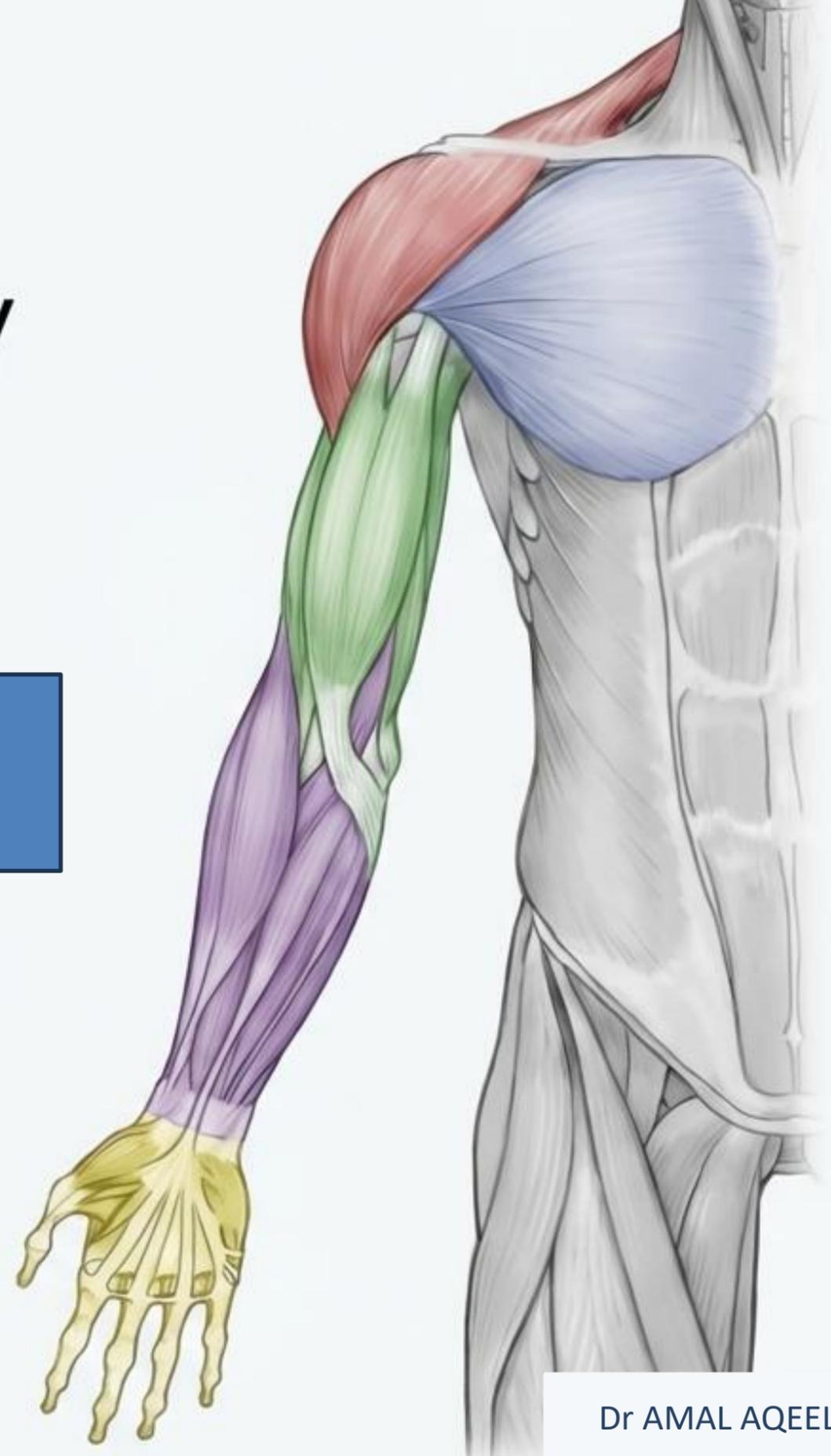


# Upper Limb Anatomy: A Proximal-to-Distal Journey

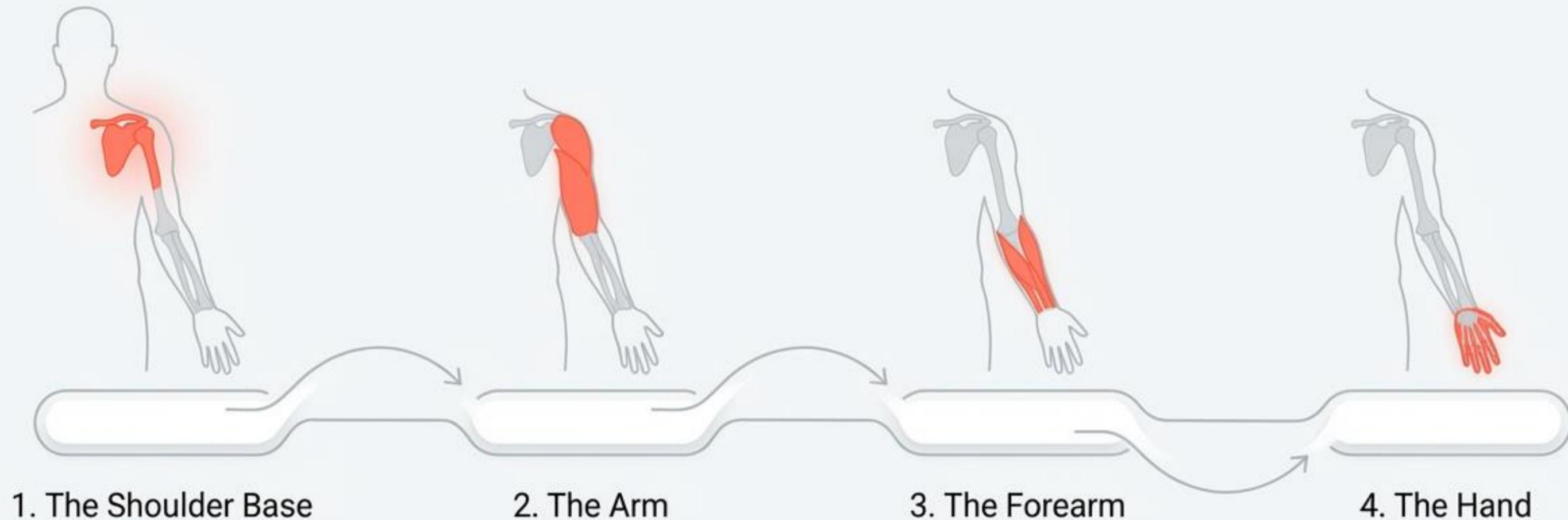
Master the compartments, neurovascular supplies,  
and critical exceptions of the human arm.

Dr AMAL AQEEL ALBTOOSH



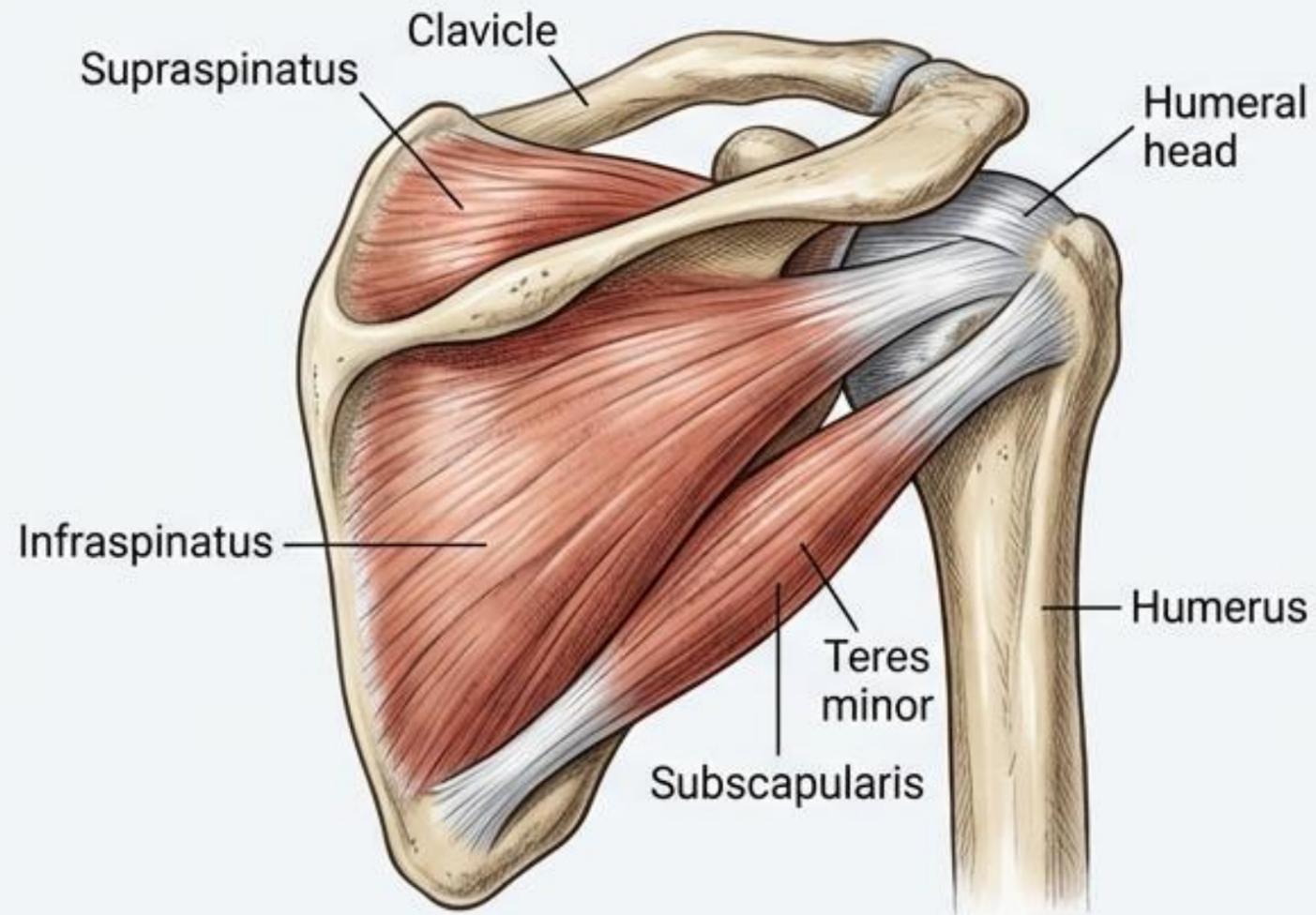
# Mapping the Upper Limb

Gross anatomy is inherently spatial. We will build our anatomical understanding layer by layer, moving progressively down the limb.



# The Scapular Base and Rotator Cuff

The inserting tendons of the “SITS” muscles blend with the glenohumeral joint capsule to provide essential stability and rotation.



- Supraspinatus
- Infraspinatus
- Teres minor
- Subscapularis

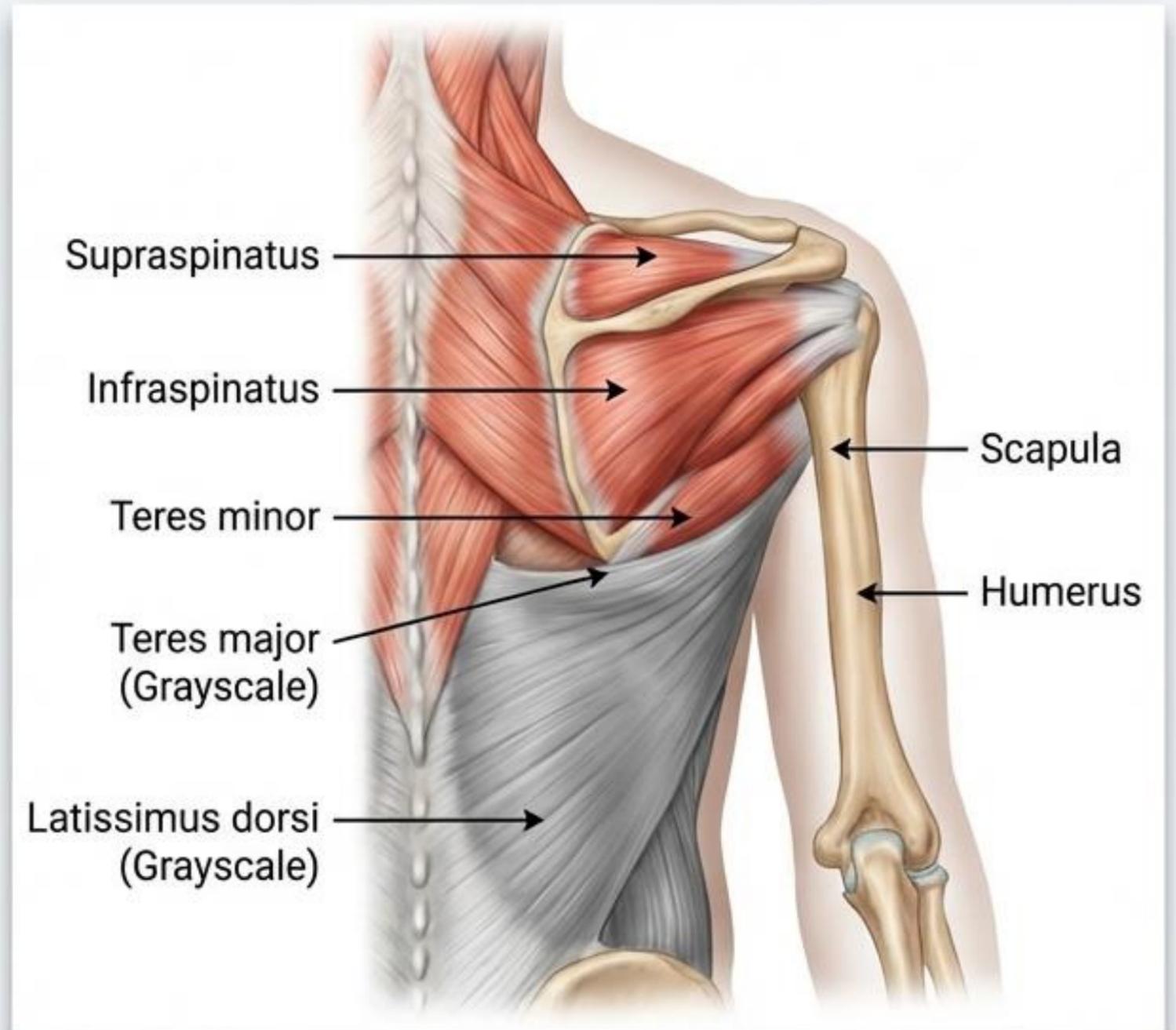
# Rotator Cuff Exceptions

While the cuff generally 'rotates' the humerus, there is one major functional exception, and two common anatomical distractors.

## HIGH-YIELD EXAM CALLOUT

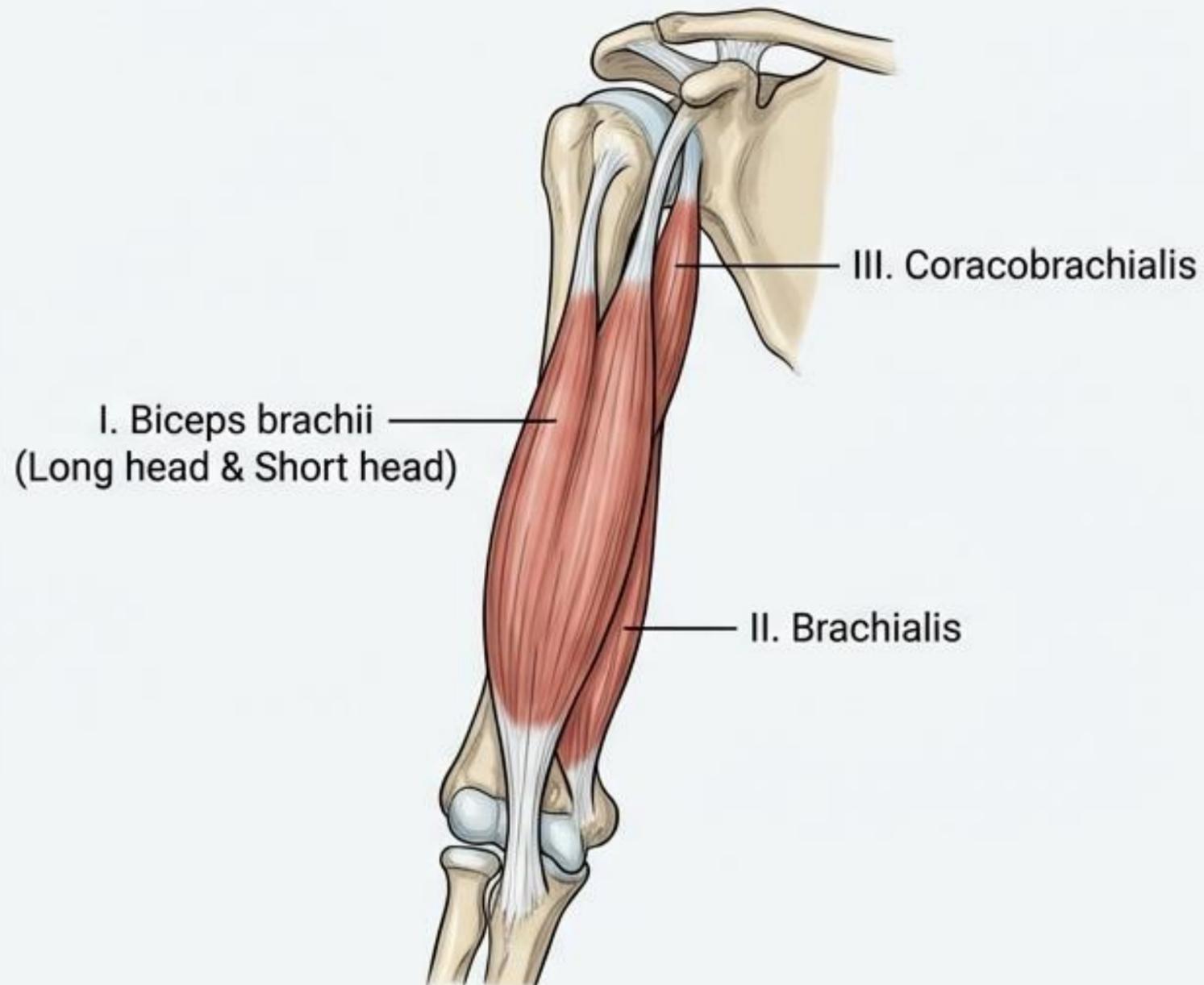
The Supraspinatus does NOT rotate; it abducts the humerus.

The Teres major and Latissimus dorsi do NOT hold the shoulder joint. Therefore, they are NOT members of the rotator cuff.



# The Anterior Arm: Flexion and Supination

Enclosed by the brachial fascia (deep fascia), the arm is divided by two intermuscular septa. The anterior compartment contains three primary muscles.



- I. Biceps brachii
- II. Brachialis
- III. Coracobrachialis

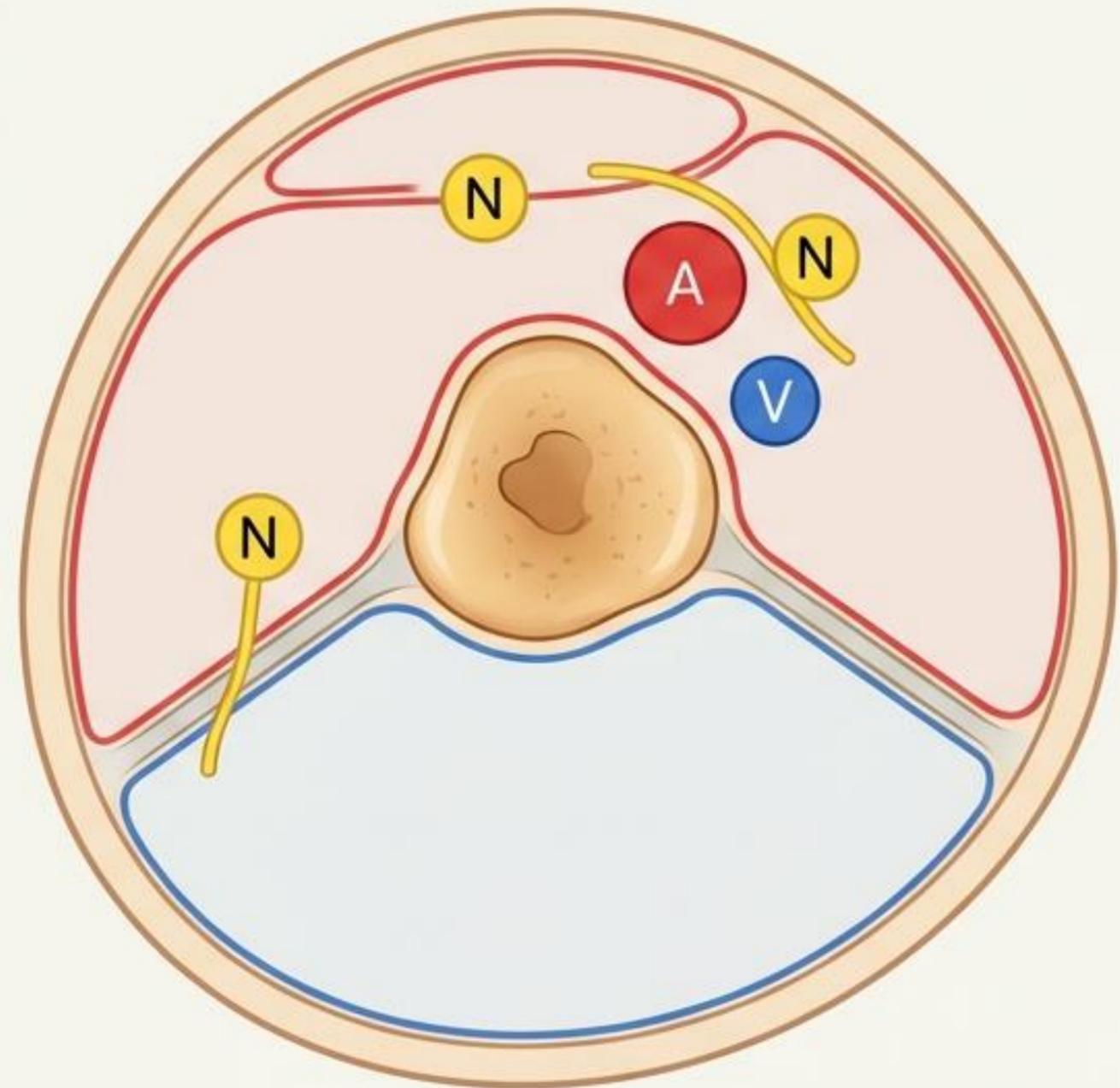
## Supply:

- A** [A] Brachial artery
- N** [N] Musculocutaneous nerve

# Contents of the Anterior Fascial Compartment

Beyond the three muscles, the anterior compartment acts as a major highway for neurovascular structures traveling distally.

- **N** Musculocutaneous Nerve
- **N** Median Nerve
- **N** Radial Nerve (Present only in the lower part of the compartment)
- **A** Brachial Artery
- **V** Basilic Vein



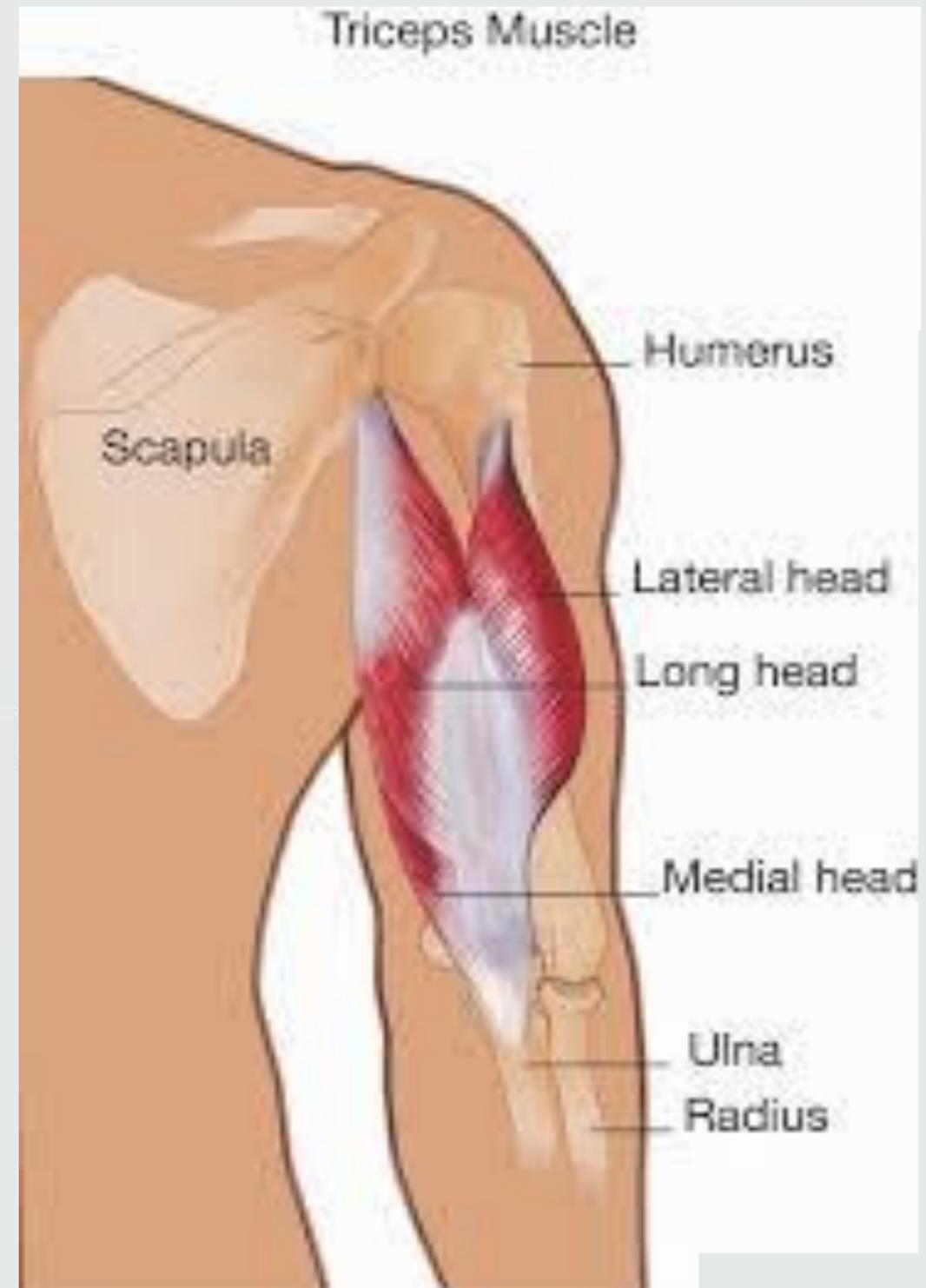
# The Posterior Arm: The Extensor

The posterior compartment of the arm is mechanically straightforward, dedicated to the extension of the elbow.

**Muscle:** Consists solely of the Triceps brachii muscle.

## Supply:

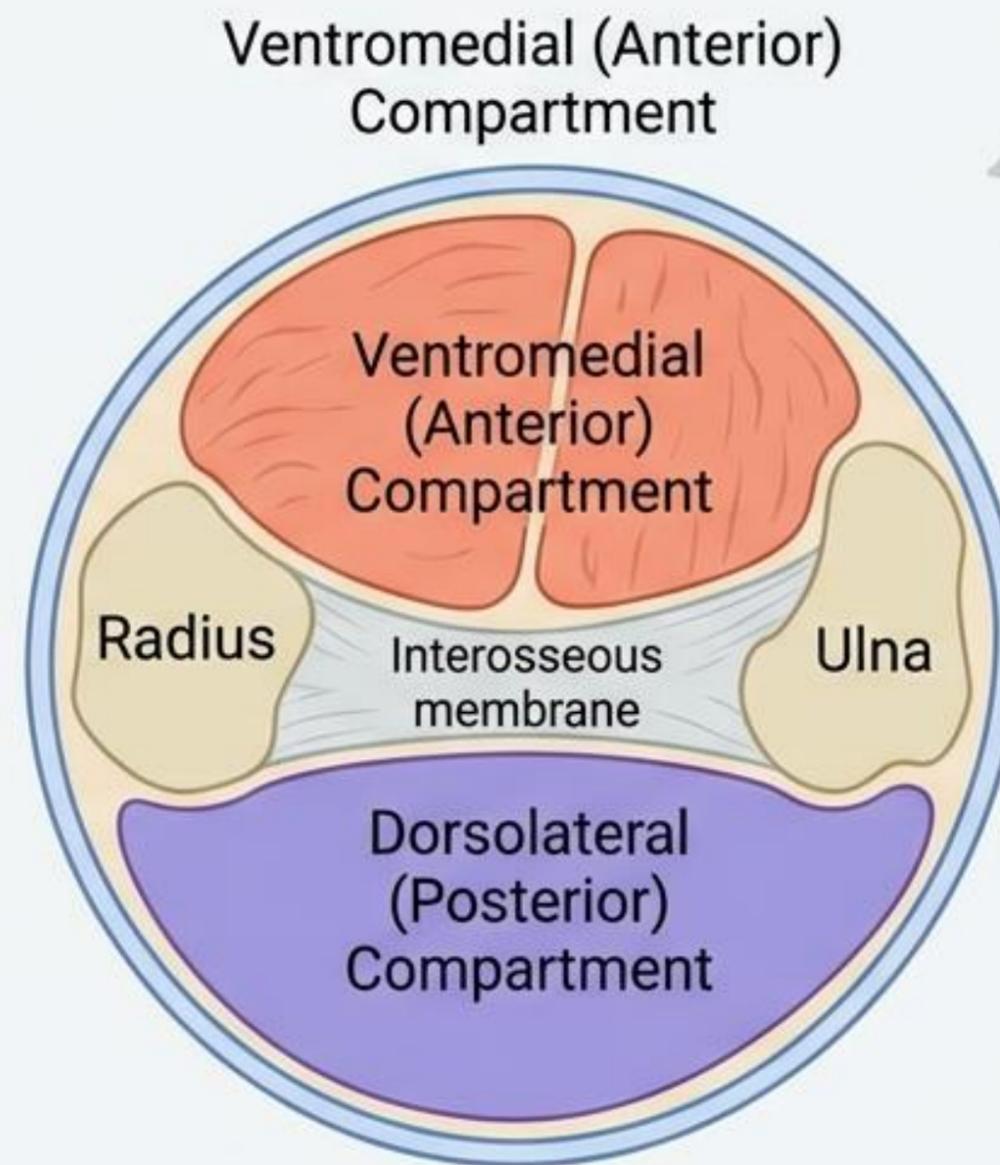
- N** Radial nerve
- A** Profunda brachii artery  
(Deep brachial artery)



# The Forearm: The Grand Division

The forearm is split into two functionally opposing compartments separated by the interosseous membrane and intermuscular septum.

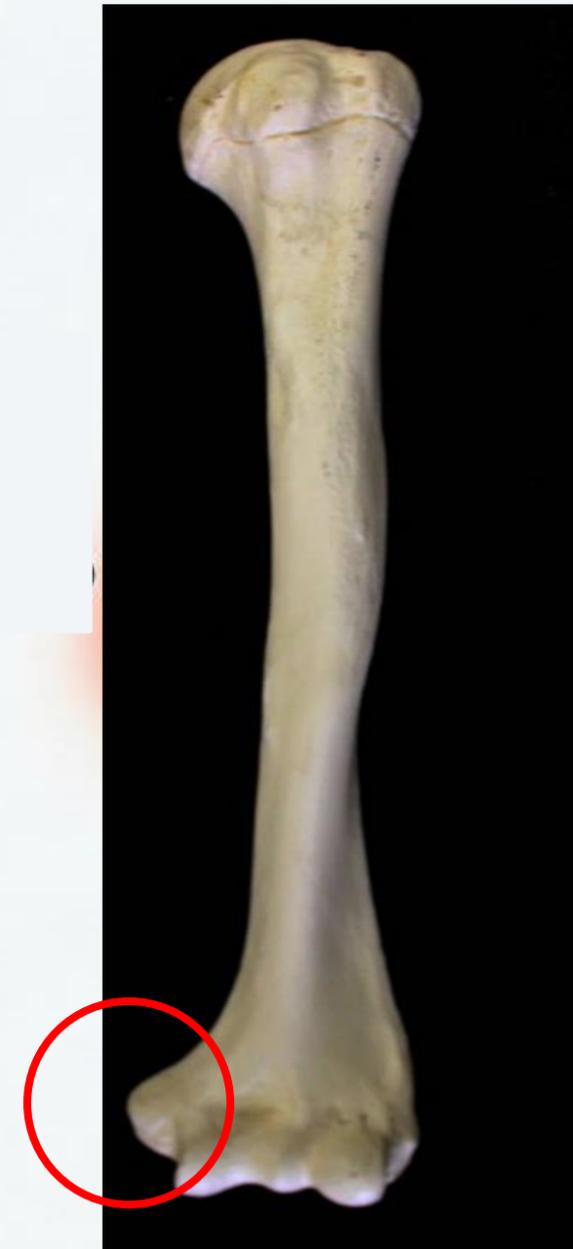
- Ventromedial (Anterior) Compartment  
→ The Flexors of the wrist/fingers and the Pronators.
- Dorsolateral (Posterior) Compartment  
→ The Extensors of the wrist/fingers and the Supinator.



# Anterior Forearm: The Flexor Rules

Muscles in the anterior compartment share four highly reliable common features.

- **Origin:** Common attachment at the Medial Epicondyle.
- **Action:** Common action is Flexion.
- **Innervation:** Median nerve (with minimal ulnar contribution).
- **Vascular:** Branches of the Ulnar and Radial arteries.

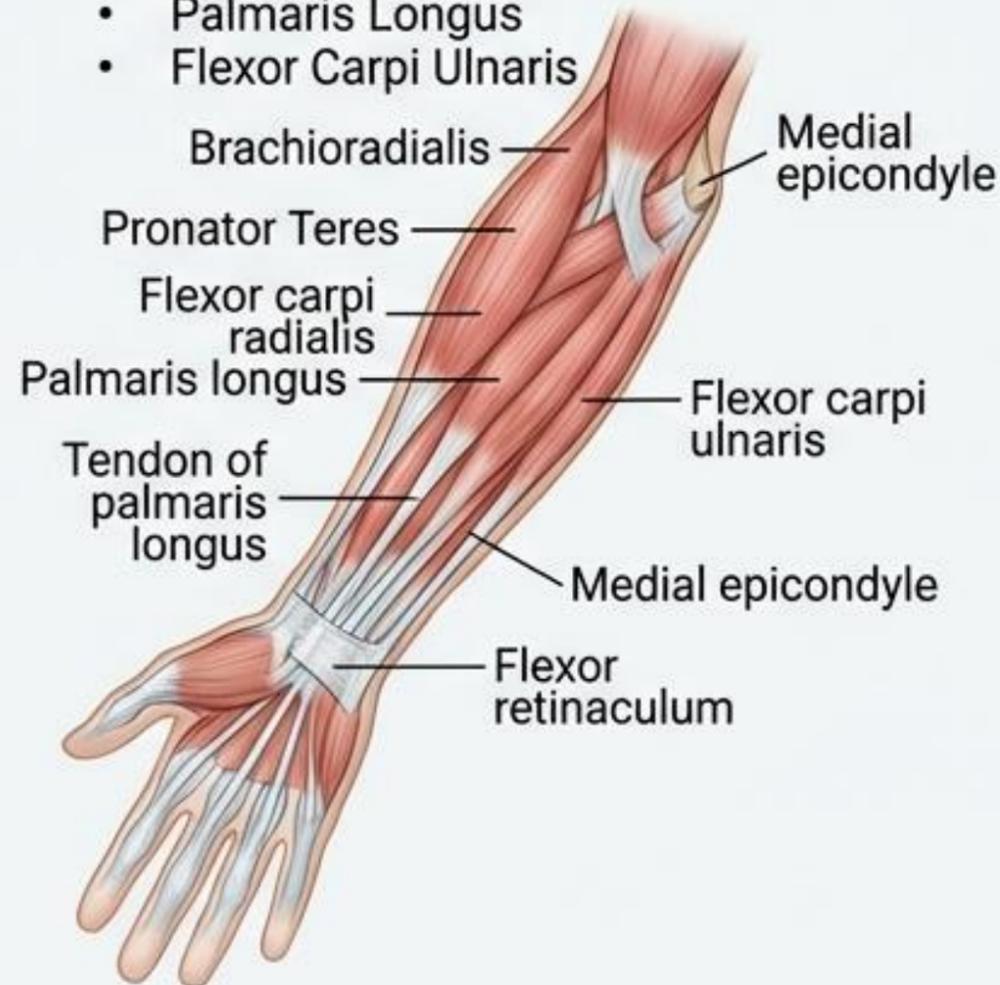


# Anterior Forearm: Three Muscle Layers

## Superficial Group (4)

4 muscles

- Pronator Teres
- Flexor Carpi Radialis
- Palmaris Longus
- Flexor Carpi Ulnaris



## Intermediate Group (1)

1 muscle

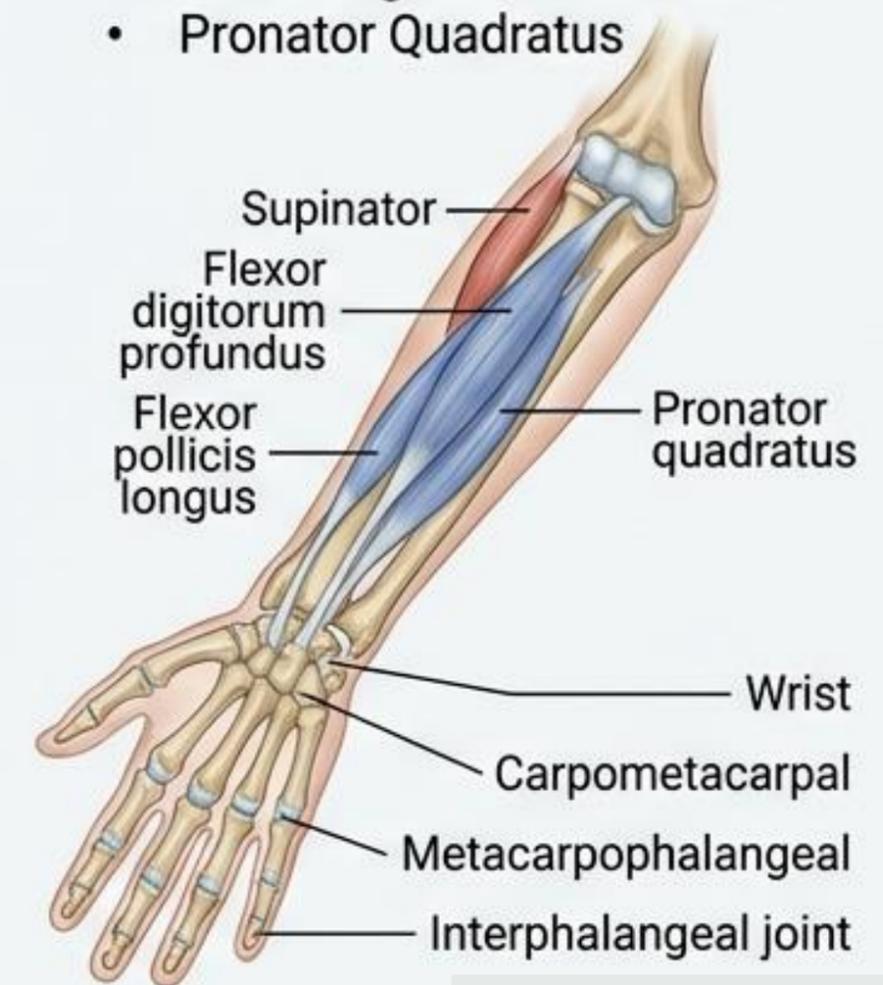
- Flexor Digitorum Superficialis



## Deep Group (3)

3 muscles

- Flexor Pollicis Longus
- Flexor Digitorum Profundus
- Pronator Quadratus

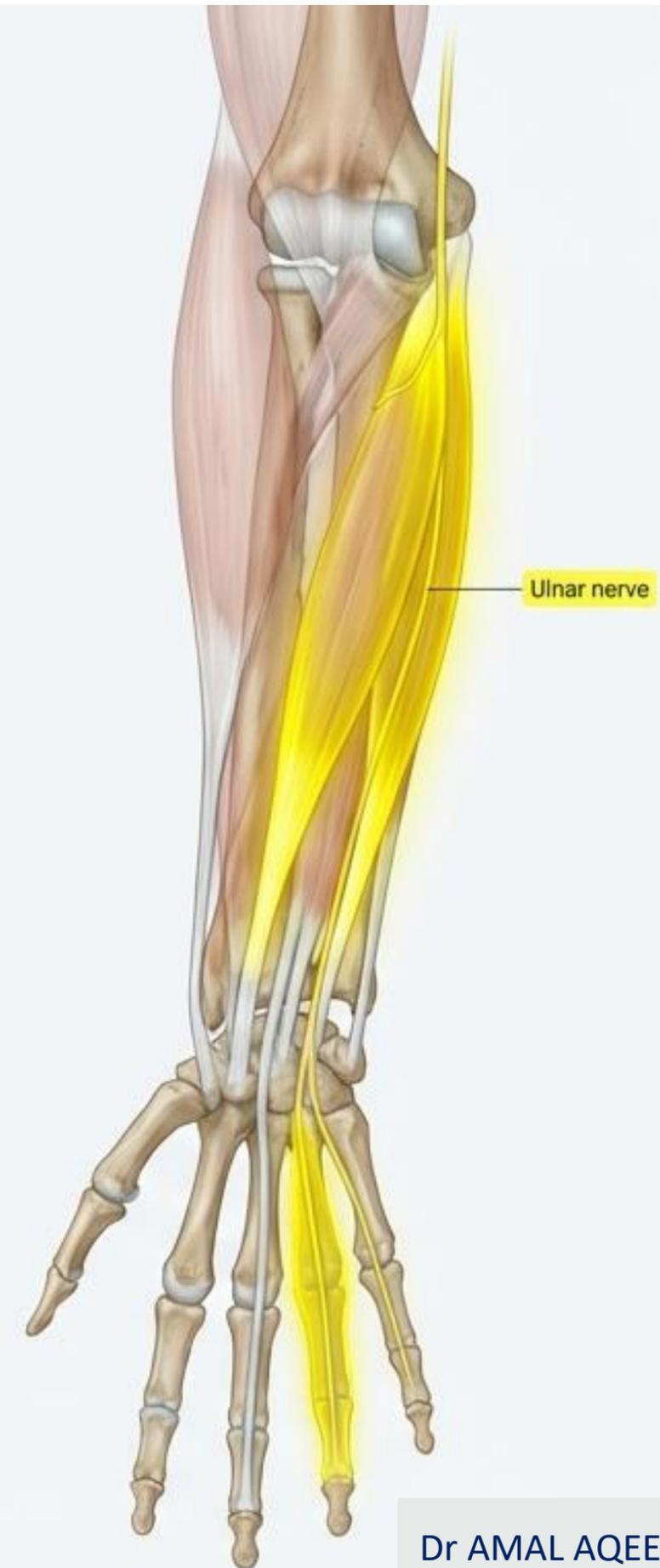


# The Ulnar Nerve Exception

**Rule:** All anterior forearm muscles are supplied by the Median Nerve.

**Exception:** Two specific structures break this rule and are instead supplied by the **ULNAR NERVE**.

1. Flexor Carpi Ulnaris (Entire muscle)
2. Medial part of the Flexor Digitorum Profundus

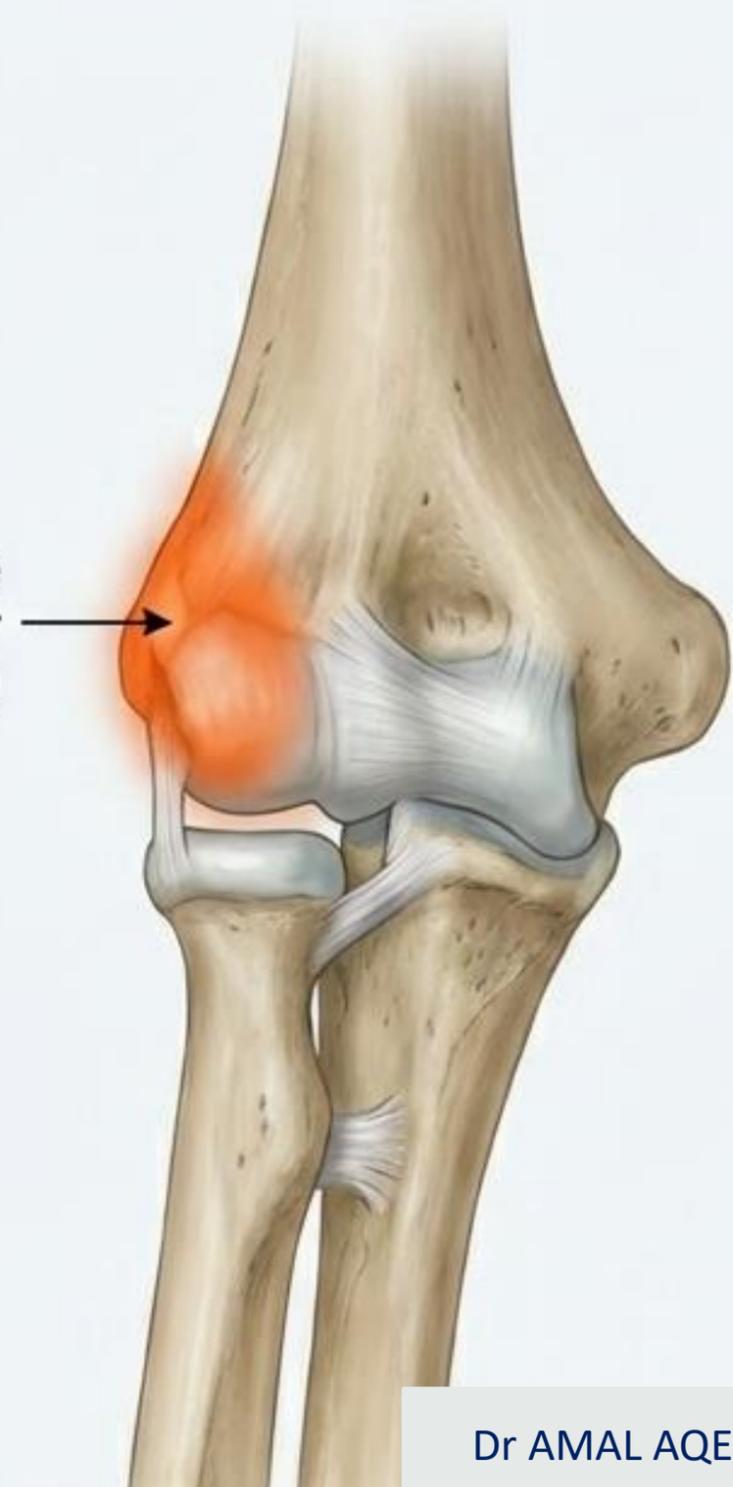


# Posterior Forearm: The Extensor Rules

The posterior compartment mirrors the anterior, but operates on opposite mechanical and neurovascular principles.

- **Origin:** Common attachment at the Lateral Epicondyle of the humerus.
- **Action:** Common action is Extension.
- **Innervation:** Deep branch of the Radial nerve.
- **Vascular:** Branches of the ulnar and radial arteries (Posterior and anterior interosseous arteries).

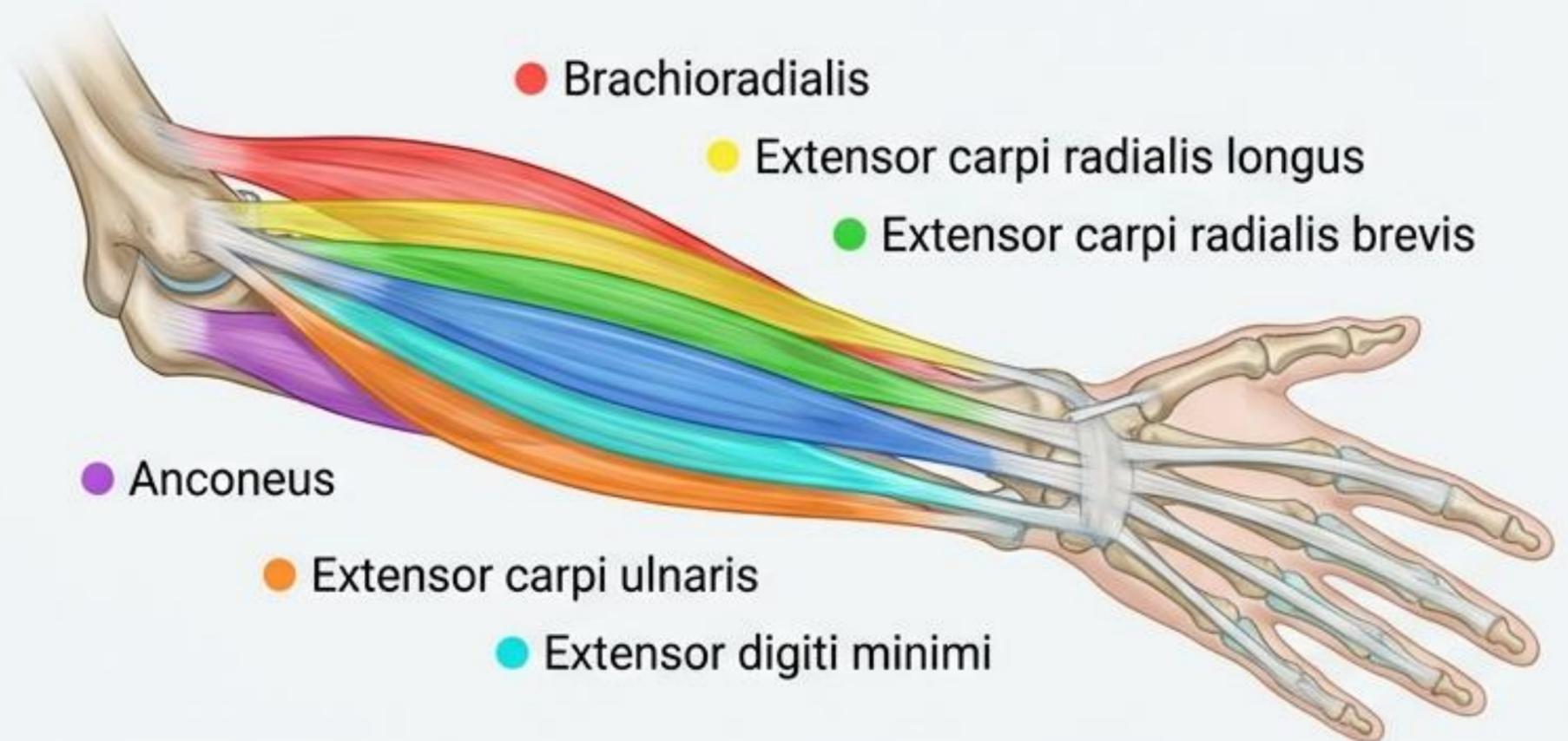
Lateral Epicondyle  
(Common Extensor  
Origin)



# Posterior Forearm: Superficial Layer

The superficial group of the posterior forearm consists of 7 muscles fanning out from the lateral epicondyle.

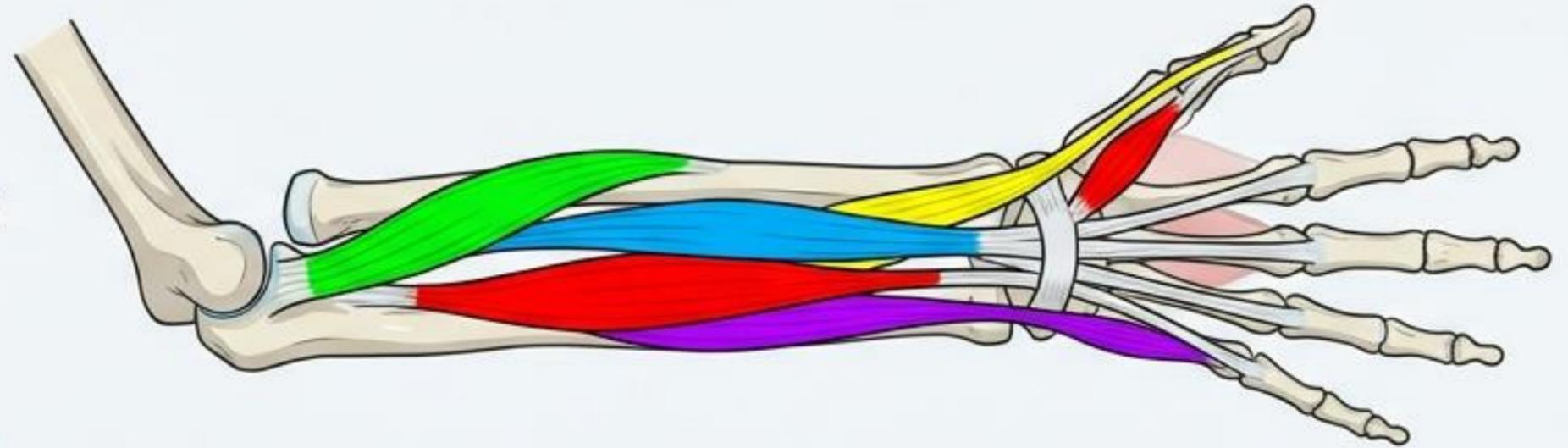
- Brachioradialis
- Extensor carpi radialis longus
- Extensor carpi radialis brevis
- Extensor digitorum
- Extensor digiti minimi
- Extensor carpi ulnaris
- Anconeus



# Posterior Forearm: Deep Layer

Beneath the superficial extensors lie 5 deep muscles, primarily responsible for complex movements of the thumb and index finger, plus supination.

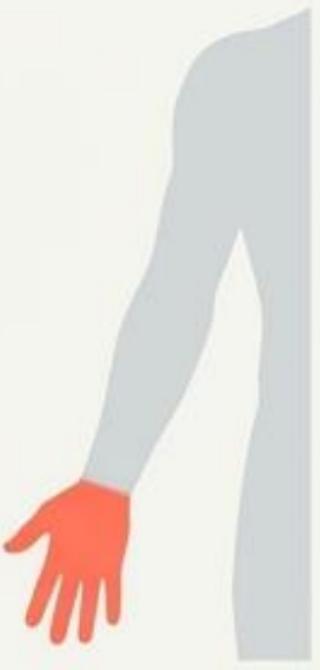
- Supinator
- Abductor pollicis longus
- Extensor pollicis brevis
- Extensor pollicis longus
- Extensor indicis



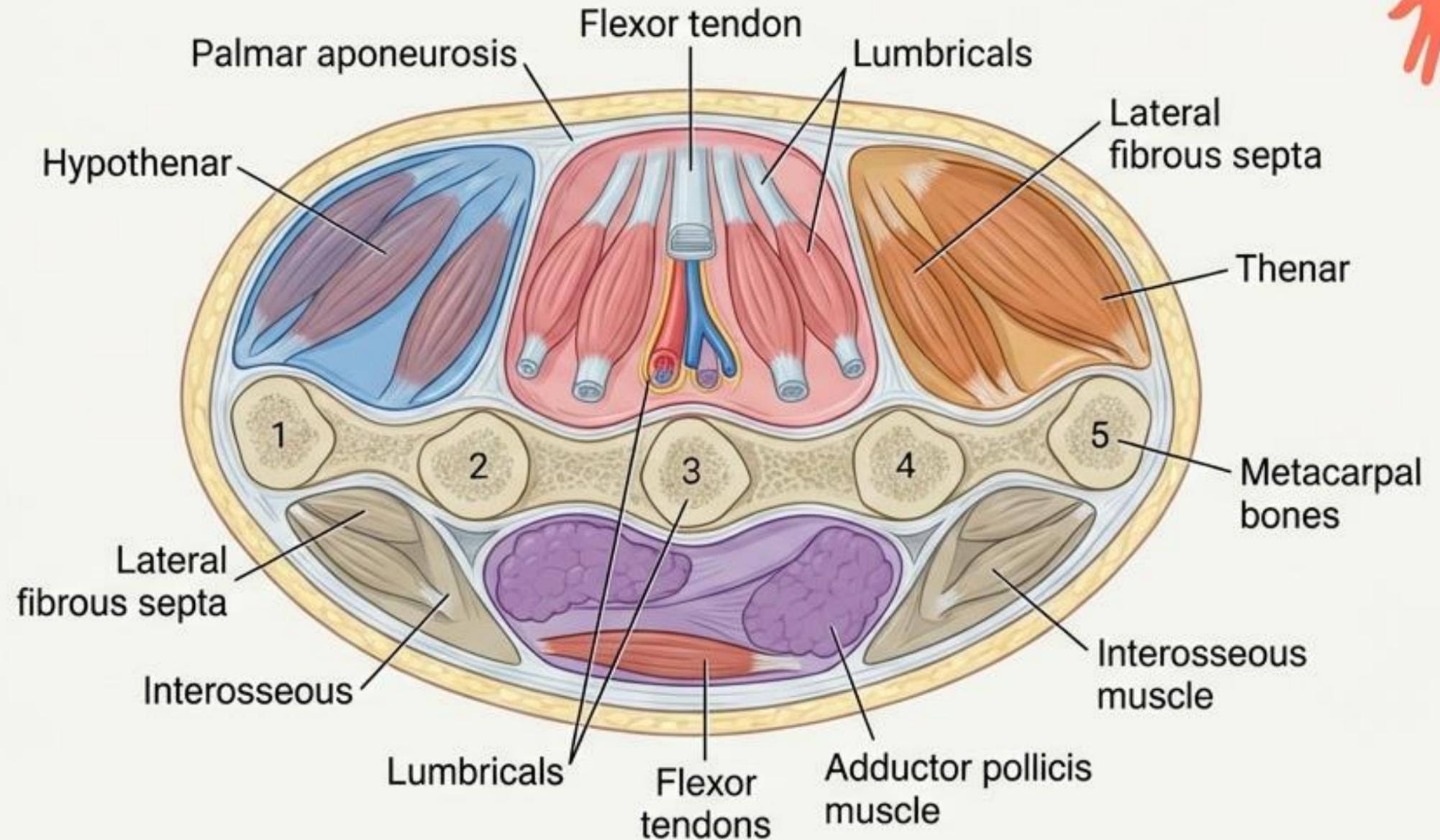
- Supinator
- Abductor pollicis longus
- Extensor pollicis brevis
- Extensor pollicis longus
- Extensor indicis

# Fascial Compartments of the Palmar Hand

The fascial layers divide the palmar side of the hand into five highly specialized compartments.

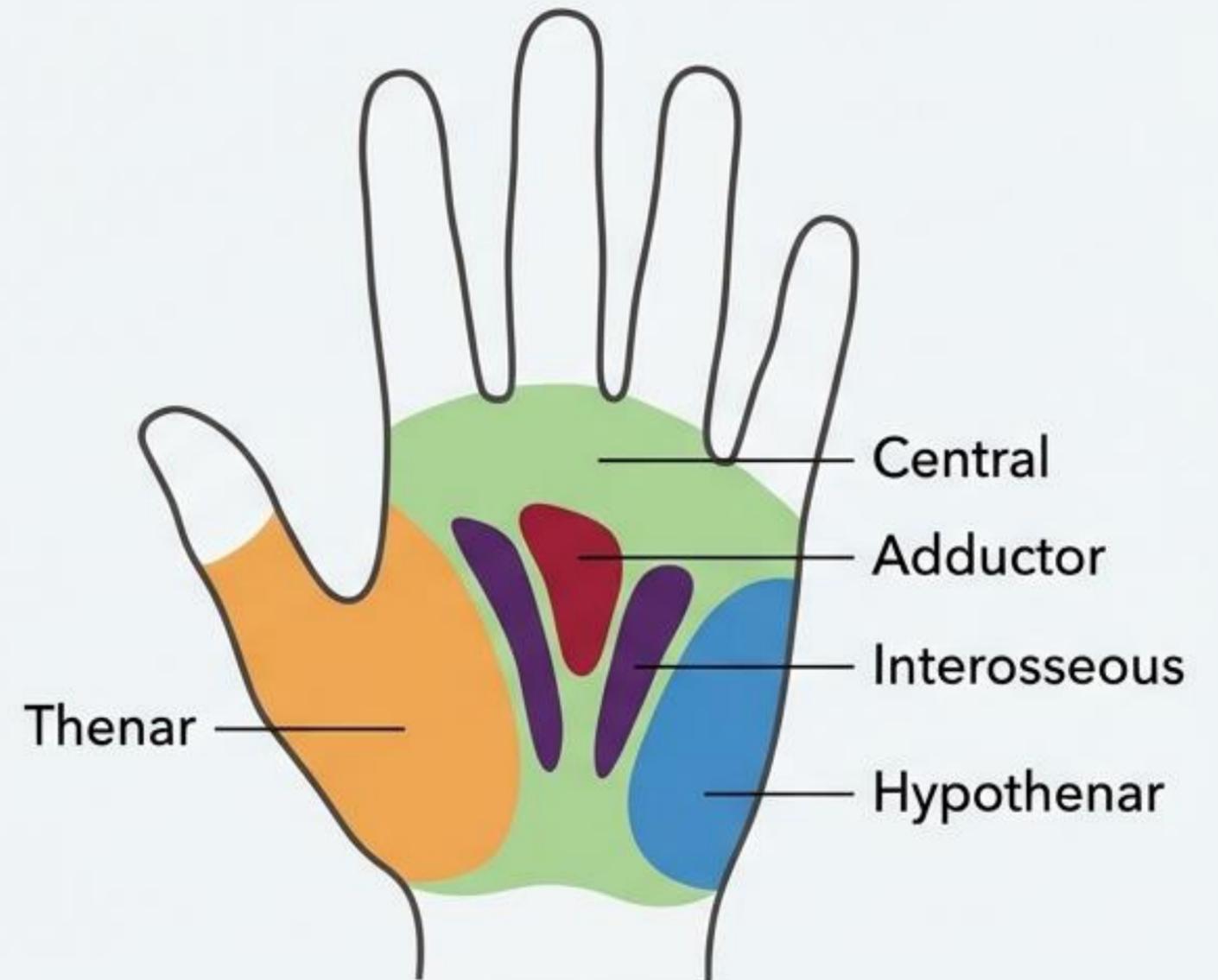


- 1. Thenar
- 2. Hypothenar
- 3. Central
- 4. Adductor
- 5. Interosseous



# Contents of the Palmar Compartments

- **Thenar Compartment:** 3 muscles acting on digit 1 (thumb).
- **Hypothenar Compartment:** 3 muscles acting on digit 5.
- **Central Compartment:** Located between Thenar/Hypothenar; contains flexor tendons and lumbrical muscles.
- **Adductor Compartment:** Contains the adductor pollicis muscle.
- **Interosseous Compartment:** Located deep between the metacarpals.



# Intrinsic Hand Muscle Groups

The fine motor control of the human hand is driven by five localized muscle groups.

- Thenar Muscles (Act on the thumb)
- Hypothenar Muscles (Act on the little finger)
- Lumbricals
- Dorsal Interossei
- Palmar Interossei



# The Golden Rule of Muscle Mechanics

From the rotator cuff to the palmar interossei, anatomy follows physics.

- **Core Principle:** Muscles act strictly on the joints they cross.
- **Synthesis:** Understanding where a muscle originates and where it inserts—and which joints lie between those two points—is the key to unlocking its mechanical action without rote memorization.

