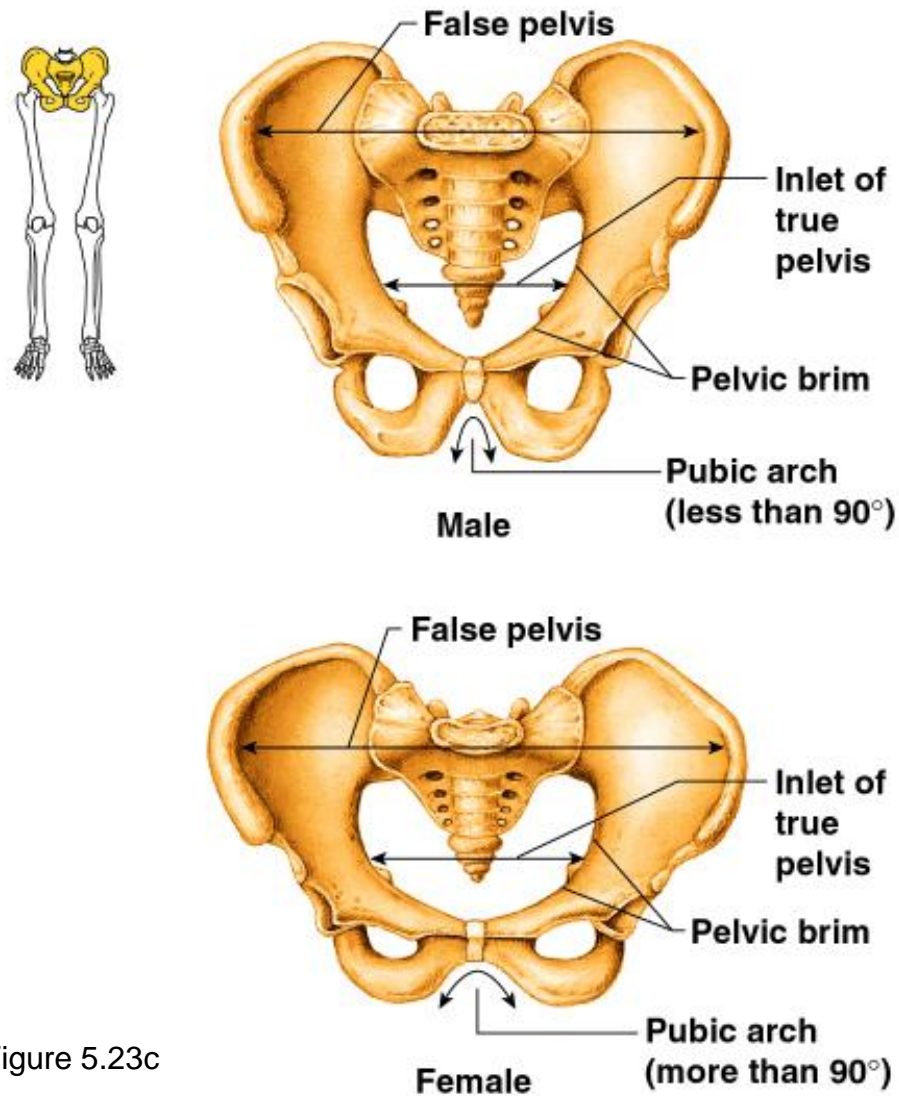


Figure 5.23c

# Bones of the Lower Limbs

- The thigh has one bone
  - Femur – thigh bone

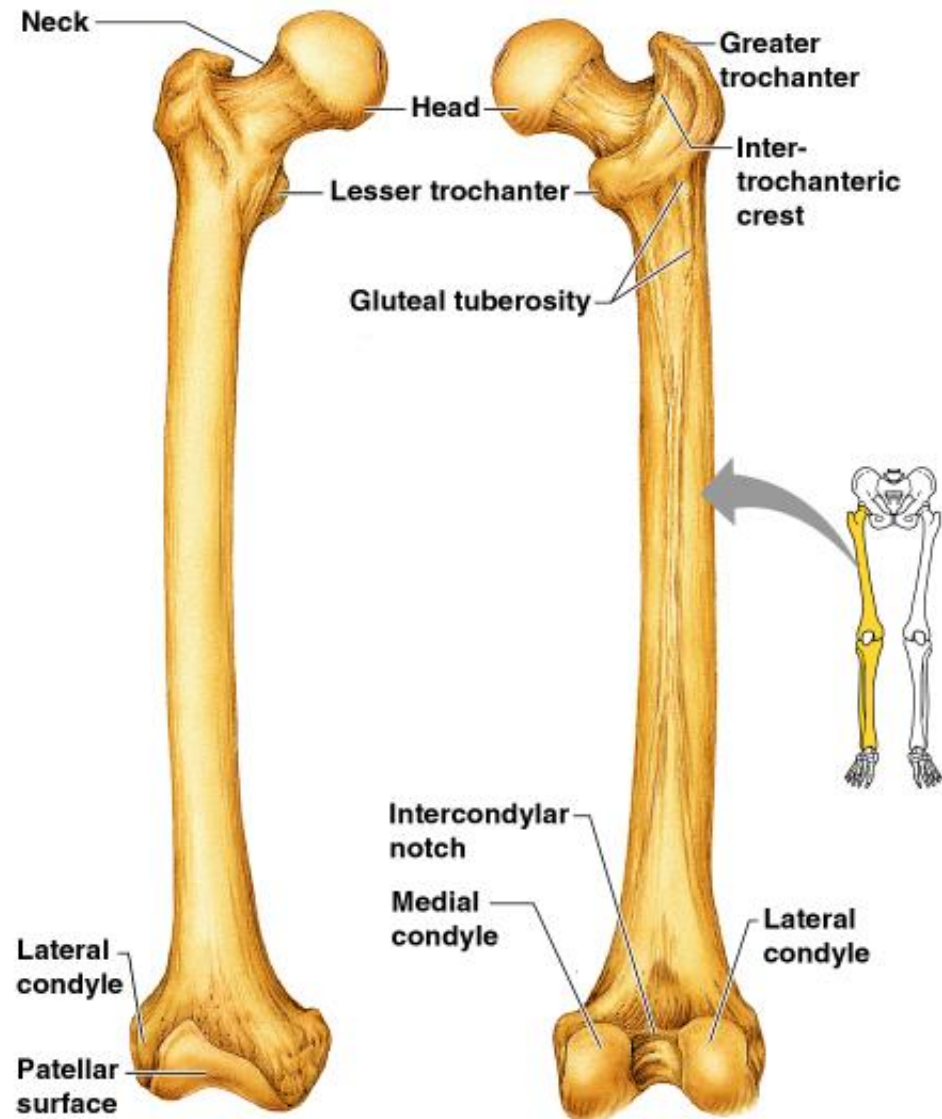


Figure 5.35a, b

# Bones of the Lower Limbs

- The leg has two bones
  - Tibia
  - Fibula

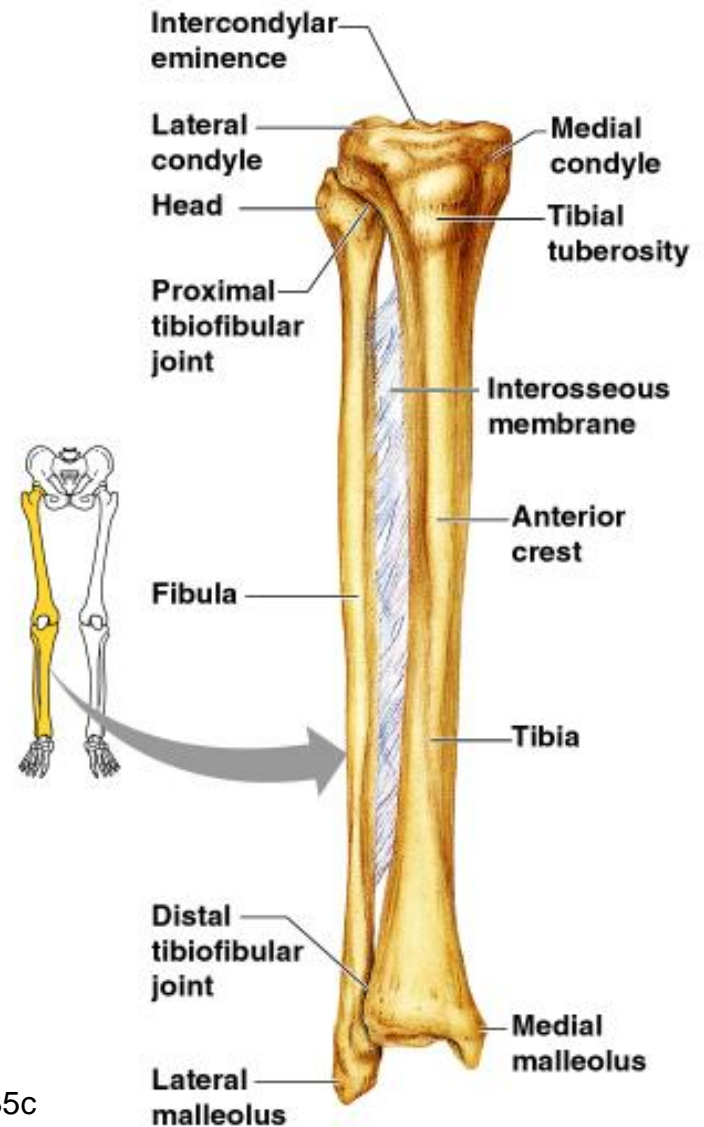


Figure 5.35c

# Bones of the Lower Limbs

- The foot
  - Tarsus – ankle
  - Metatarsals – sole
  - Phalanges – toes

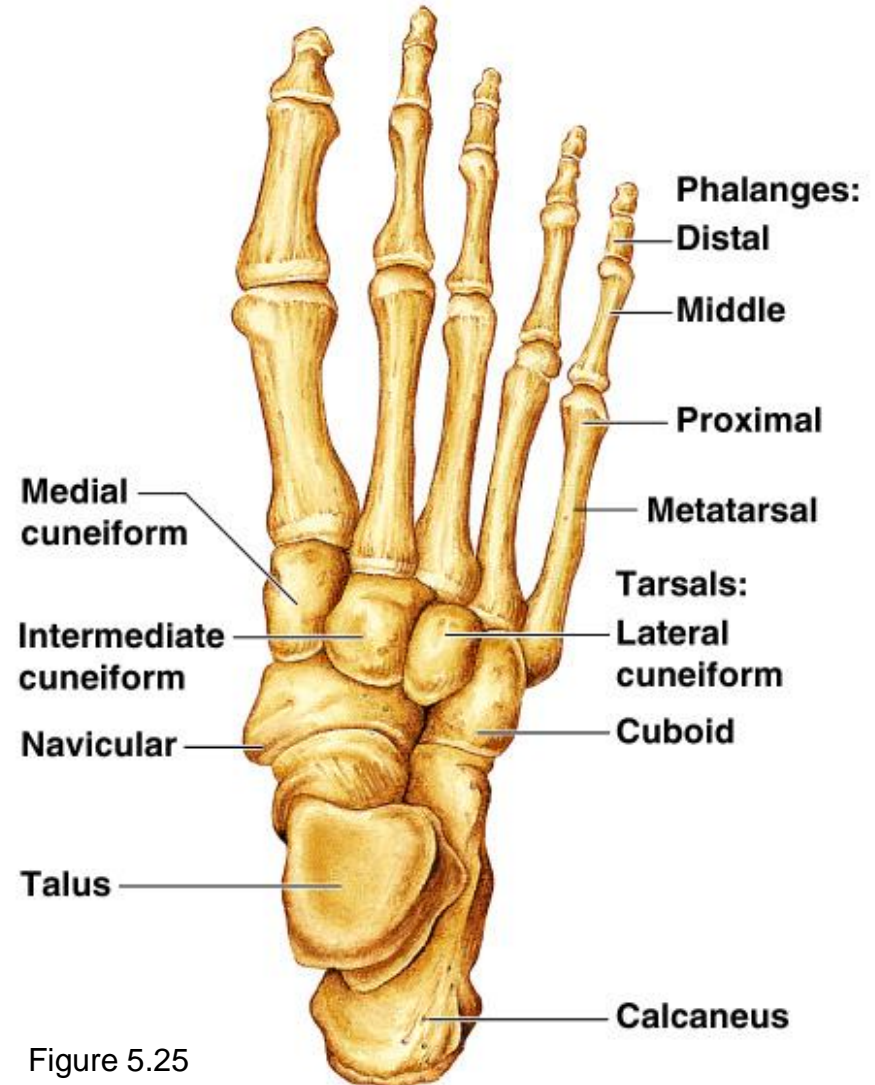


Figure 5.25

# The Appendicular Skeleton

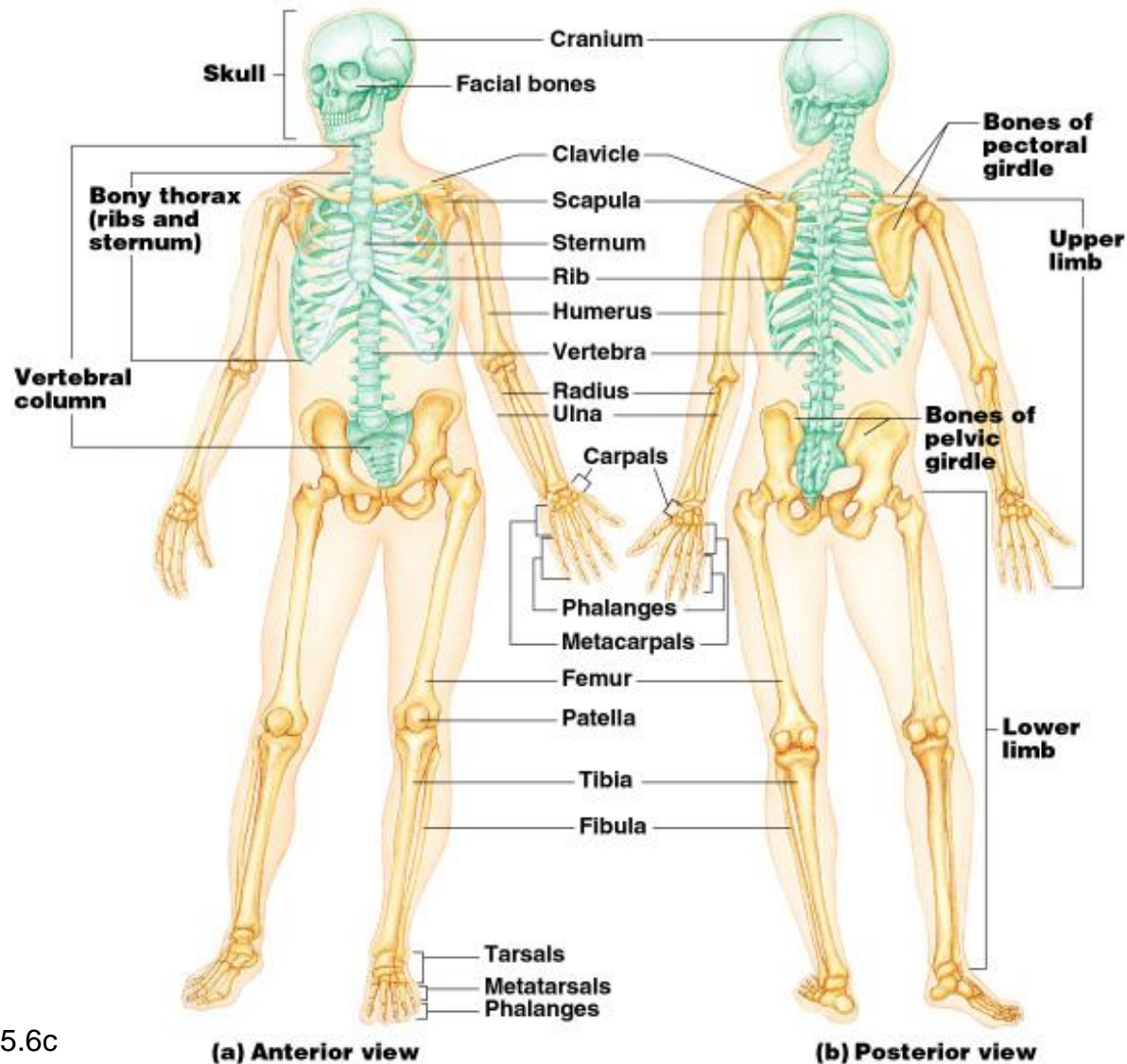


Figure 5.6c

(a) Anterior view

(b) Posterior view