13a A&P:

Skeletal System - Cells, Tissues, and Bone Shapes

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Skeletal System - Cells, Tissues, and Bone Shapes
Class Outline

5 minutes	Attendance, Breath of Arrival, and Reminders
10 minutes	Lecture:
25 minutes	Lecture:
15 minutes	Active study skills:
60 minutes	Total

13a A&P:

Skeletal System - Cells, Tissues, and Bone Shapes
Class Reminders

Assignments:

- 17a Review Questions (A: 131-140)

Quizzes and Exams:

- 13b Kinesiology Quiz
  - Tibialis anterior, fibularis longus and brevis, quads, rectus abdominis, and pec. major
- 17b Kinesiology Quiz
- 17a Quiz
- 19a Quiz
- 21a Exam

Preparation for upcoming classes:

- 14a H&H: Compassionate Care for All People
  - Trail Guide: biceps brachii and coracobrachialis
  - Packet H: 55-64
- 14b Swedish: Technique Review and Practice - Feet, Anterior Lower Body, and Abs
  - Packet F: 45-46, and 58

Classroom Rules

Punctuality - everybody's time is precious

- Be ready to learn at the start of class; we'll have you out of here on time
- Tardiness: arriving late, returning late after breaks, leaving during class, leaving early

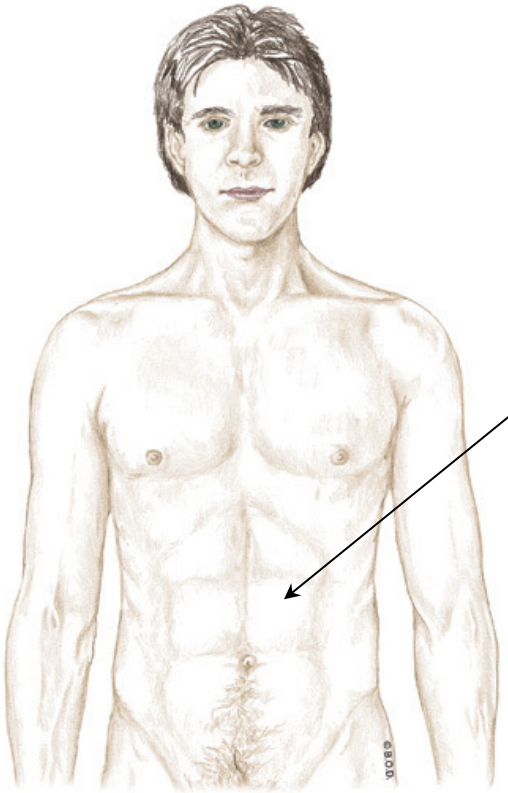
The following are not allowed:

- Bare feet
- Side talking
- Lying down
- Inappropriate clothing
- Food or drink except water
- Phones that are visible in the classroom, bathrooms, or internship

You will receive one verbal warning, then you'll have to leave the room.

Rectus Abdominis

Trail Guide, Page 210



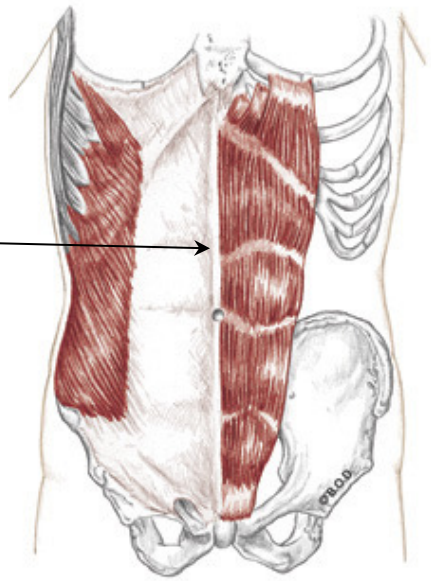
Anterior View

Rectus abdominis has multiple superficial bellies that are often referred to as a "washboard belly".

The abdominals as a group of muscles consist of four muscles:

- Rectus abdominis
- External oblique
- Internal oblique
- Transversus abdominis

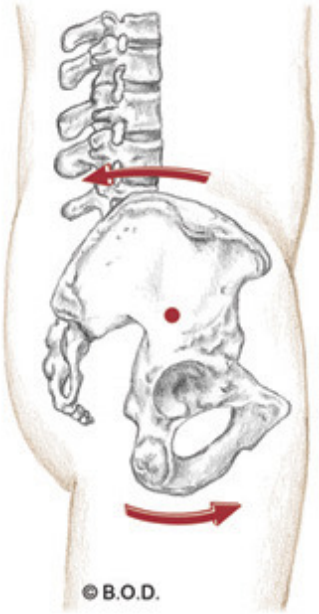
When do you use your rectus abdominis?



Anterior View

Actions of the Rectus Abdominis

Flexion of the vertebral column



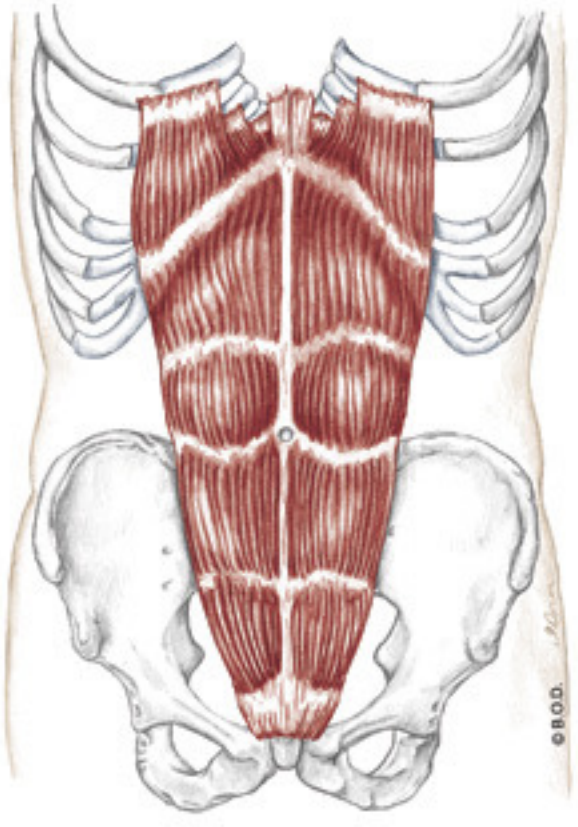
Posterior pelvic tilt

Rectus Abdominis, page 210

A Flex the vertebral column
Tilt the pelvis posteriorly

O Pubic crest
Pubic symphysis

I Cartilage of 5th, 6th, and 7th ribs
Xiphoid process



Anterior View

Rectus Abdominis, page 210

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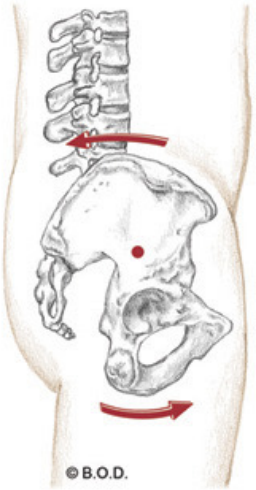

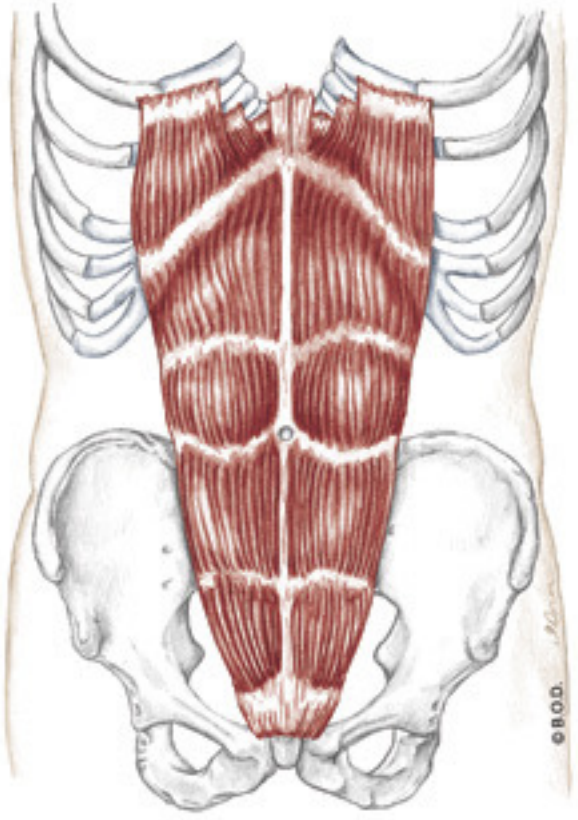

Anterior View

Rectus Abdominis, page 210

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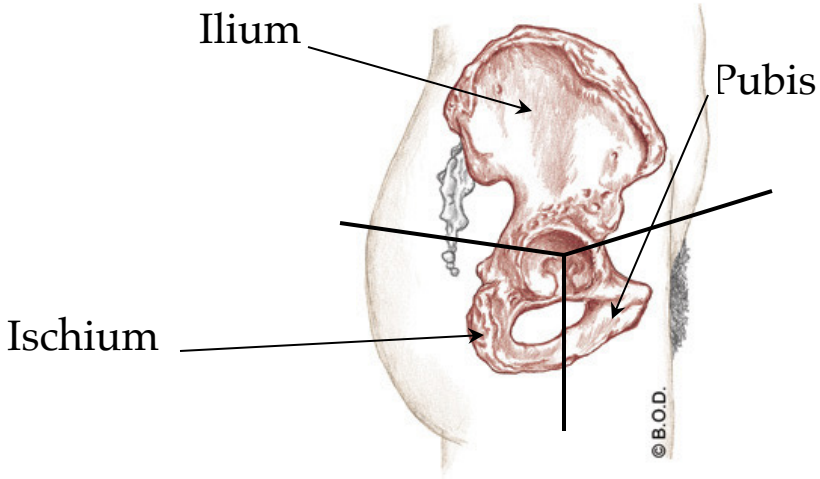

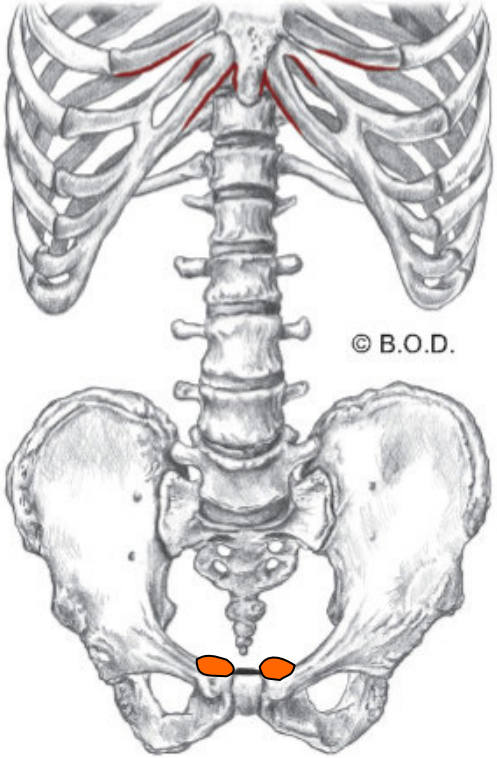

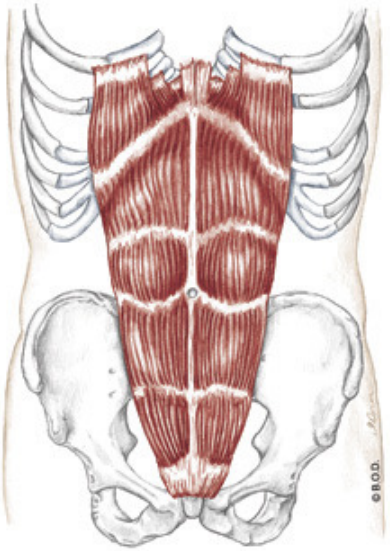

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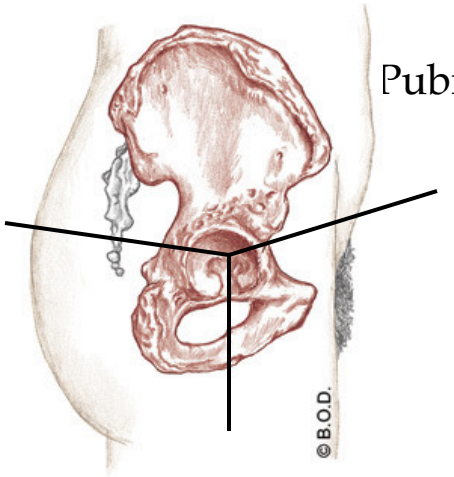

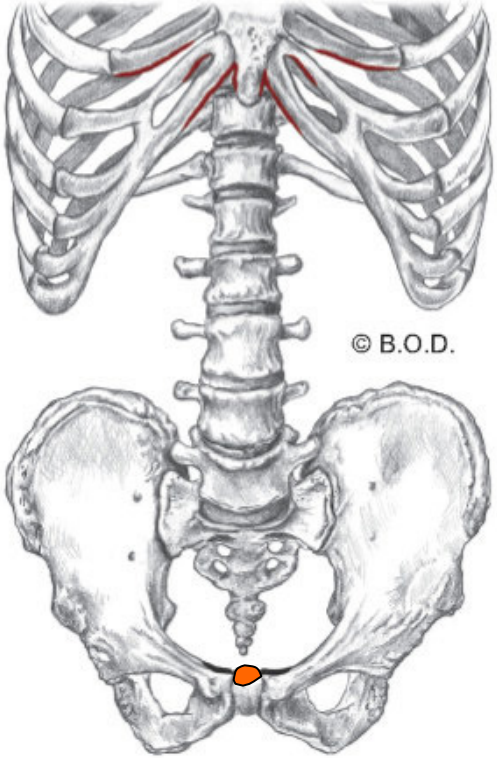

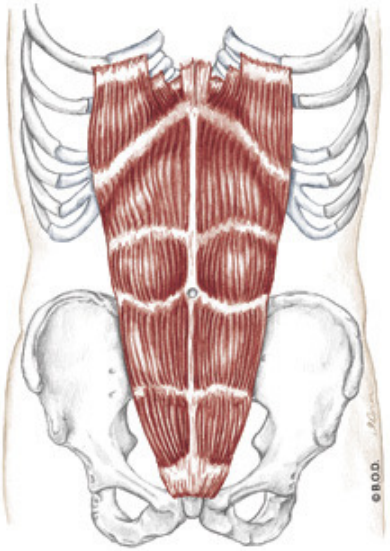

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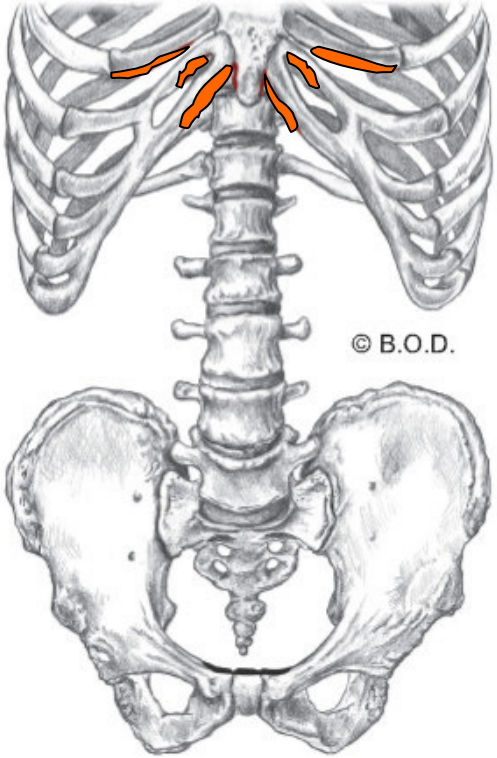

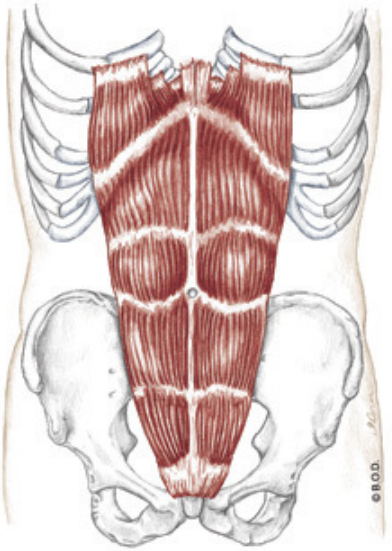

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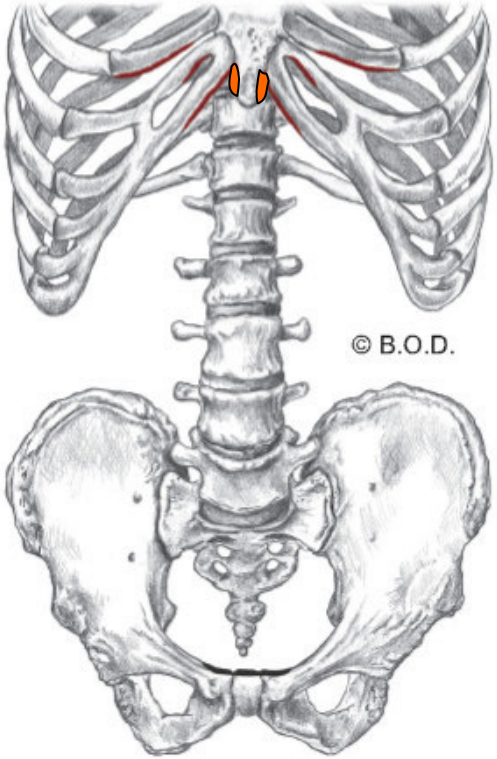
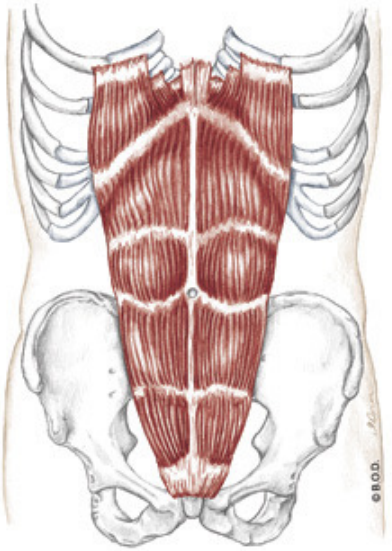
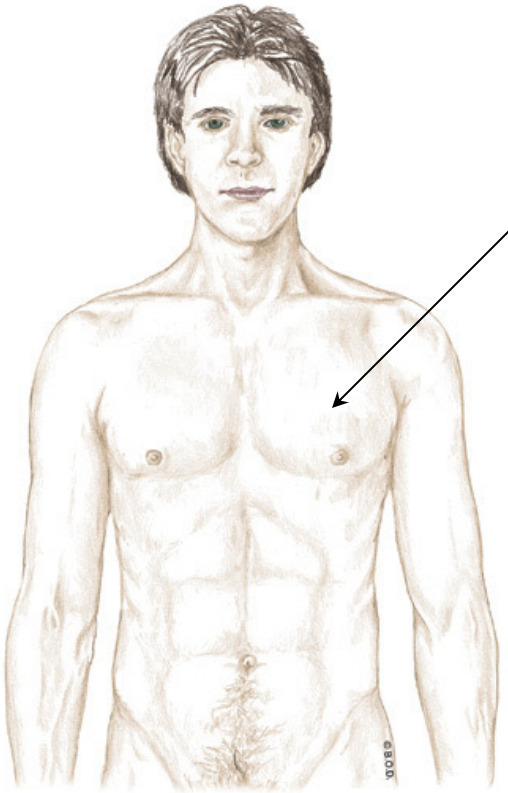




Anterior View

Pectoralis Major

Trail Guide, Page 89



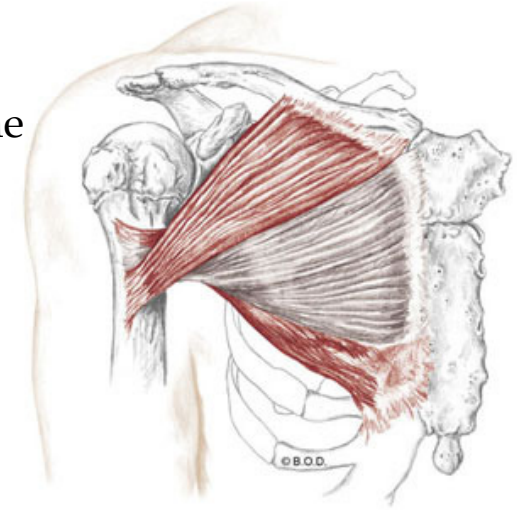
Anterior View

Pectoralis Major
is a broad, powerful muscle located on the chest.

Pec major consists of three segments:
- Clavicular (clavicle)
- Sternal (sternum)
- Costal (rib cartilage)

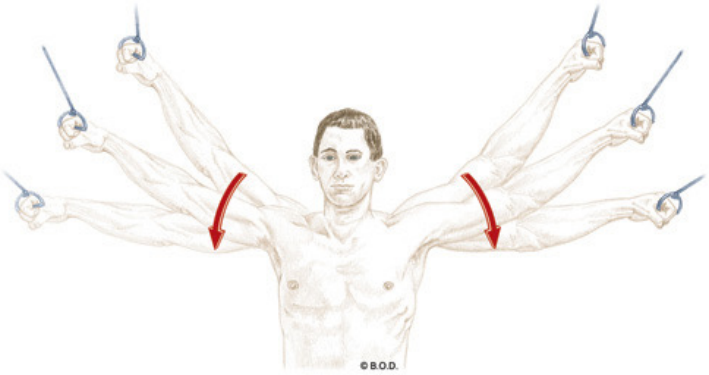
Pec major is also an antagonist to itself:
Upper fibers flex the glenohumeral joint.
Lower fibers extend the glenohumeral joint.

When do you use your pecs?

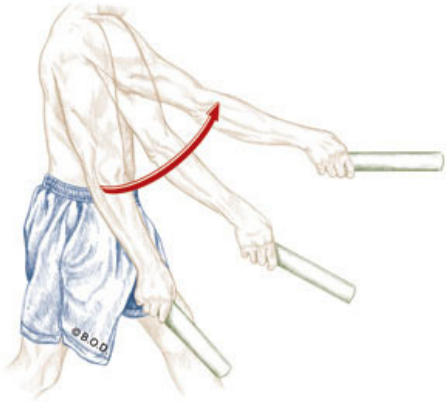


Anterior View

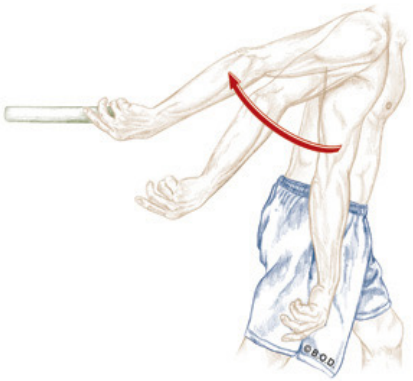
Actions of the Pectoralis Major



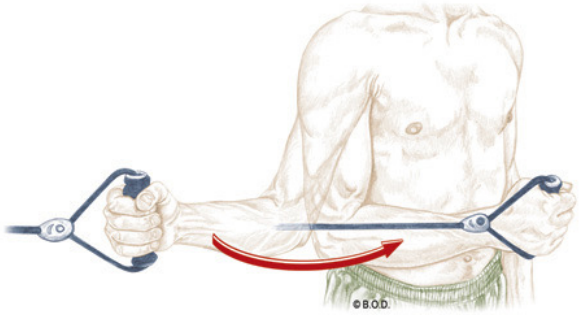
Adduct the glenohumeral joint



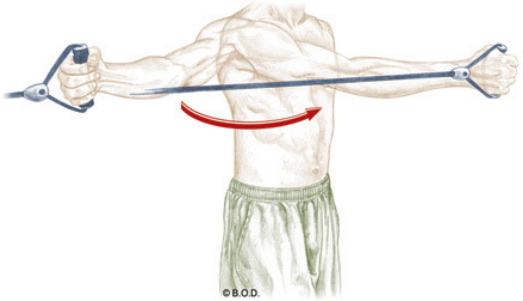
Flex the glenohumeral joint



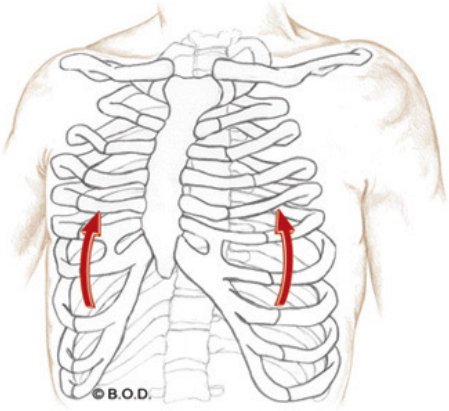
Extend the glenohumeral joint



Medially rotate the glenohumeral joint



Horizontally adduct the glenohumeral joint



Assist to elevate the thorax during forced inhalation

Pectoralis Major, page 89

A *All fibers:*

Adduct the glenohumeral joint

Medially rotate the glenohumeral joint

Assist to elevate the thorax during forced inhalation (with the arm fixed)

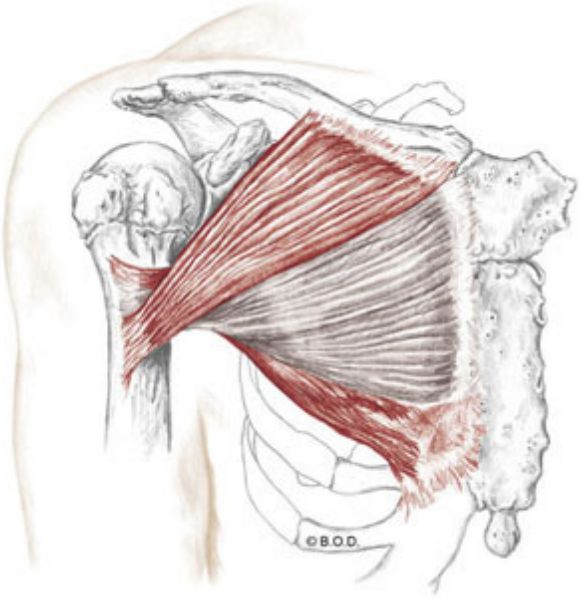
Upper fibers:

Flex the glenohumeral joint

Horizontally adduct the glenohumeral joint

Lower fibers:

Extend the glenohumeral joint



Anterior View

O Medial half of the clavicle
Sternum
Cartilage of ribs 1-6

I Crest of greater tubercle of humerus

Pectoralis Major, page 89

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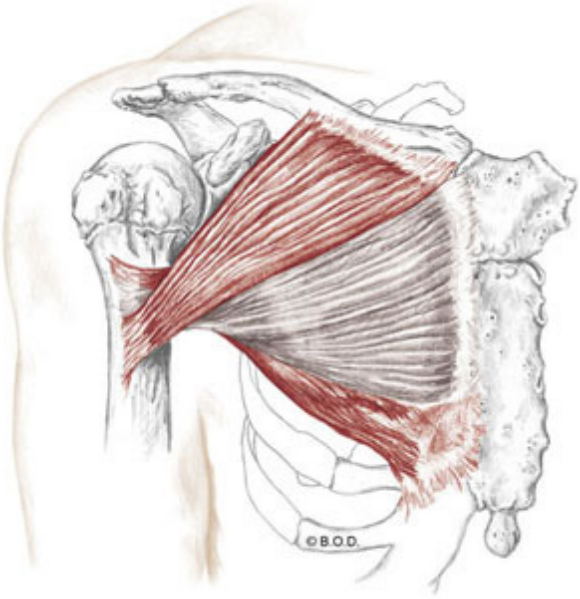

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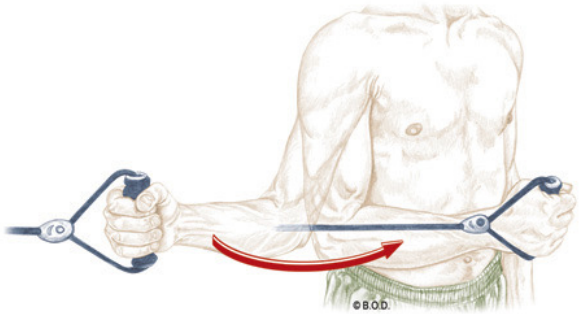

Pectoralis Major, page 89

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Medially rotate the glenohumeral joint
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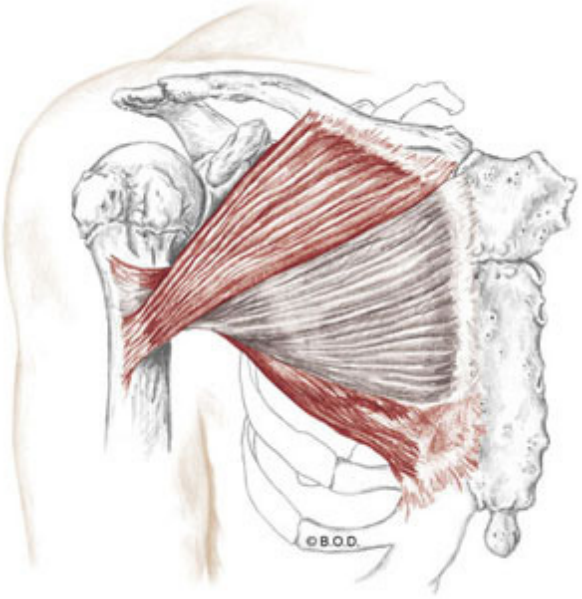

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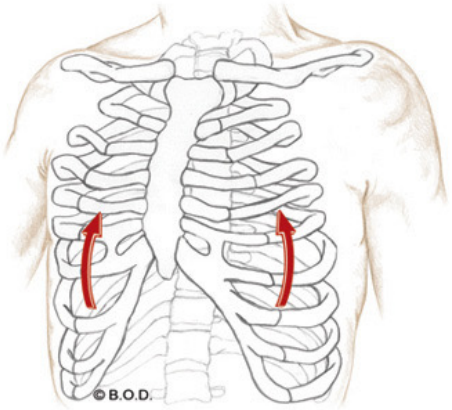

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Pectoralis Major, page 89

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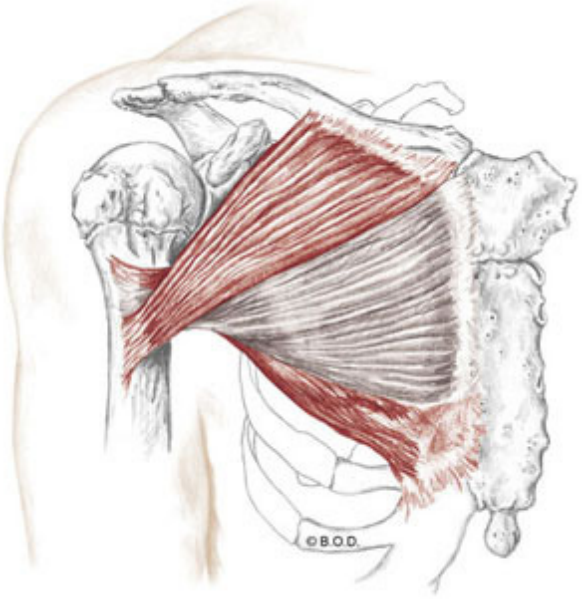

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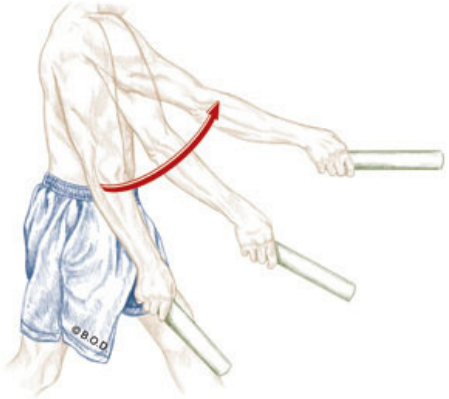

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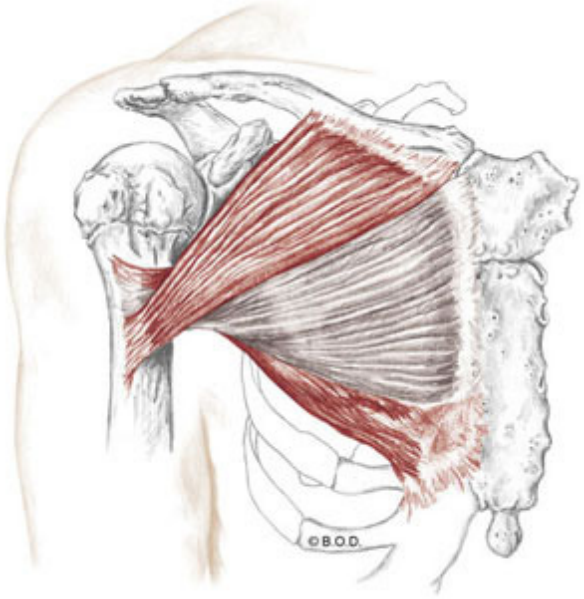

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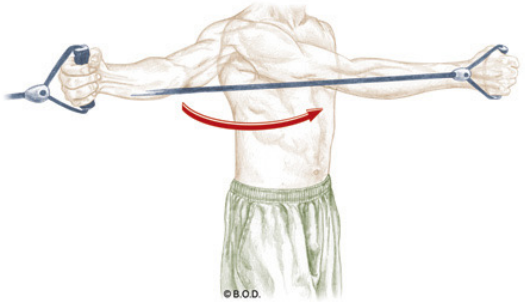

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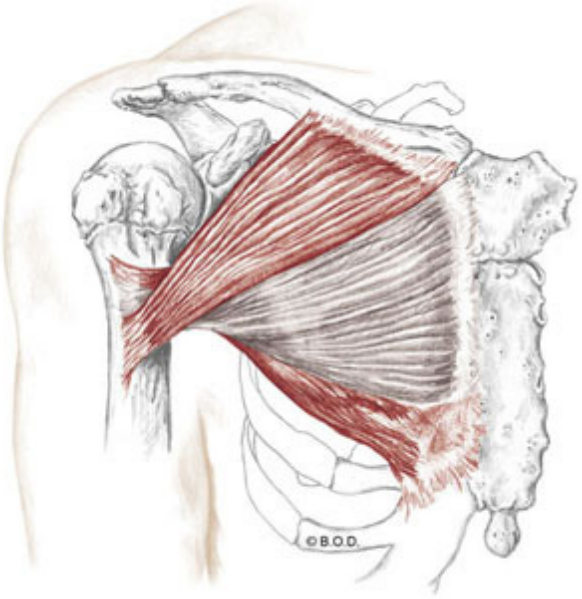

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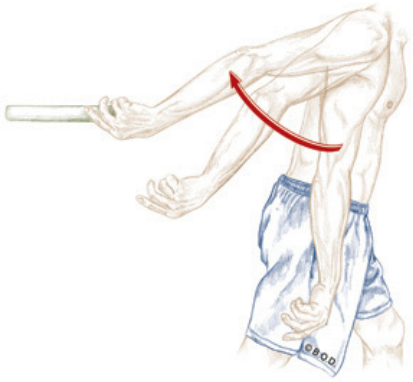

I Crest of greater tubercle of humerus

Pectoralis Major, page 89

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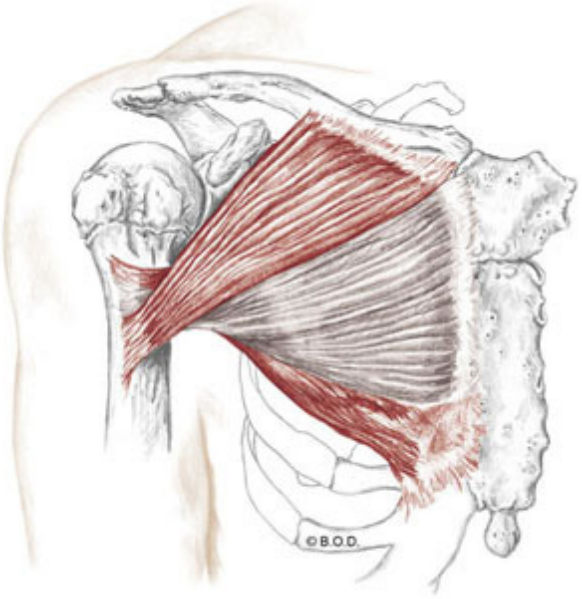

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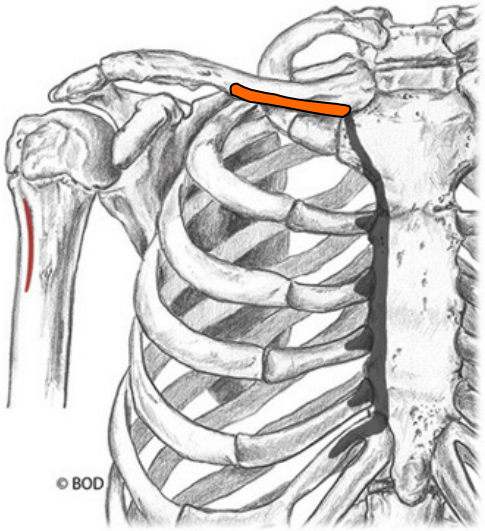

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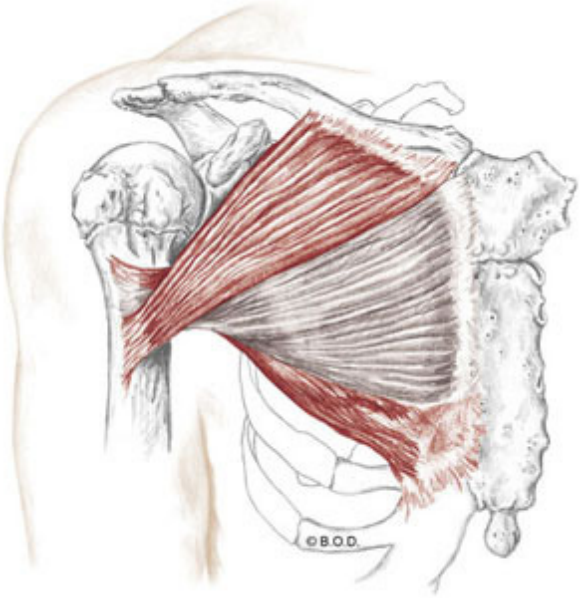

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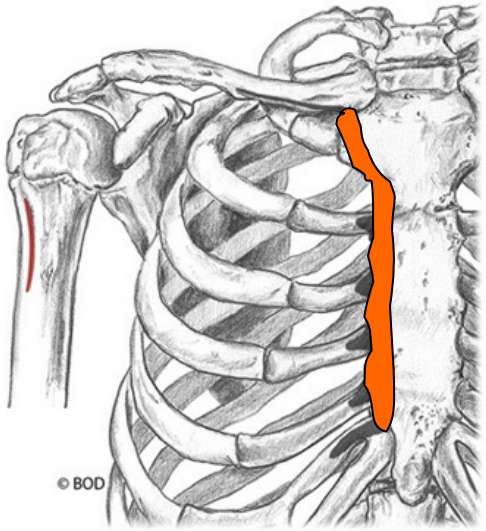

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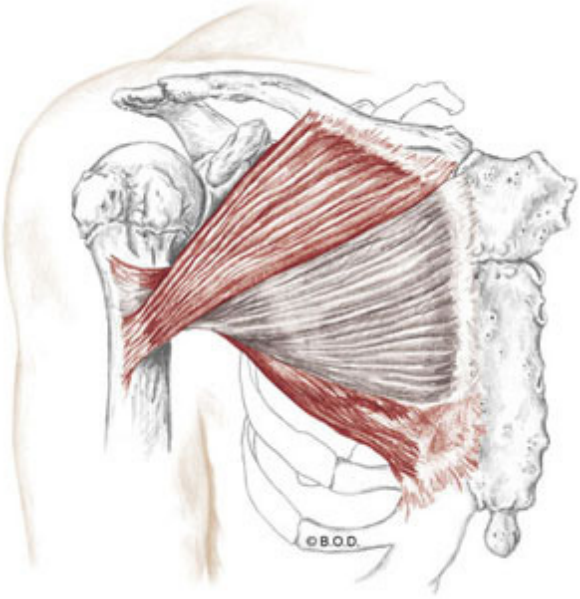

Anterior View

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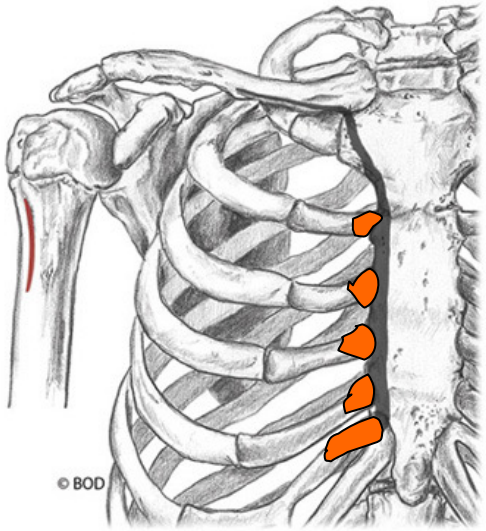
Cartilage of ribs 1-6



I Crest of greater tubercle of humerus

Pectoralis Major, page 89

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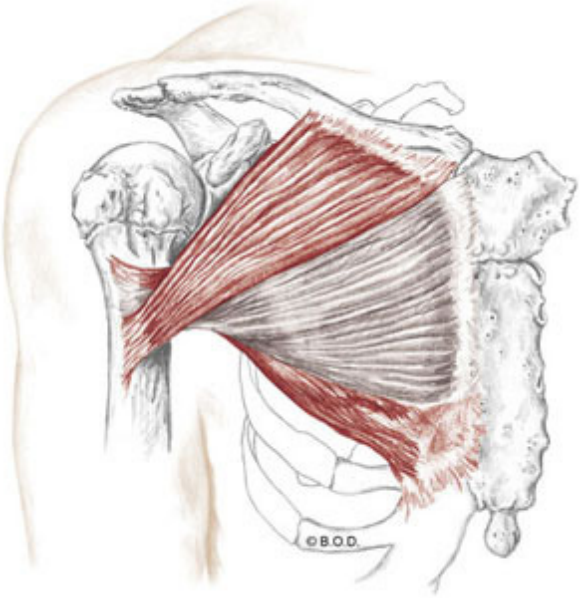
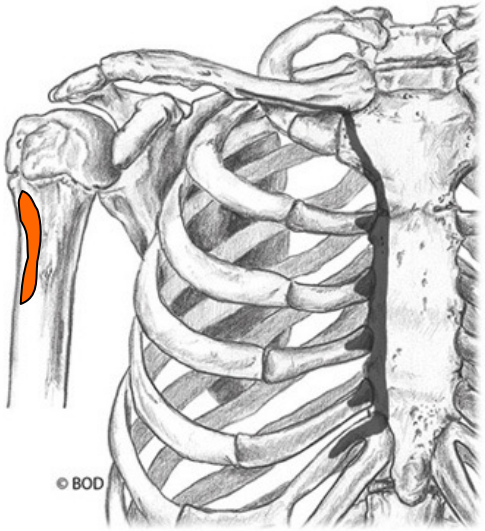


Anterior View

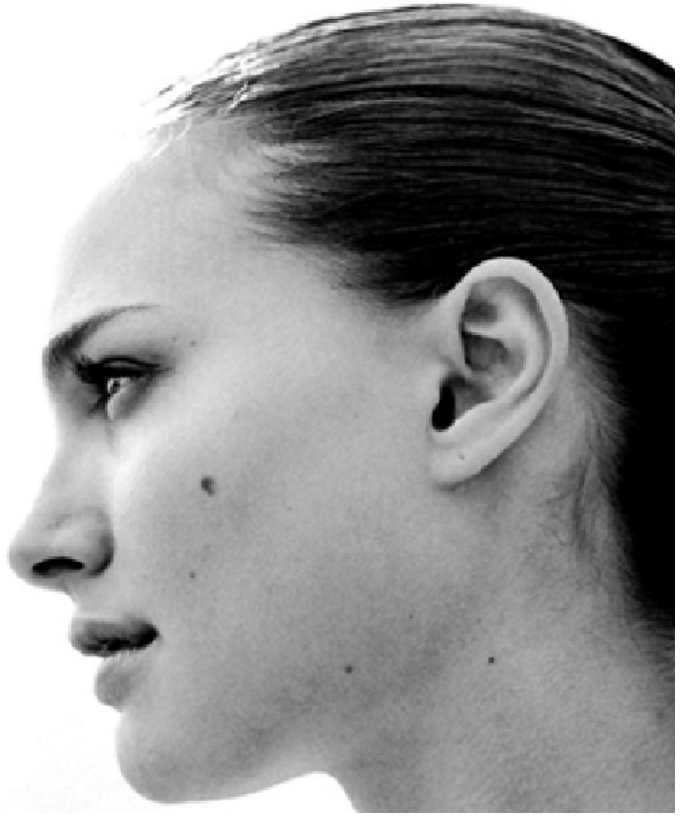


13a A&P:

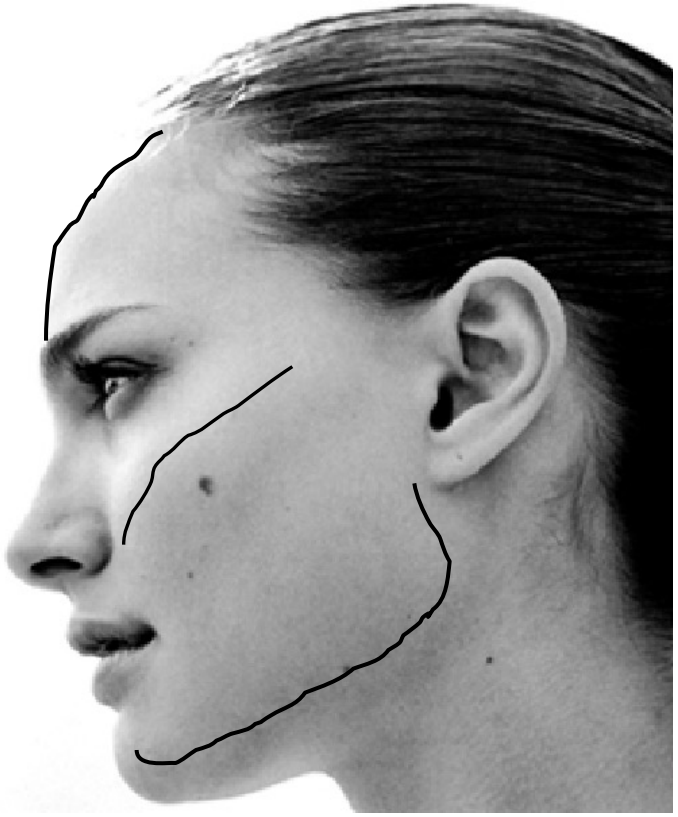
Skeletal System - Cells, Tissues, and Bone Shapes

E-15

Bones
The structural foundation of our bodies



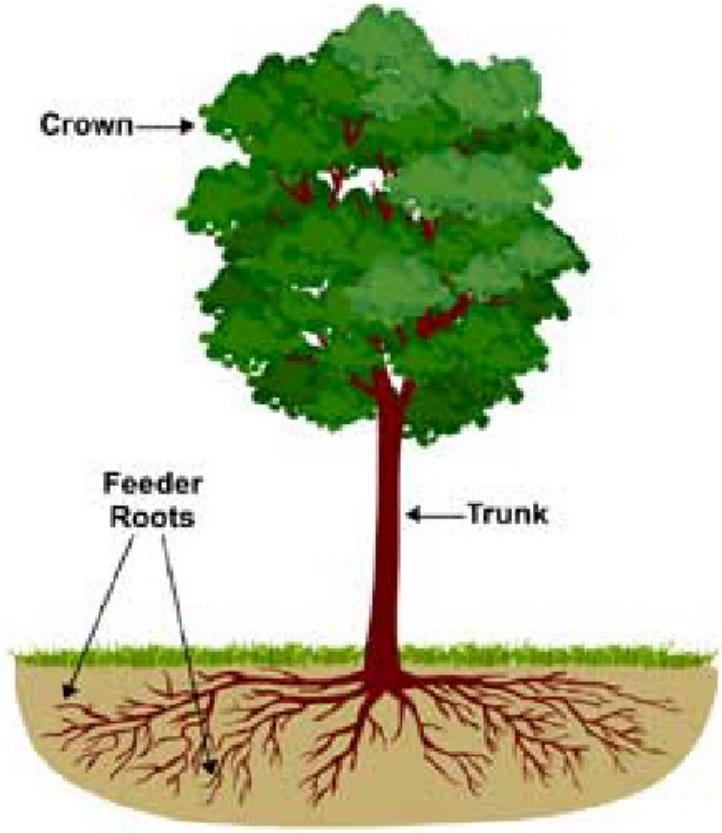
Bones
The structural foundation of our bodies



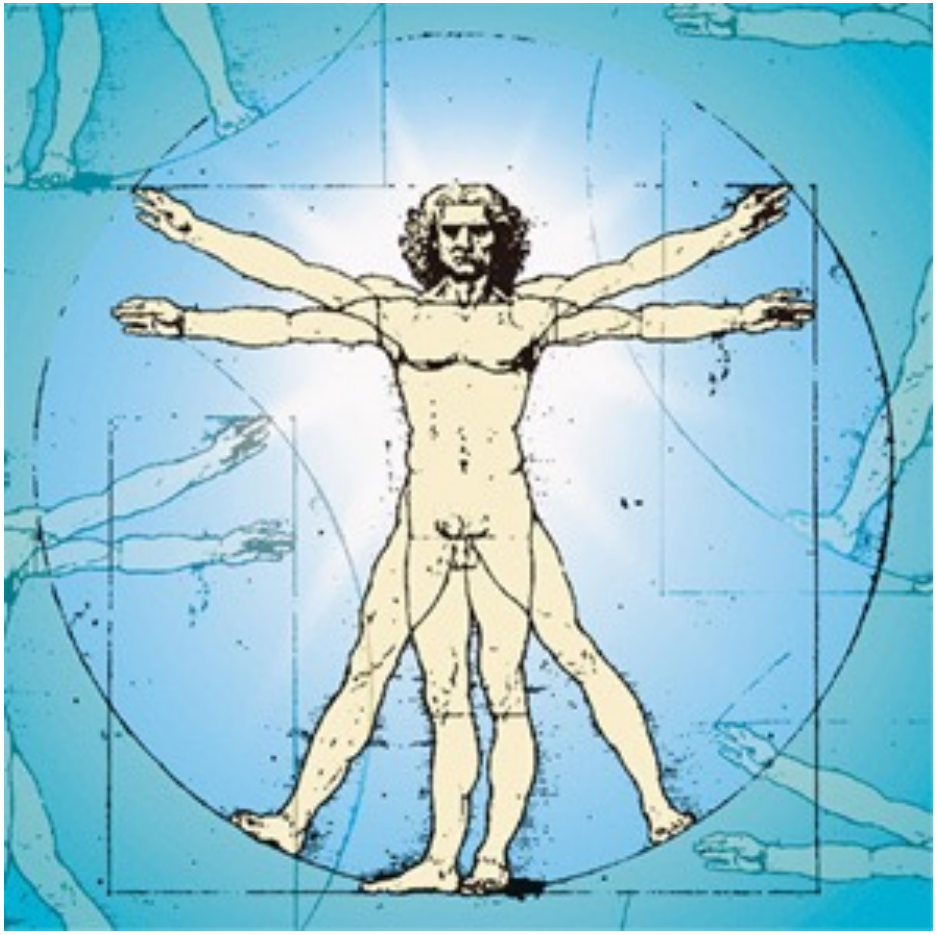
Contacting bones with confidence

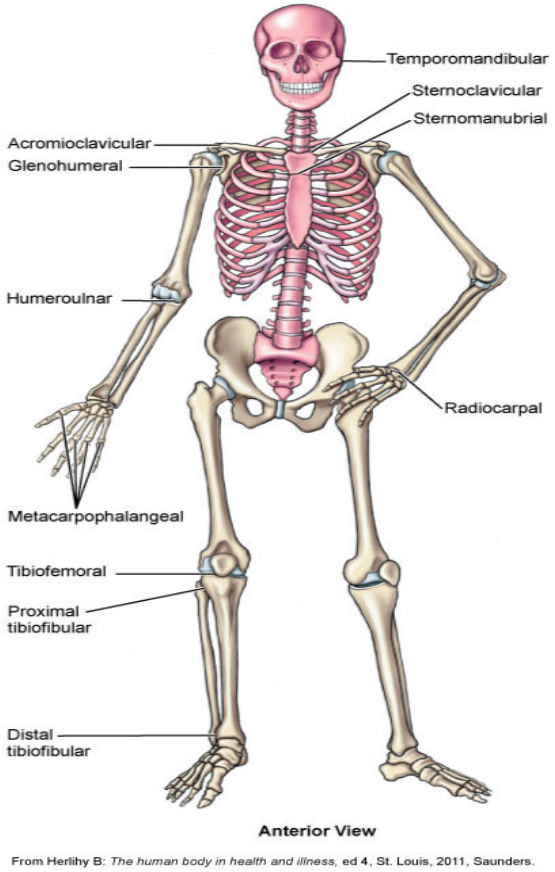
Bones acts as handles for moving the body

Living Tree versus Telephone Pole



Living Bone versus Human Skeleton

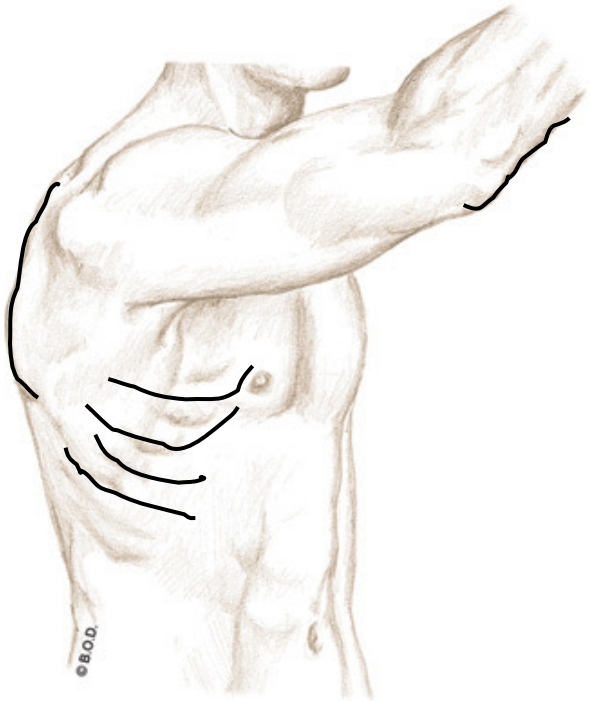


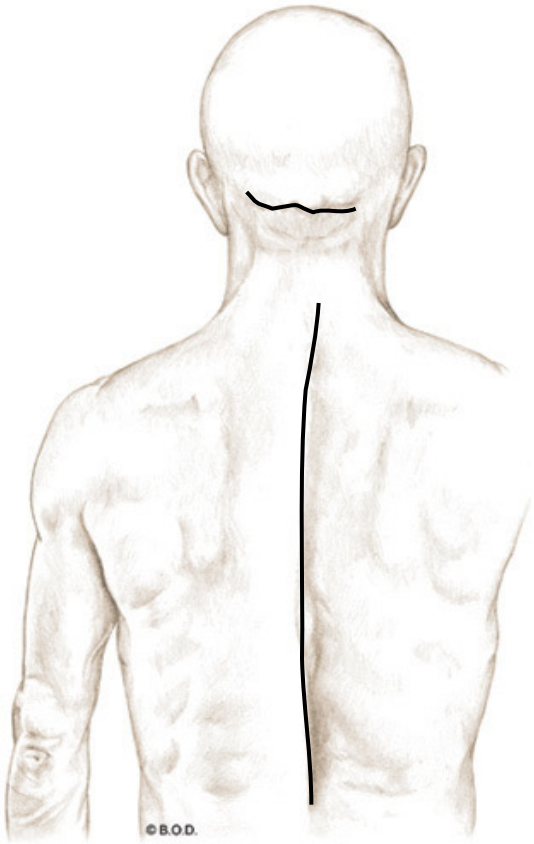


From Herlihy B: *The human body in health and illness*, ed 4, St. Louis, 2011, Saunders.

Fig. 21-40. Select joints.

Bony landmarks are used to locate other structures

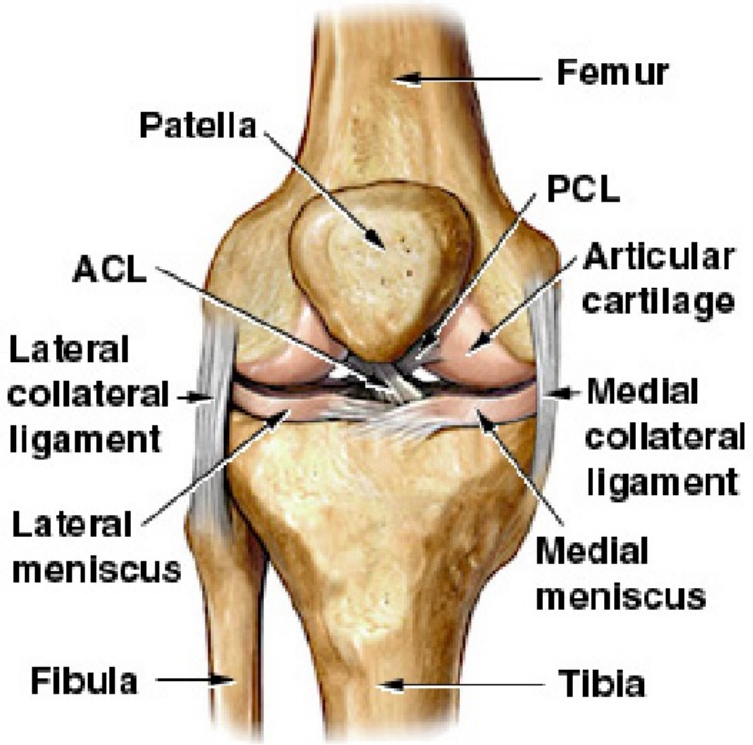




Anatomy

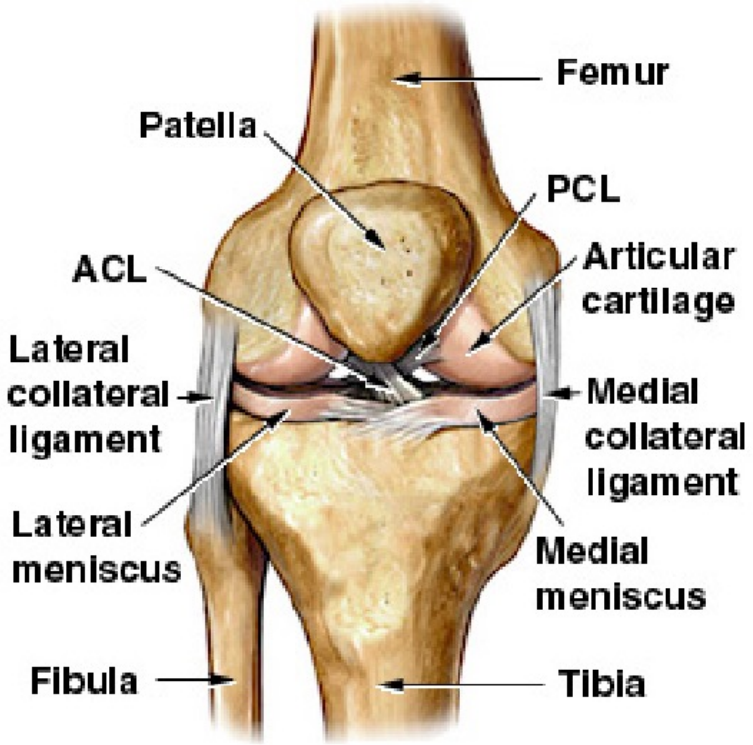
Anatomy

Bones Connective tissue that consists of compact bone, spongy bone, collagenous fibers, and mineral salts.



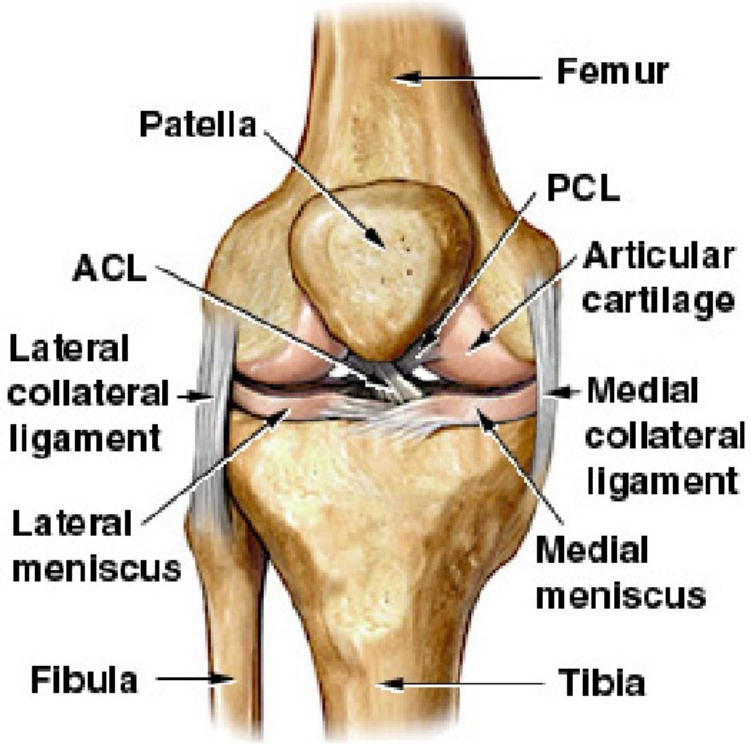
Anatomy

Joints (AKA: articulation or arthrosis) Where bones come together or join.



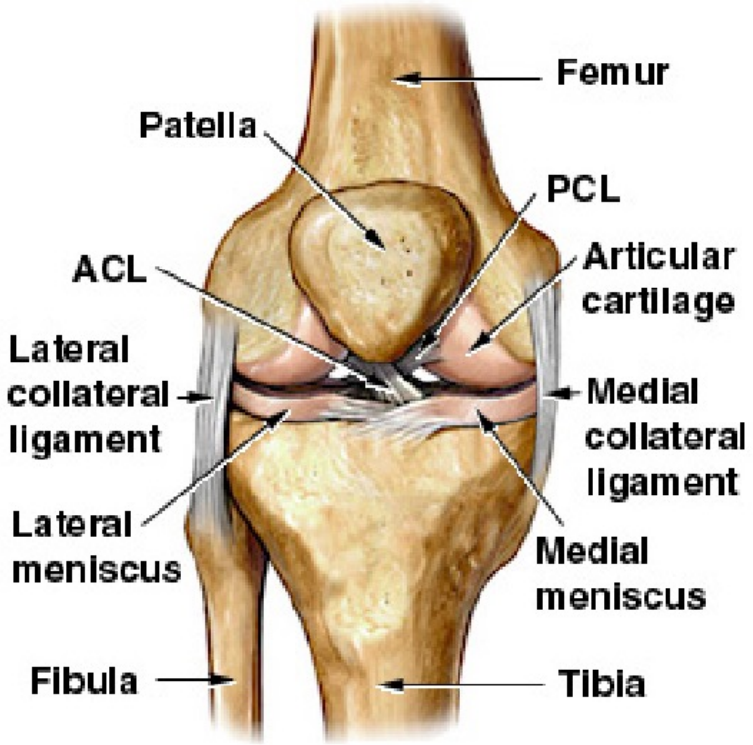
Anatomy

Cartilage Avascular, tough, protective connective tissue found in the thorax, joints, and some rigid tubes of the body such as the trachea and larynx.



Anatomy

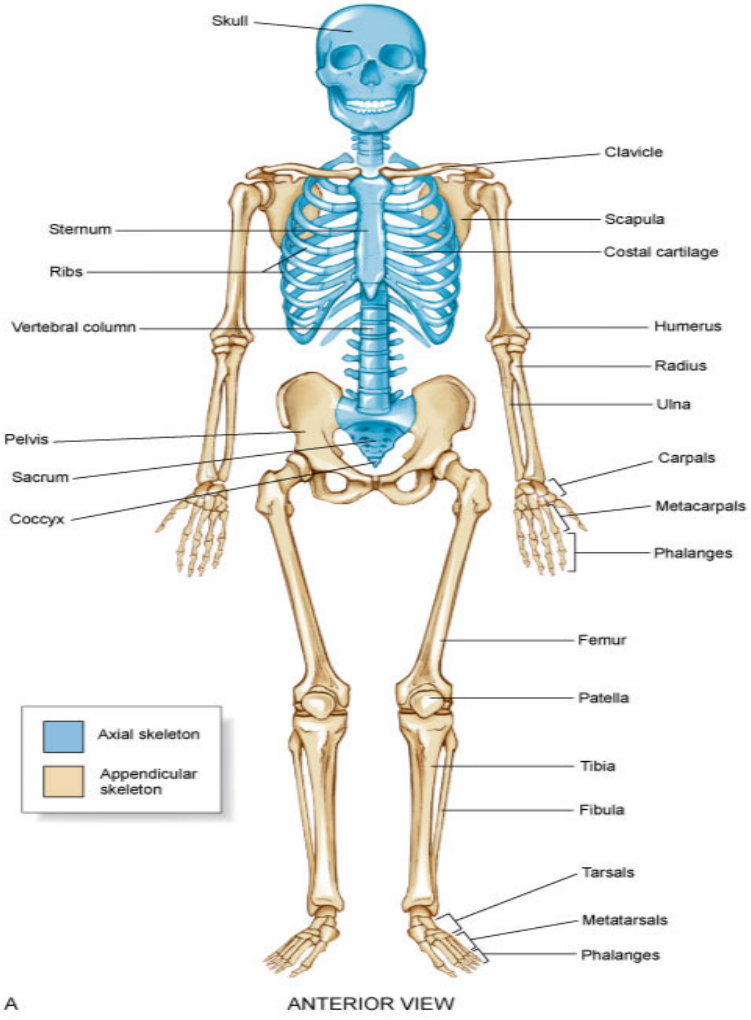
Ligaments Dense regular connective tissue that attaches bones to one another.



Physiology

Physiology

Support Supports the body through a __bony__ framework.



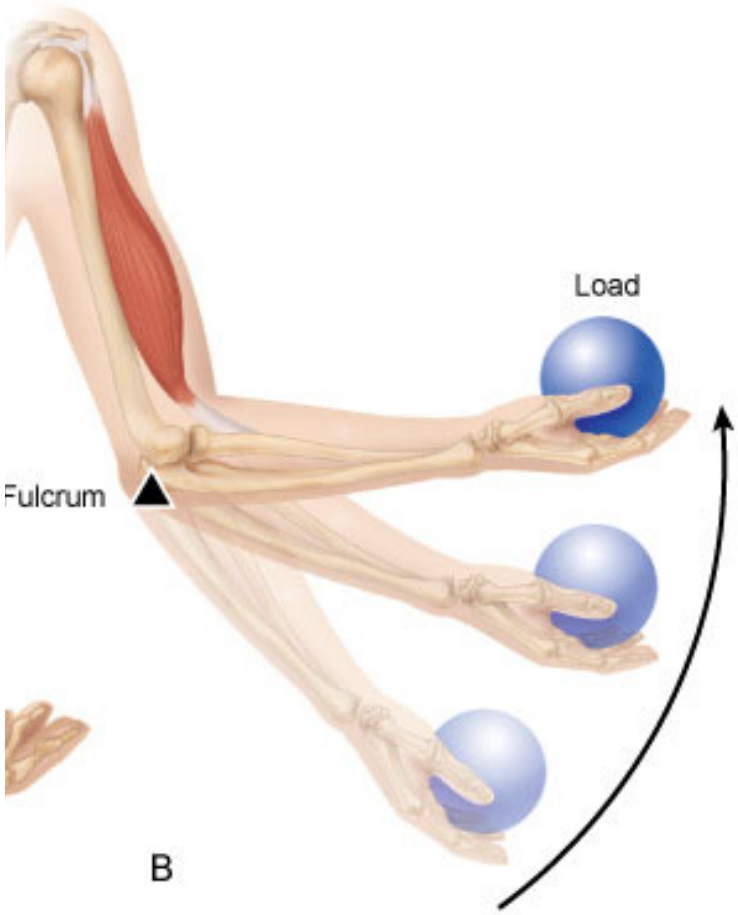
A ANTERIOR VIEW

Physiology

Protection Protects __vital__ organs.

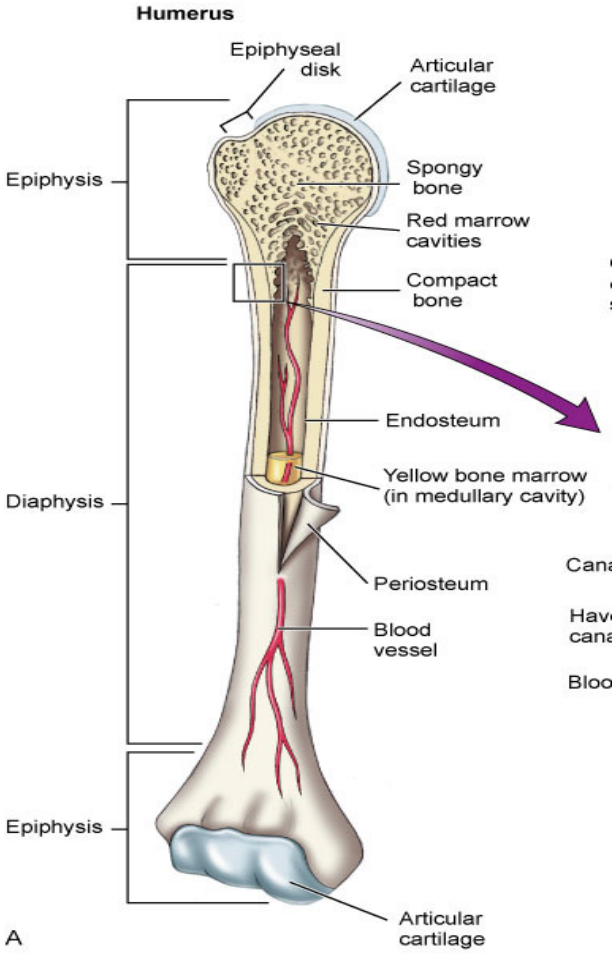
Physiology

Movement Contracting muscles pull on bones to cause movements at joints.



Physiology

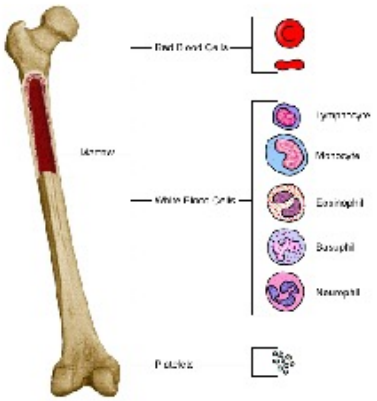
Blood cell production (AKA: hemopoiesis) Blood cells are produced in the __red__ marrow of certain bones, especially long bones.

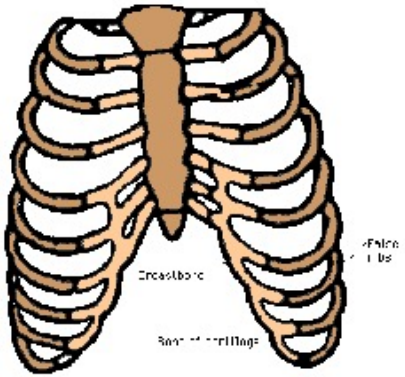


Physiology

Locations of red bone marrow:

humerus
femur
pelvis
sternum / ribs
scapula
cranial bones



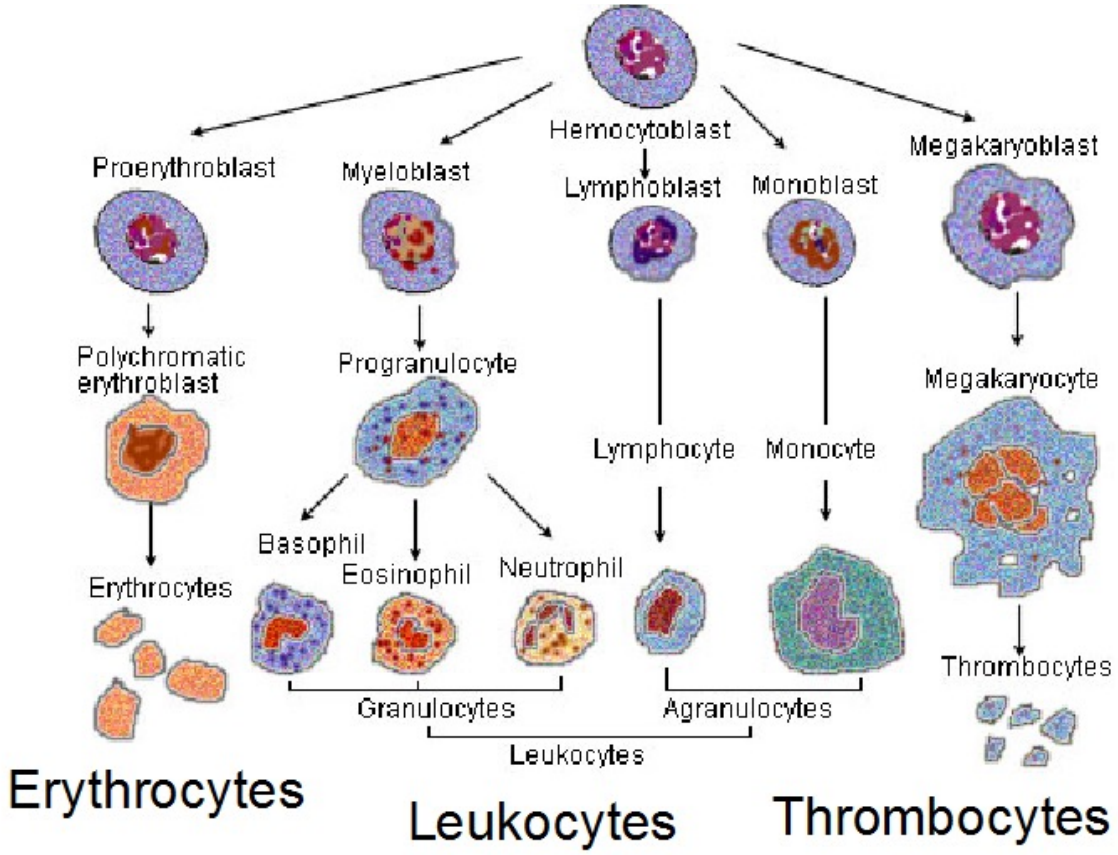


Physiology

All mature blood cells begin as stem cells.

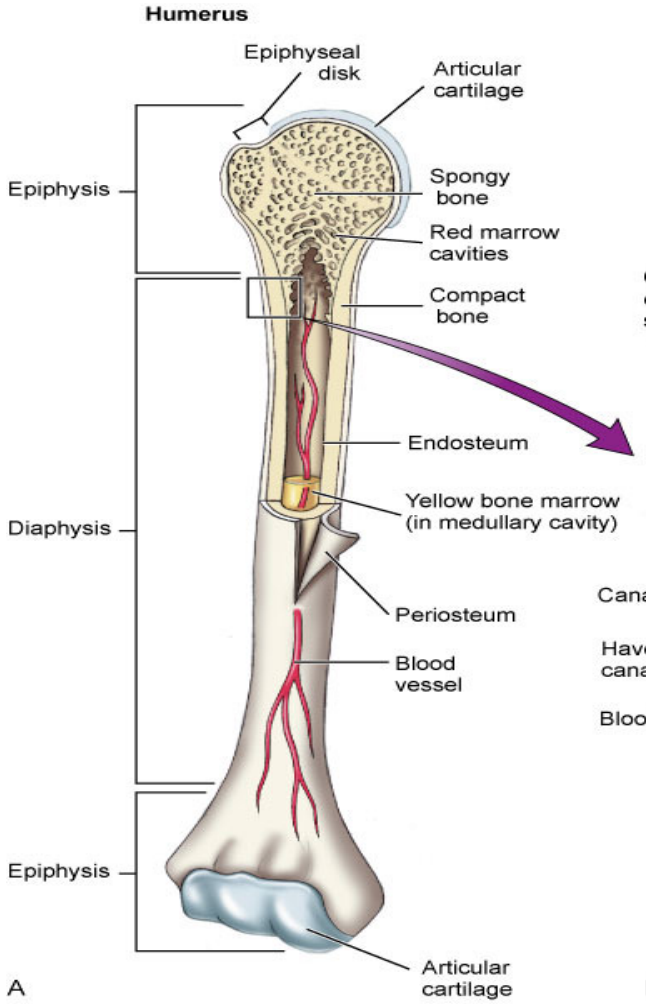
They mature to become one of the following:

1. More stem cells
2. Erythrocytes
3. Leukocytes
4. Thrombocytes



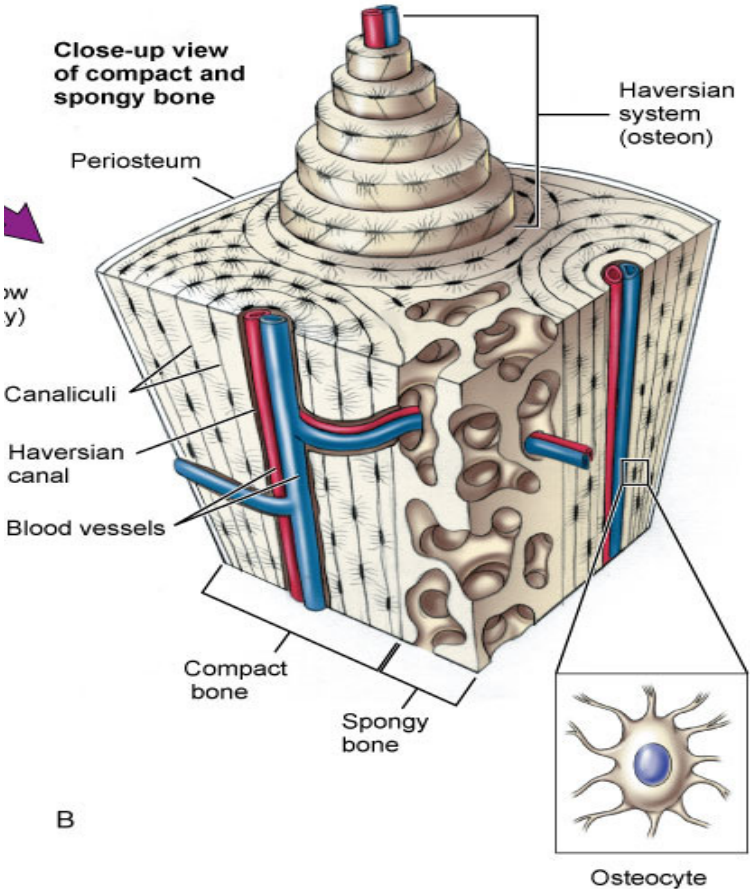
Physiology

Fat storage Fats are stored in __yellow__ bone marrow.



Physiology

Mineral storage Vital minerals and mineral compounds are stored in bone.

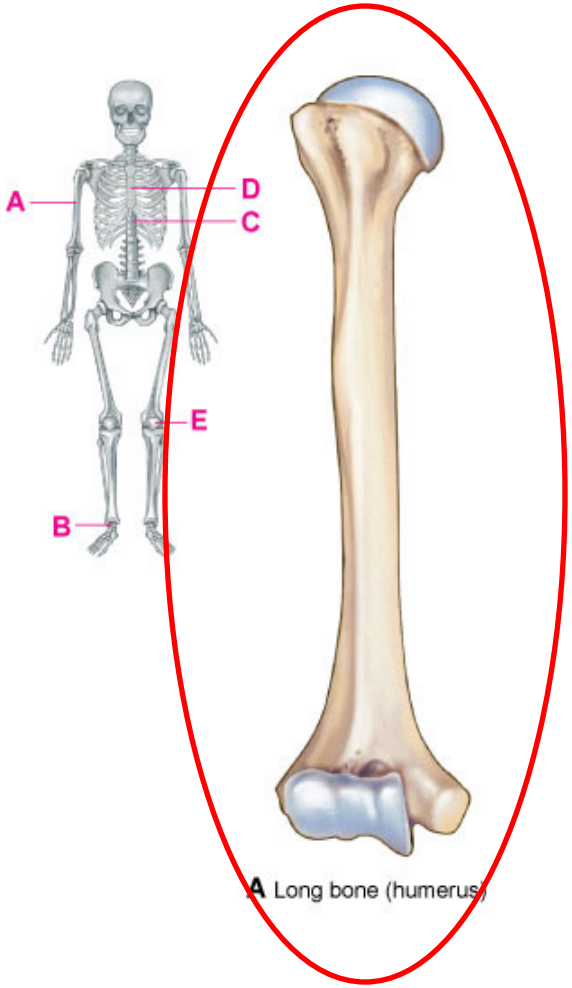


Classification of Bones

Classification of Bones

Long Longer than they are __wide__.

Examples: *humerus*, femur, and tibia.



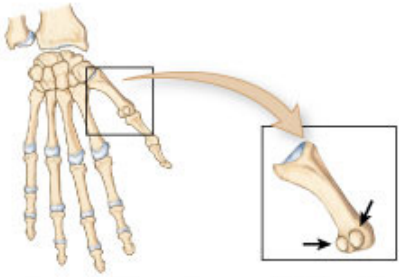
A Long bone (humerus)

B Short bone (tarsal bone)

C Irregular bone (vertebra)

E Sesamoid bone (patella)

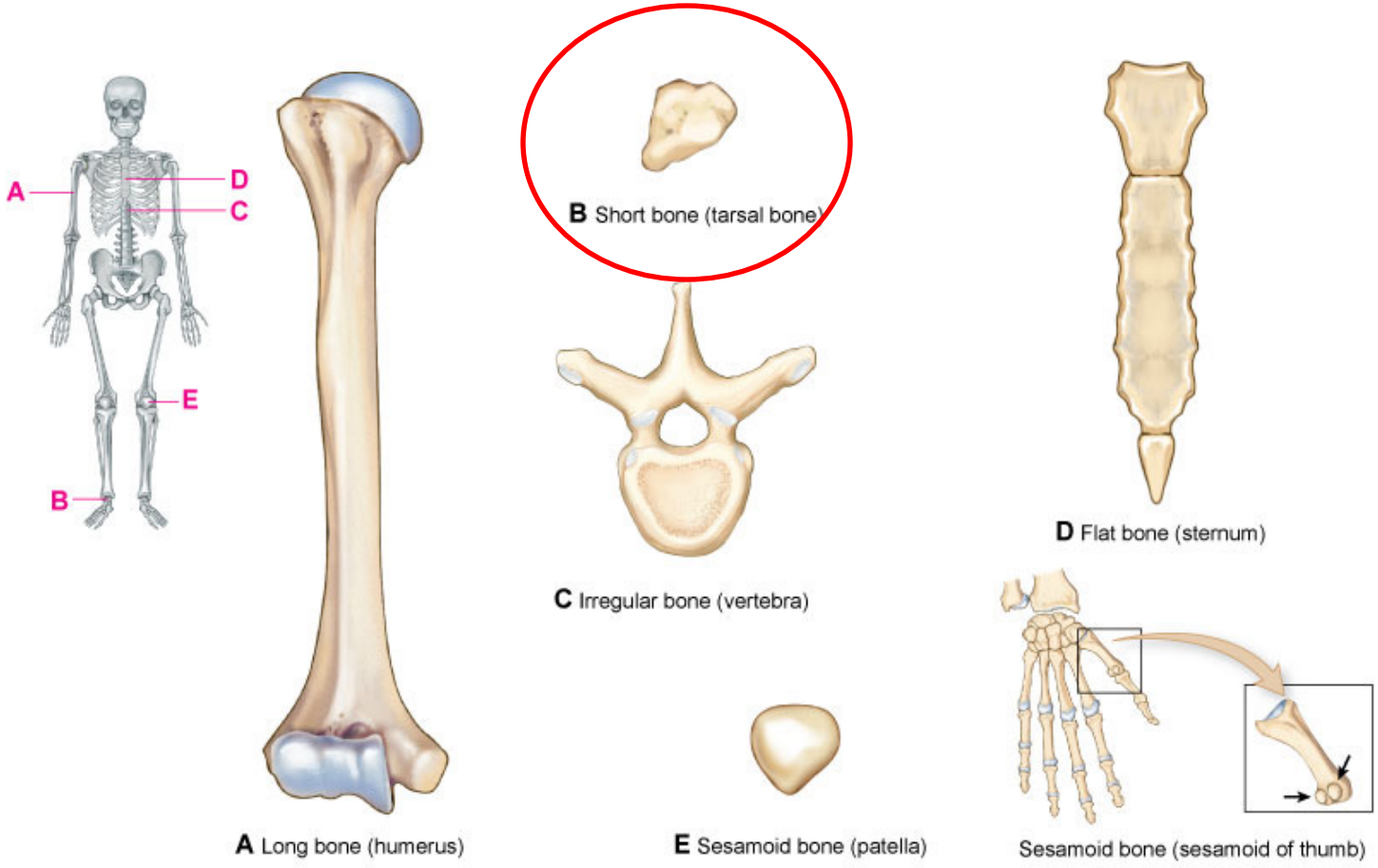
D Flat bone (sternum)



Sesamoid bone (sesamoid of thumb)

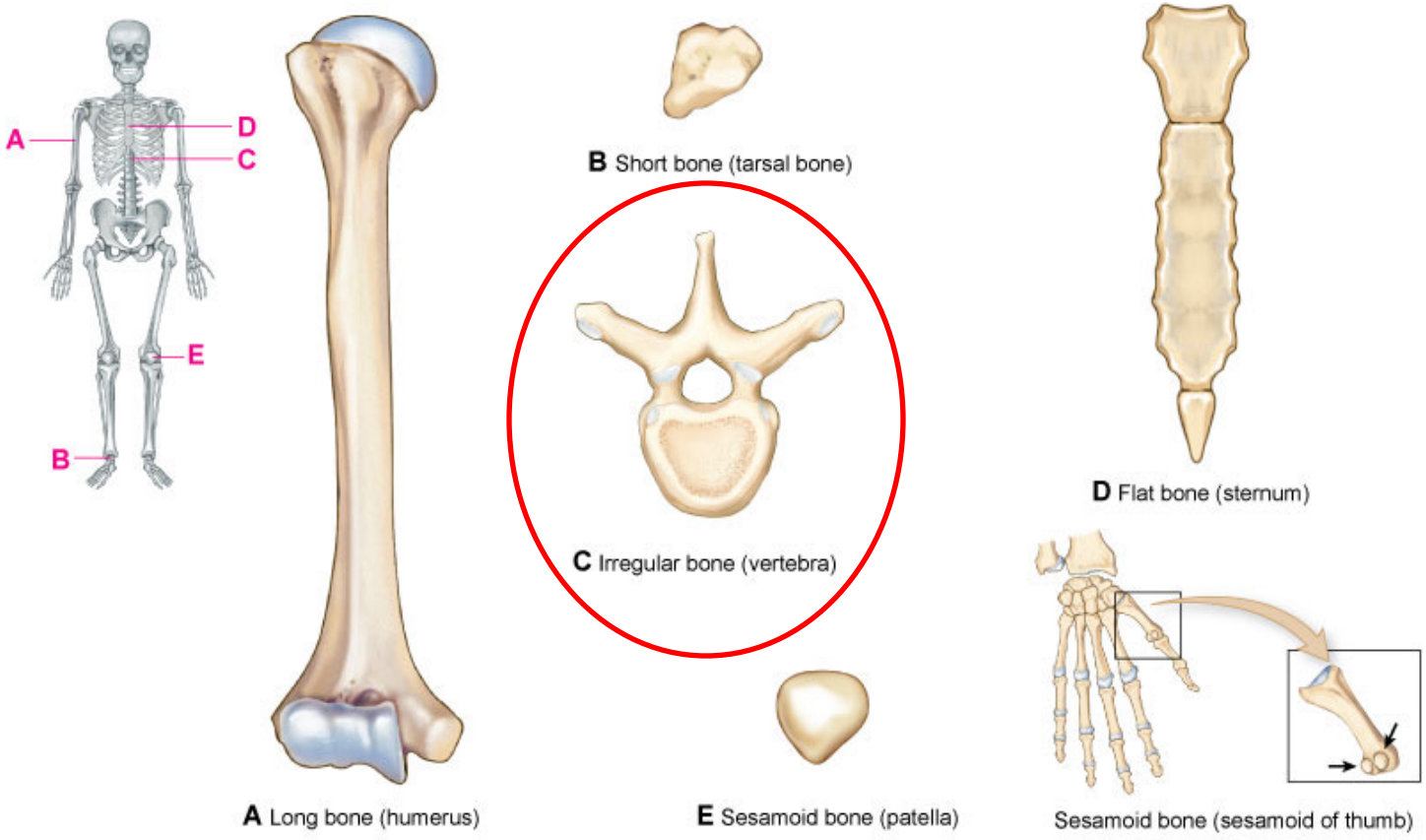
Classification of Bones

Short Small, __cube__-shaped, and contain multiple articulating surfaces.
Examples: carpals and *tarsals*.



Classification of Bones

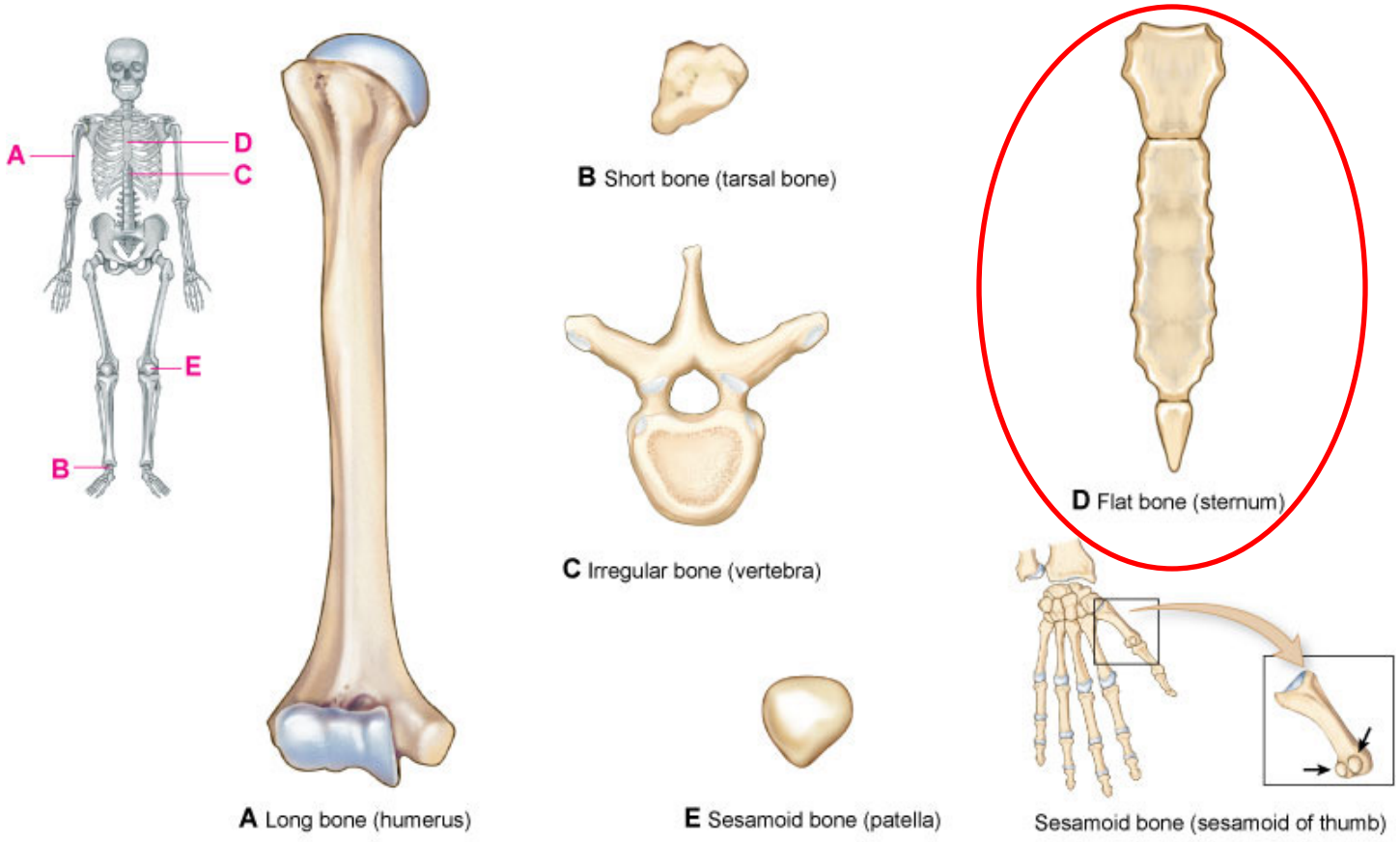
Irregular Catch-all category for bone that do not fit in other categories.
Examples: facial bones and *vertebrae*.



Classification of Bones

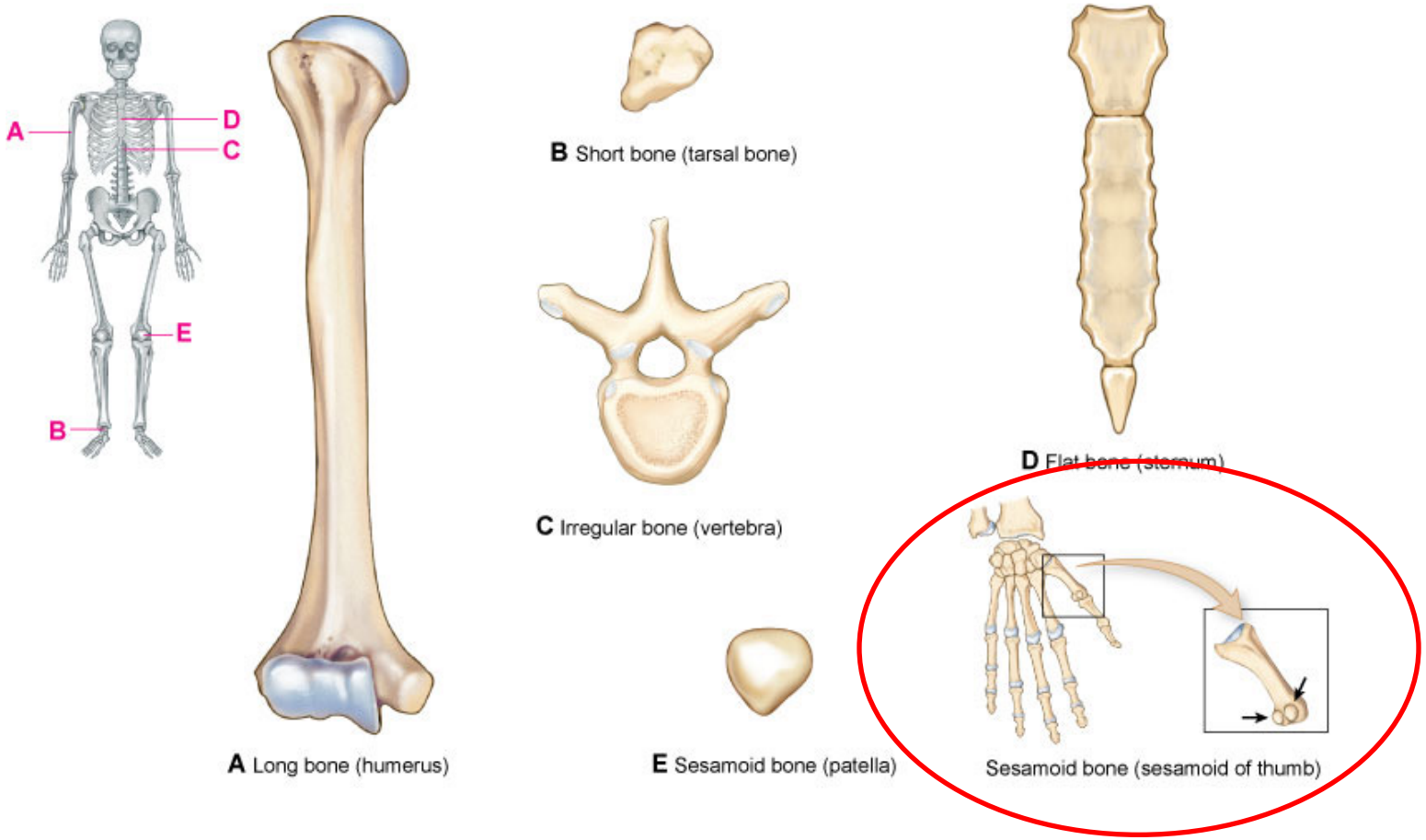
Flat Possess a broad, flat surface for muscle attachment or protection of underlying organs.

Examples: *sternum*, scapula, ribs, and most cranial bones.



Classification of Bones

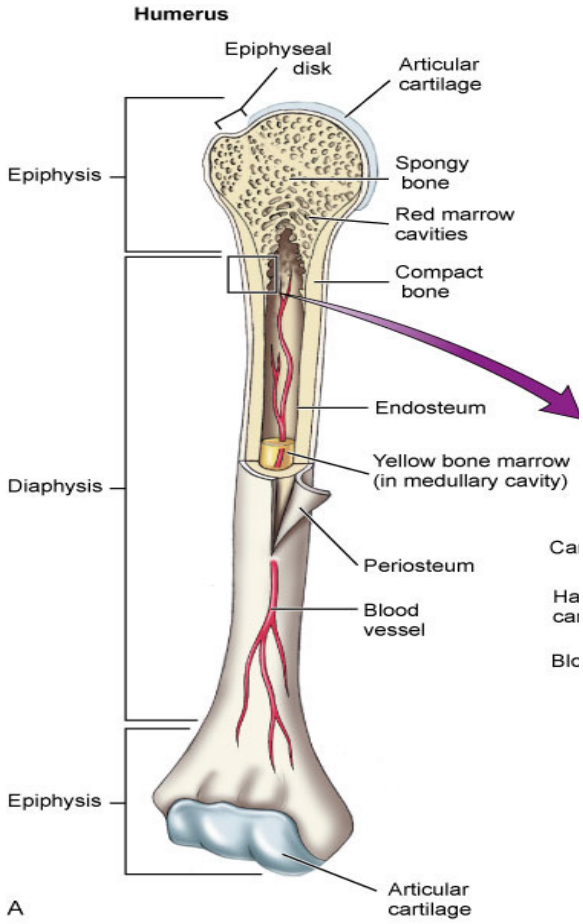
Sesamoid Small, round bones that are embedded in certain __tendons__.
Example: *patella*.

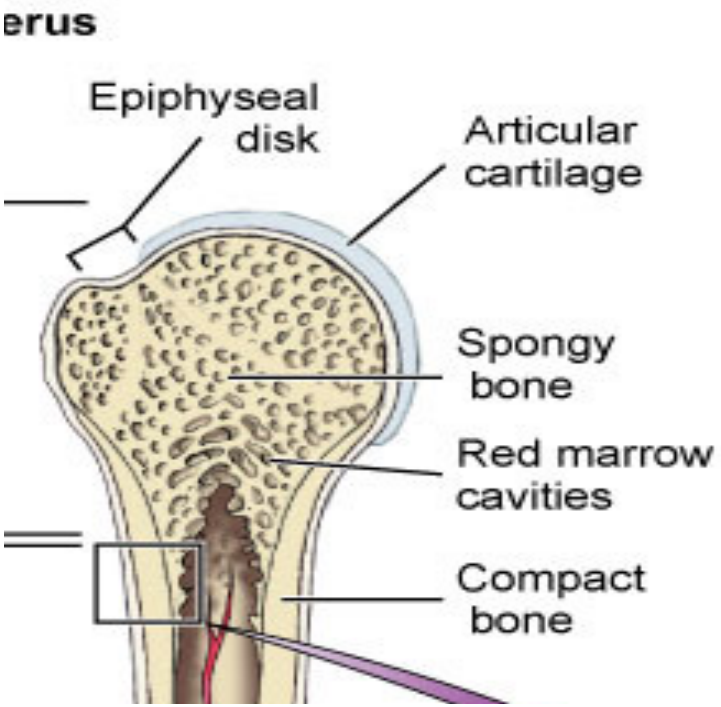


Bone Tissue

Bone Tissue

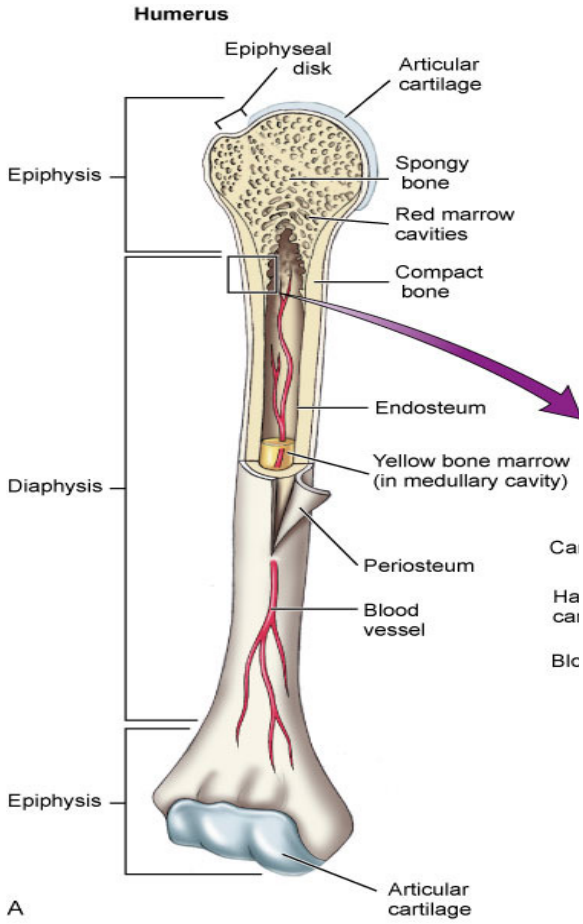
Compact Forms the hard outer shell of all bones and a small portion of the shaft of long bones. Provides protection, support, and resistance to stress of weight and movement.

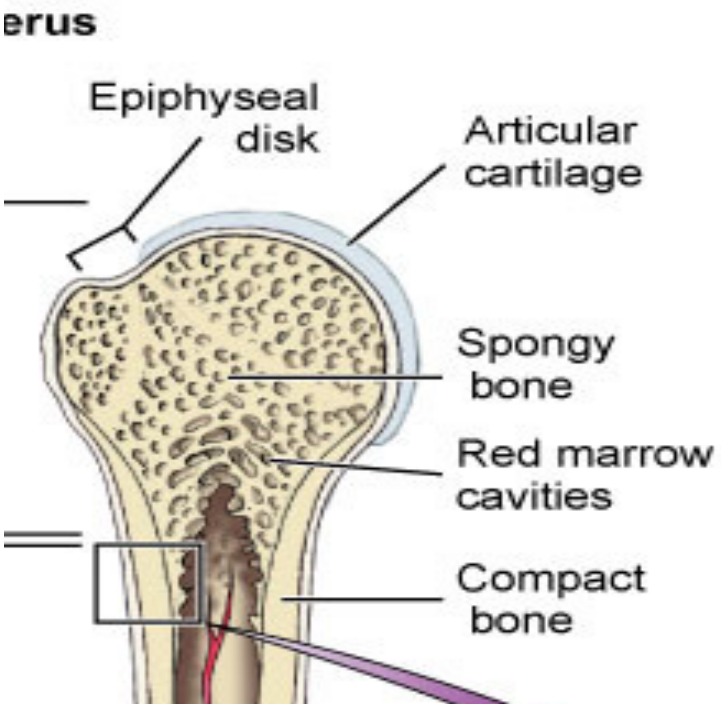




Bone Tissue

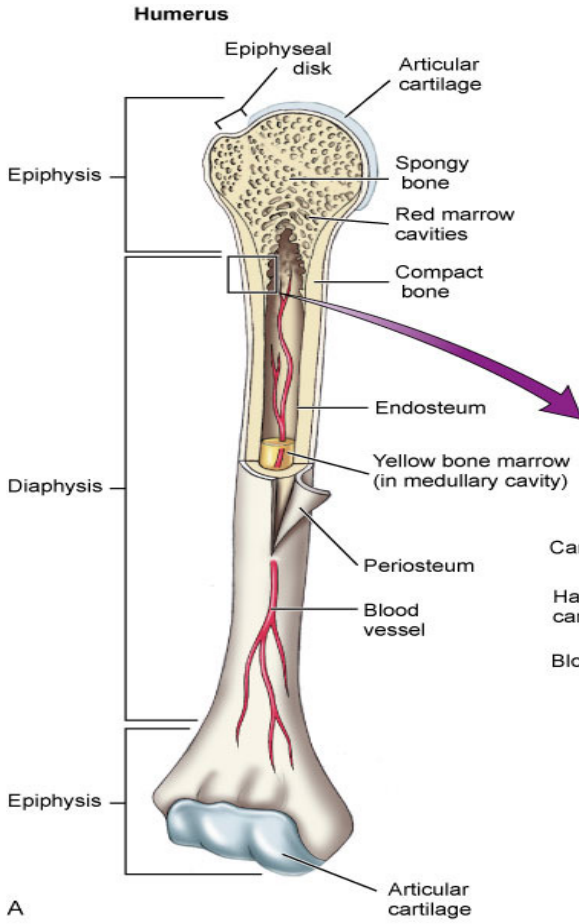
Spongy (AKA: cancelleous) A __lattice__ of thin beams of bone within bones. Lightens the bone and is filled with red bone marrow.

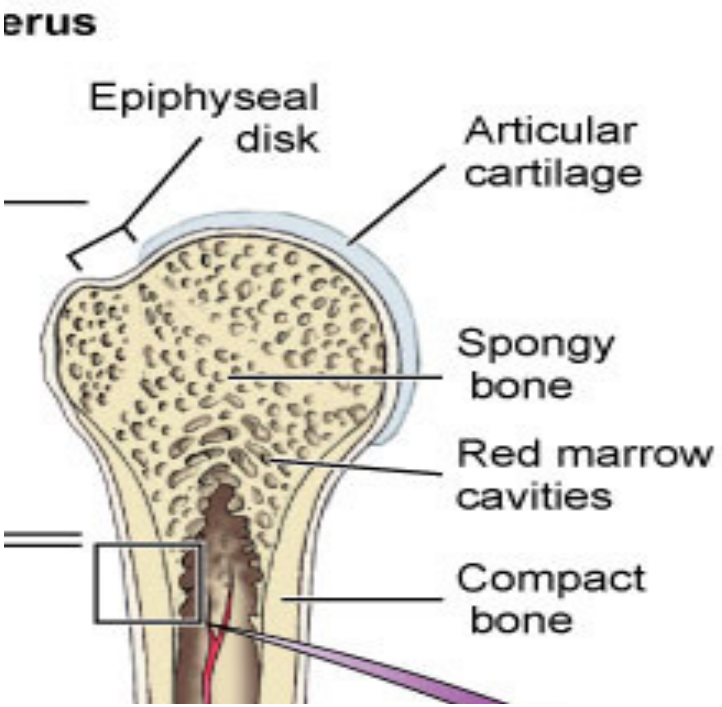




Bone Tissue

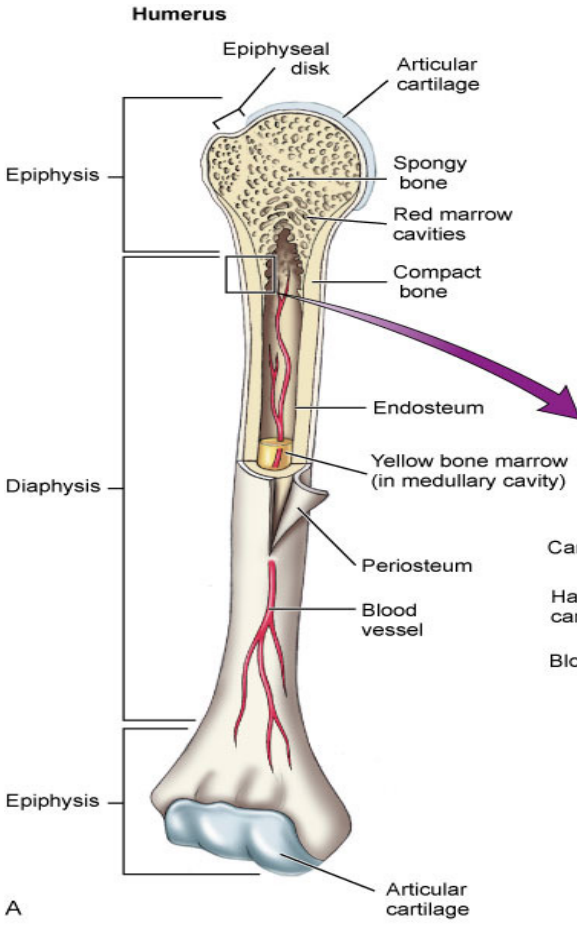
Red bone marrow Blood __forming__ cells found in flat and long bones. Produce red blood cells, platelets, and white blood cells.

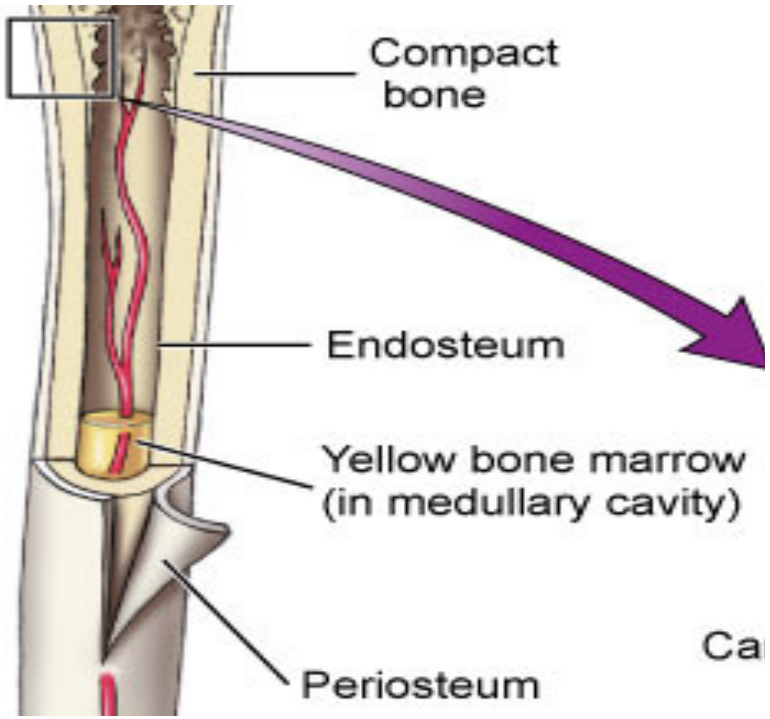




Bone Tissue

Yellow bone marrow Adipose fibrous connective tissue that contains mainly _fat_ cells and is found in the medullary cavity.



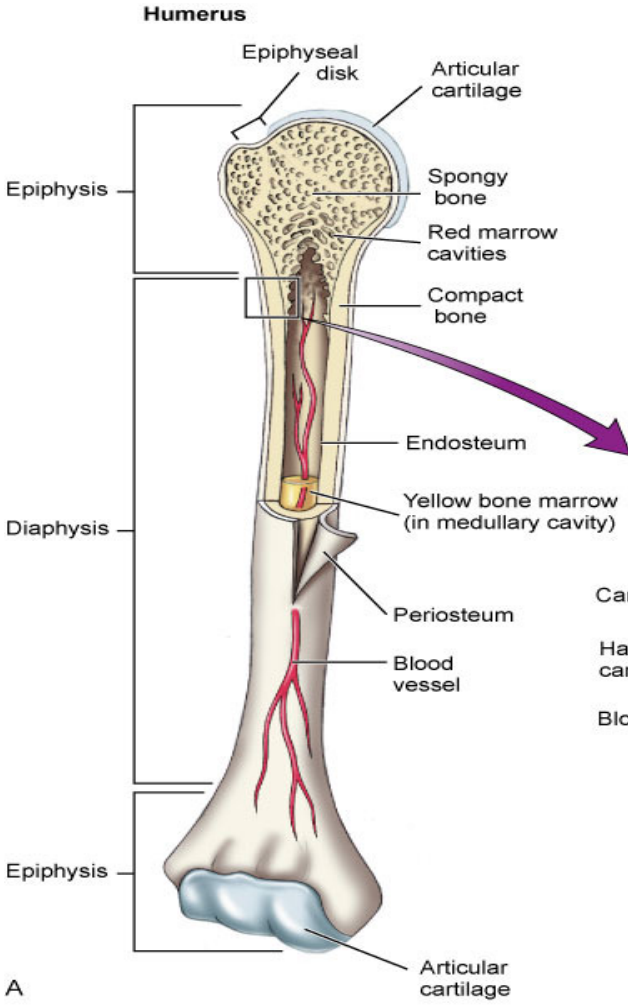


Anatomy of a Long Bone

Anatomy of a Long Bone

Diaphysis Cylindrical __shaft__ of a long bone.

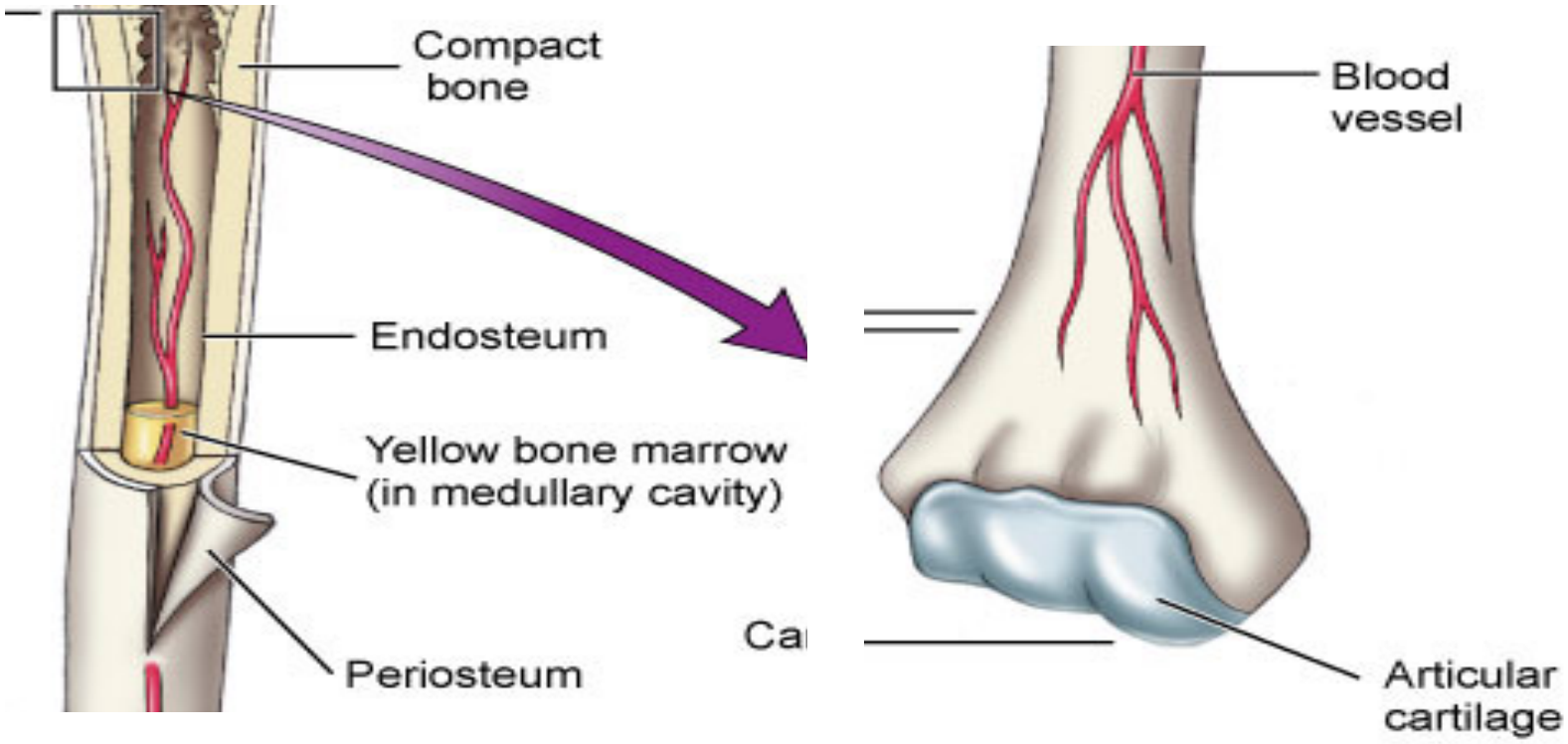
Epiphysis The __ends__ of a long bone.



Anatomy of a Long Bone

Articular cartilage Hyaline cartilage covering an epiphysis.

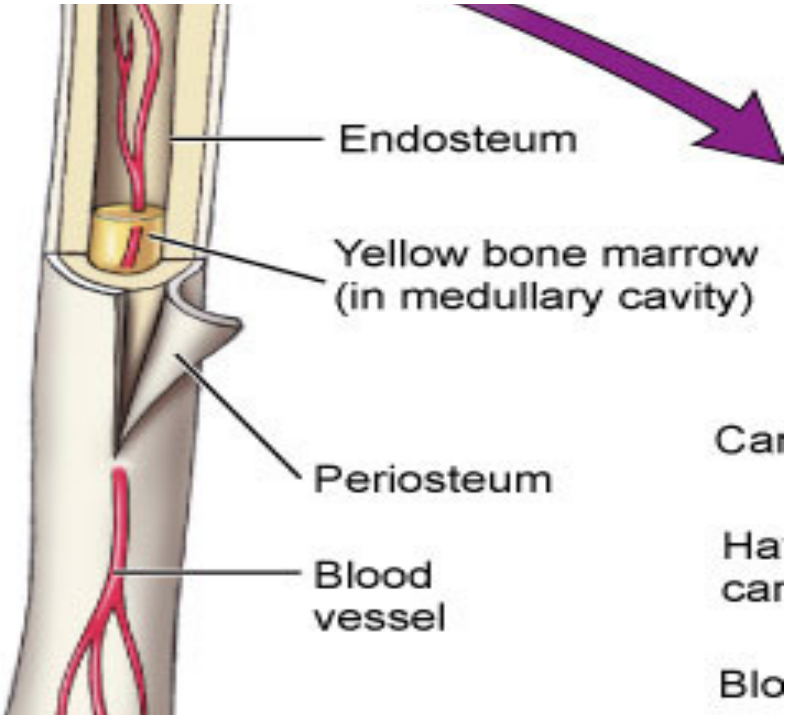
Medullary cavity Hollow space within the diaphysis.



Anatomy of a Long Bone

Periosteum Fibrous sheath surrounding the bone's shaft containing blood and lymphatic vessels, nerves, and bone-forming cells for growth and fracture healing.

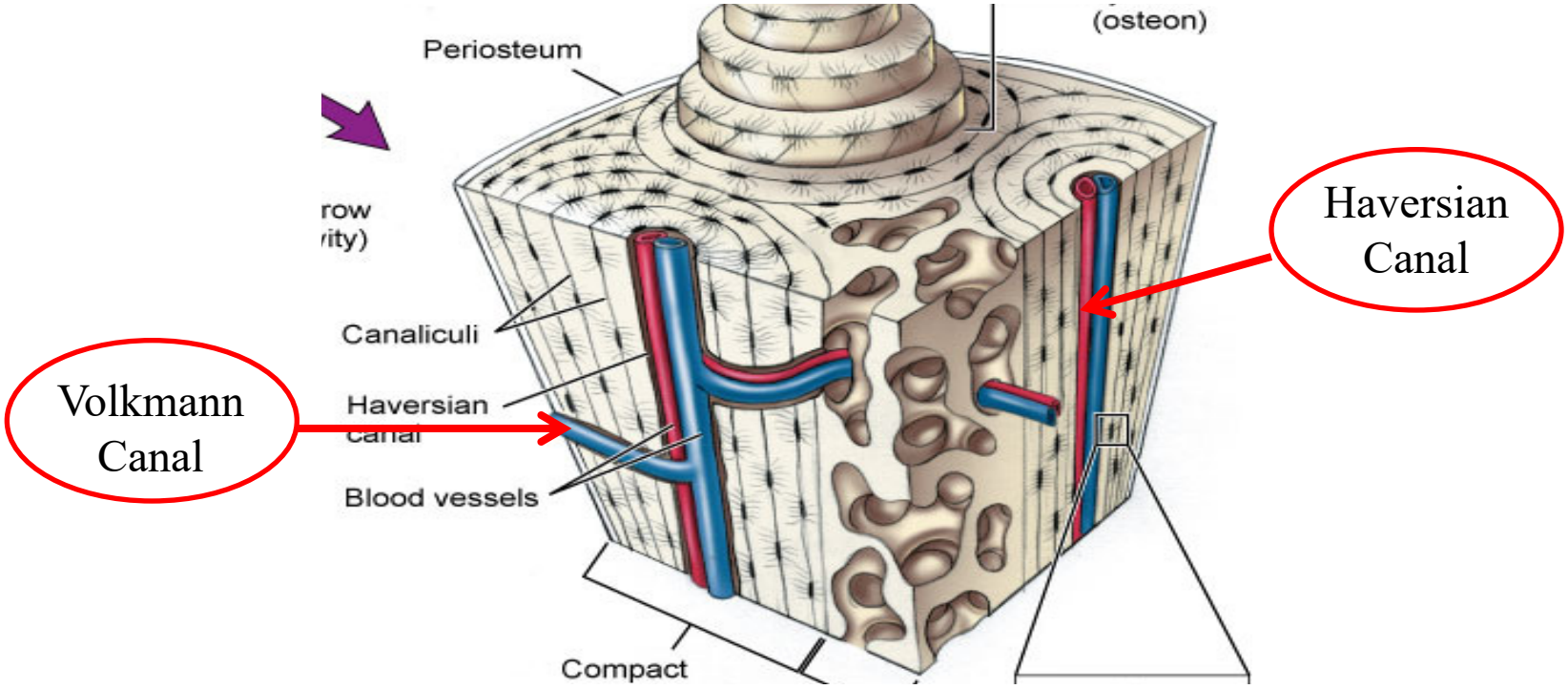
Endosteum Lining of the medullary cavity.



Anatomy of a Long Bone

Haversian canal Vascular canal that runs __longitudinally__ through a bone.

Volkmann canal Vascular canal that runs __horizontally__ through a bone, connecting Haversian canals.



Bone Remodeling

Bone Remodeling

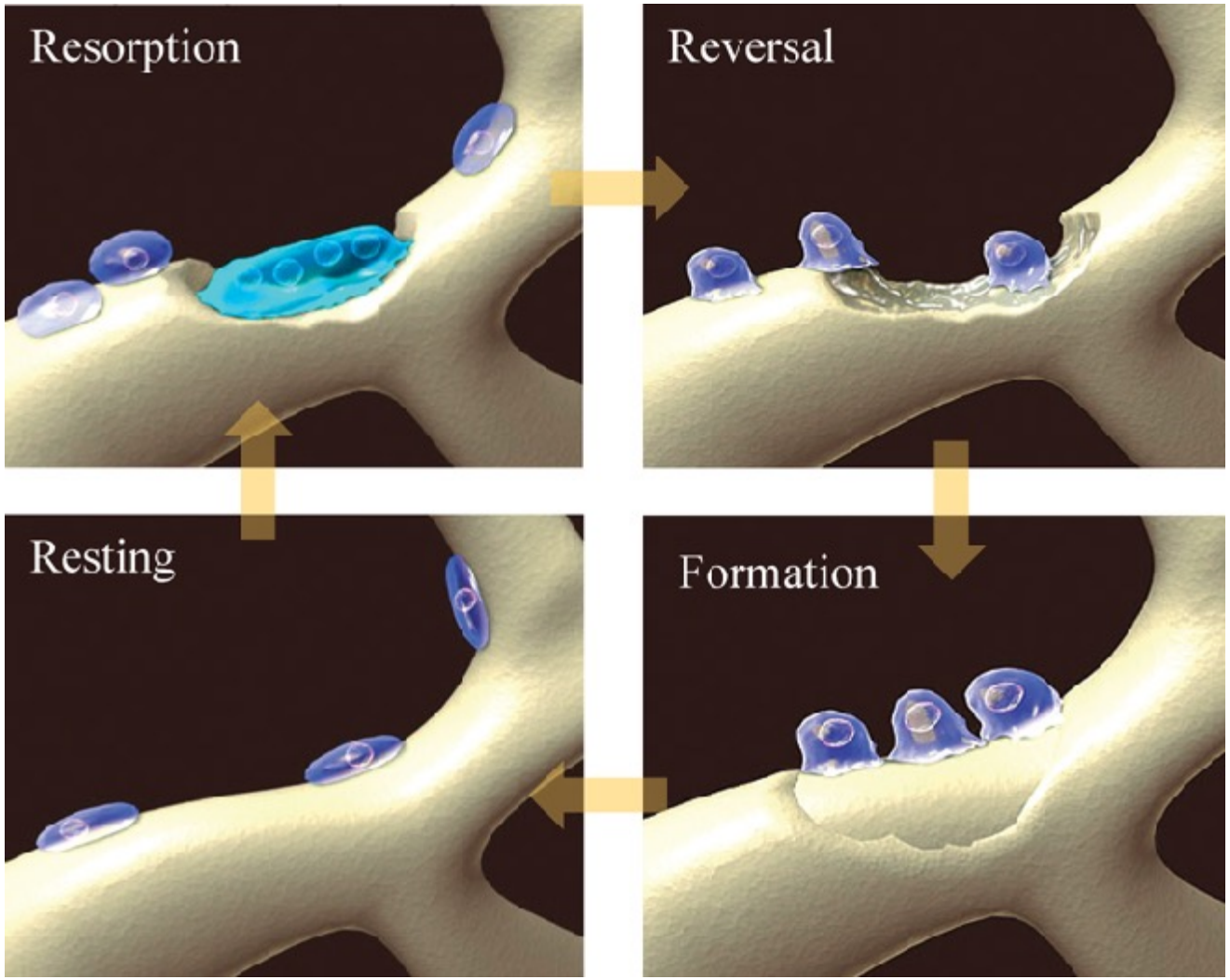
Osteoblasts Bone-__forming__ cells.

Osteoclasts Bone-__destroying__ cells.

Osteocytes Mature bone cell.

Osteoblasts Bone-forming cells.

Osteoclasts Bone-destroying cells.



13a A&P:

Skeletal System - Cells, Tissues, and Bone Shapes