

Muscles of the arm

Upper limbs

L3

Objectives

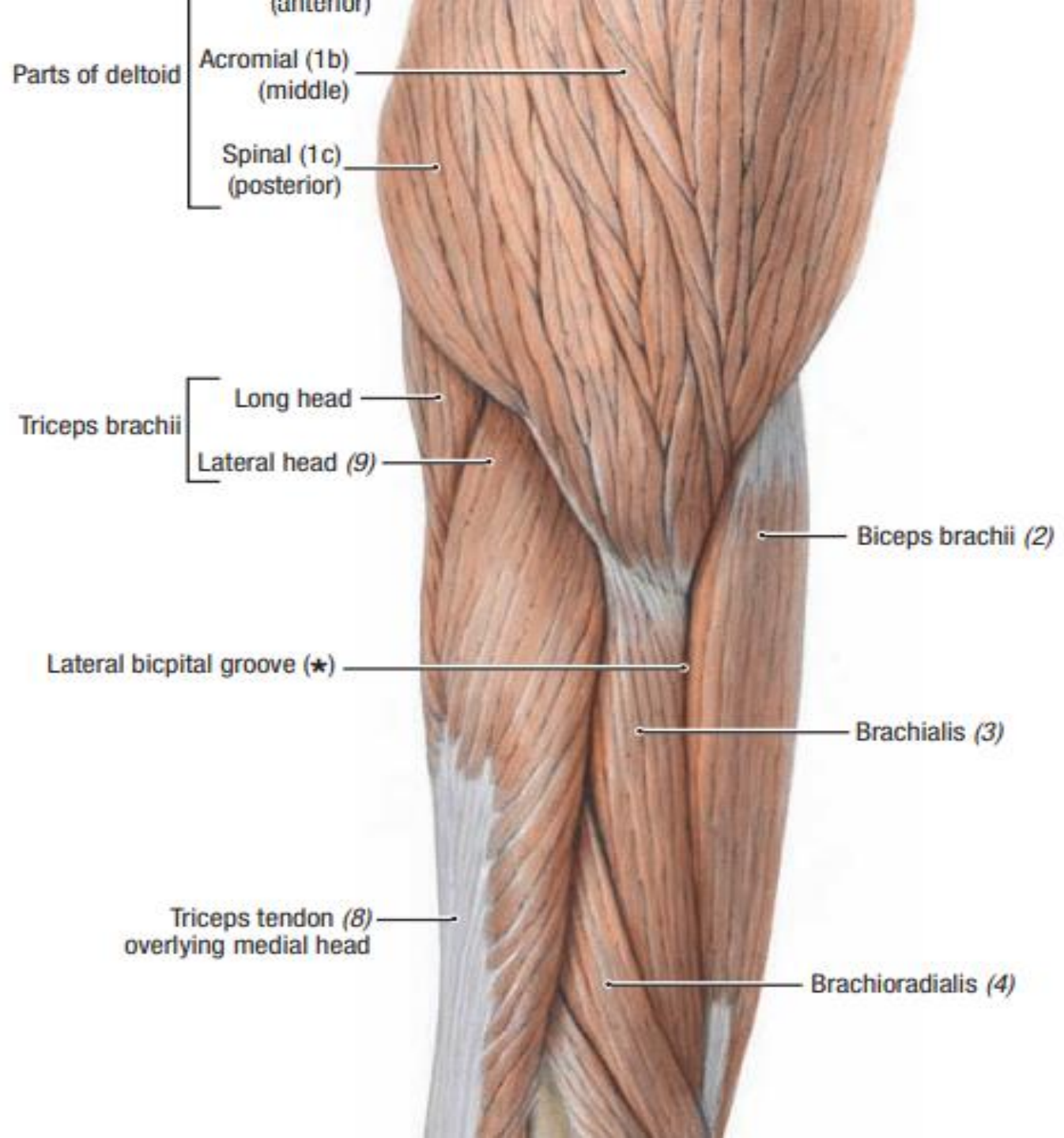
At the end of this lecture students must understand the following:

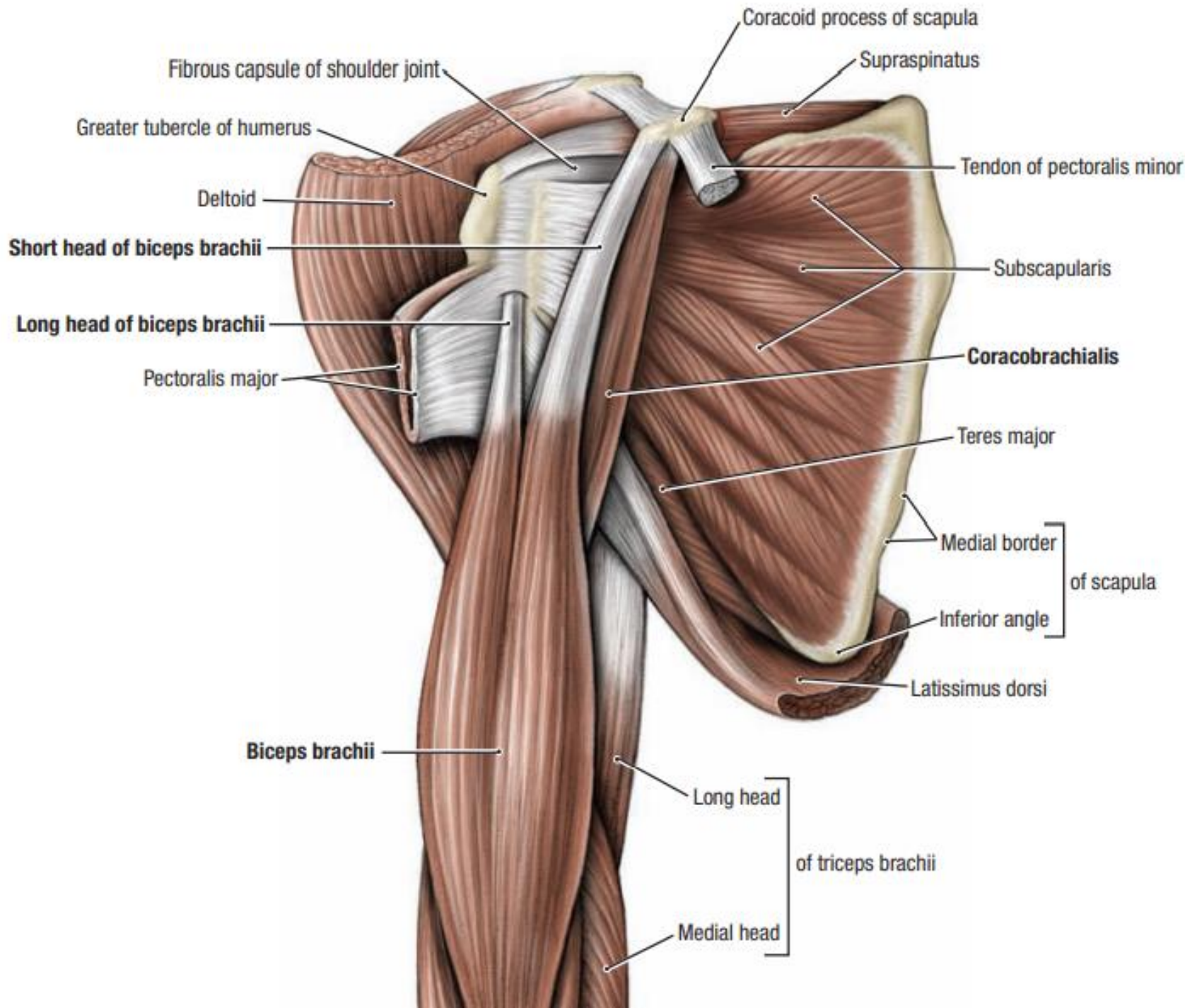
- 1-Muscles of the arm with their action and nerve supply.
- 2-Anatomical spaces of the shoulder region and arm.
- 3-Axilla with its contents.

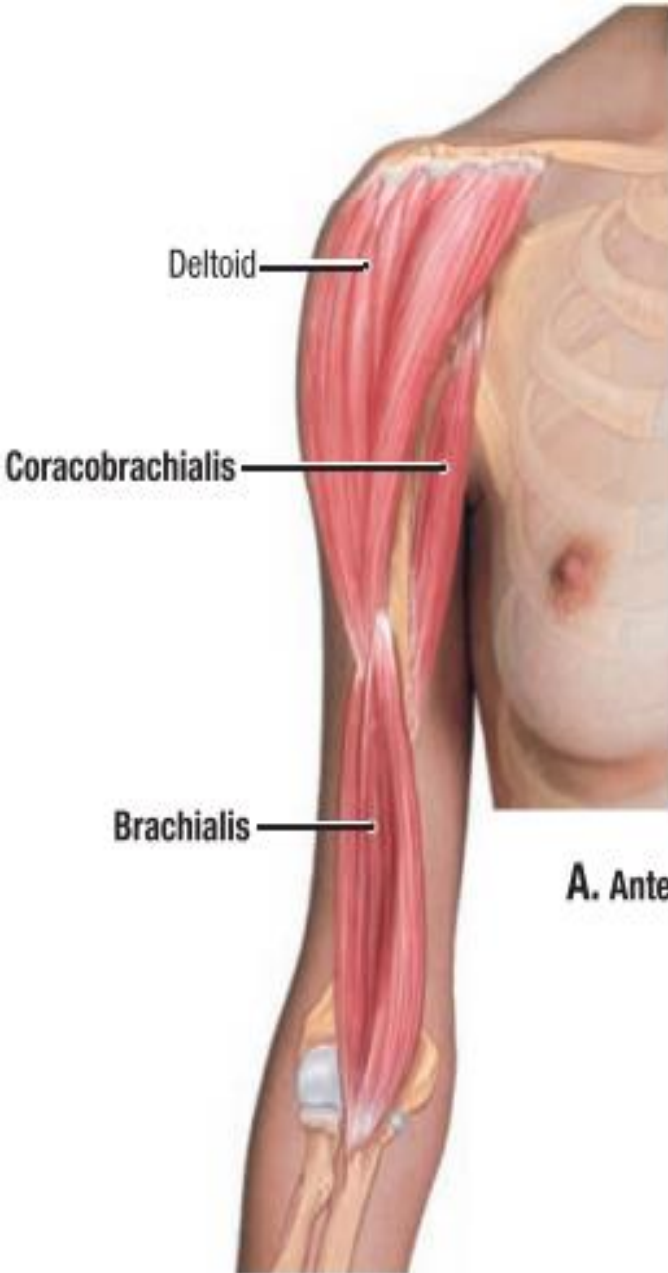
TABLE 6.10 ARM MUSCLES

Muscle	Proximal Attachment	Distal Attachment
Biceps brachii	<i>Short head:</i> tip of coracoid process of scapula <i>Long head:</i> supraglenoid tubercle of scapula and glenoid labrum	Tuberosity of radius and fascia of forearm through bicipital aponeurosis
Brachialis	Distal half of anterior surface of humerus	Coronoid process and tuberosity of ulna
Coracobrachialis	Tip of coracoid process of scapula	Middle third of medial surface of humerus
Triceps brachii	<i>Long head:</i> infraglenoid tubercle of scapula <i>Lateral head:</i> posterior surface of humerus, superior to radial groove <i>Medial head:</i> posterior surface of humerus, inferior to radial groove	Proximal end of olecranon of ulna and fascia of forearm
Anconeus	Lateral epicondyle of humerus	Lateral surface of olecranon and superior part of posterior surface of ulna

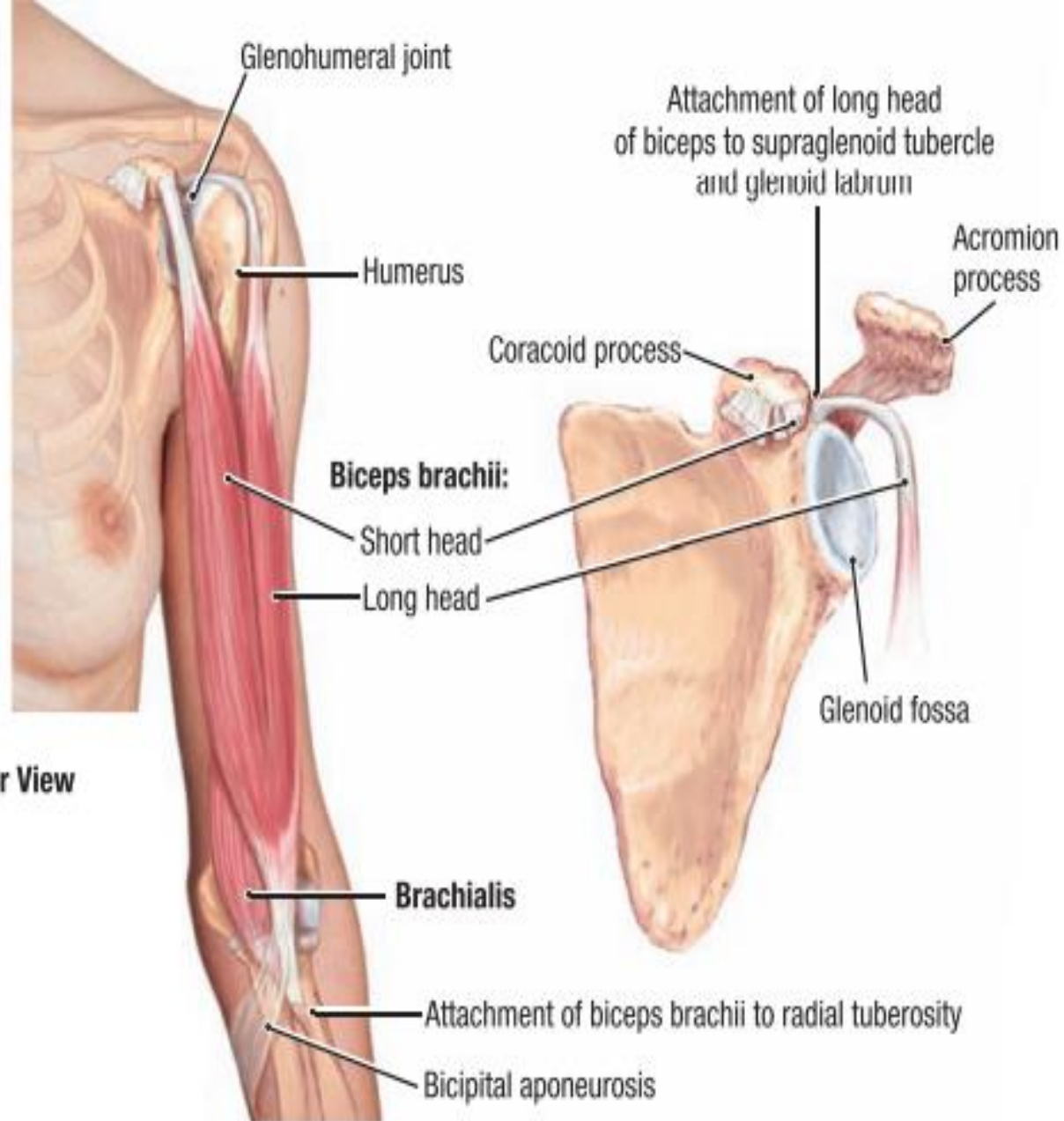
Innervation	Main Actions
Musculocutaneous nerve (C5, C6 , C7)	Supinates forearm and, when forearm is supine, flexes elbow joint; short head flexes shoulder joint; long head helps to stabilize should joint during abduction.
Musculocutaneous nerve (C5–C7) and radial (C5–C7)	Flexes elbow joint in all positions
Musculocutaneous nerve (C5, C6 , C7)	Assists with flexion and adduction of shoulder joint
Radial nerve (C6, C7 , C8)	Extends the elbow joint; long head steadies head of humerus when shoulder joint is abducted
Radial nerve (C7–T1)	Assists triceps in extending elbow joint; stabilizes elbow joint; abducts ulna during pronation







A. Anterior View



Triceps brachii:

Lateral head

Long head

Medial head

Humerus



B. Posterior View

Triceps brachii:

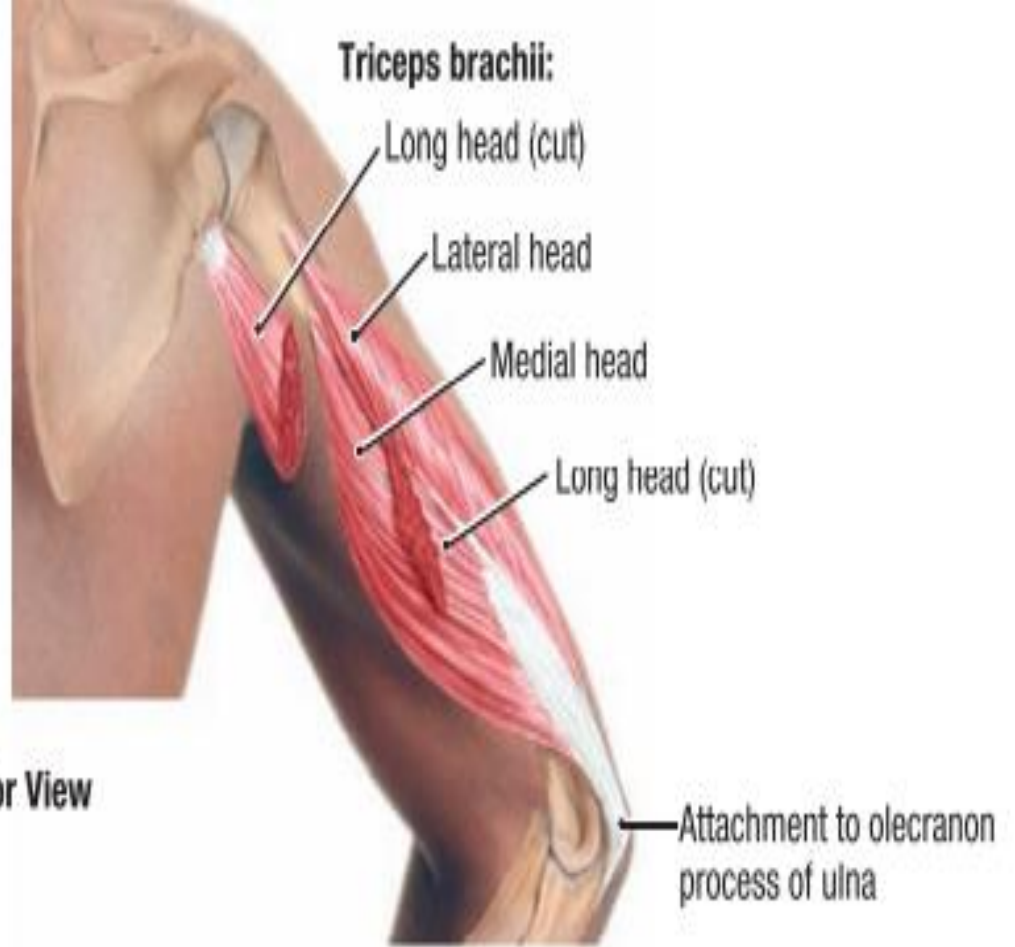
Long head (cut)

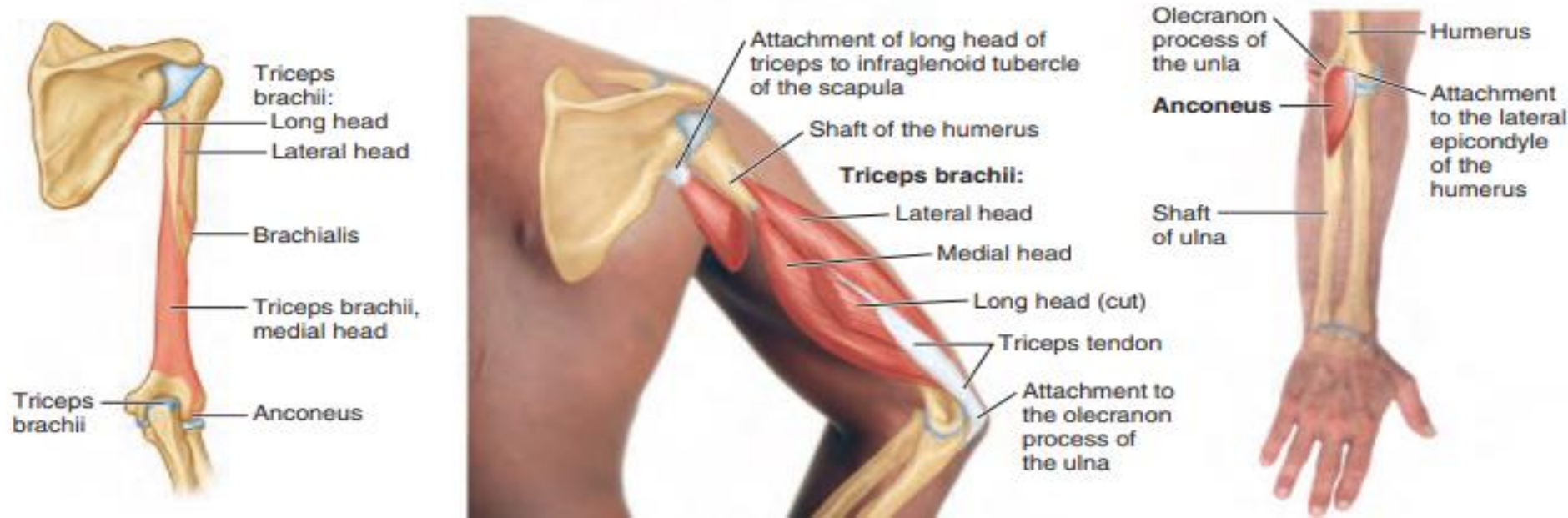
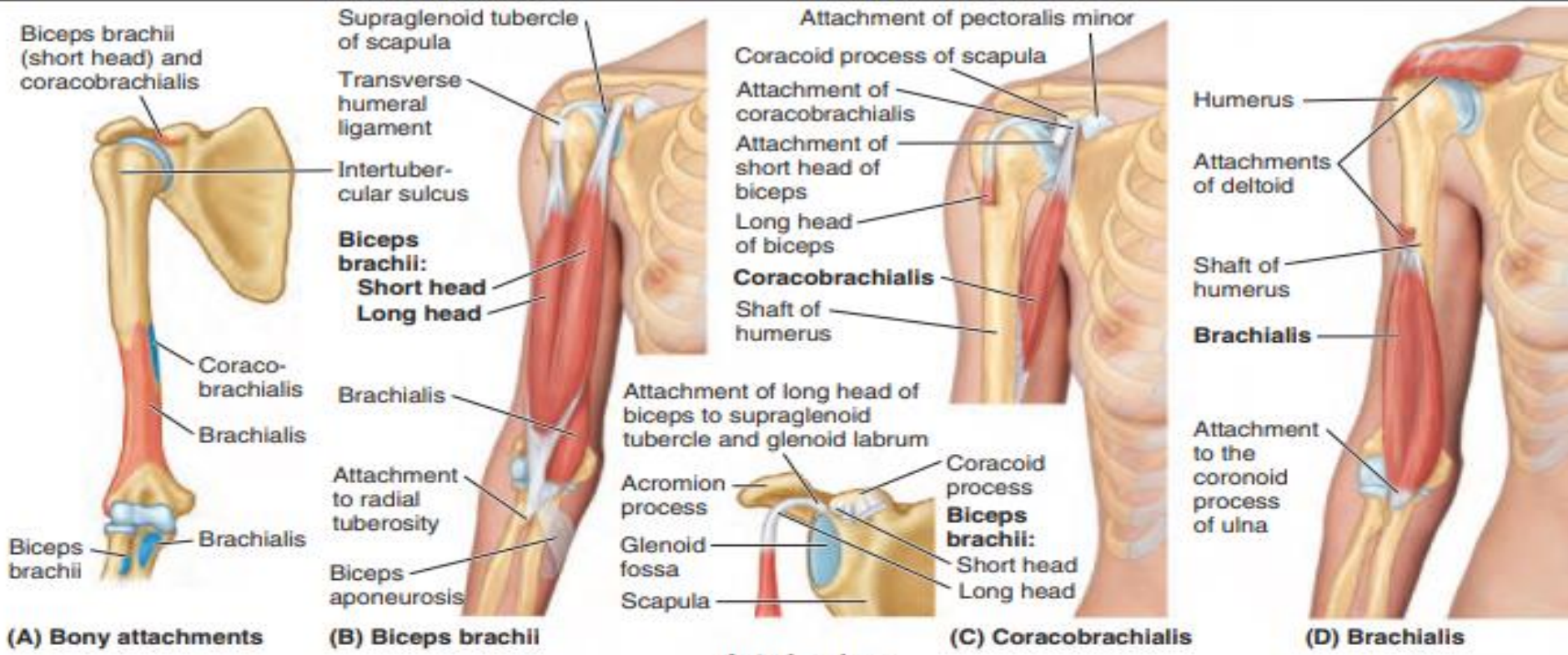
Lateral head

Medial head

Long head (cut)

Attachment to olecranon process of ulna





Muscles of Arm

Of the four major arm muscles, three flexors (biceps brachii, brachialis, and coracobrachialis) are in the anterior (flexor) compartment, supplied by the musculocutaneous nerve, and one extensor (triceps brachii) is in the posterior compartment, supplied by the radial nerve (Figs. 6.48 and 6.49B–D & F; Table 6.9). A distally placed assistant to the triceps, the anconeus, also lies within the posterior compartment (6.49G). The flexor muscles of the anterior compartment are almost twice as strong as the extensors in all positions; consequently, we are better pullers than pushers. It should be noted, however, that the extensors of the elbow are particularly important for raising oneself out of a chair, and for wheelchair activity. Therefore, conditioning of the triceps is of particular importance in elderly or disabled persons.

The arm muscles and their attachments are illustrated in Figure 6.49 and their attachments, innervation, and actions are described in Table 6.9.

BICEPS BRACHII

As the term **biceps brachii** indicates, the proximal attachment of this fusiform muscle usually has two heads (*bi*, two + *L. caput*, head). The two heads of the biceps arise proximally by tendinous attachments to processes of the scapula,

primarily acts at the latter two. Its strength is markedly affected by the position of the elbow. When the elbow is extended, the biceps flexes the forearm; however, as elbow flexion requires more power is needed against resistance. It is capable of two powerful movements, flexion and pronation of the forearm. When the elbow is flexed, the biceps flexes the forearm. When the forearm is supinated, the biceps is the primary muscle during flexion. Alternately, when the forearm is pronated, the biceps is the primary (most powerful) muscle of the arm. For example, it is used when driving a screw into hard wood, and when pulling the cork from a wine bottle. The biceps acts as a flexor when the forearm is extended against resistance. In the semiprone position, the biceps acts against resistance (Hamill and Knutzen, 1992).

Arising from the supraglenoid tubercle, the biceps crosses the head of the humerus at the glenohumeral joint, the rounded tendon of the biceps continues to be surrounded by the biceps sheath as it descends in the intertubercular groove. A broad band, the **transverse humeral ligament**, extends from the lesser to the greater tuberosity and converts the intertubercular groove into a tunnel. The ligament holds the tendon of the biceps in the groove.

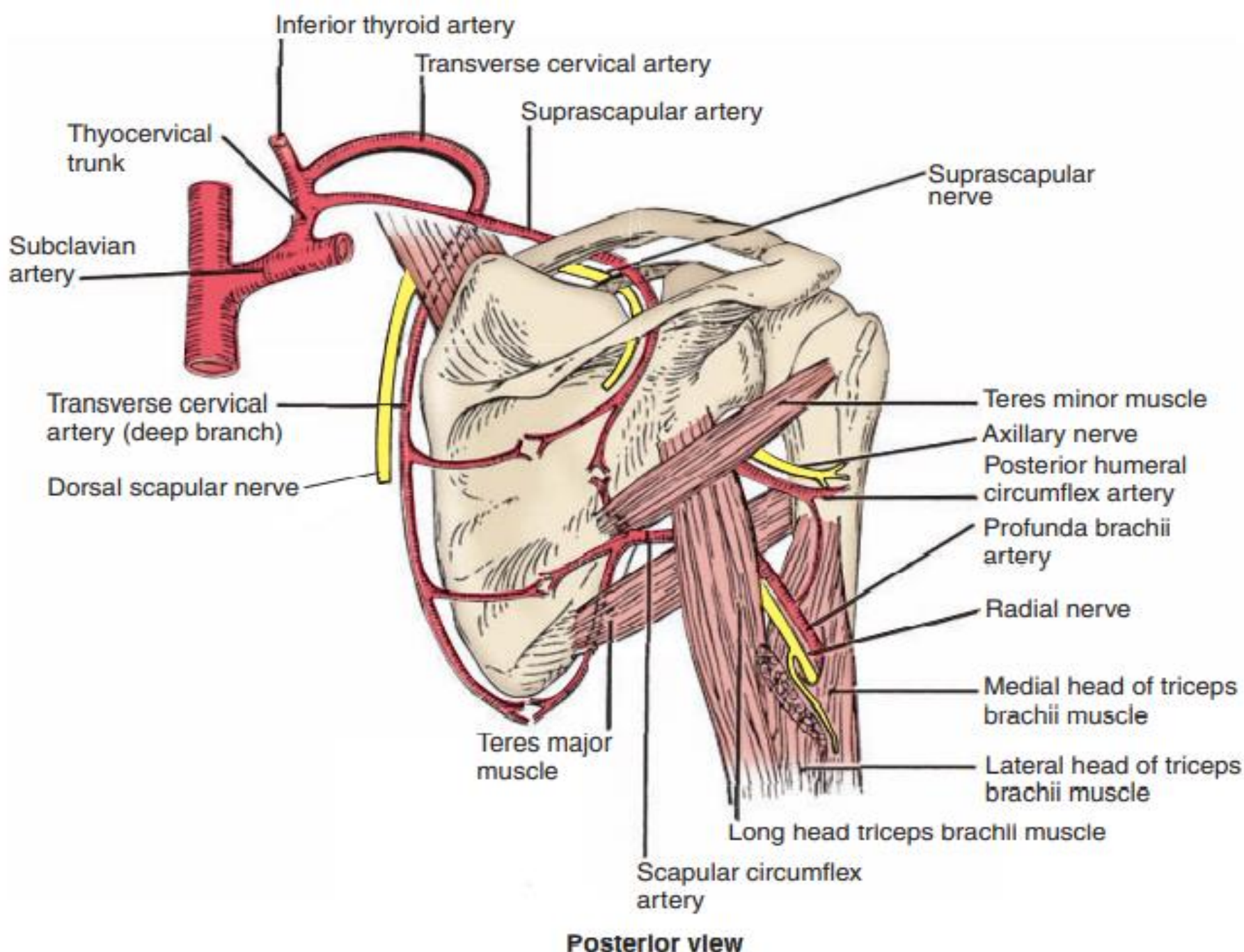
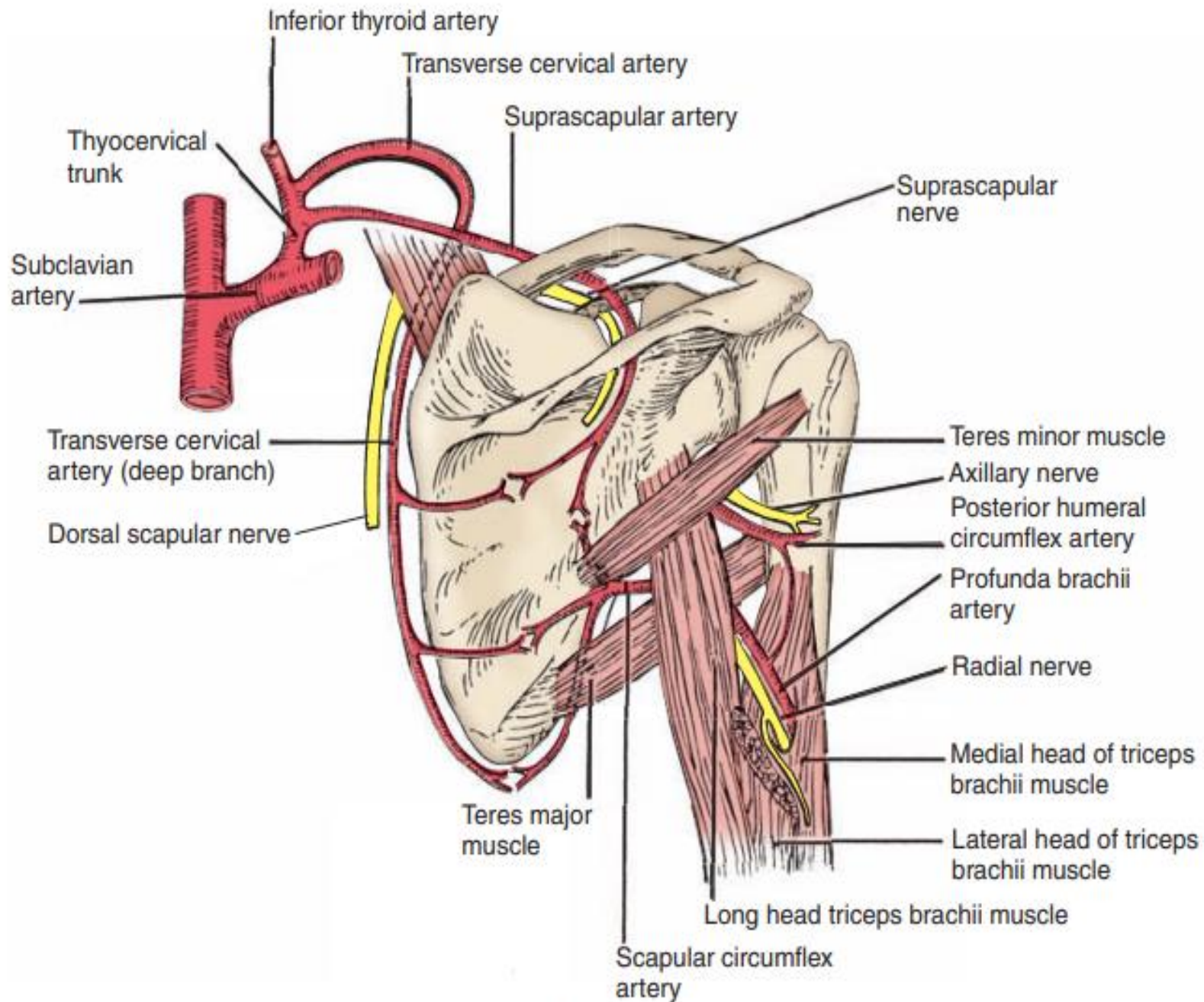


FIGURE 2-12. Structures of the shoulder region (posterior view).



Posterior view

Quadrangular Space (Figures 2-12 and 2-13)

- Is bounded superiorly by the teres minor and subscapularis muscles, inferiorly by the teres major muscle, medially by the long head of the triceps, and laterally by the surgical neck of the humerus.
- Transmits the **axillary nerve** and the **posterior humeral circumflex vessels**.

Triangular Space (Upper)

- Is bounded superiorly by the teres minor muscle, inferiorly by the teres major muscle, and laterally by the long head of the triceps.
- Contains the **circumflex scapular vessels**.

Triangular Space (Lower)

- Is formed superiorly by the teres major muscle, medially by the long head of the triceps, and laterally by the medial head of the triceps.
- Contains the **radial nerve** and the **profunda brachii (deep brachial) artery**.

Triangle of Auscultation

- Is bounded by the upper border of the latissimus dorsi muscle, the lateral border of the trapezius muscle, and the medial border of the scapula; its floor is formed by the rhomboid major muscle.
- Is the site at which **breathing sounds** are heard most clearly.

Cubital Fossa

- Is a V-shaped interval on the anterior aspect of the elbow that is bounded laterally by the **brachioradialis** muscle, medially by the **pronator teres** muscle, and superiorly by an imaginary

horizontal line connecting the epicondyles of the humerus with a floor formed by the brachialis and supinator muscles.

- At its lower end, the brachial artery divides into the radial and ulnar arteries, with a fascial roof strengthened by the bicipital aponeurosis.
- Contains (from lateral to medial) the radial nerve, **b**iceps tendon, **b**rachial artery, and **m**edian nerve (mnemonic device: **R**on **B**cats **B**ad **M**an).

Bicipital Aponeurosis

- Originates from the medial border of the biceps tendon, lies on the brachial artery and the median nerve, and blends with the deep fascia of the forearm.

Pronation and Supination

- Occur at the **proximal** and **distal radioulnar joints** and have unequal strengths, with supination being stronger.
- Are movements in which the upper end of the radius nearly rotates within the annular ligament.

II. AXILLA (ARMPIT)

- Is a pyramid-shaped space between the upper thoracic wall and the arm.

A. Boundaries of the Axilla

- Include **medial wall**: upper ribs and their intercostal muscles and serratus anterior muscle; **lateral wall**: Intertubercular groove of the humerus; **posterior wall**: subscapularis, teres major, and latissimus dorsi muscles; **anterior wall**: pectoralis major and pectoralis minor muscles and clavipectoral fascia; **base**: axillary fascia and skin; and **apex**: interval between the clavicle, first rib, and upper border of the scapula.

B. Contents of the Axilla (Figures 2-7 to 2-9)

1. Brachial plexus and its branches (see Figure 2-7).

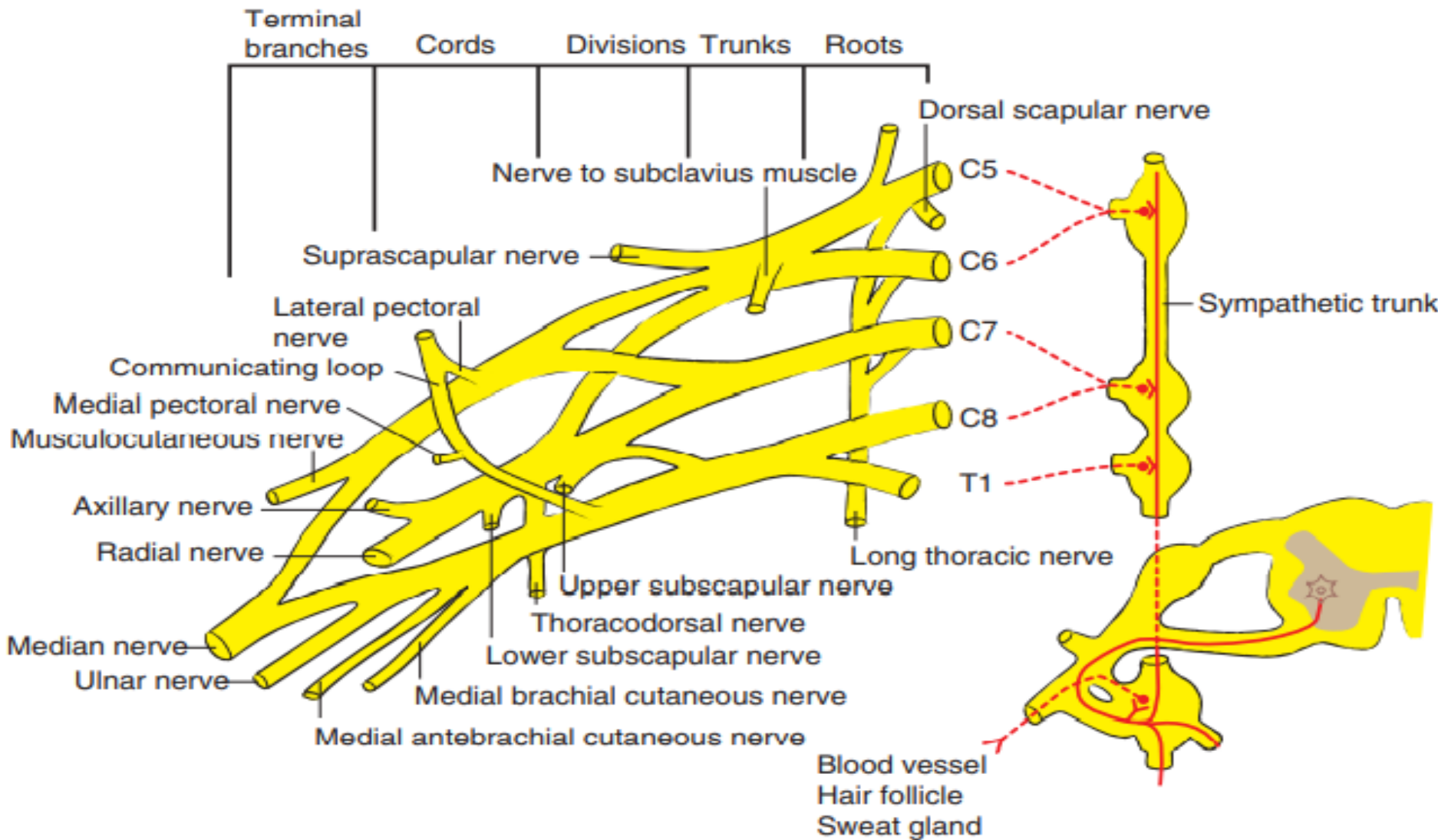


FIGURE 2-7. Brachial plexus.

- 2. Axillary artery** has many branches, including the superior thoracic, thoracoacromial, lateral thoracic, thoracodorsal, and circumflex humeral (anterior and posterior) arteries.
- 3. Axillary vein** is formed by the union of the brachial veins (venae comitantes of the brachial artery) and the basilic vein, receives the cephalic vein and veins that correspond to the branches of the axillary artery, and drains into the subclavian vein.
- 4. Lymph nodes** and areolar tissue are present.
- 5. Axillary tail** (tail of Spence) is a superolateral extension of the mammary gland.

C. Axillary Lymph Nodes (Figure 2-6)

1. Central Nodes

- Lie near the base of the axilla between the lateral thoracic and subscapular veins; they drain into the apical nodes.

2. Brachial (Lateral) Nodes



3. Subscapular (Posterior) Nodes

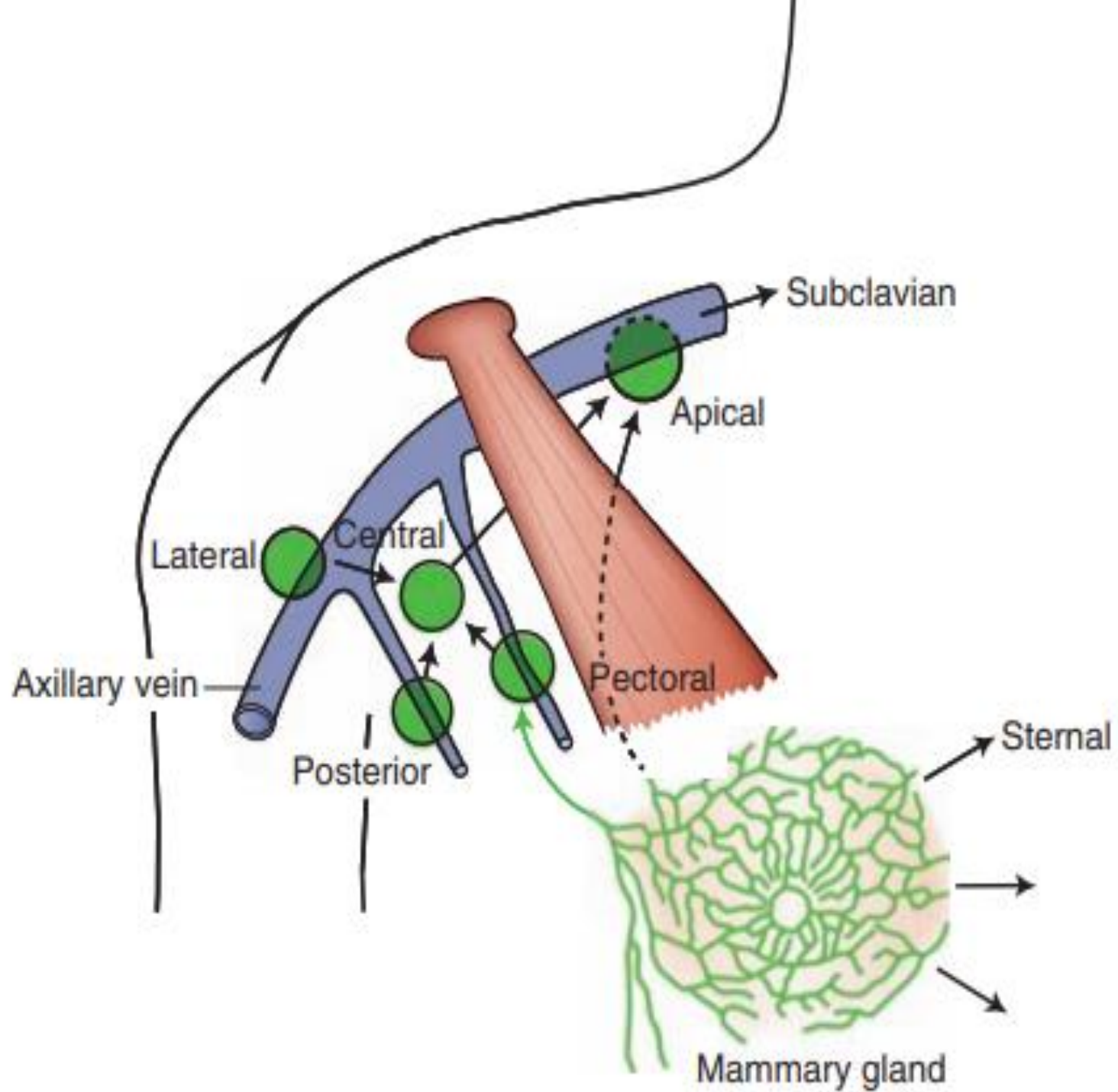
- Lie along the subscapular vein, receiving lymph from the posterior thoracic wall and the scapular region.

4. Pectoral (Anterior) Nodes

- Lie along the inferolateral border of the pectoralis minor muscle, receiving lymph from the anterior thoracic wall and the breast.

5. Apical (Medial or Subclavicular) Nodes

- Lie at the apex of the axilla medial to the axillary vein and above the upper border of the pectoralis minor muscle; they receive lymph from the breast, and drain into the subclavian trunk.



The end

