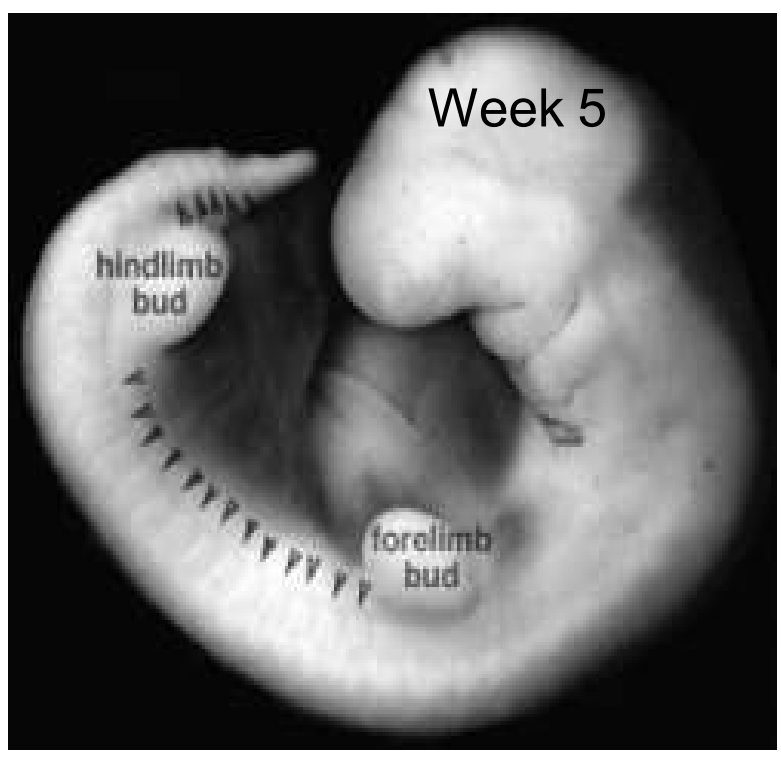
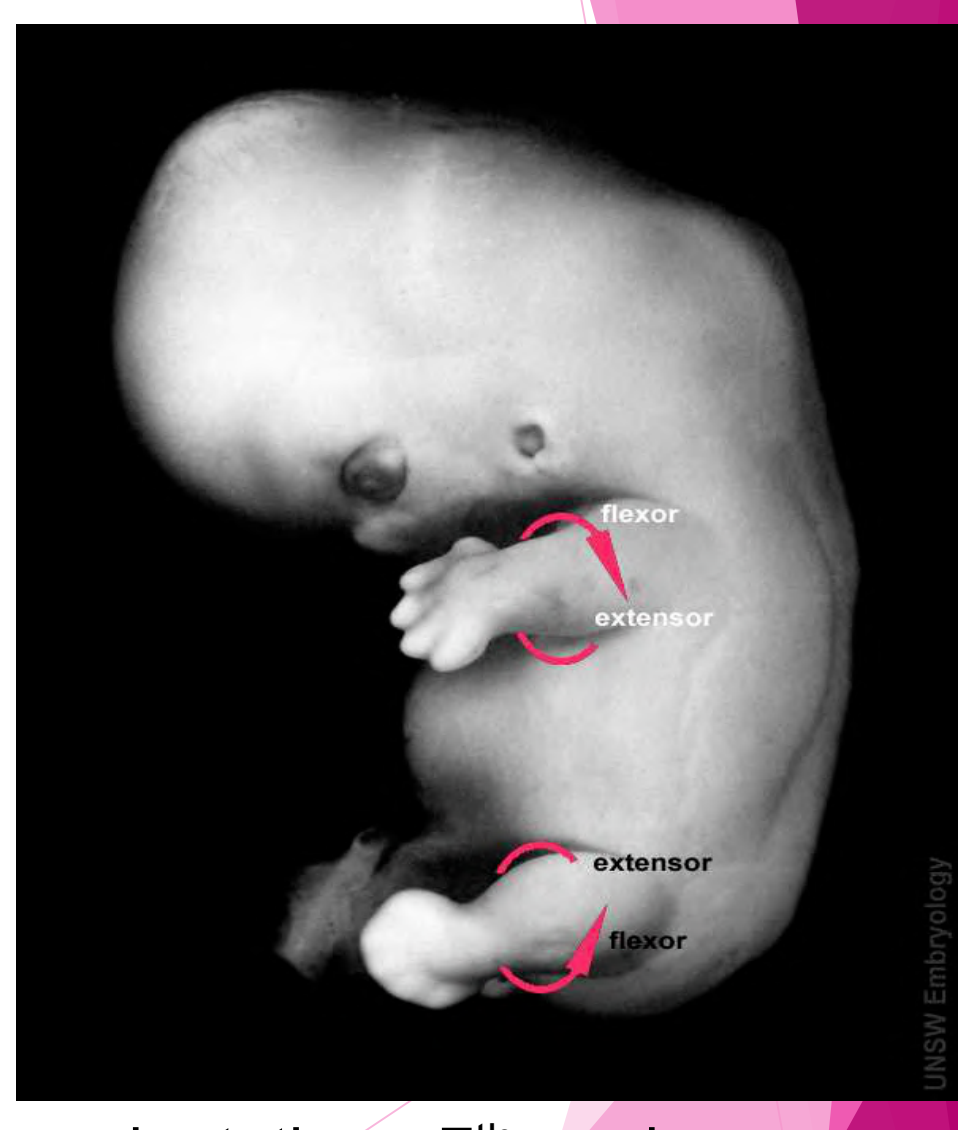
Learning objectives

- *At end of this session, students should be able to:*
- DESCRIBE
- Contents of ant & post compartment of arm ,
- Brachial plexus
- Nerves ,blood vessels & their anatomical Relations with clinical importance



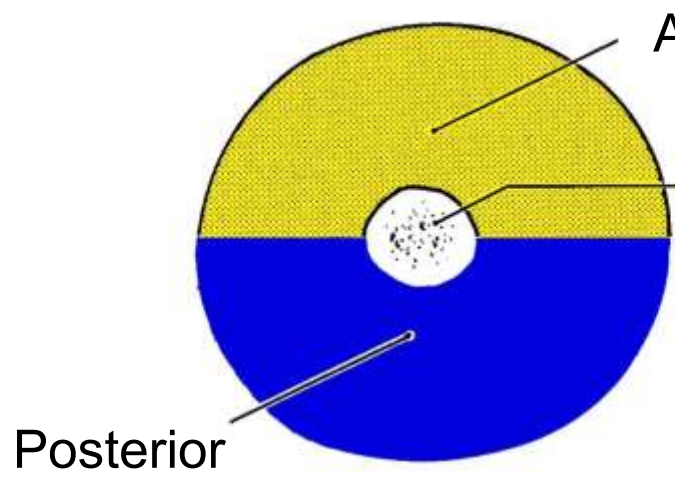
RULE -
Limbs are outgrowths of the ventral body wall that undergo distal growth and differentiation…5th Week

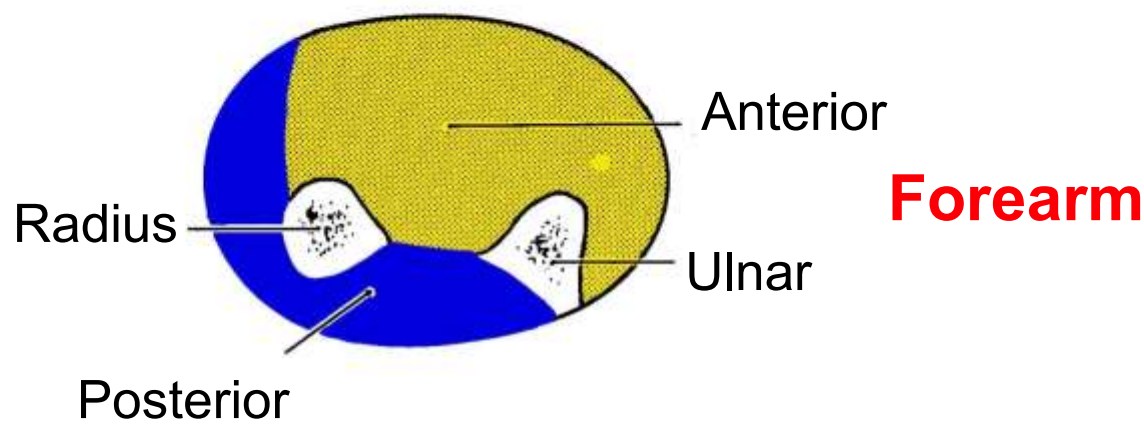
Week 7



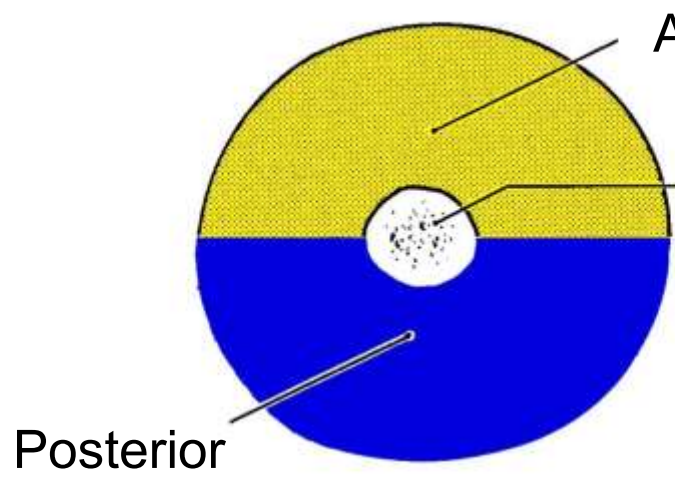
and rotation…7th week

Upper Limb Muscle Compartments

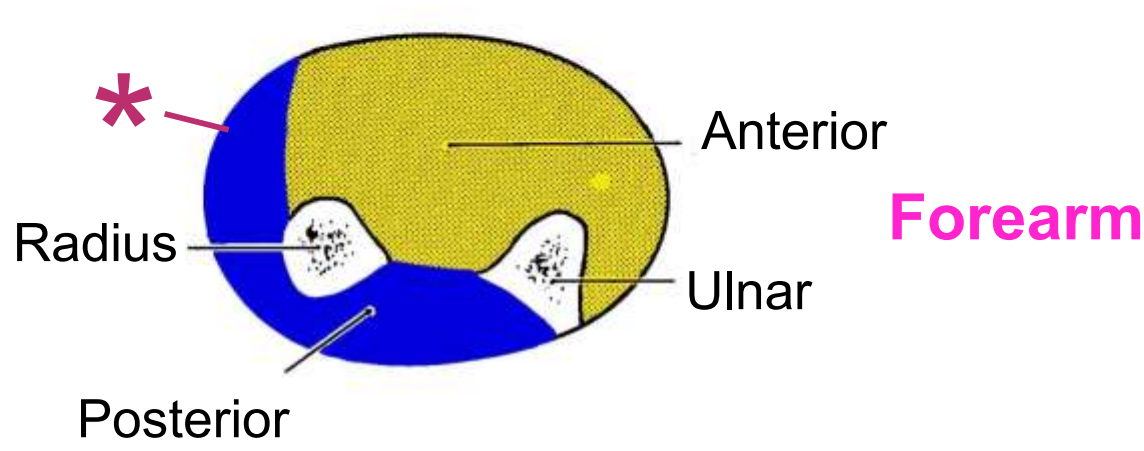


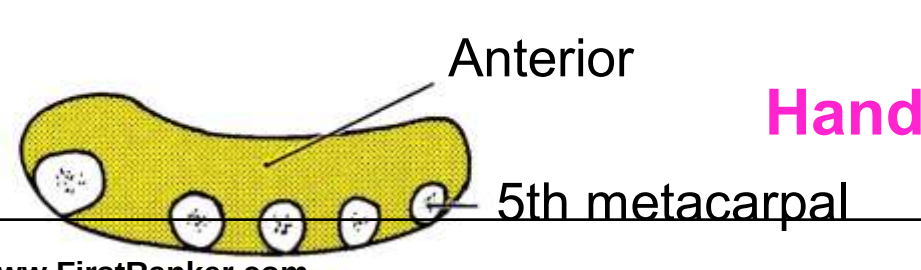


Stern Essential of Gross Anatomy



Few muscles of posterior compartment are present in anterolateral aspect of forearm (*brachioradialis, supinator)

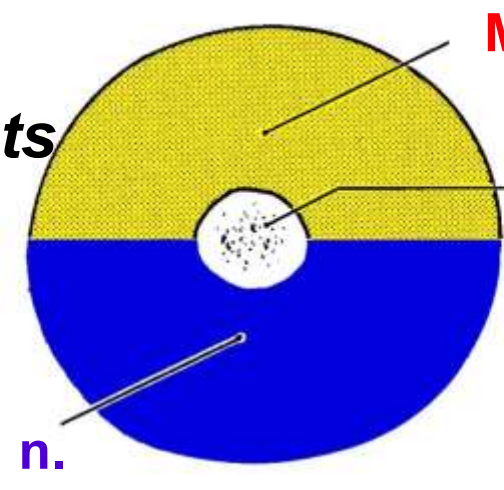


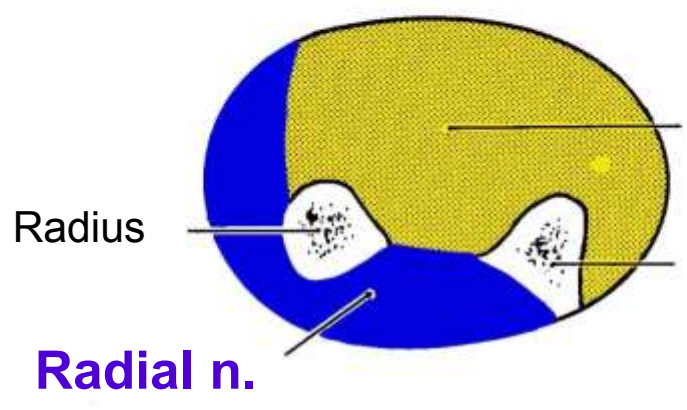


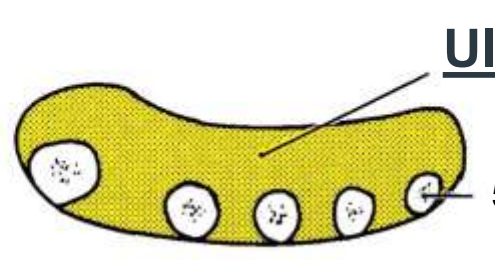
Stern Essential of Gross Anatomy

No posterior compartment in the hand

Motor innervation
Muscle Compartments



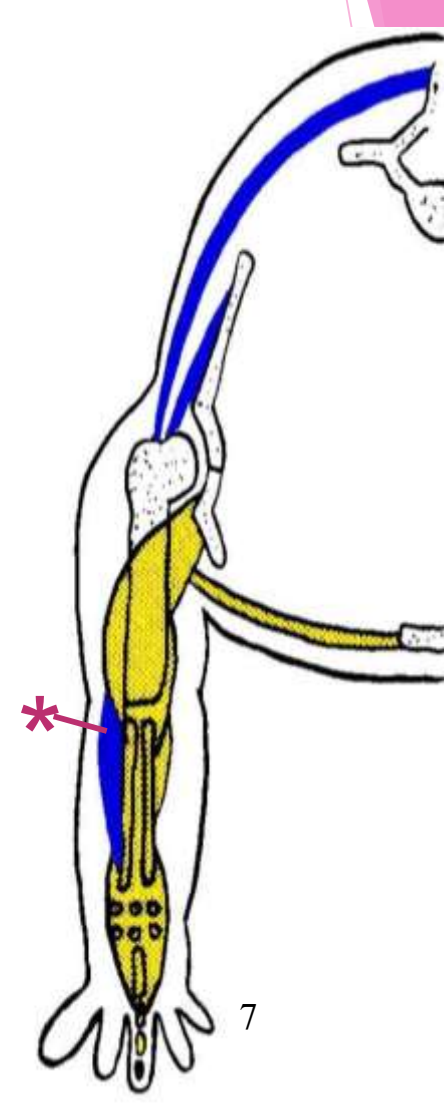




Stern Essential of Gross Anatomy

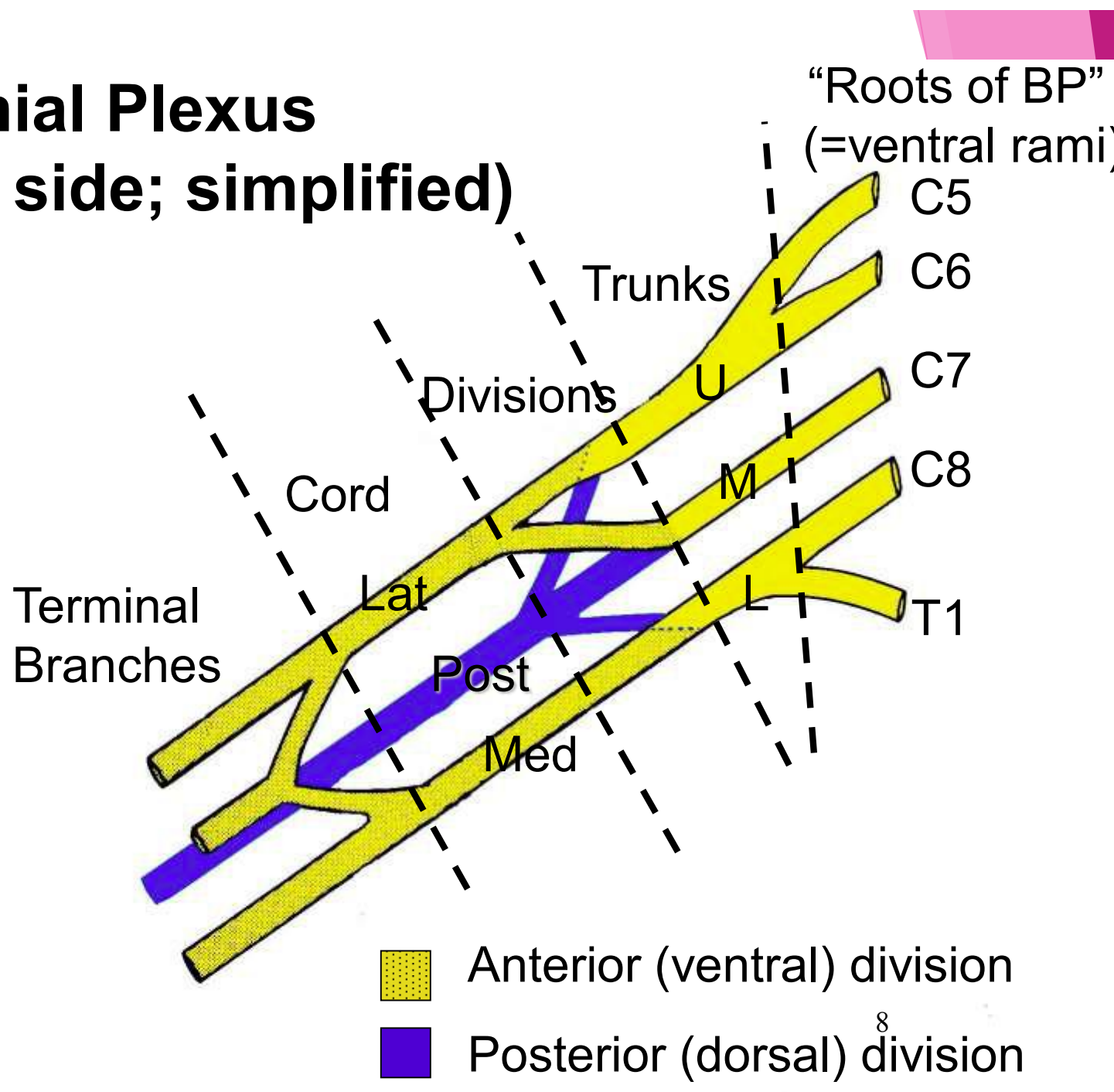
RULE : Ventral vs. dorsal limb mm.

- Developmentally-dorsal muscles:
  - Lie posterior to the long bones in anatomical position (* exceptions)
- Developmentally-ventral muscles:
  - Lie anterior to the long bones in anatomical position



Stern Essential of Gross Anatomy

Brachial Plexus
(right side; simplified)



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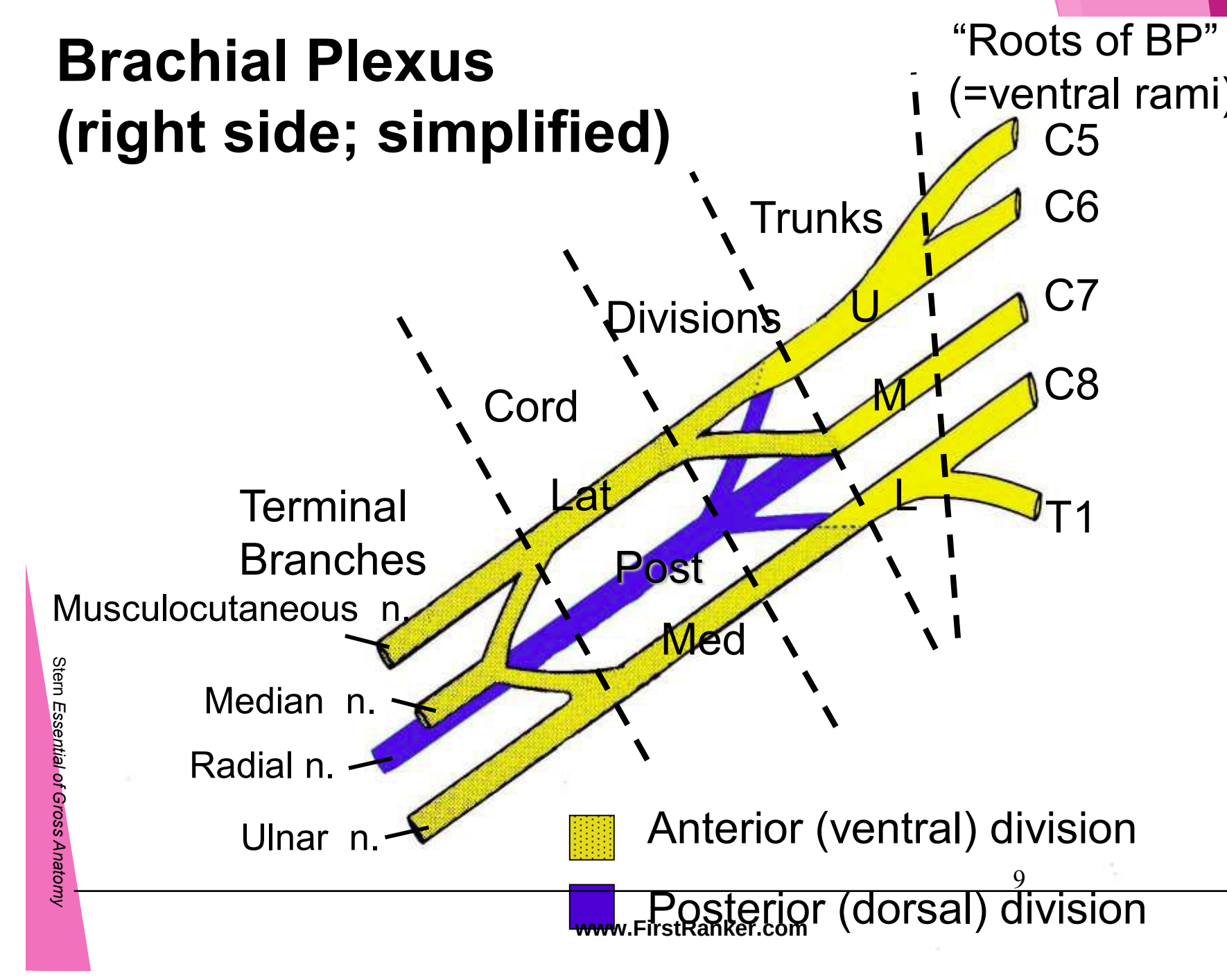
Stern Essential of Gross Anatomy

Brachial Plexus
(right side; simplified)



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Stern Essential of Gross Anatomy

Brachial plexus - cords

- Lateral cord – LML – Lateral Pectoral n, Musculocutaneous n, lateral root of Median n
- Medial cord – MMMMU – Medial pectoral n, Medial cutaneous n of forearm, Medial cutaneous n of arm , Ulnar n & Medial root of median n.
- Posterior cord – LUNAR – Lower subscapular n, Upper subscapular n , Nerve to latissimus dorsi, Axillary n & Radial n.

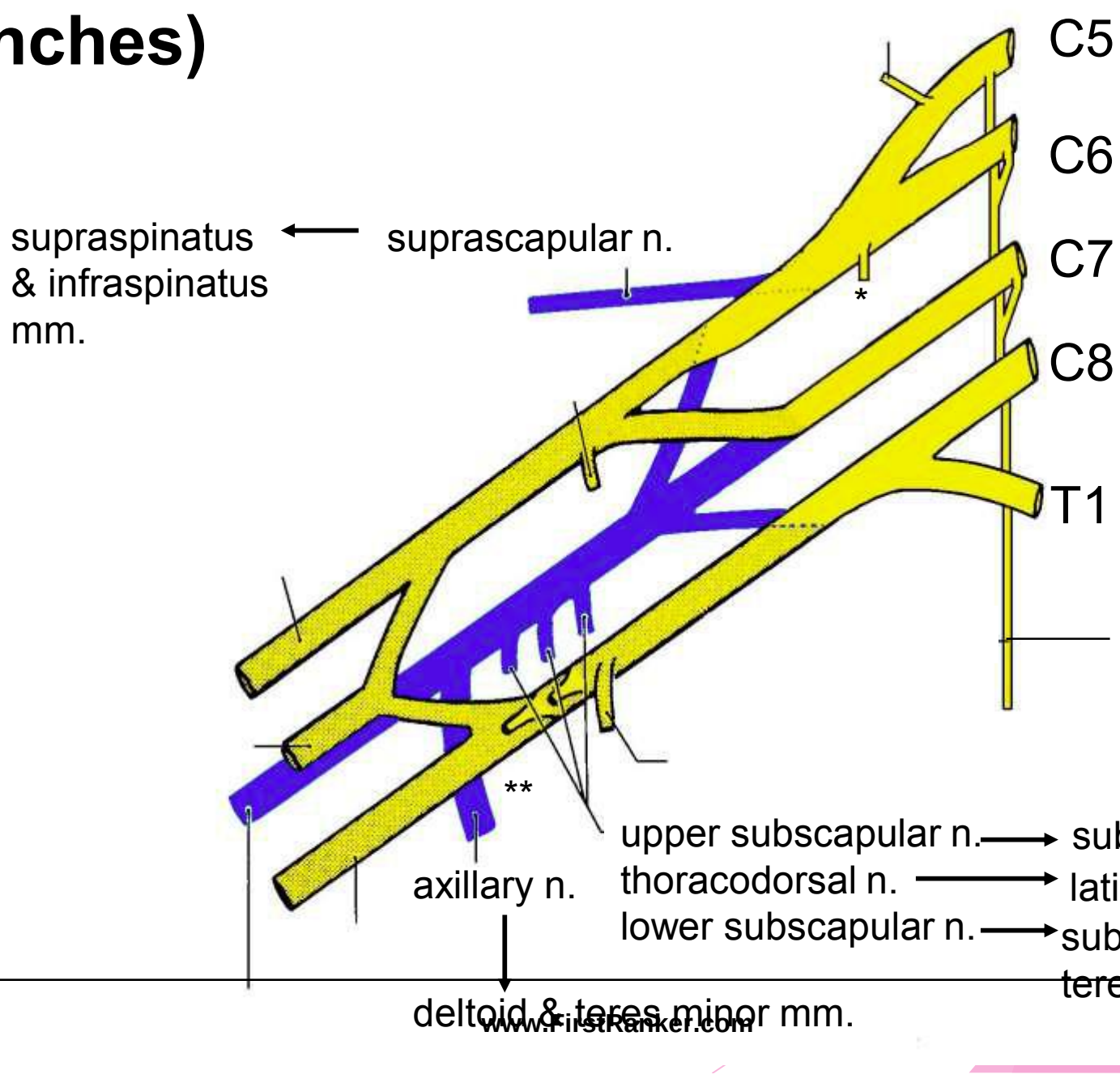
Brachial plexus – supraclavicular branches - roots & trunks

- **Branch to Phrenic nerve** –C5 –anterior to sclaneus anterior
- **Dorsal scapular n** – C5 – pierces sclaneus medius, supplies rhomboids & levator scapulae
- **Long thoracic n** – C5C6C7 – (C7 – may be absent) upper two roots C5C6 pierce sclaneus medius , runs b/w sclaneus ant & medius – Supply - serratus anterior.
- **TRUNKS - Upper**
- **Nerve to subclavius** – Erb's Point - C5 C6 –subclavius (gives - accessory phrenic nerve –C5)
- **Suprascapular n**- C5C6 – supra & infraspinatus , articular – shoulder, acromioclavicular,

Brachial plexus-

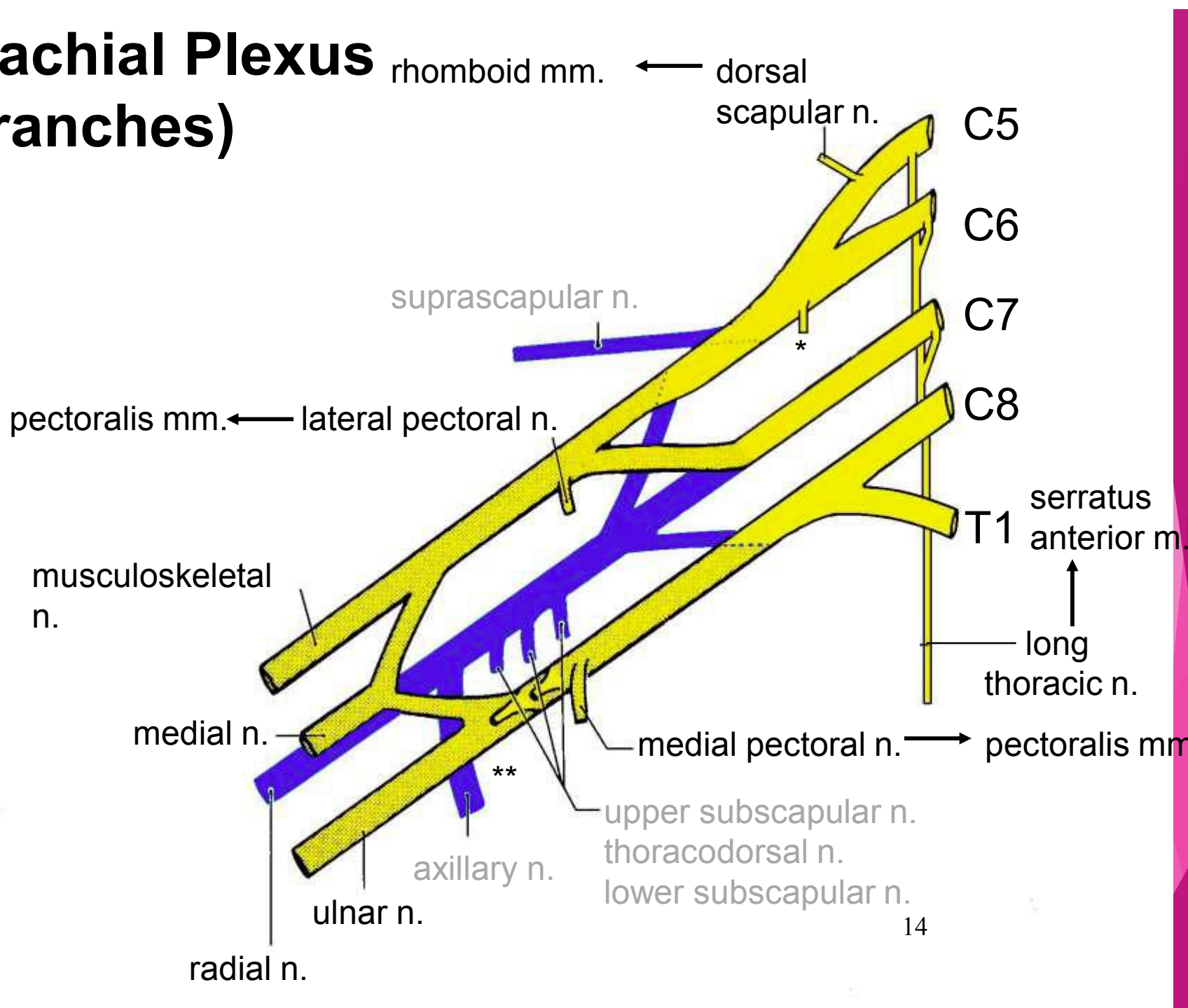
- **Lateral pectoral n-** C5C6C7 – LC **-larger**, pierces clavipectoral fascia ,ant to axillary art- pectoralis major & minor.
- **Medial pectoral n-** C8T1-MC- , pierces pectoralis minor & supplies both pectoralis major & minor.
- **Upper sub scapular n-** *smaller* – frequently double.
- **Lower sub scapular n-** subscapularis & teres major.
- **Axillary n**- ant branch –deltoid & post branch- has pseudoganglion supplies teres minor ,cutaneous – as- upper lateral cutaneous nerve of arm .

Brachial Plexus (branches)



Stern Essentials of Gross Anatomy

Brachial Plexus (branches)



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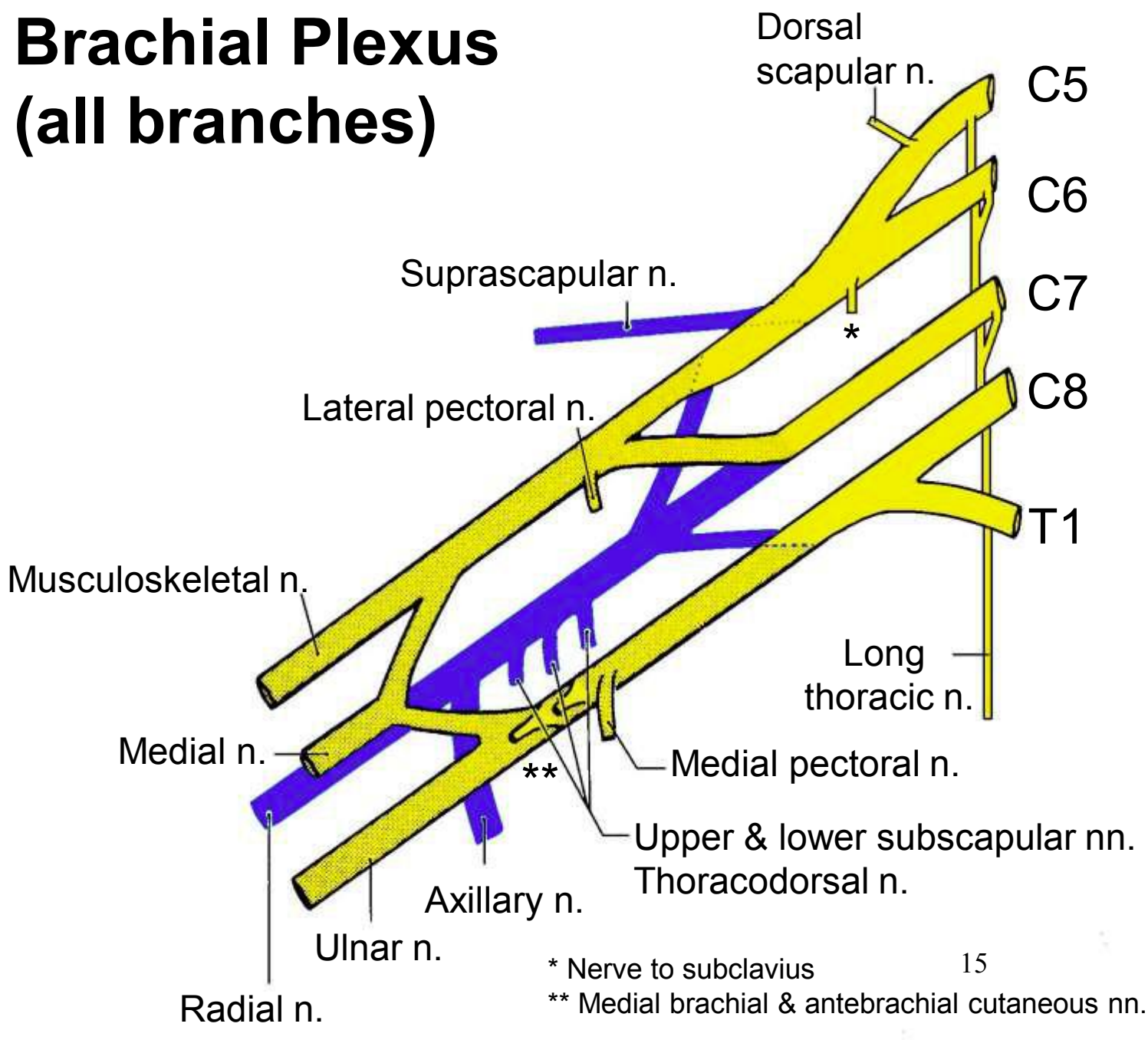
Stern Essential of Gross Anatomy

Brachial Plexus (all branches)



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Stern Essential of Gross Anatomy

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Nerve supply of Scapula Muscles

- Origin on Scapula:
  - Latissimus dorsi = Thoracodorsal nerve
  - Subscapularis, Teres Major = Subscapular nerves
  - Supraspinatus, Infraspinatus = Suprascapular nerves
  - Teres Minor = Axillary nerve
- Insertion on Scapula
  - Levator Scapular, Rhomboids = Dorsal Scapular nerve
  - Pectoralis Minor = Pectoral n.
  - Serratus anterior = Long Thoracic n.
  - Trapezius = Accessory n.

Branches of the Posterior Cord (continued)

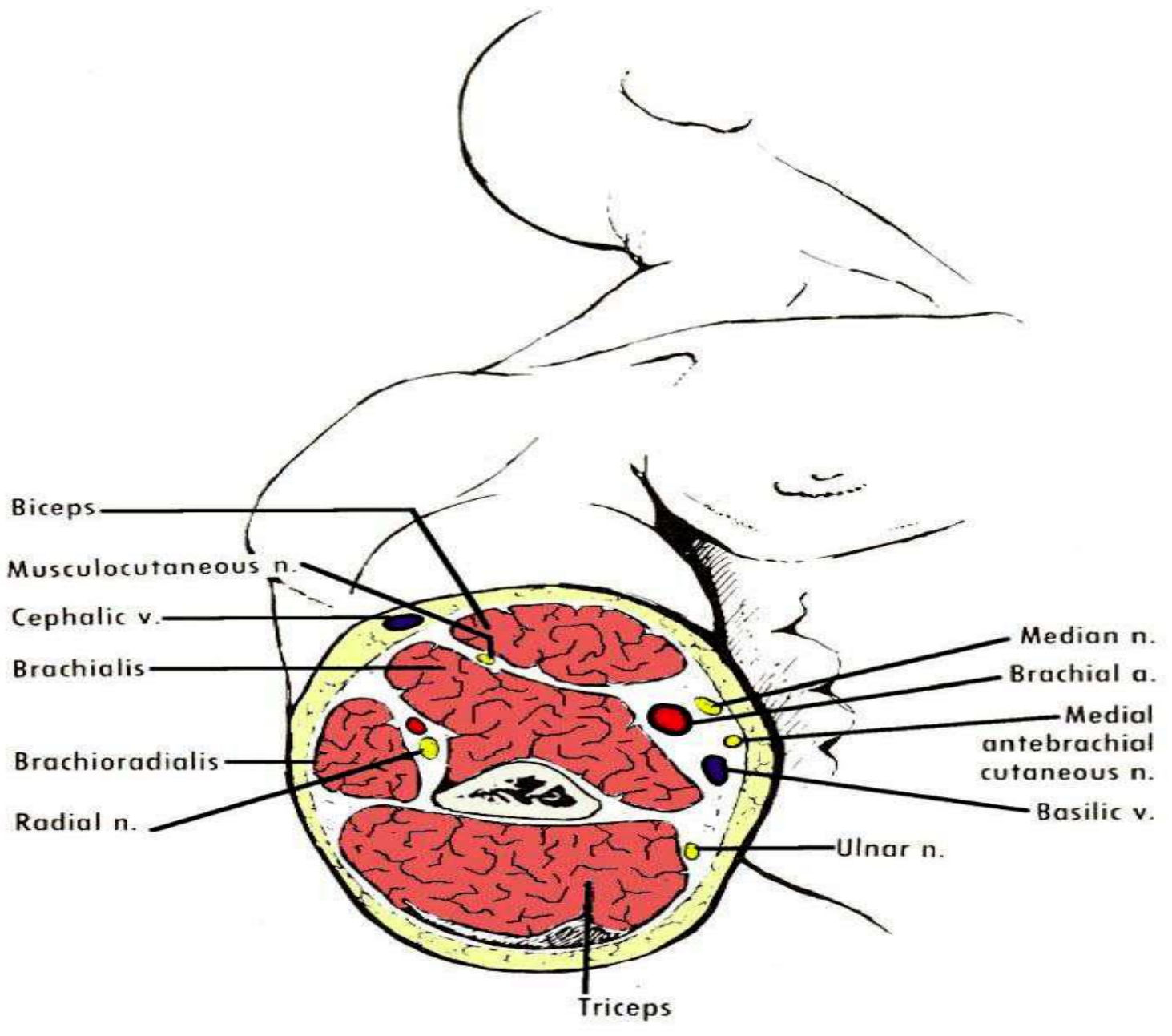
- Axillary Nerve (w . Circumflex vs..)
  - Supplies:
    - Deltoid and Teres minor (motor supply)
    - Capsule of shoulder
    - skin of lower part covering deltoid (sensory supply)
- Subscapular Nerves {branches of C5 + C6 rami}
  - Innervates: Subscapularis, Teres major
- Thoracodorsal Nerve (runs w. thoracodorsal vs) supplies: Latissimus dorsi

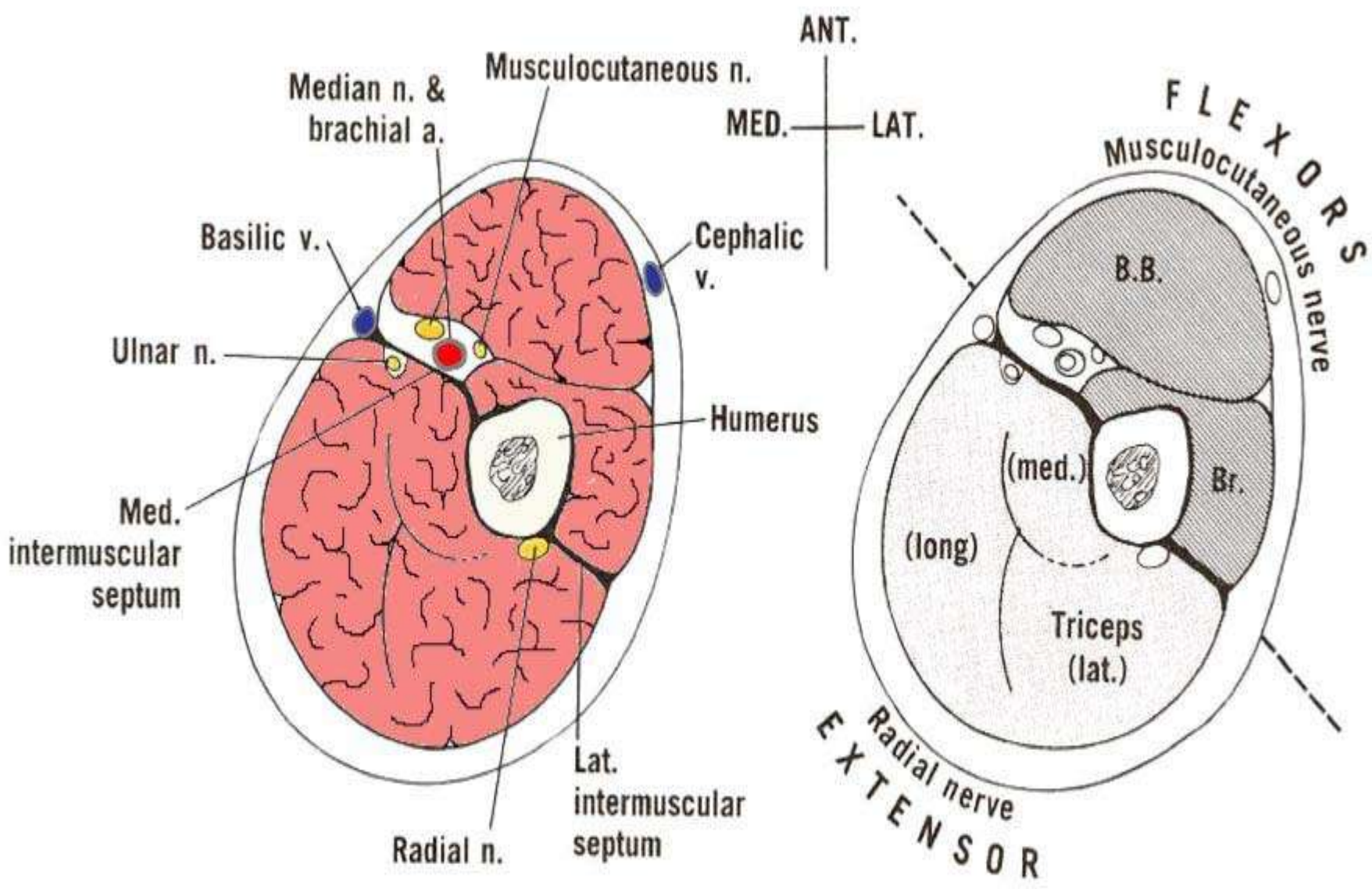
Muscles of Arm: Cross elbow, Move forearm

- Two compartments 1. Anterior: Flexors of forearm &
2. Posterior: Extensors of forearm
- ***Anterior Compartment - MCN +AA & BA***
  - Biceps brachii = MC nerve
  - Brachialis = MC nerve
  - Coracobrachialis = MC nerve &
  - Brachioradialis = Radial nerve
- ***Posterior Compartment - RN + PBA***

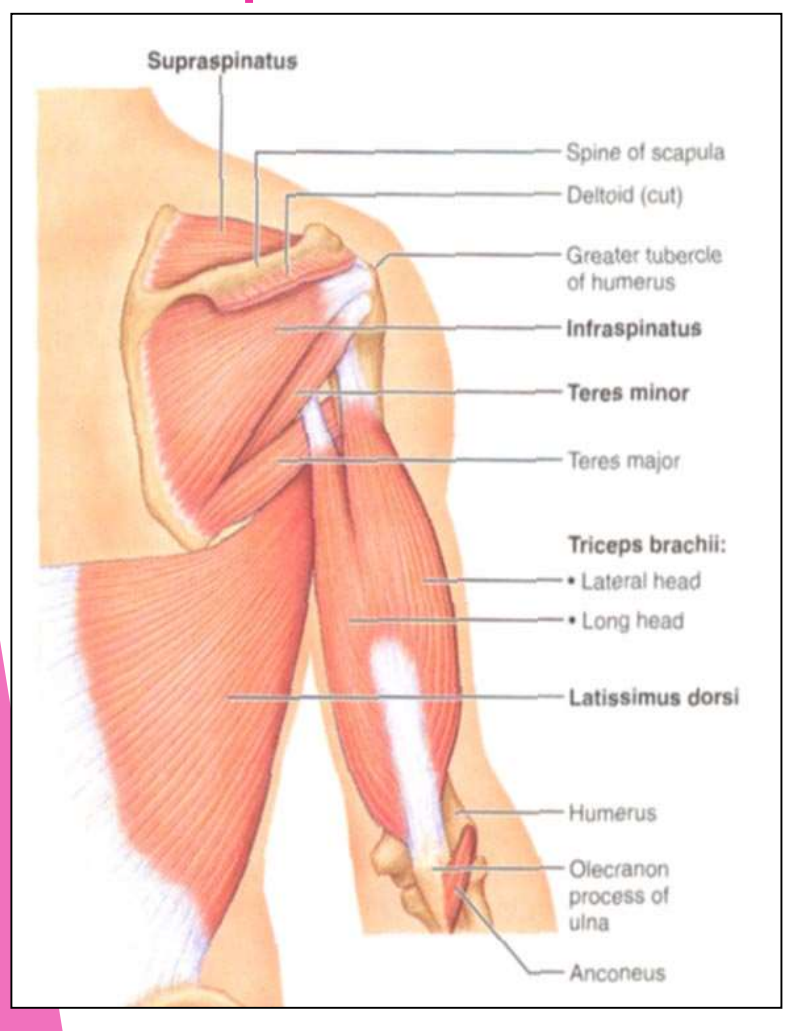
Triceps brachii = Radial nerve

Anconeus = Radial nerve





Muscles of Scapula



- **If ORIGIN on scapula =**
- **Move Arm**
  - Subscapularis
  - Supraspinatus
  - Infraspinatus
  - Teres Minor

  → **Rotator Cuff**
  - Teres Major
  - Latissimus Dorsi (partial O on scapula)
  - Coracobrachialis
- If INSERTION on scapula =
- Move scapula
  - Rhomboids
  - Trapezius
  - Pectoralis Minor
  - Serratus Ventralis
  - Levator Scapulae

Compartments of the forearm :

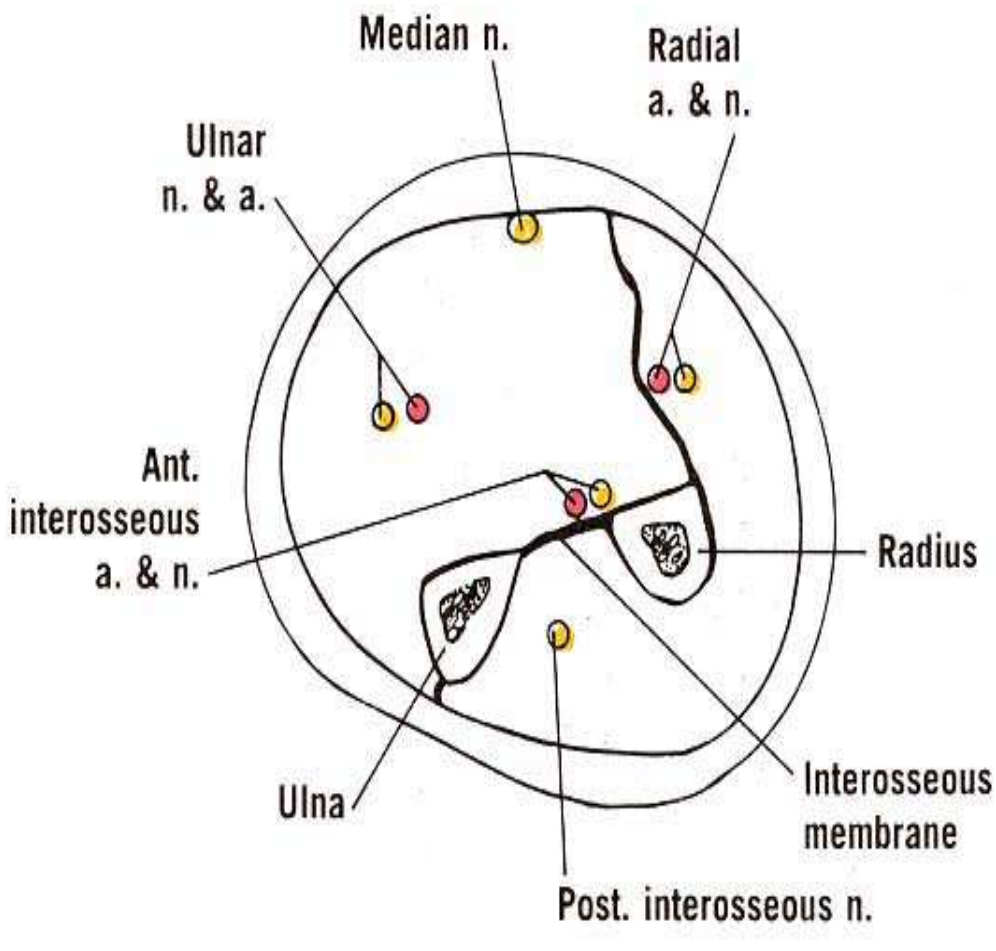
Flexor Compartment : Anterior (Superficial + Deep layers)

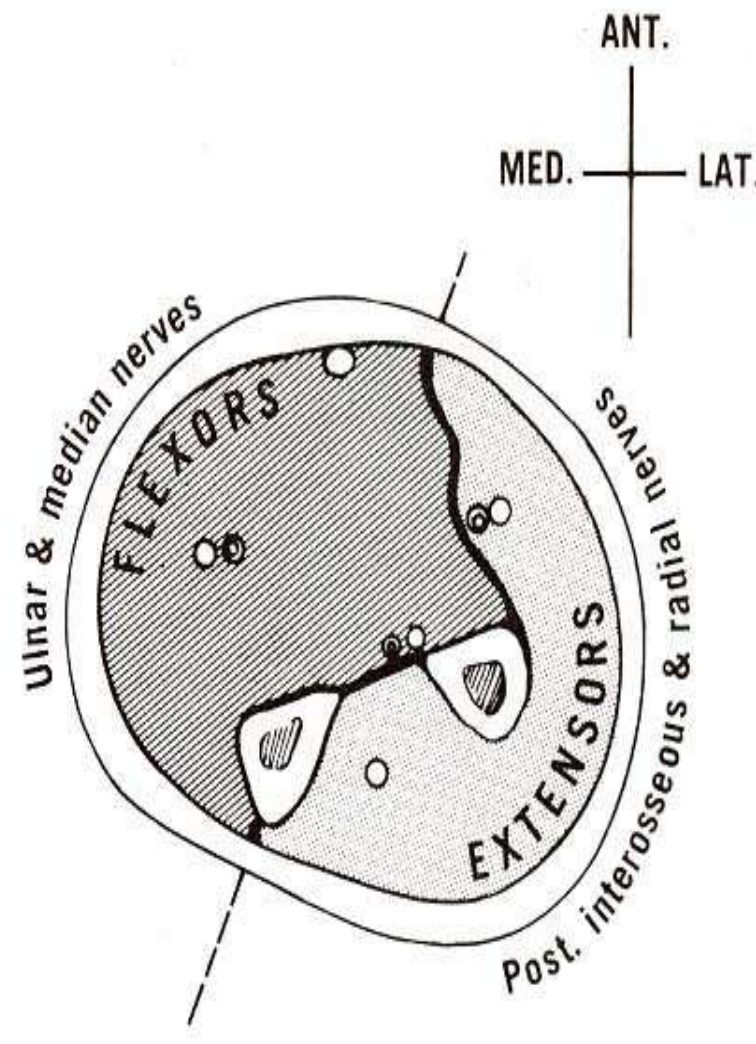
Most of superficial flexors originate by a common origin from medial epicondyle

Contains 2 pronators, are supplied by Median, AIN and Ulnar nerves

2. Posterior Extensor Compartment : Posterior (Superficial + Deep layers)

Are supplied by Radial and Posterior interosseous nerve.

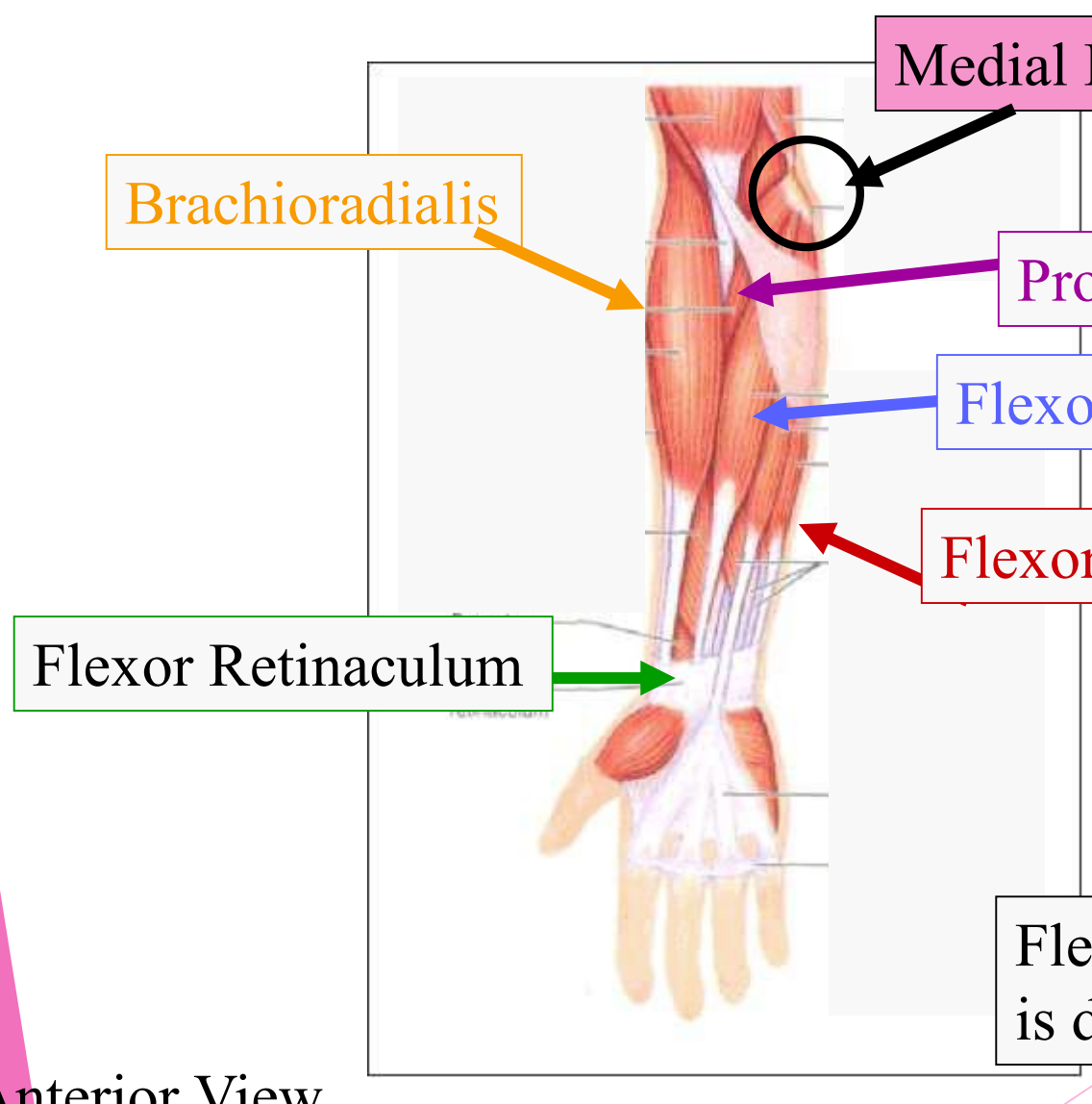




Anterior Compartment of Forearm

Muscle	Nerve
Superficial Muscles	
Flexor digitorum superficialis	Median
Flexor carpi radialis	Median
Pronator teres	Median
Palmaris longus	Median
Flexor carpi ulnaris	Ulnar
Deep Muscles	
Pronator quadratus	Ant.int N - Median
Flexor pollicis longus	Ant.int.N - Median
Flexor digitorum profundus	Ulnar (med 1/2)
Flexor digitorum profundus	Ant.int.N - Median (lat 1/2)

Anterior Compartment Forearm

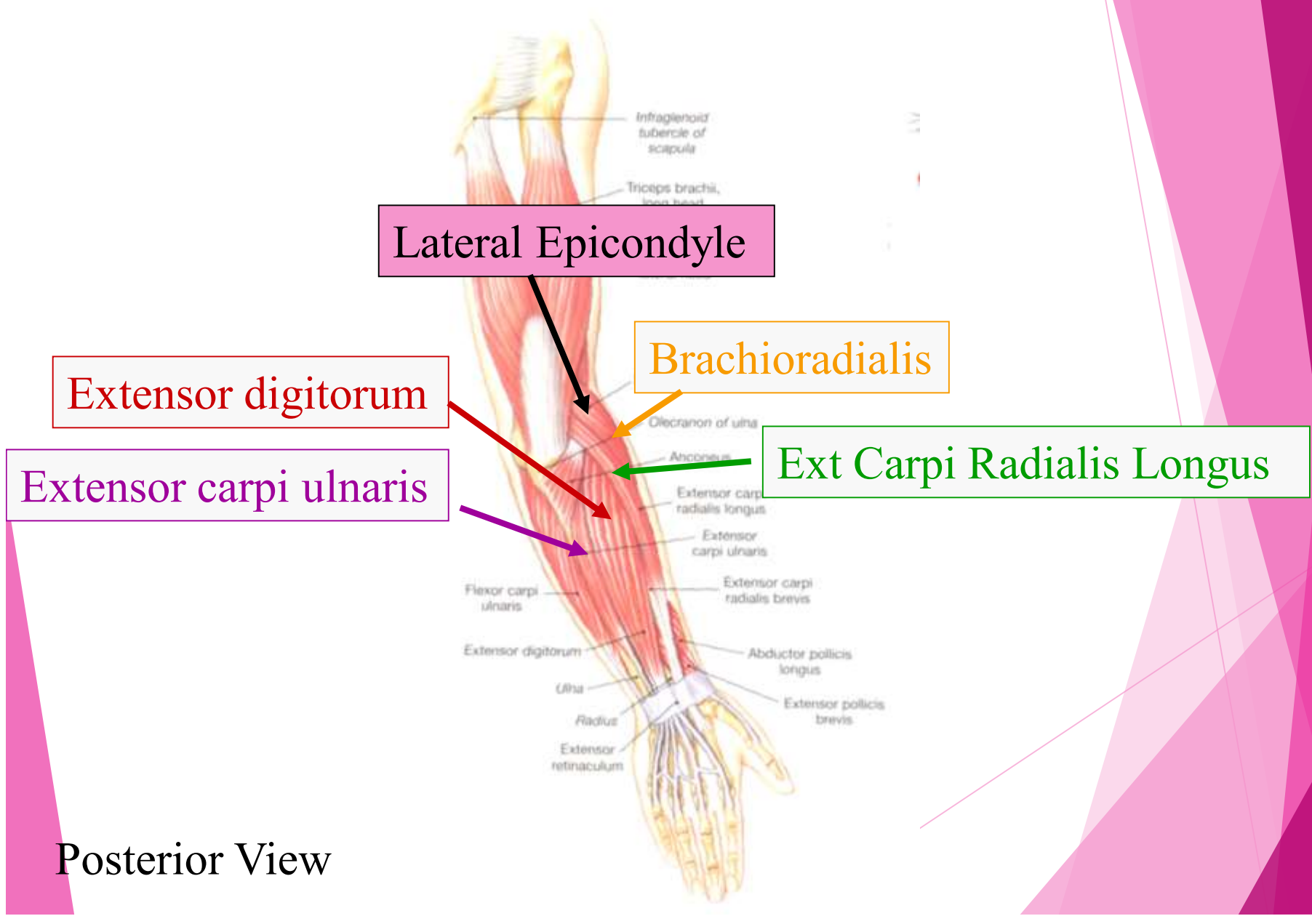


Anterior View

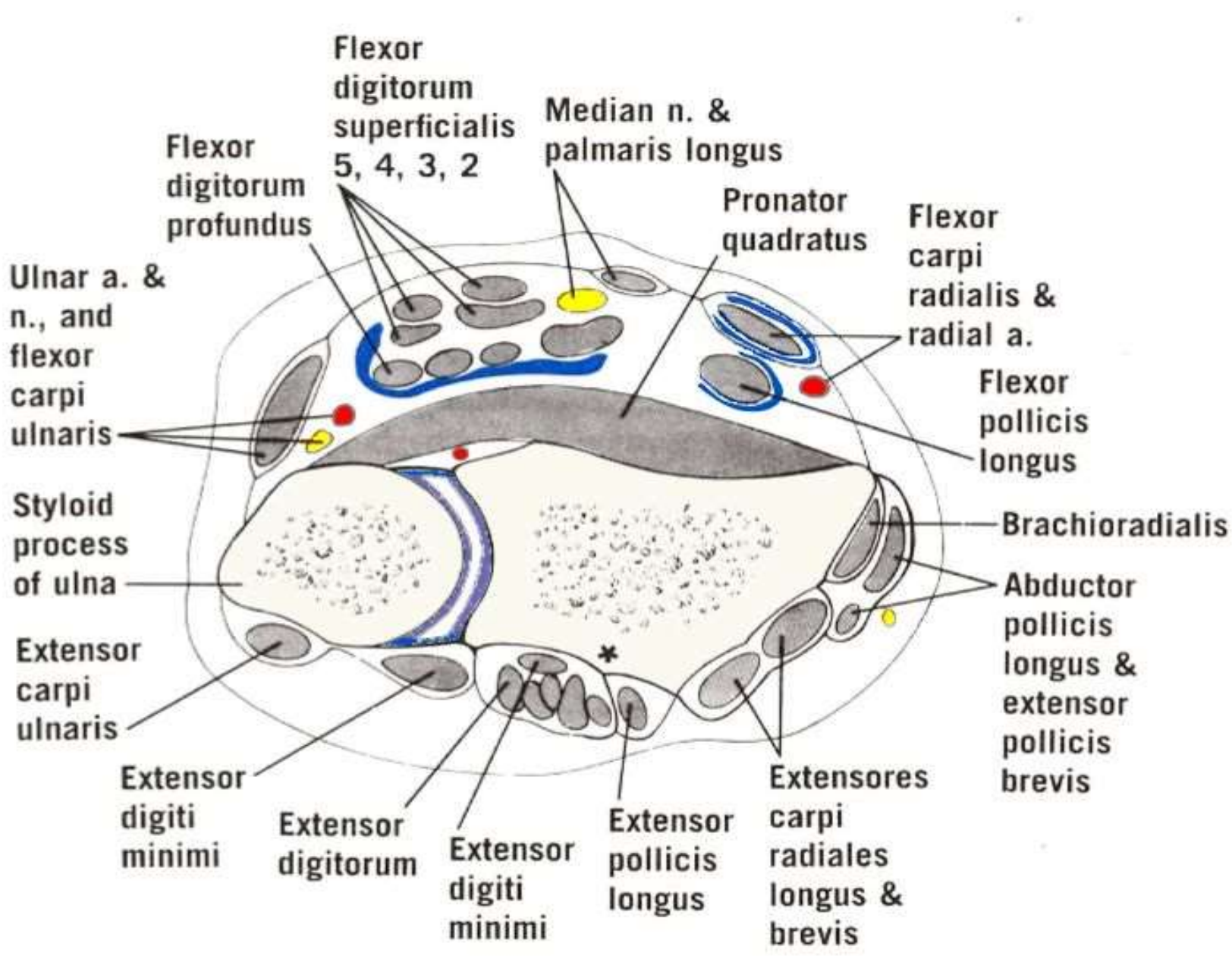
Posterior Compartment of Forearm

Muscle	Nerve
Superficial	
Extensor carpi radialis Longus & Brevis	RN
Extensor digitorum (communis)	RN
Extensor digiti minimi	RN
Extensor carpi ulnaris	RN
Deep (post gp) - PIN	
Supinator	Radial n + PIN
Abductor pollicis longus	PIN
Extensor pollicis longus + brevis	PIN
Extensor indicis	PIN

Posterior Compartment of Forearm



Posterior View



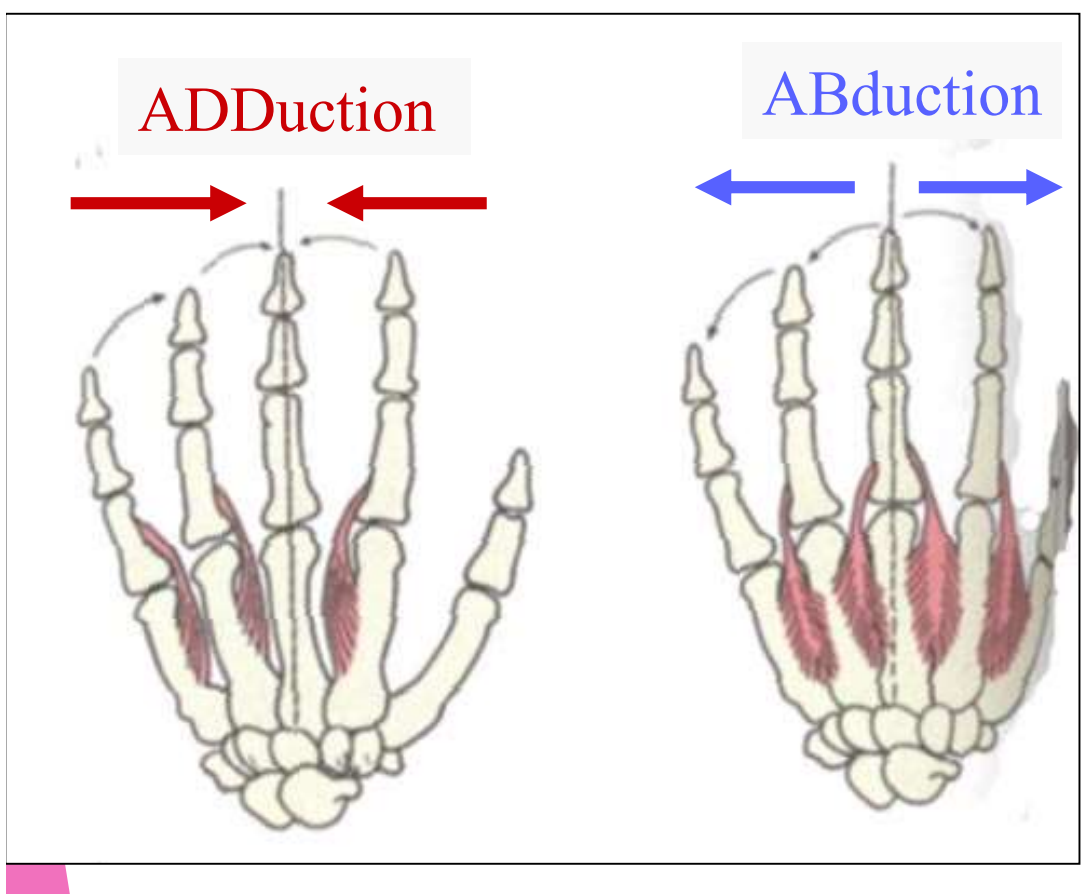
Muscles of Hand

Muscle	Nerve
▶ Pinky (little finger)	
▶ All digiti minimi	Ulnar
▶ (Flexor, Abductor, Opponens)	
▶ Thumb	
▶ Abductor pollicis brevis	Median
▶ Flexor pollicis brevis	Median
▶ Opponens pollicis	Median
▶ Adductor pollicis	Ulnar- deep br
▶ Other Intrinsic Muscles	
▶ Palmar & Dorsal Interossei	Ulnar
▶ 4 Lumbricals	Median, Ulnar

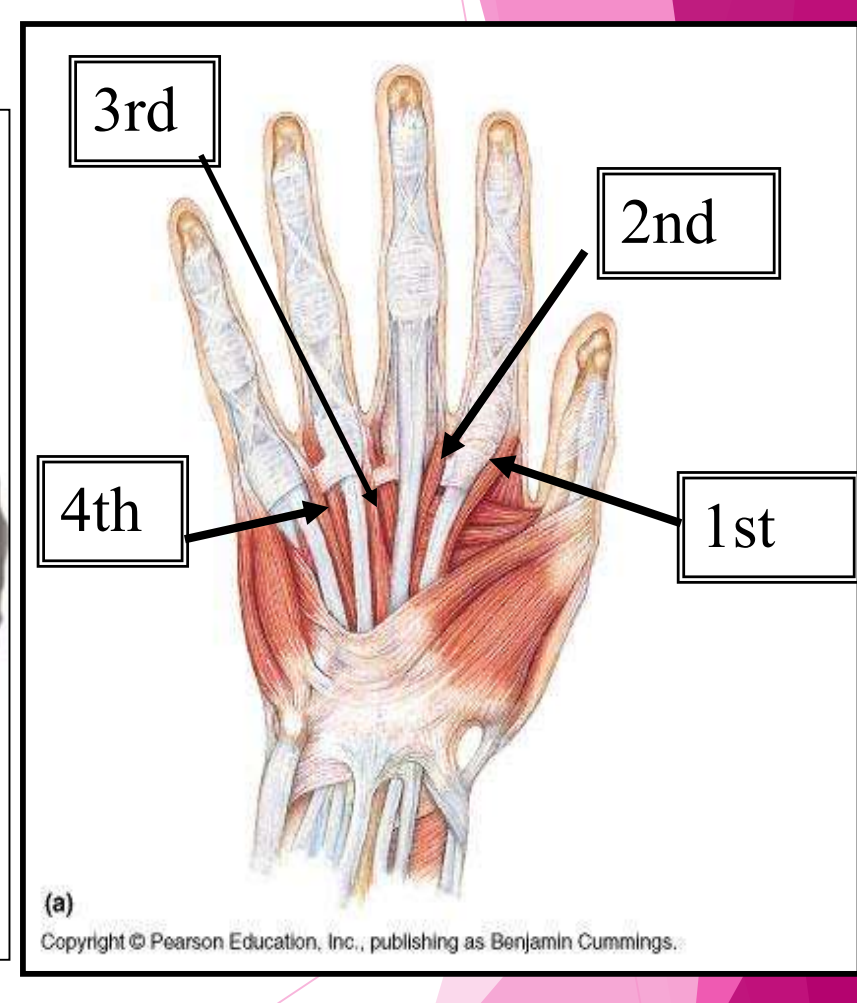
Muscles of Hand

Palmar Interossei

Dorsal Interossei

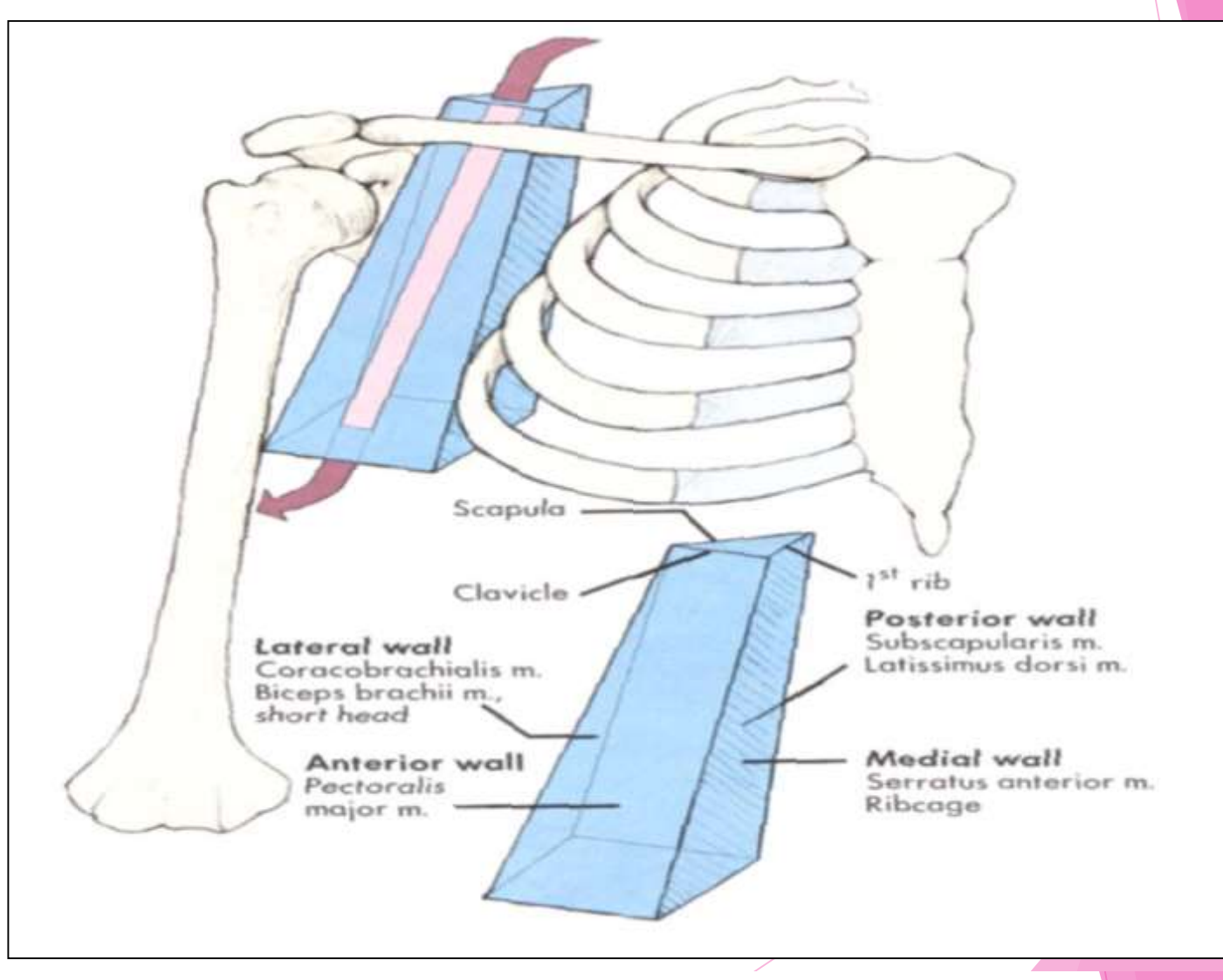


Lumbricals



Interossei help the lumbricals to extend I P joints and flex MC-P joints

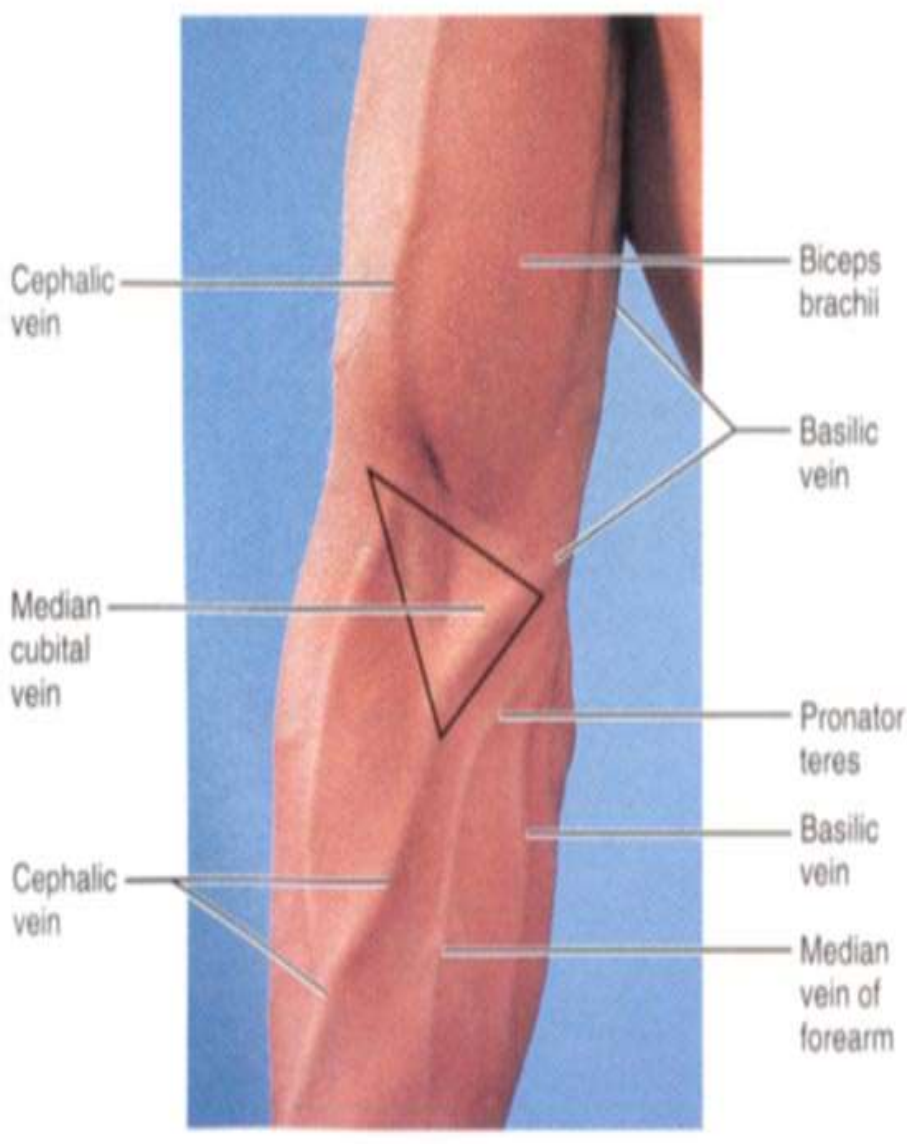
The Axilla

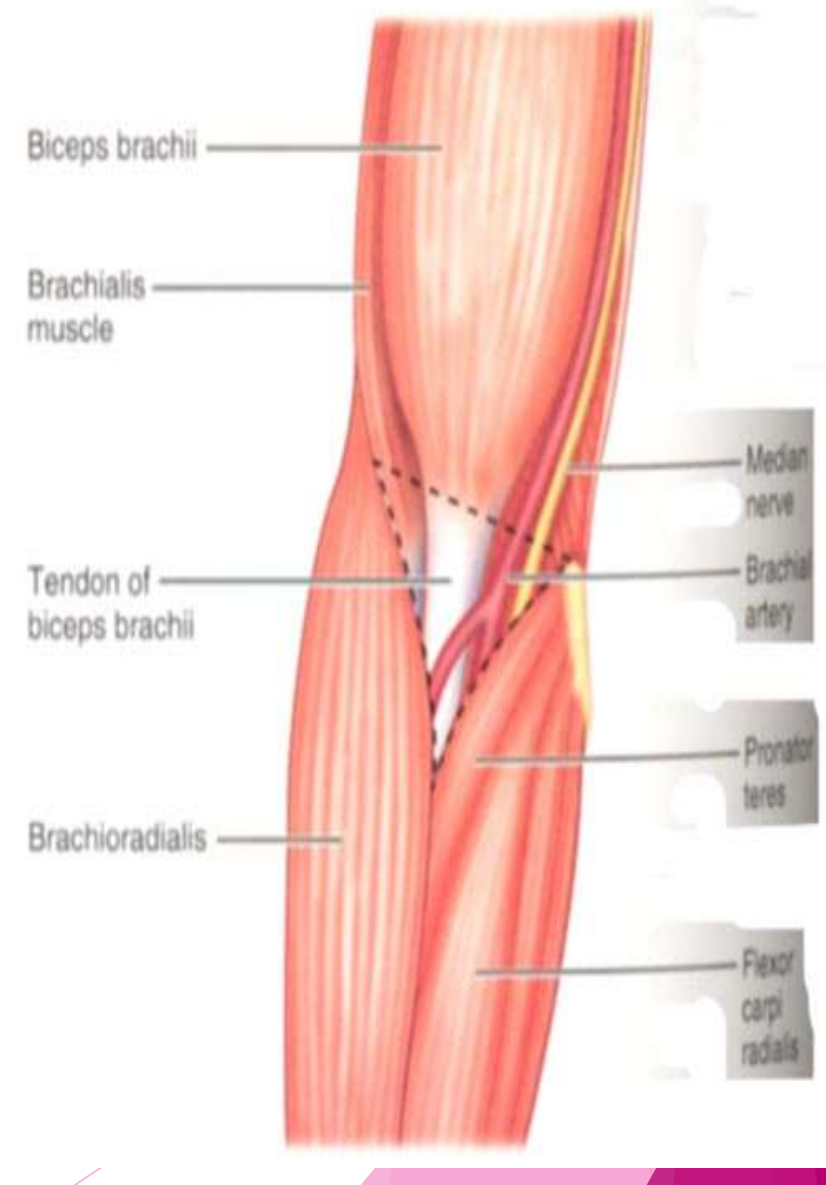


Axilla = Armpit

- Region between arm and chest
- Boundaries
  - Anterior - pectoral muscles
  - Posterior = latissimus dorsi, teres major& subscapularis
  - Medial = upper 4 ICS & serratus ant
  - Lateral = bicipital groove of humerus
- Contents
  - Axillary lymph nodes, Axillary vessels ,Brachial Plexus

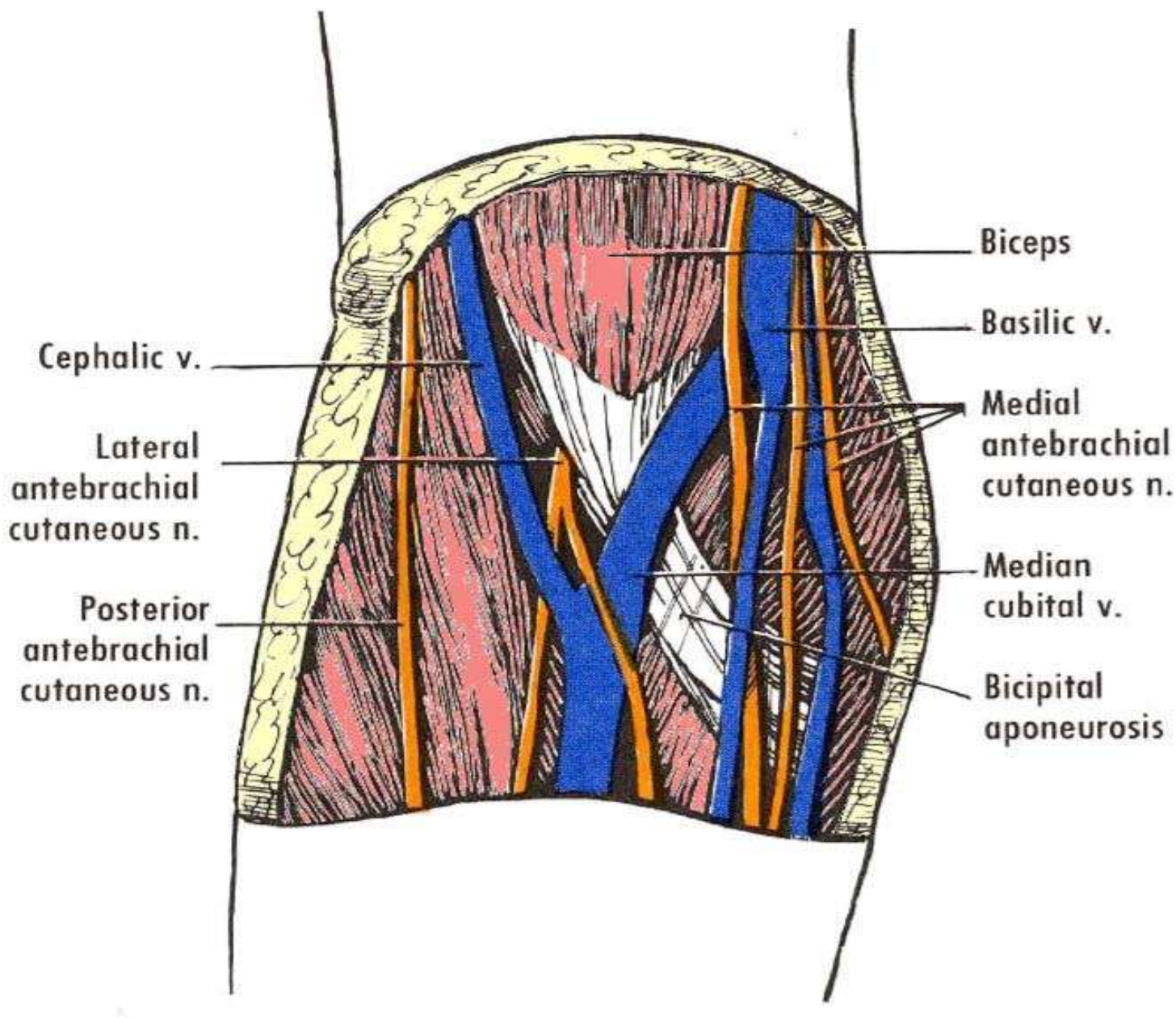
Upper Limb

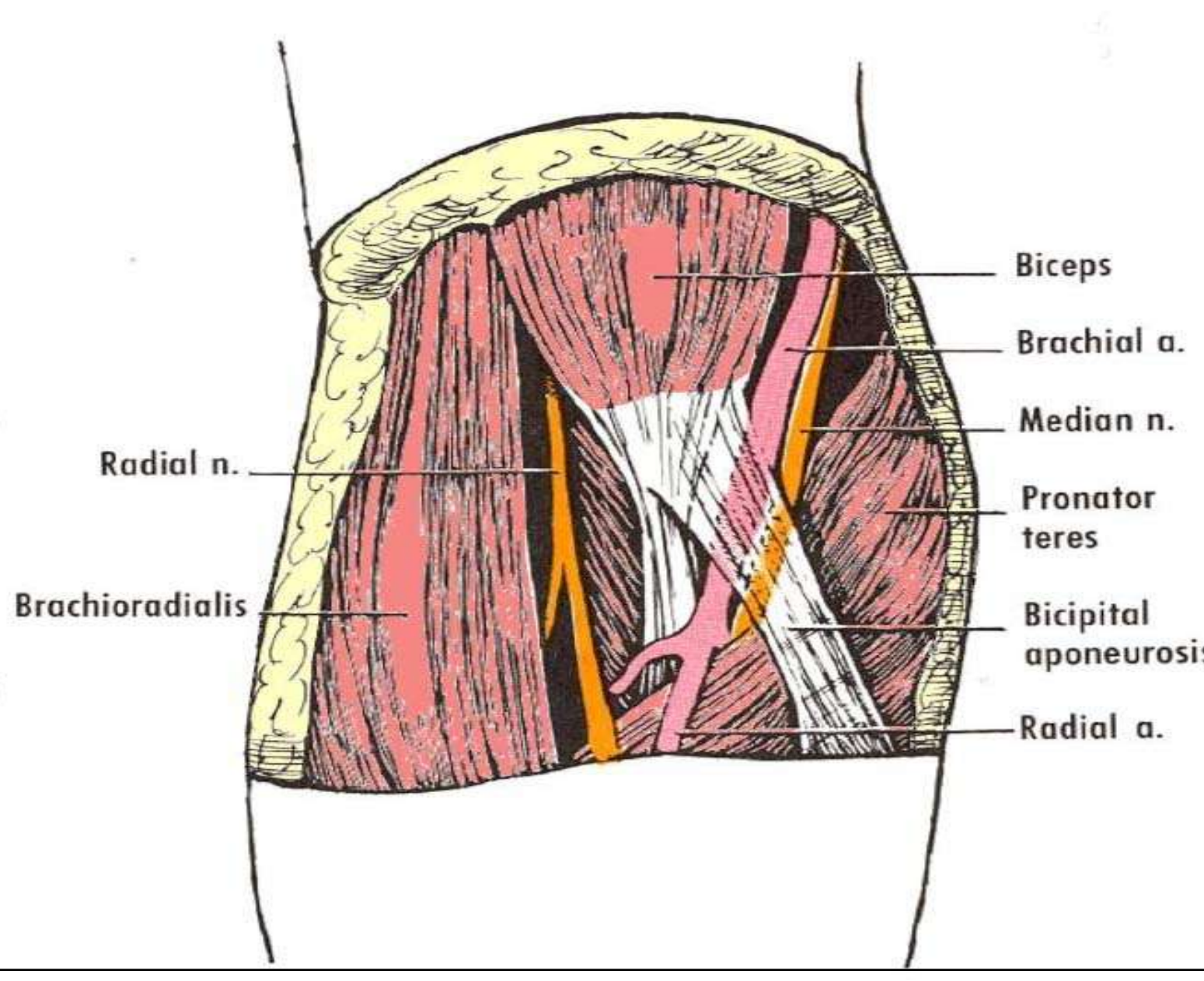




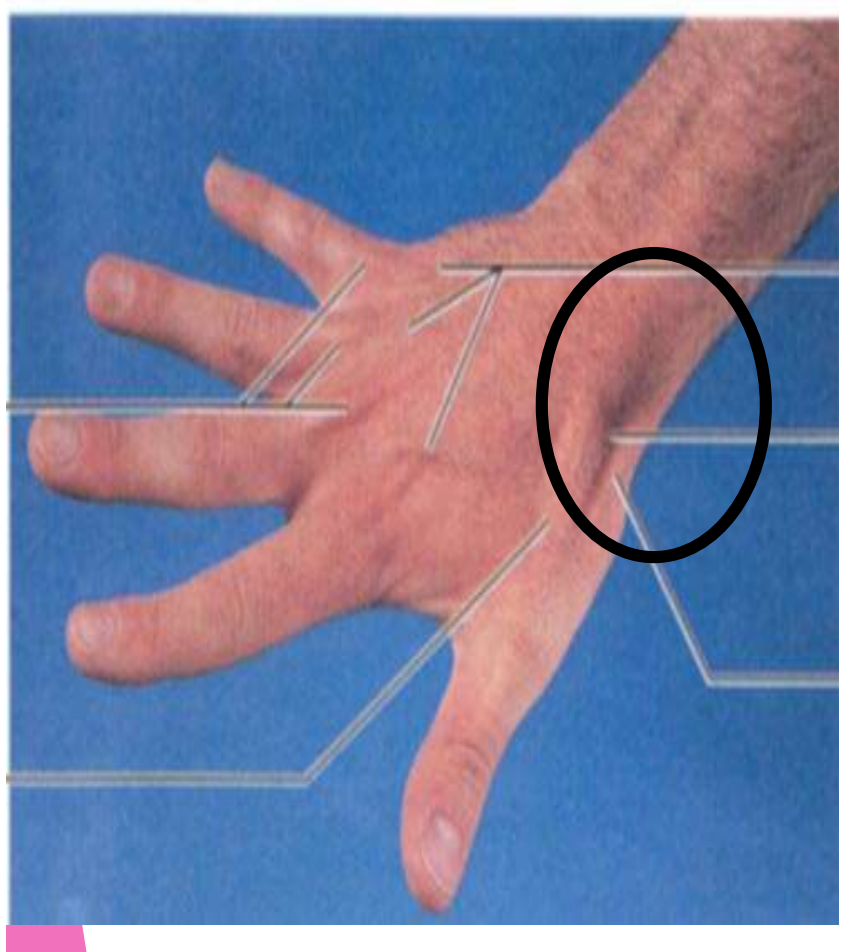
Upper Limb

- **Cubital Fossa**
  - Contents
    - Median Cubital Vein
    - Brachial Artery
    - Median Nerve
  - Boundaries
    - Medial= Pronator teres
    - Lateral= Brachioradialis
    - Superior= Line between epicondyles





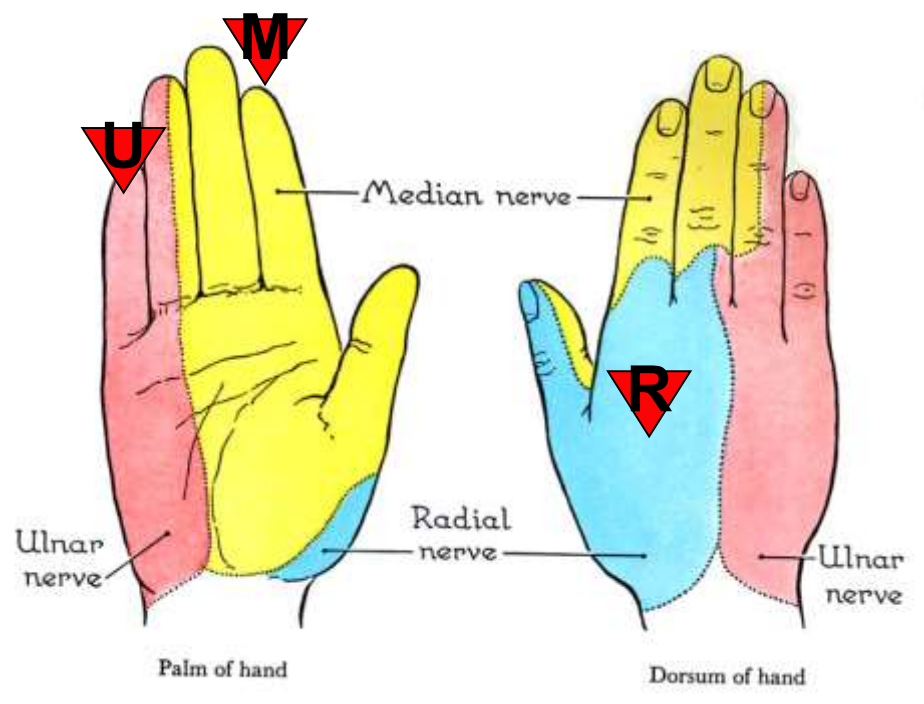
Surface Anatomy of Upper Limb



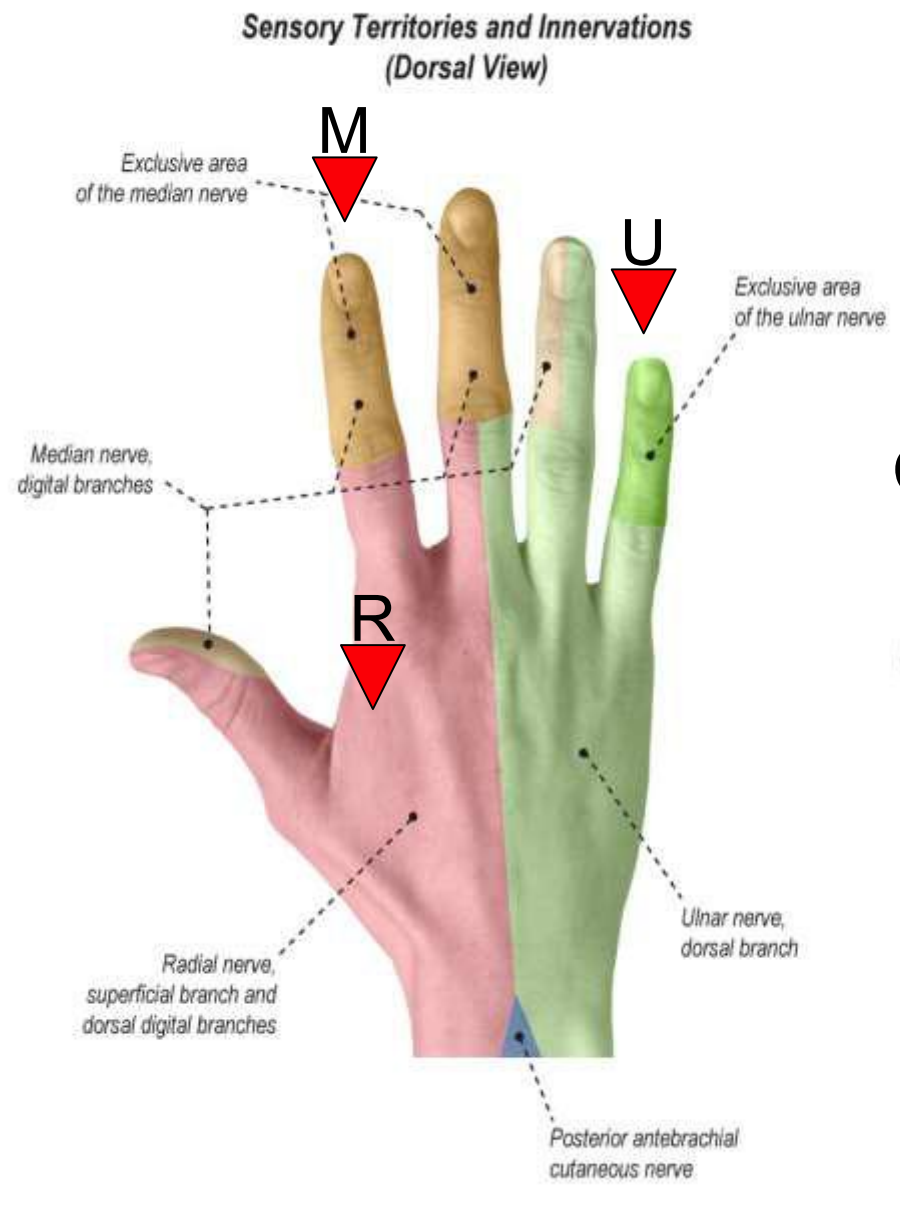
Anatomical Snuffbox

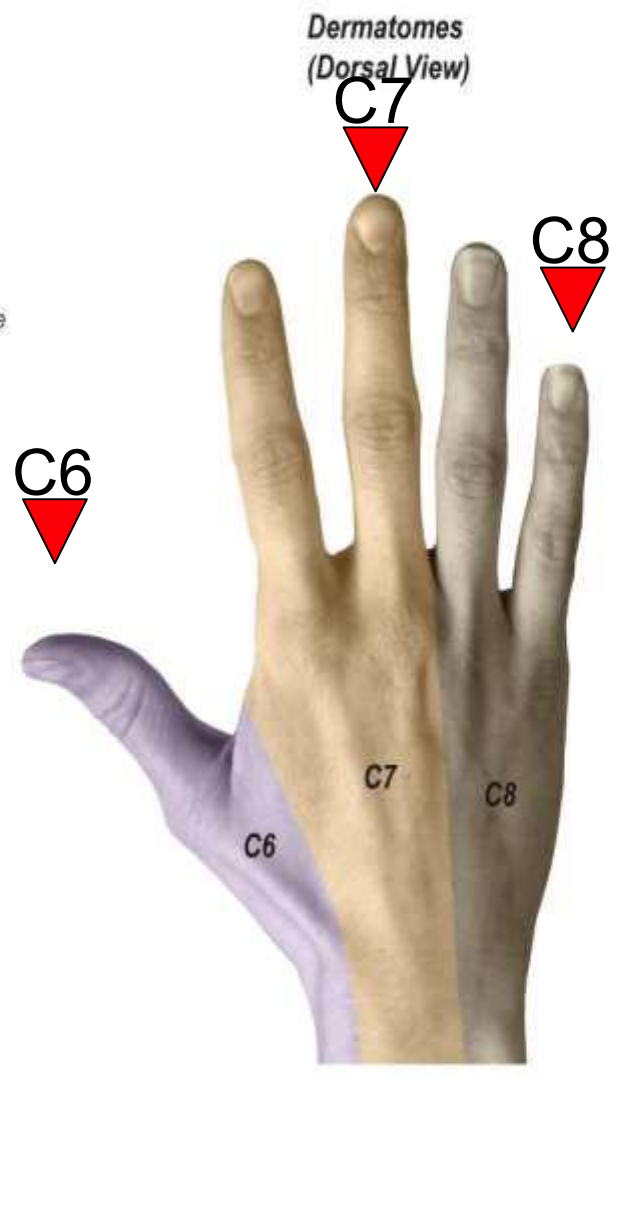
- Lateral = APL & E pol brevis
- Medial = E. pollicis longus
- Floor = scaphoid, styloid of radius
- Contains Radial Artery (pulse)

Test for Peripheral Nerve Sensory Function:



Ulnar n. – Tip of 5th digit (little finger)
Median n. – Tip of 2nd digit (index finger)
Radial n. – Webbing b/w thumb & index finger (dorsum)





Washington University in St. Louis School of Medicine

Stretch Reflex

academic.scranton.edu

Bicipital reflex (C6 cord level)

Triceps reflex (C7 cord level)

UPPER LIMB RADICULAR SYNDROMES

Cranial ↓ Proximal ↓

IVD	Root	Sensory Loss	Motor Weakness
C4-C5	C5	Shoulder	Shoulder weakness
C5-C6	C6	Anterior upper arm, Lateral forearm, thumb	Forearm flexion Biceps reflex
C6-C7	C7	3rd digits	Forearm extension Triceps reflex Wrist extension Hand grip
C7-C8	C8	5th digits Medial forearm	Wrist flexion Intrinsic hand mm.

Caudal ↓ Distal ↓

Source: Devinsky et al. *Neurologic Pearls*