

# Anatomy and Physiology II

Review Bones of the Upper  
Extremities

Muscles of the Upper Extremities

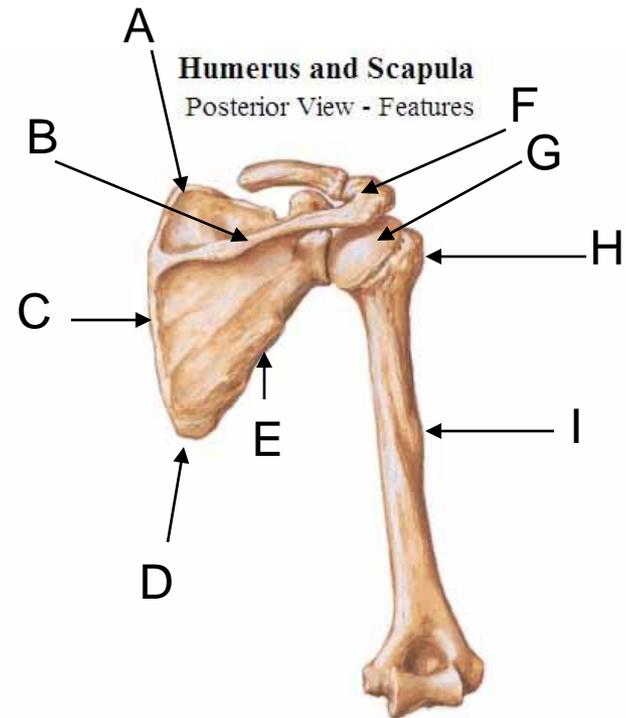
# Anatomy and Physiology II

Review

Bones of the Upper Extremities

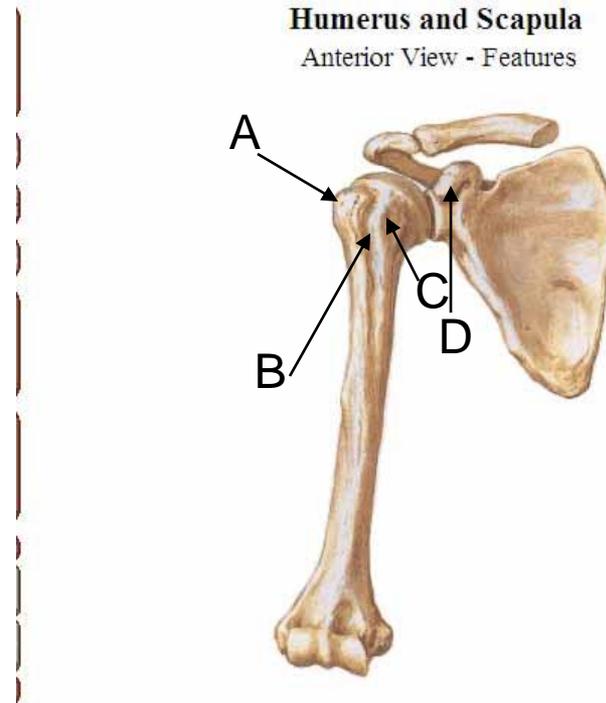
# Questions From Shoulder Girdle Lecture

- Can you name the following structures?
  - F
    - Acromion
  - B
    - Spine of the Scapula
  - C
    - Medial (Vertebral) Border
  - E
    - Lateral (Axillary) Border
  - A
    - Superior Angle
  - D
    - Inferior Angle
  - G
    - Head of the Humerus
  - H
    - Greater Tubercle of Humerus
  - I
    - Deltoid Tuberosity



# Questions From Shoulder Girdle Lecture

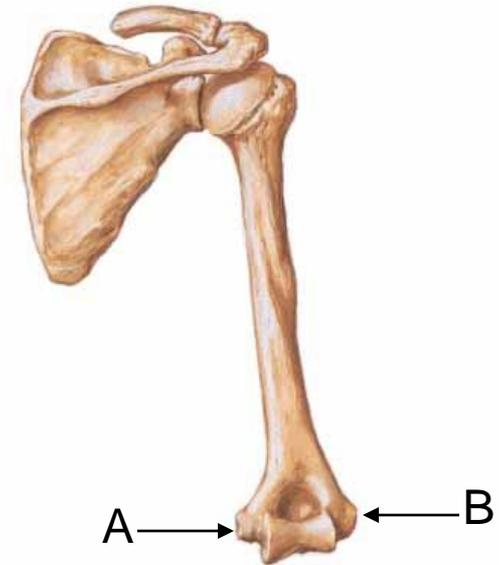
- Would you be able to find the many of the same landmarks on this view (angles, borders, etc)?
- Can you name the following?
  - D
    - Coracoid process of scapula
  - C
    - Lesser Tubercle
  - A
    - Greater Tubercle
  - B
    - Bicipital Groove (Intertubercular groove)



# Questions From Upper Extremities Lecture

- Can you name the following structures?
  - B
    - Lateral epicondyle
  - A
    - Medial epicondyle

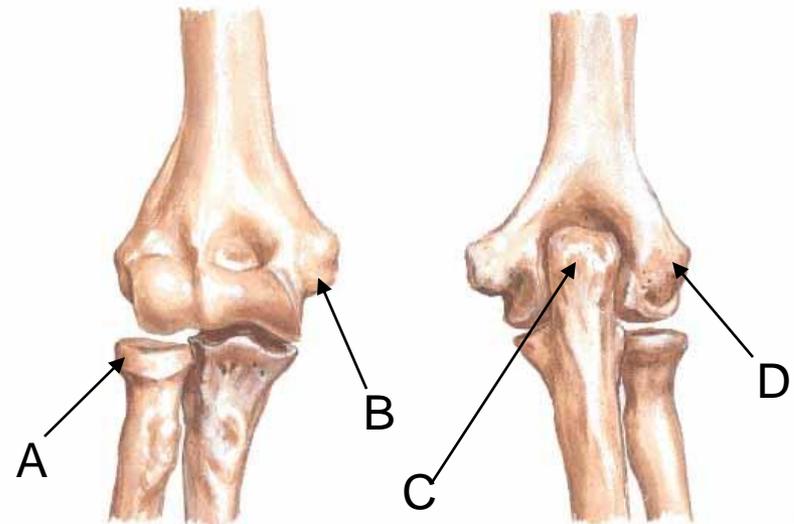
**Humerus and Scapula**  
Posterior View - Features



# Questions From Upper Extremities Lecture

- Can you name the following landmarks?
  - C
    - Olecranon process
  - A
    - Head of the radius
  - B
    - Medial epicondyle
  - D
    - Lateral epicondyle

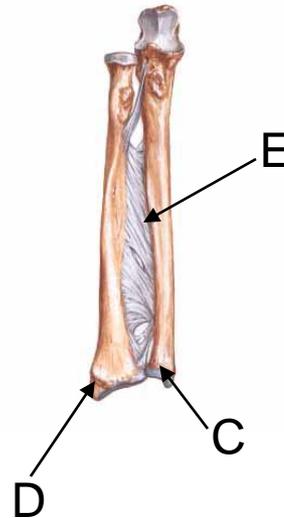
**Bones of Elbow in Extension**  
Anterior and Posterior Views



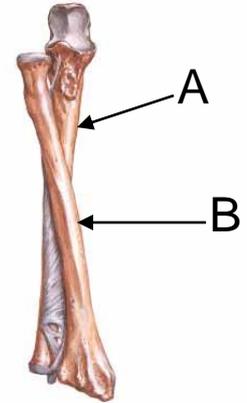
# Questions From Upper Extremities Lecture

- Can you name the following bones and landmarks?
  - Which bone is A pointing to?
    - Ulna
  - Which bone is B pointing to?
    - Radius
  - C
    - Styloid process of the ulna
  - D
    - Styloid process of the radius
  - E
    - Interosseous membrane of forearm

Right Radius and Ulna in Supination  
Anterior View



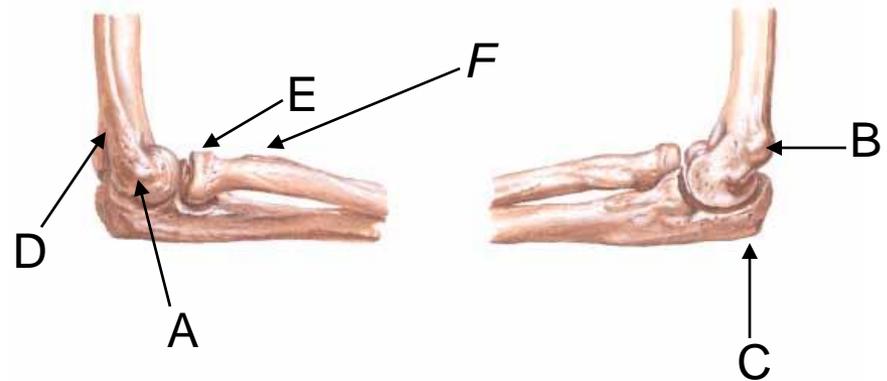
Right Radius and Ulna in Pronation  
Anterior View



# Questions From Upper Extremities Lecture

- Can you name the following bony landmarks?
  - Which landmark is A pointing to?
    - Lateral epicondyle of humerus
  - Which bone is B pointing to?
    - Medial epicondyle of humerus
  - C
    - Olecranon process of the ulna
  - D
    - Lateral supracondylar ridge of humerus
  - E
    - Interosseous membrane of forearm
  - F
    - *Radial tuberosity*

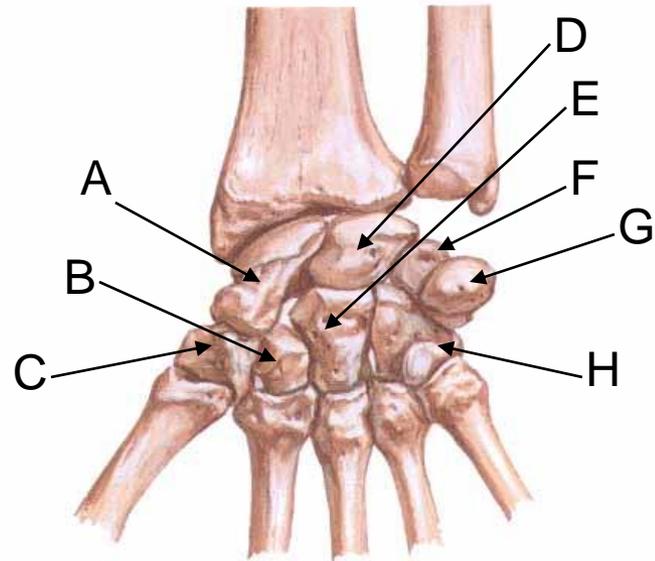
**Bones of Elbow in 90° Flexion**  
Lateral and Medial Views



- Name the following carpal bones

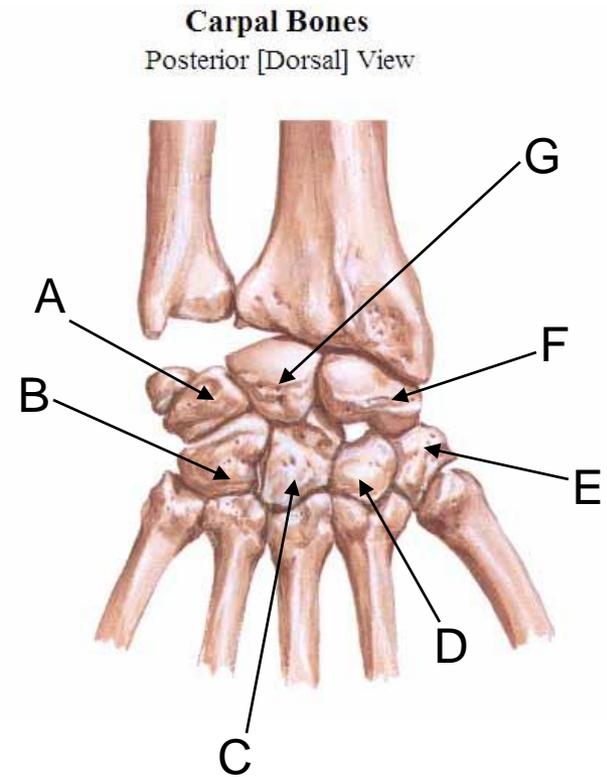
- A
  - Scaphoid
- B
  - Trapezoid
- C
  - Trapezium
- D
  - Lunate
- E
  - Capitate
- F
  - Triquetrum
- G
  - Pisiform
- H
  - Hamate

**Carpal Bones**  
Anterior [Palmar] View



- Name the following carpal bones

- A
  - Triquetrum
- B
  - Hamate
- C
  - Capitate
- D
  - Trapezoid
- E
  - Trapezium
- F
  - Scaphoid
- G
  - Lunate



# Anatomy and Physiology II

## Muscles of the Upper Extremities

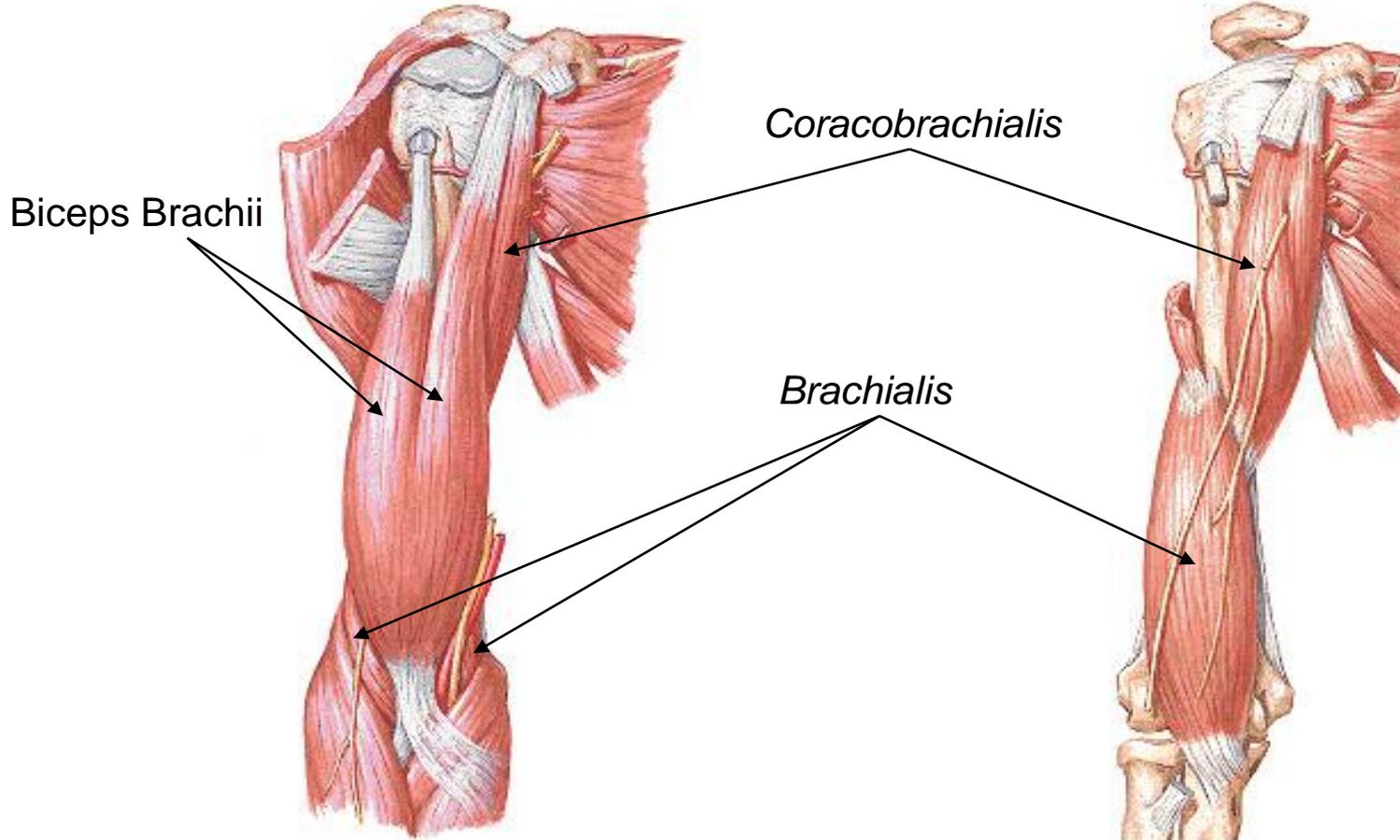
# Muscles

- Muscles that move the forearm and hand
  - Biceps brachii
  - Triceps brachii
  - Bracioradialis, Extensor carpi radialis (longus and brevis), Extensor carpi ulnaris
  - *Pronator teres*, Flexor carpi radialis, Palmaris longus, Flexor carpi ulnaris
- *Muscles that move the hand and fingers*
  - *Finger flexors: Flexor digiti superficialis, Flexor digiti profundus,*
  - *Finger extensors: Extensor digitorum, Extensor digiti minimi*
  - *Anatomic snuffbox*
    - *Abductor pollicis longus, extensor pollicus brevis, extensor pollicus longus*

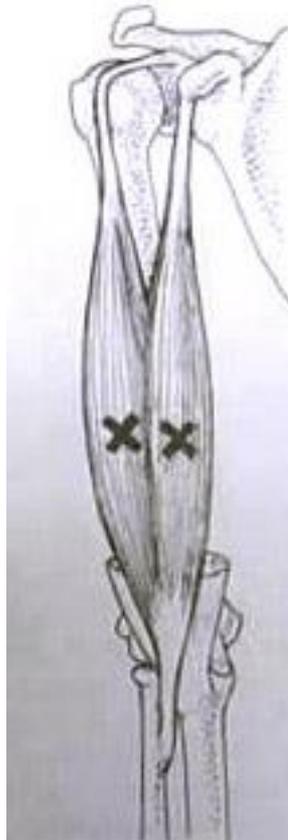
# Muscles of the Anterior Arm

Superficial Layer

Deep Layer



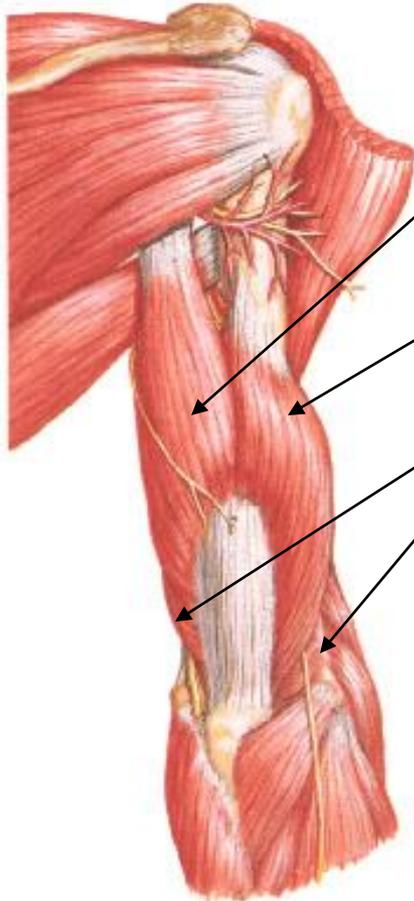
# Biceps Brachii



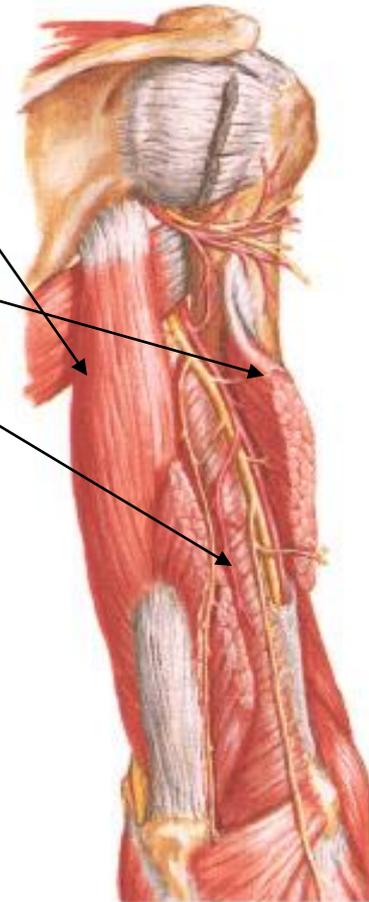
- The biceps brachii contains two heads, a long head and a short head
- Attachments
  - Supraglenoid tubercle (long head) and coracoid process (short head) of the scapula to the radial tuberosity and the deep fascia overlying the common flexor tendon
- Action
  - Flexes the forearm at the elbow joint, supinates the forearm at the elbow joint
  - Flexes the arm at the shoulder joint

# Muscles of the Posterior Arm

Superficial Layer



Deep Layer

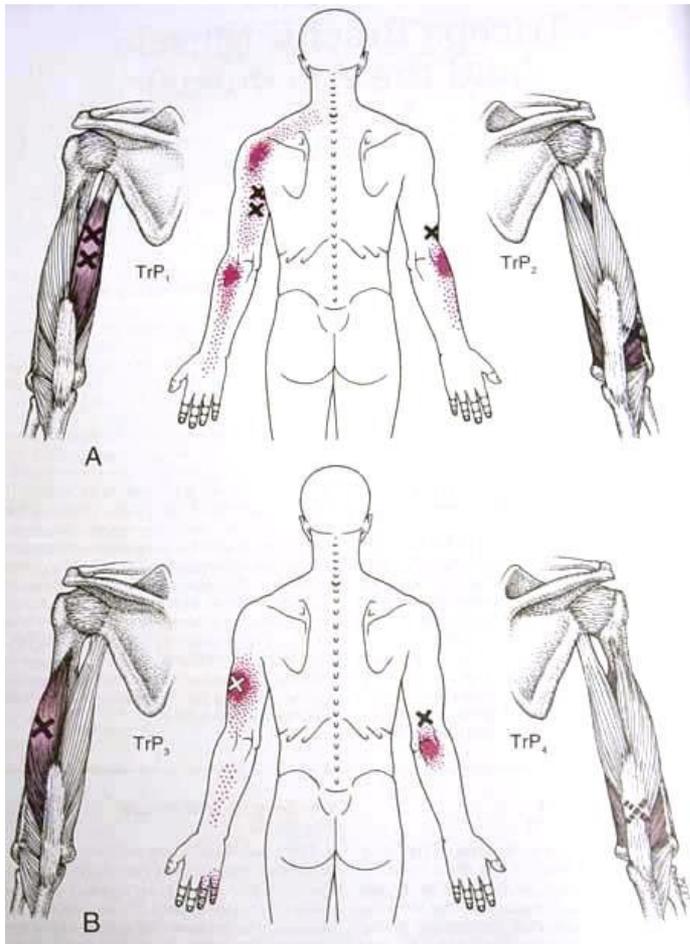


Triceps Brachii  
Long Head

Triceps Brachii  
Lateral Head

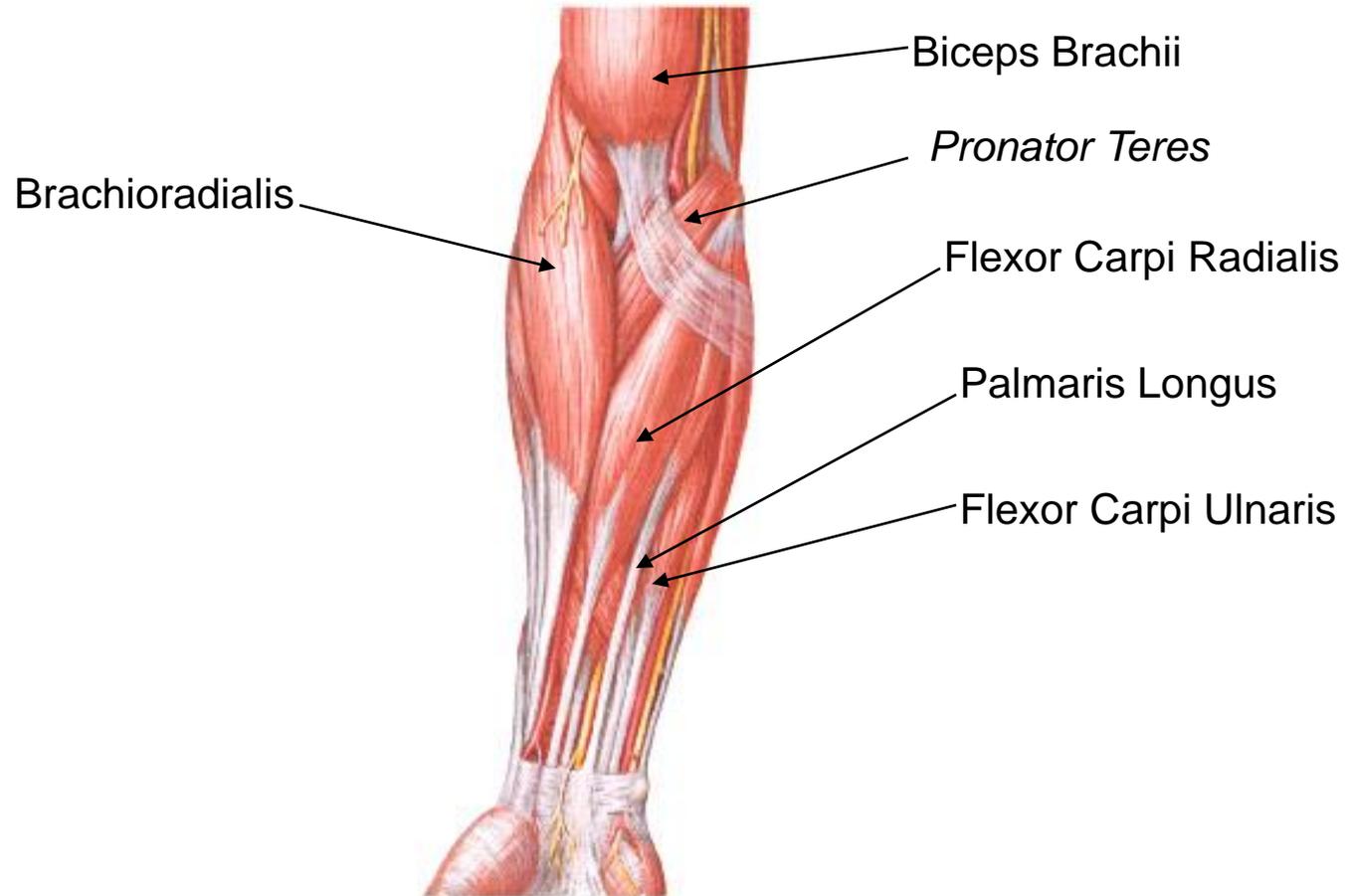
Triceps Brachii  
Medial Head

# Triceps Brachii



- The only muscle on the posterior arm
- Contains three heads
- Do not need to know attachments for the test
- Action
  - Extends the forearm at the elbow joint
  - Extends the arm at the shoulder joint (long head)

# Muscles of the Anterior Forearm

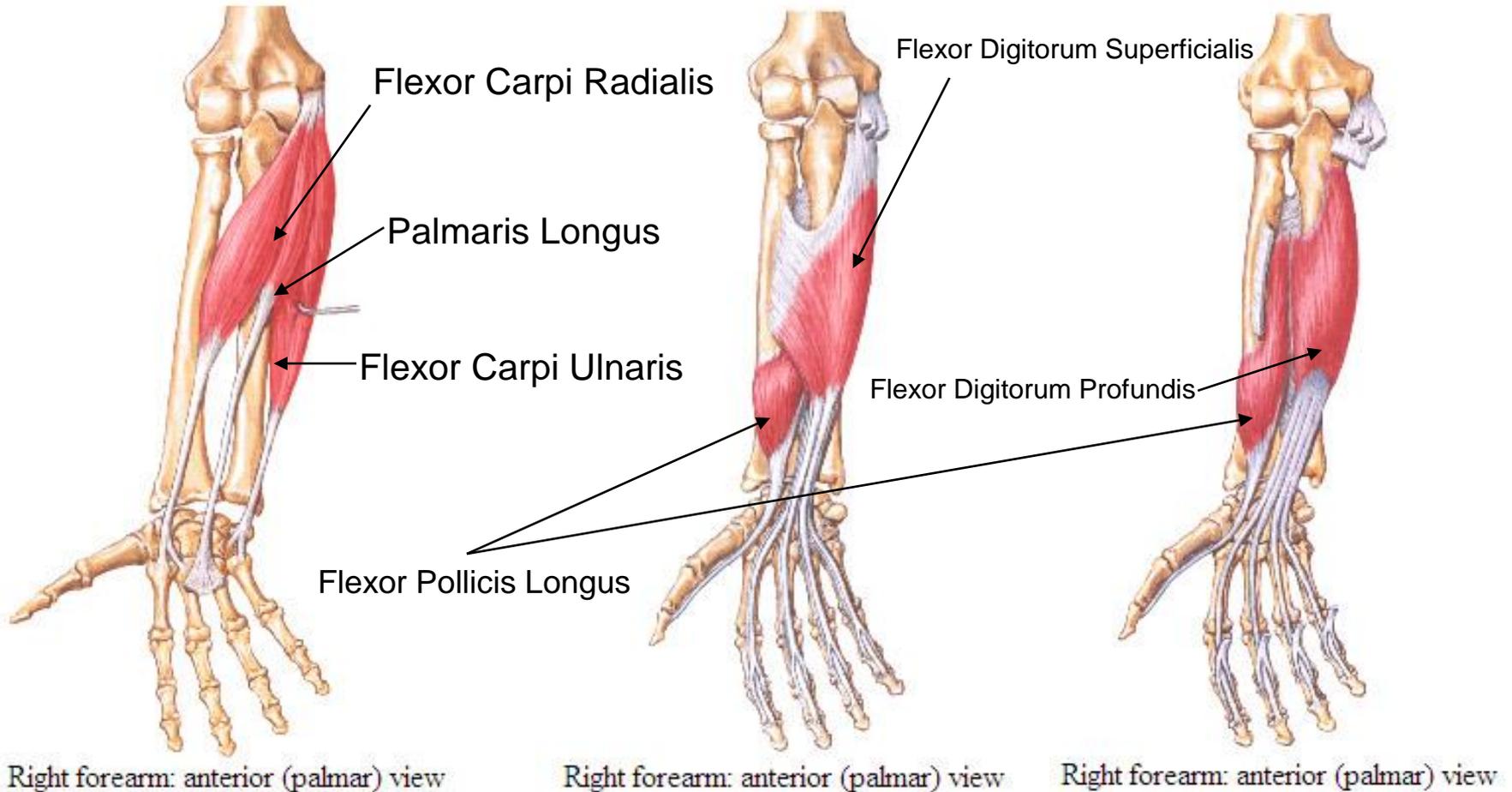


# Muscles of the Anterior Forearm

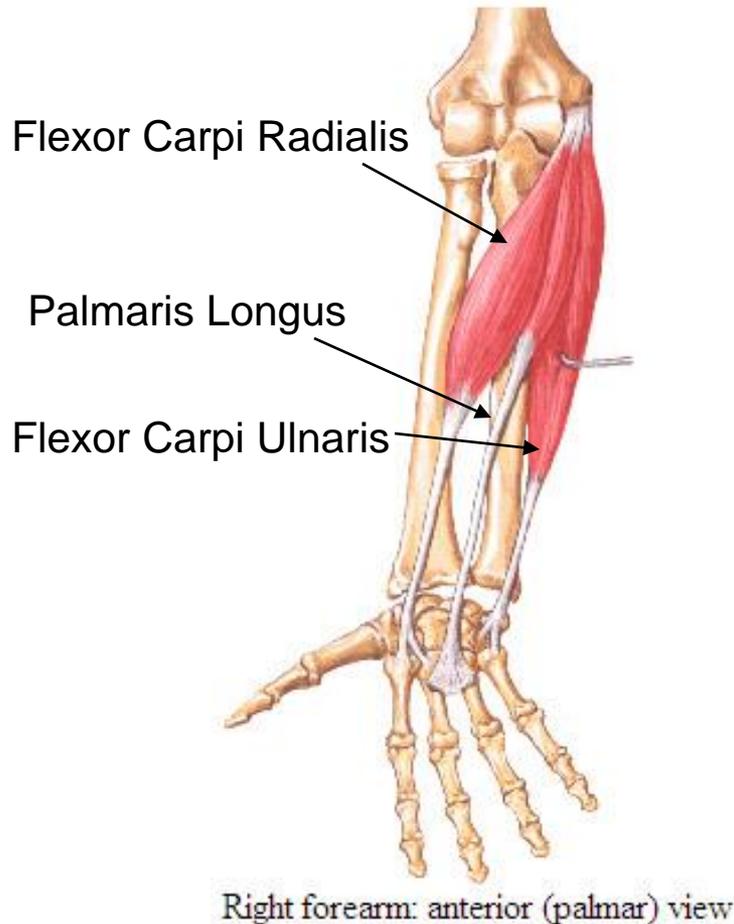
Superficial Layer

Intermediate Layer

Deep Layer

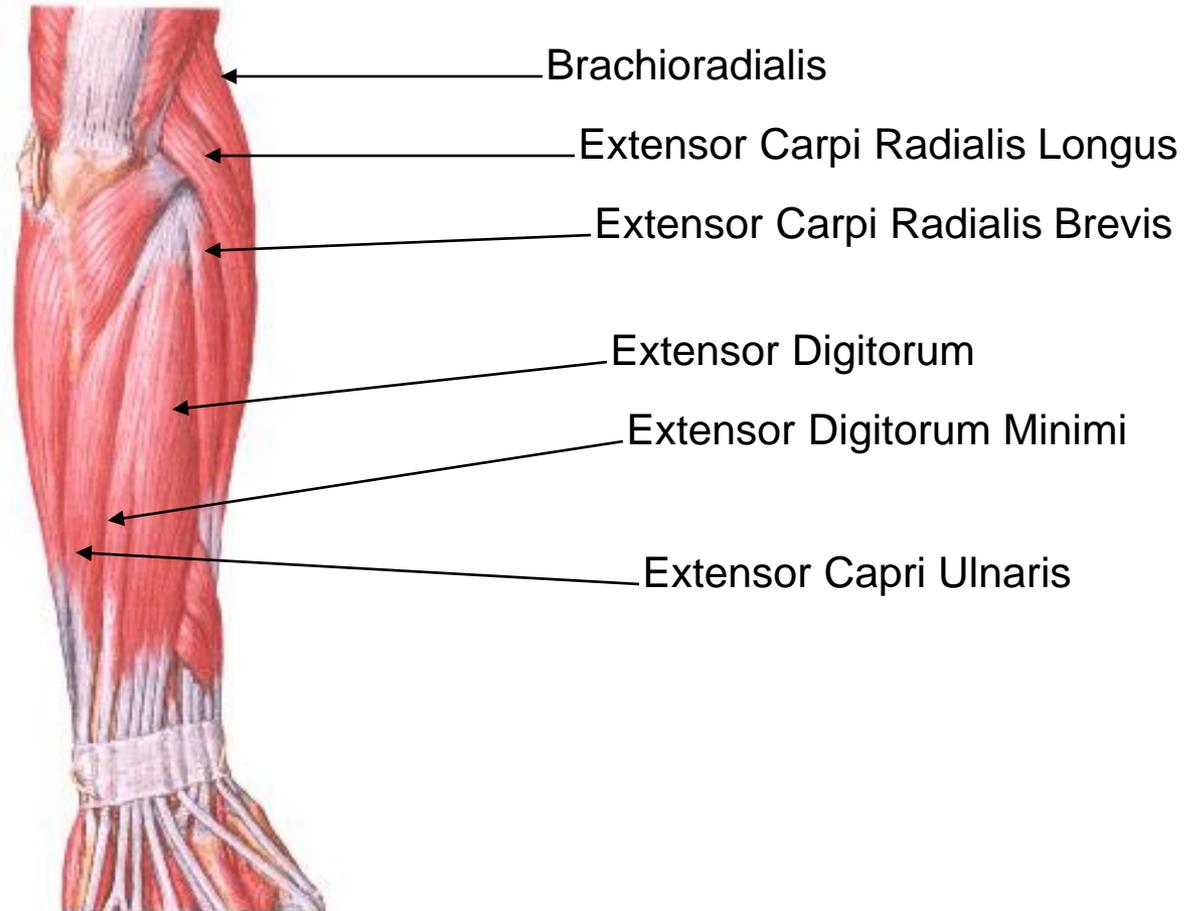


# Muscles of the Anterior Forearm

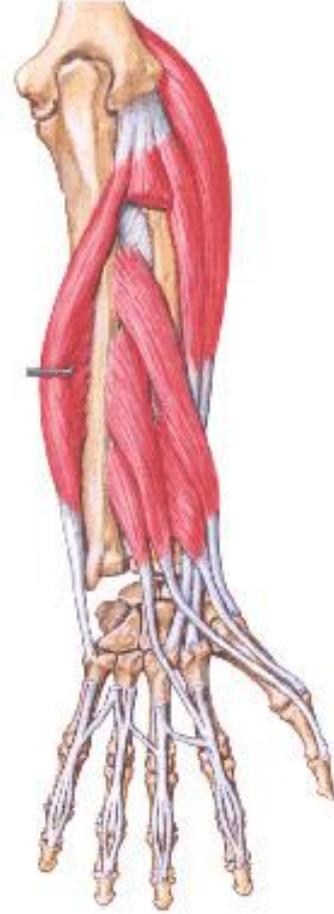


- These muscles have a common origin at the medial epicondyle of the humerus which is referred to as the common flexor tendon
  - *Common flexor tendon also includes the pronator teres and flexor digiti superficialis*
  - *The flexor carpi ulnaris also has an attachment on the proximal 2/3 of the ulna*
- They cross the wrist joint
  - *FCR attaches to the base of the 2<sup>nd</sup> and 3<sup>rd</sup> metacarpal*
  - *Palmaris longus attaches into the palmar aponeurosis*
    - An aponeurosis is a flat tendon
  - *FCU attaches to the base of the 5<sup>th</sup> metacarpal, the pisiform and the hook of the hamate*
- Actions
  - All flex the hand at the wrist joint
  - FCR radially deviates the hand at the wrist joint
  - FCU ulnar deviates the hand at the wrist joint
- For the test: not necessary to know specifics
  - Know that they all have a common attachment as part of the common flexor tendon on the medial epicondyle of the humerus
  - Know the actions of each
  - Know what an aponeurosis is

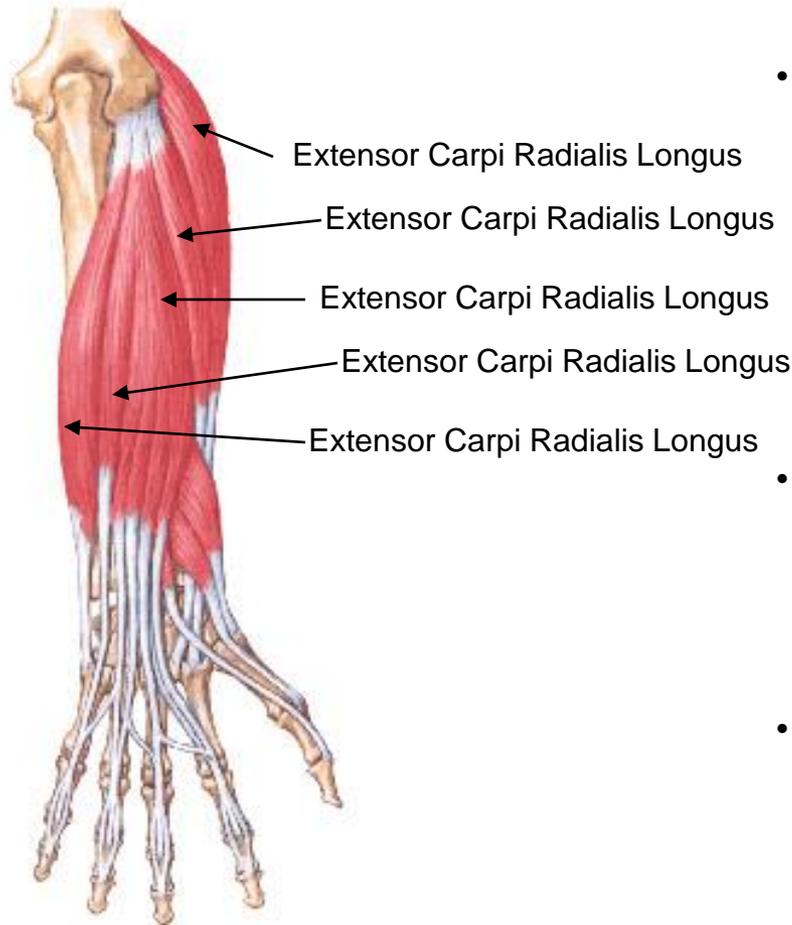
# Muscles of the Posterior Forearm



# Muscles of the Posterior Forearm



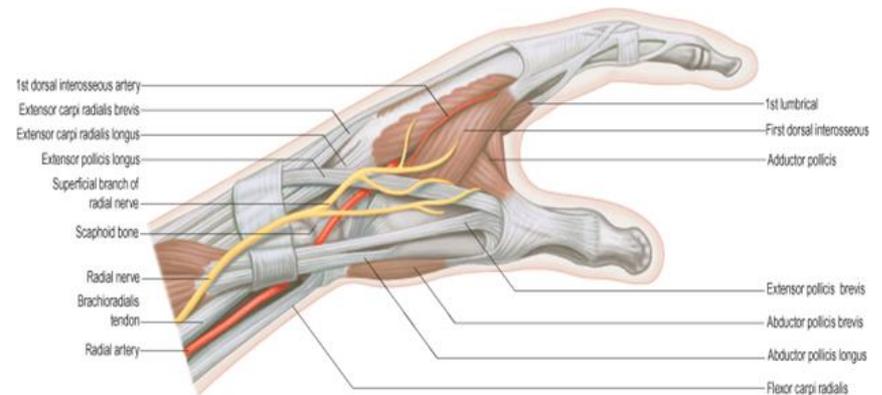
# Muscles of the Posterior Forearm



- All of these muscles have a common origin at the lateral epicondyle
  - *ECRL is on the supracondylar ridge*
- They cross the wrist joint
  - *ECRL attaches to the base of the 2<sup>nd</sup> metacarpal, ECRB attaches to the base of the 3<sup>rd</sup> metacarpal*
  - *Extensor digitorum attaches to the digits (middle and distal phalanx) of fingers 2-5, Extensor digiti minimi attaches to the little finger (posterior surface of the middle and distal phalanx of finger 5)*
  - *FCU attaches to the base of the 5<sup>th</sup> metacarpal, the pisiform and the hook of the hamate*
- Actions
  - All extend the hand at the wrist joint, extensor digitorum and extensor digiti minimi extend the fingers
  - ECRL and ECRB radially deviate the hand at the wrist joint
  - ECU ulnar deviates the hand at the wrist joint
- For the test: not necessary to know specifics
  - Know that they all have a common attachment as part of the common extensor tendon on the lateral epicondyle of the humerus
  - Know the actions of each

# Anatomic Snuff Box

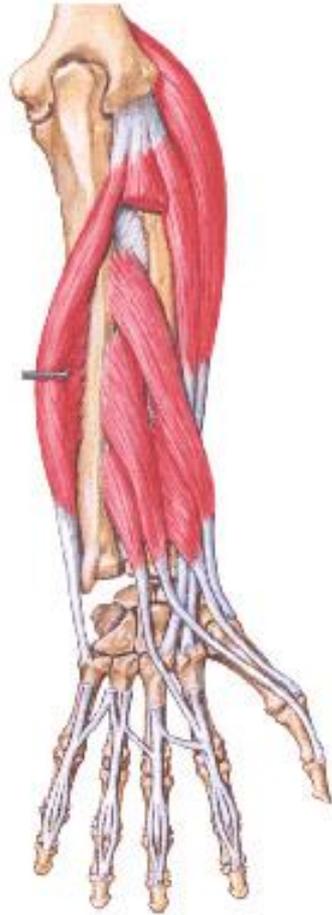
## Not on Test



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# Anatomic Snuffbox

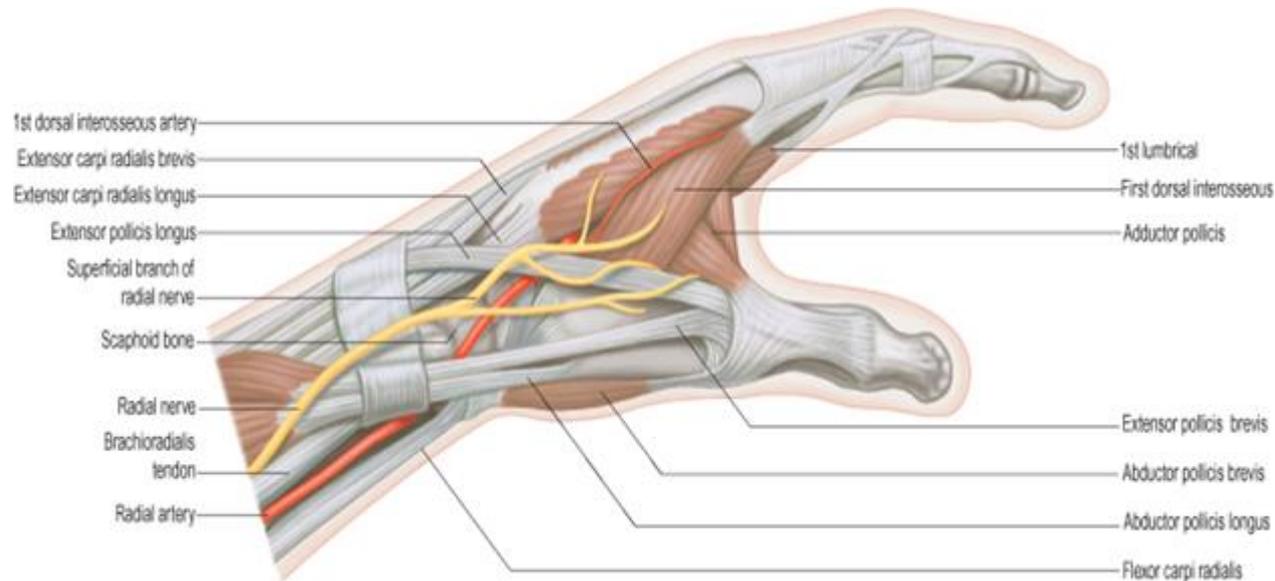
## Not on Test



- This is a depression at the radially posterior portion of the wrist
- It is bordered on its radial side by extensor pollicis brevis and abductor pollicis longus and on its ulnar side by extensor pollicis longus
- The trapezium bone makes up the floor
- The terminal branch of the musculocutaneous and radial nerve and the radial artery cross this depression
- This is the location for LI-5

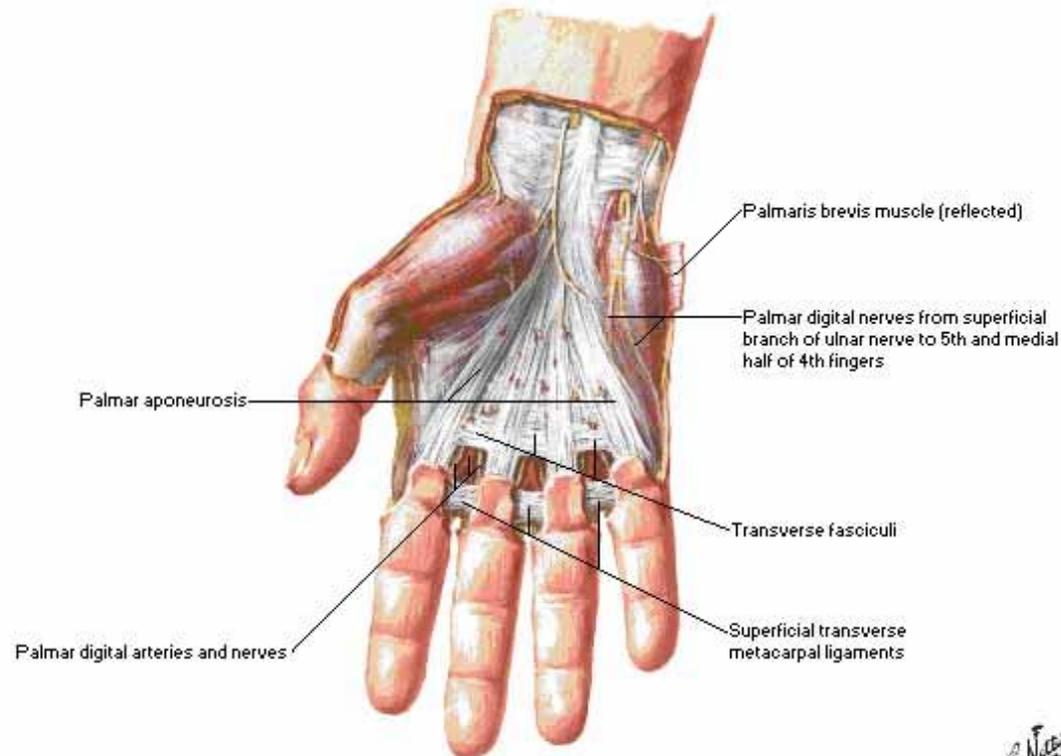
# Location of LU-7

## Not on Test



# Not on Test -Palmar Aponeurosis Relevant to Carpal Tunnel

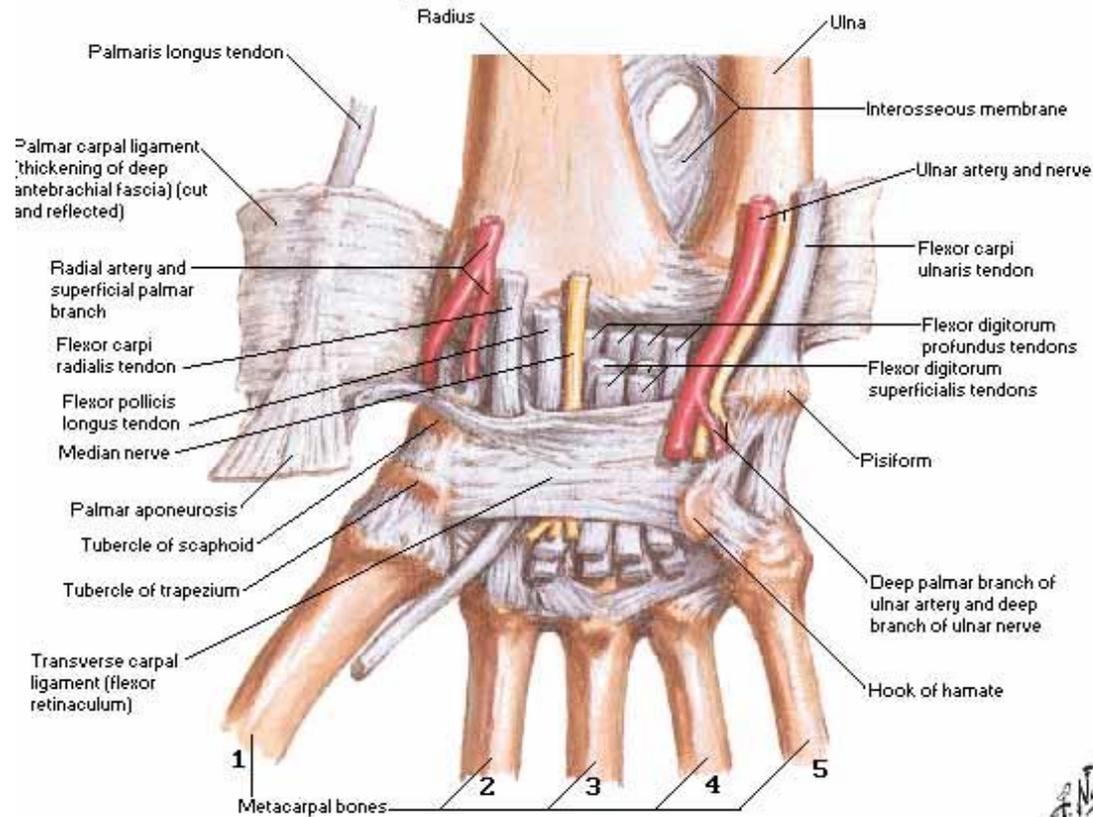
## Wrist and Hand Superficial Palmar Dissections [Continued]



# Not on Test

## Carpal Tunnel

**Ligaments of Wrist**  
Carpal Tunnel - Palmar View

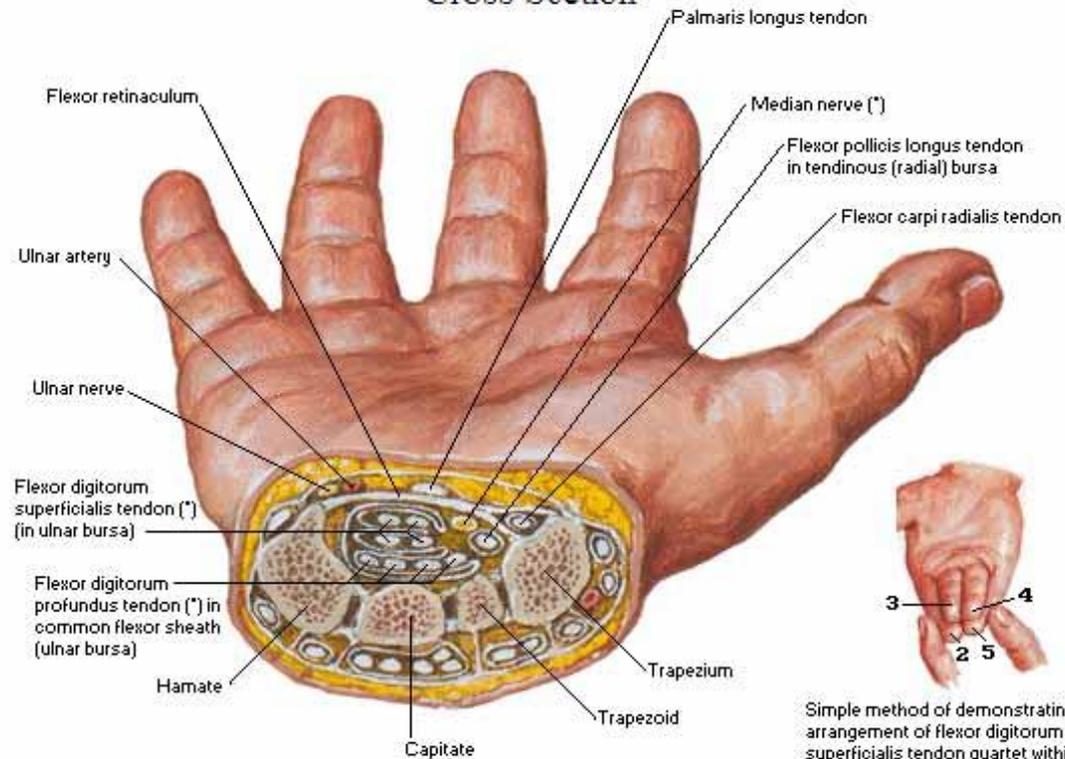


# Not on Test

# Carpal Tunnel

## Flexor Tendons, Arteries and Nerves at Wrist

### Cross Section



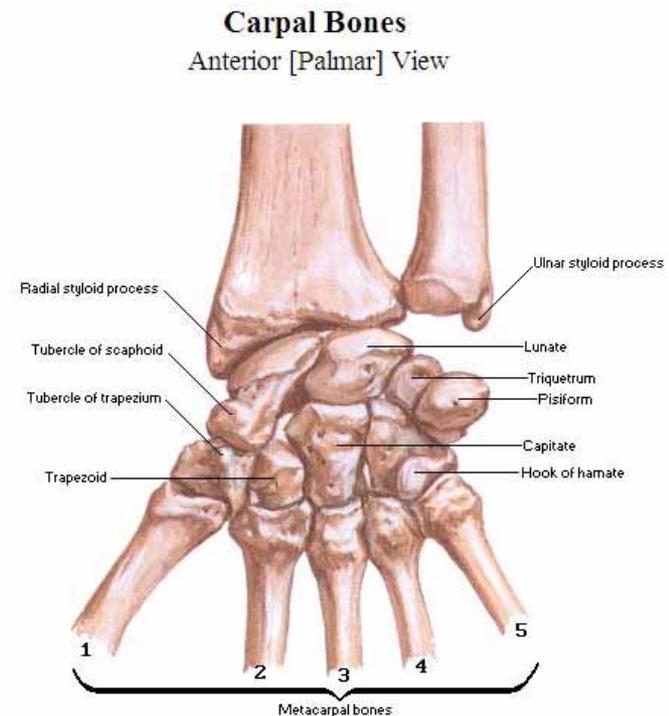
\*Contents of carpal tunnel

Simple method of demonstrating arrangement of flexor digitorum superficialis tendon quartet within carpal tunnel

# Not on Test

## Carpal Tunnel

- Carpal Bones and the Flexor Retinaculum make a tunnel
- Several structures pass through this tunnel
  - Nine tendons
    - Flexor digitorum profundus (4 tendons)
    - Flexor digitorum superficialis (4 tendons)
    - Flexor pollicis longus (1 tendon)
  - Median Nerve
- The median nerve can become entrapped and cause numbness, tingling and discomfort in the first 4 and ½ fingers
- This is carpal tunnel syndrome

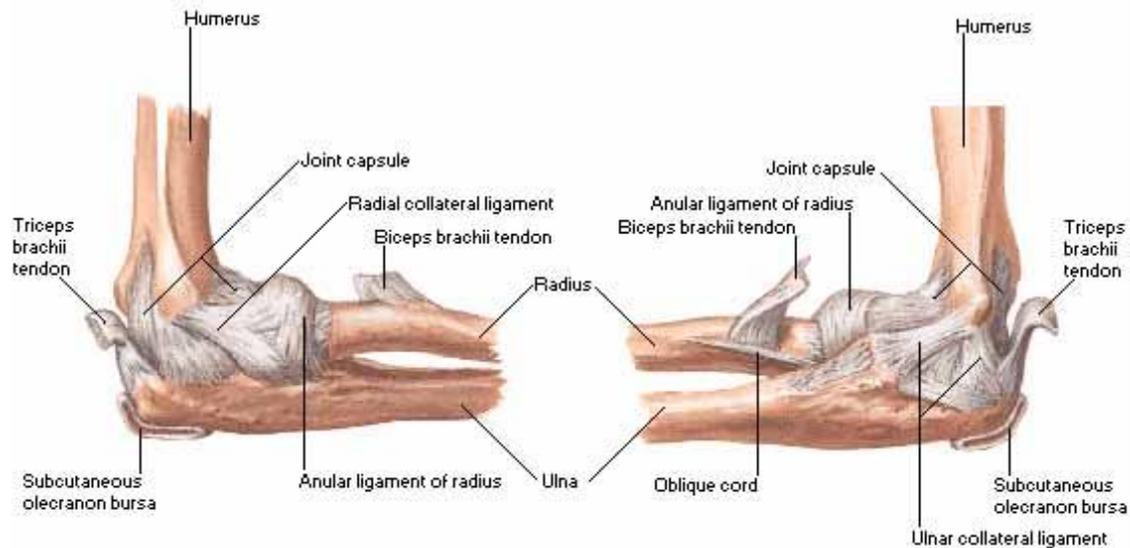


# Not on Test

## Good view of Anular Ligament and other Ligaments of Elbow

### Ligaments of Elbow in 90° Flexion

Lateral and Medial Views



# Anatomy and Physiology II

Identification and Application

# Identification and Application

- Can you name the following structures?

– A

- Medial Epicondyle of the humerus

– B

- Flexor carpi radialis

– C

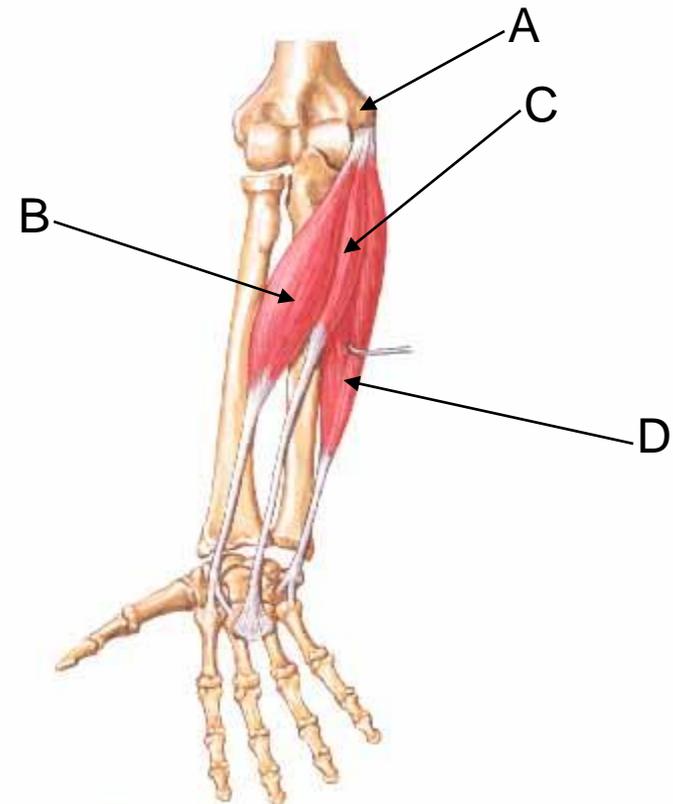
- Palmaris longus

– D

- Flexor carpi ulnaris

## Individual Muscles of Forearm

Flexors of Wrist

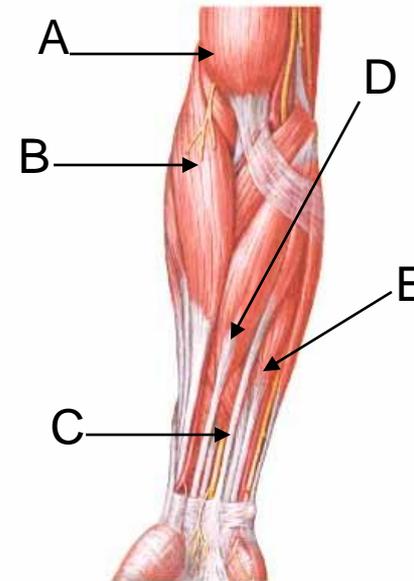


Right forearm: anterior (palmar) view

# Identification and Application

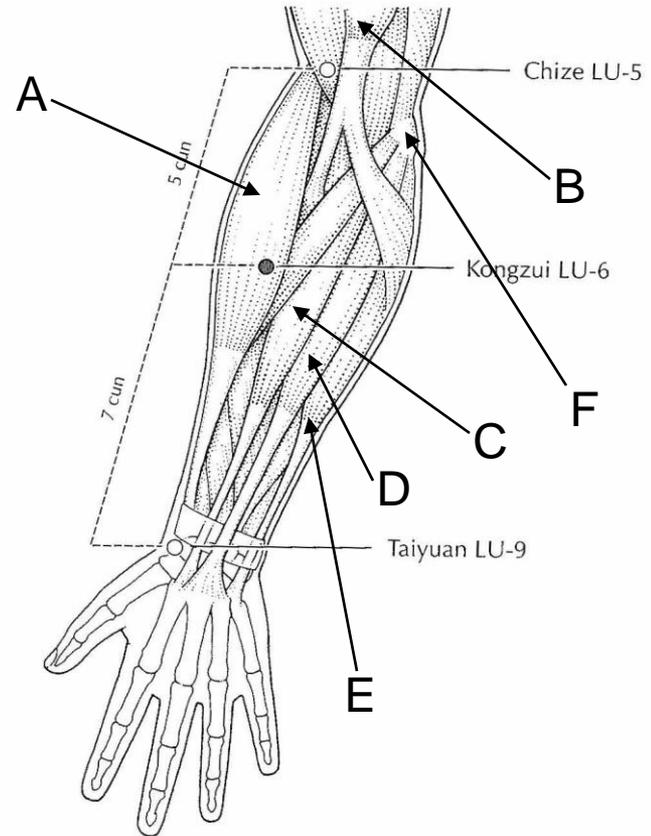
- Name the following muscles
  - A
    - Biceps brachii
  - B
    - Brachioradialis
  - C
    - Palmaris longus
  - D
    - Flexor carpi radialis
  - E
    - Flexor carpi ulnaris

Muscles of Forearm [Superficial Layer]  
Anterior View



# Identification and Application

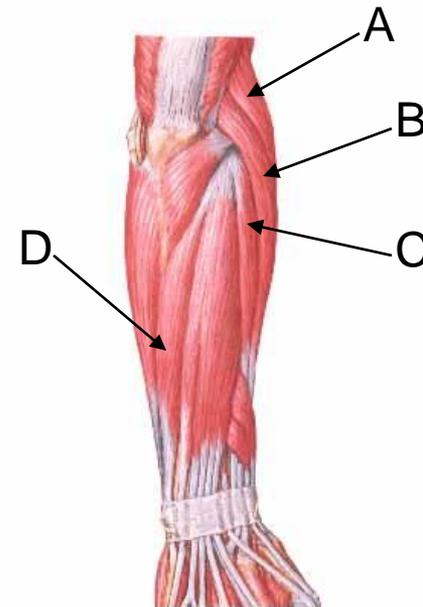
- Can you name the following structures?
  - A
    - Brachioradialis
  - B
    - Biceps brachii
  - C
    - Flexor carpi radialis
  - D
    - Palmaris longus
  - E
    - Flexor carpi ulnaris
  - What bony landmark is F pointing to?
    - Medial epicondyle



# Identification and Application

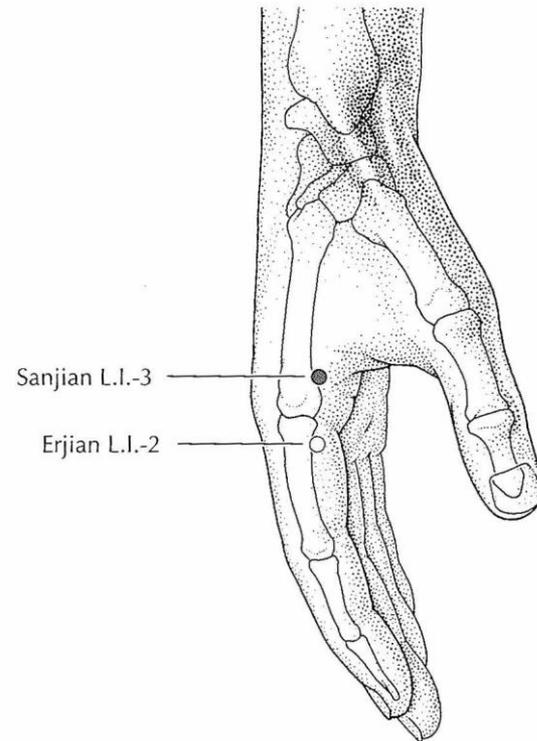
- Name the following structures
  - A
    - Brachioradialis
  - B
    - Extensor carpi radialis longus
  - C
    - Extensor carpi radialis brevis
  - D
    - Extensor carpi ulnaris

Muscles of Forearm [Superficial Layer]  
Posterior View



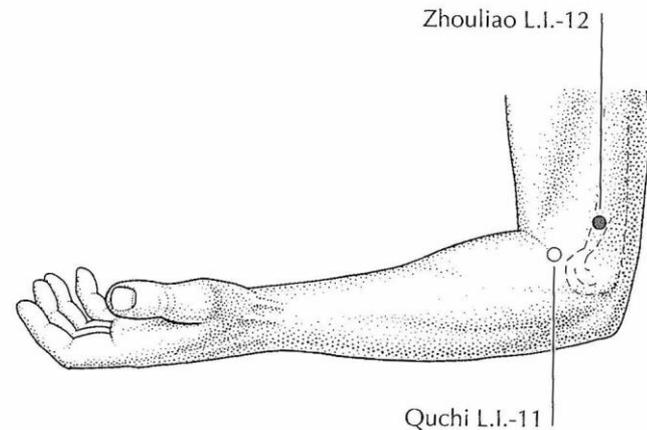
# Identification and Application

- Which is true about LI-3?
  - It is directly proximal to the base of the second metacarpal
  - It is directly proximal to the base of the distal phalanx of the second finger
  - It is directly proximal to the head of the second metacarpal
  - It is directly proximal to the head of the first metacarpal



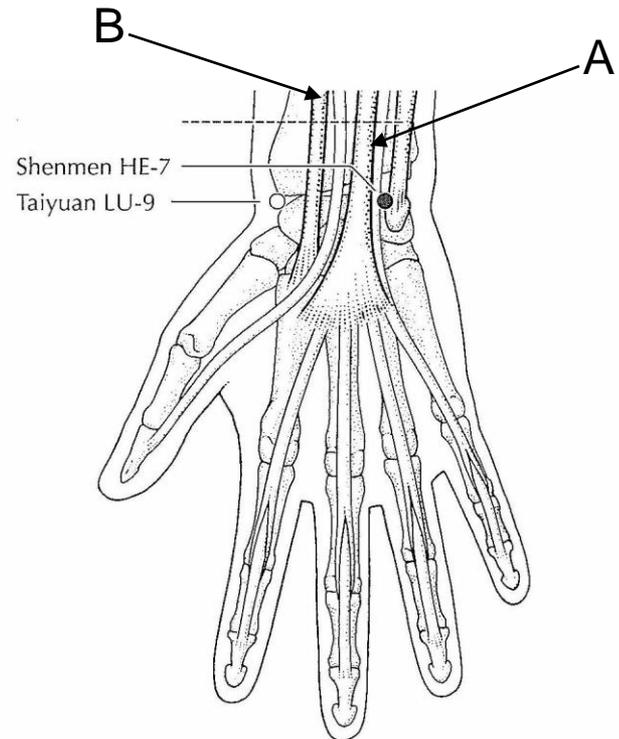
# Identification and Application

- What bony landmark is LI-12 anterior to?
  - The lateral supracondylar ridge
- What landmark is LI-11 anterior to?
  - The lateral epicondyle



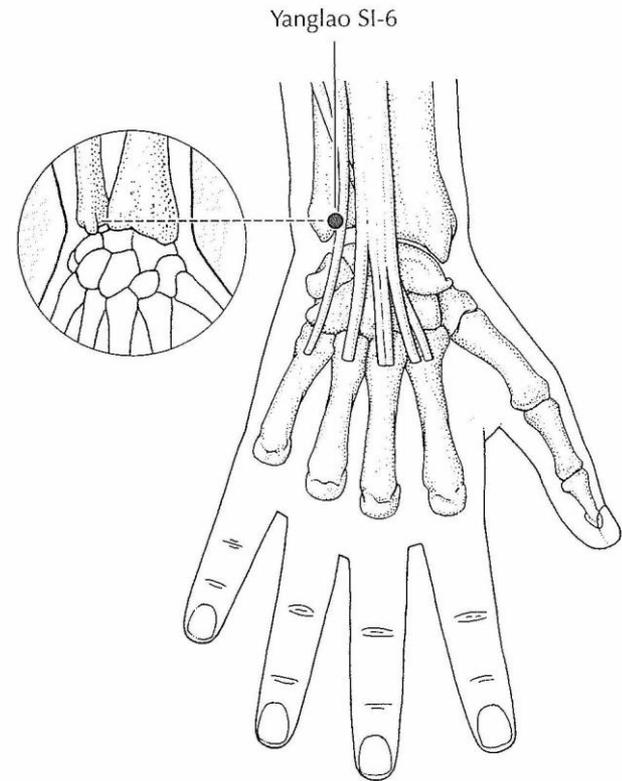
# Identification and Application

- What point is described below?
- At the wrist joint, on the radial side of the flexor carpi ulnaris, in the depression at the proximal border of the pisiform bone.
  - HE-7
- What is A pointing to?
  - Palmaris longus
- What is B pointing to?
  - Flexor carpi radialis

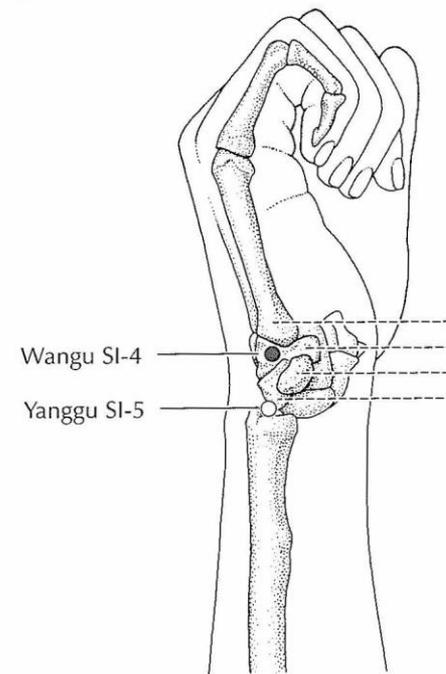


# Identification and Application

- SI-6 is located on the radial side of what bony landmark?
  - Styloid process of the Ulna

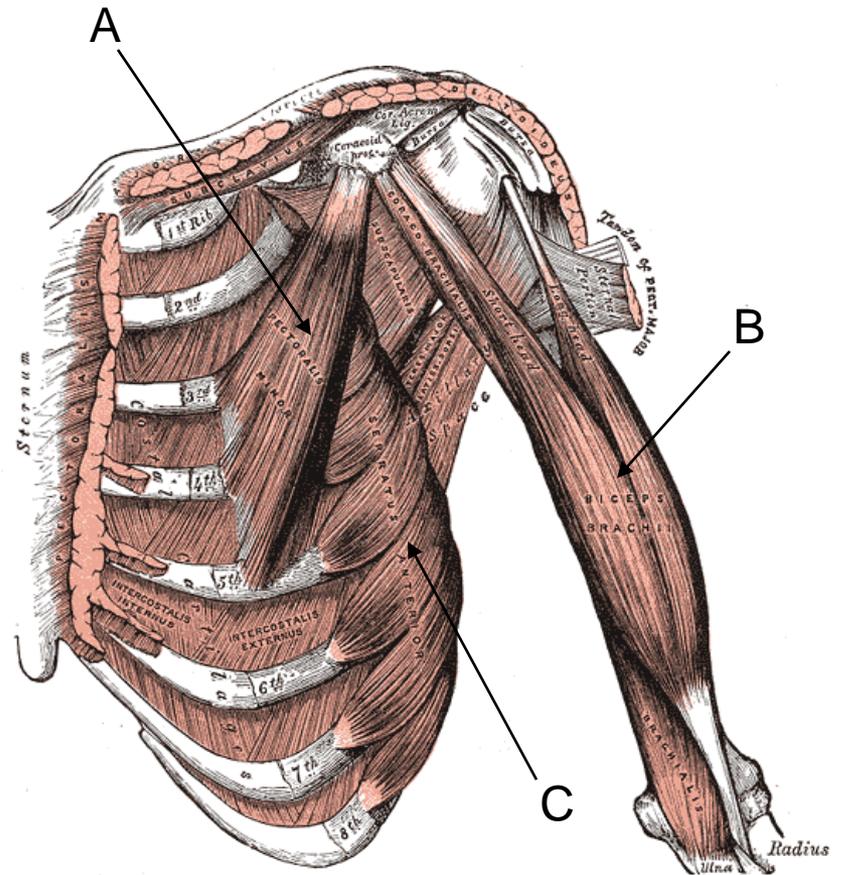


- SI-4 is located in the depression between the \_\_\_\_\_ of the fifth metacarpal and the \_\_\_\_\_ (carpal bone).
  - Base
  - Triquetrum
- What bone is it over?
  - Hamate
- SI-5 is located between the head of the \_\_\_\_\_ and the \_\_\_\_\_ (carpal bone).
  - Ulna
  - Triquetrum



# Questions From Shoulder Girdle and Upper Extremities Lectures

- Can you name the following muscles?
  - A
    - Pectoralis minor
  - B
    - Biceps brachii
  - C
    - *Serratus anterior*



# Questions From Shoulder Girdle and Upper Extremities Lectures

- Can you name this muscle?
  - Triceps brachii

