Clinical Anatomy of the Breast

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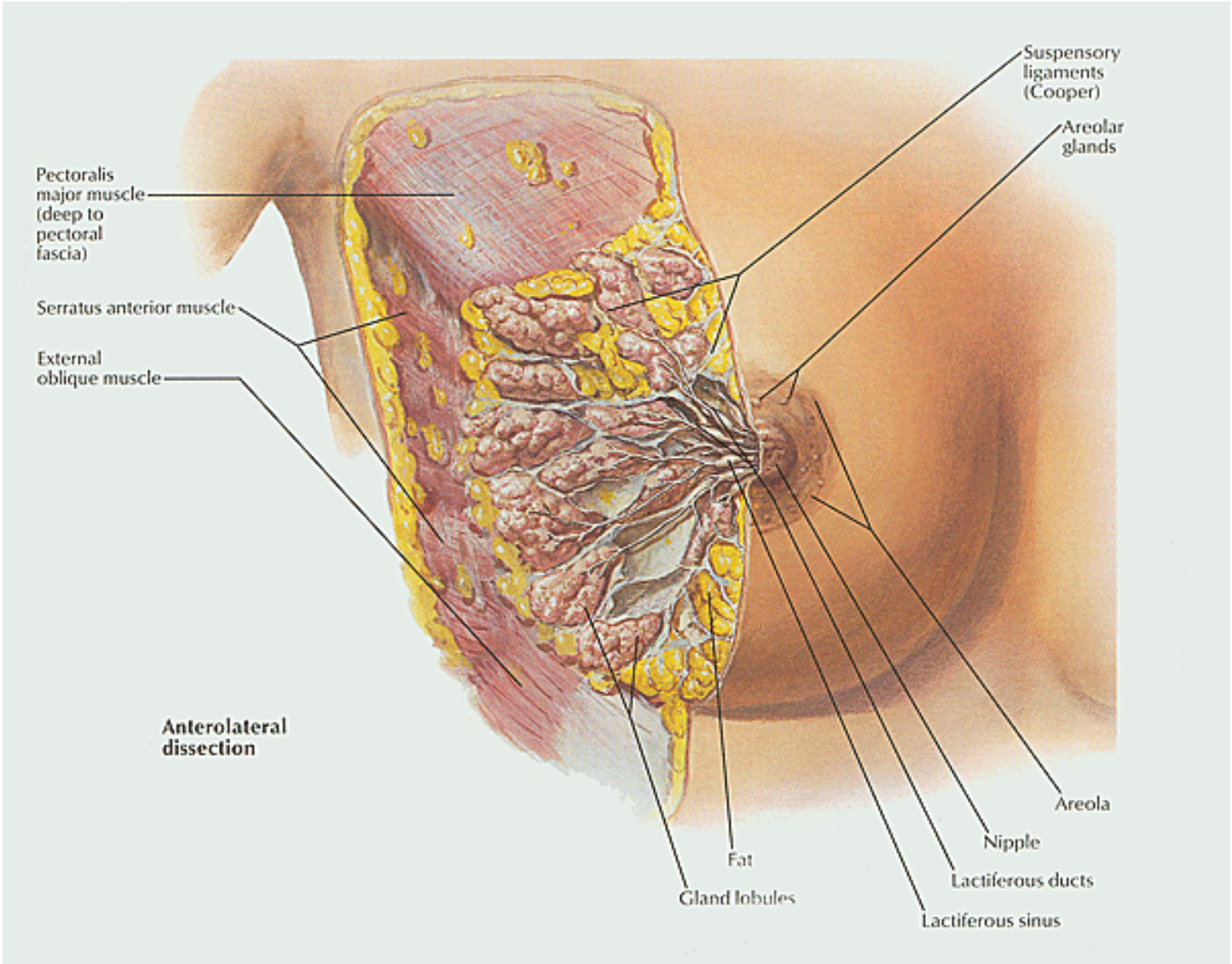
Introduction to the Breast

- Breasts (mammary glands) = modified sweat glands
- Lie in supf. fascia ant. to deep fascia of pec. major
- Btwn. glands & deep fascia is retromammary space
- (i.e., loose CT plane allowing free movement)
- Thus, glands NOT firmly attached to deep fascia

Suspensory (Cooper's) Ligaments

- Glands ARE firmly attached to skin via CT
- Fibrous septa anchor deep layer of skin to deep fascia
- These CT septa are called suspensory ligs.

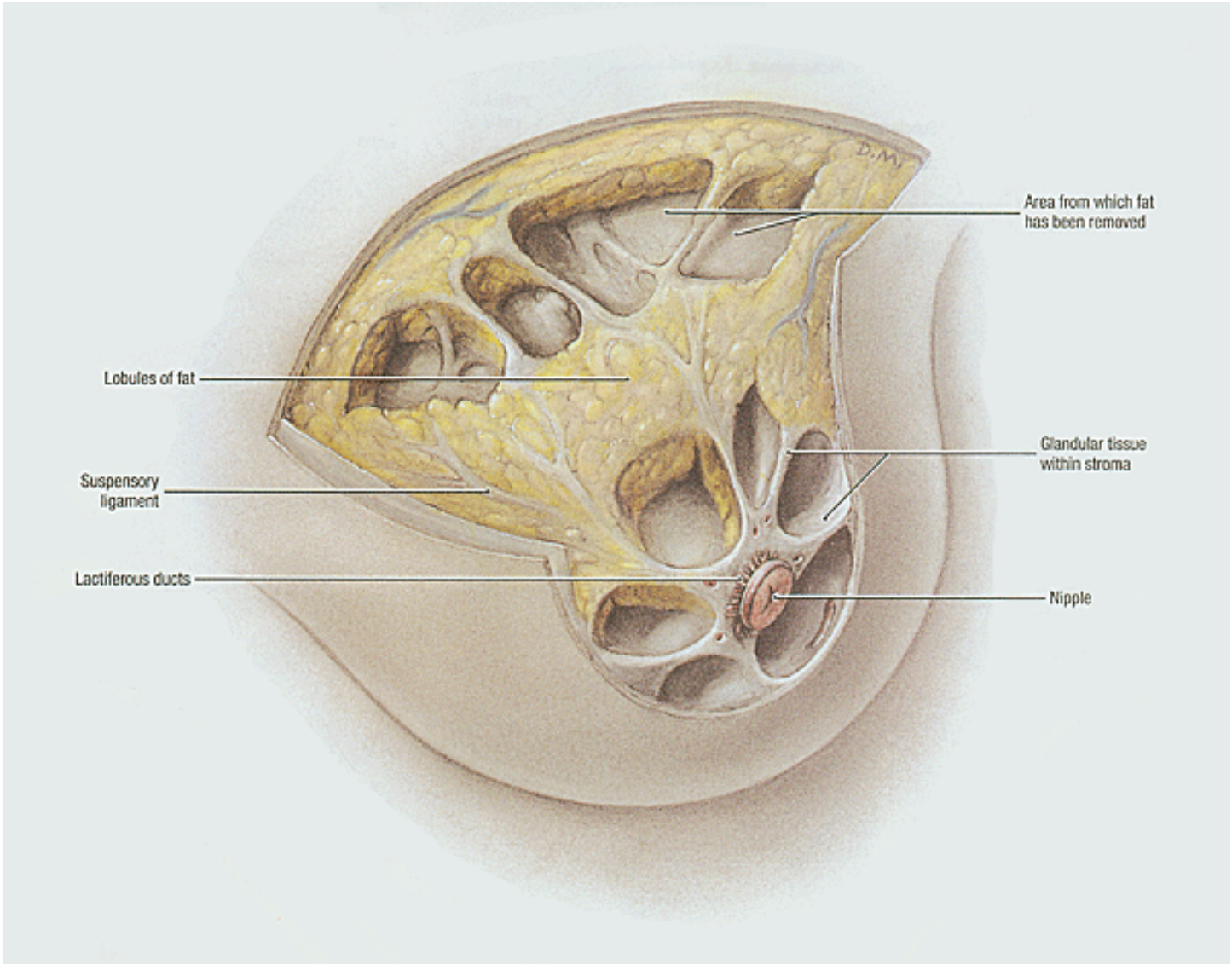
Pec. Fascia & Susp. Ligs.



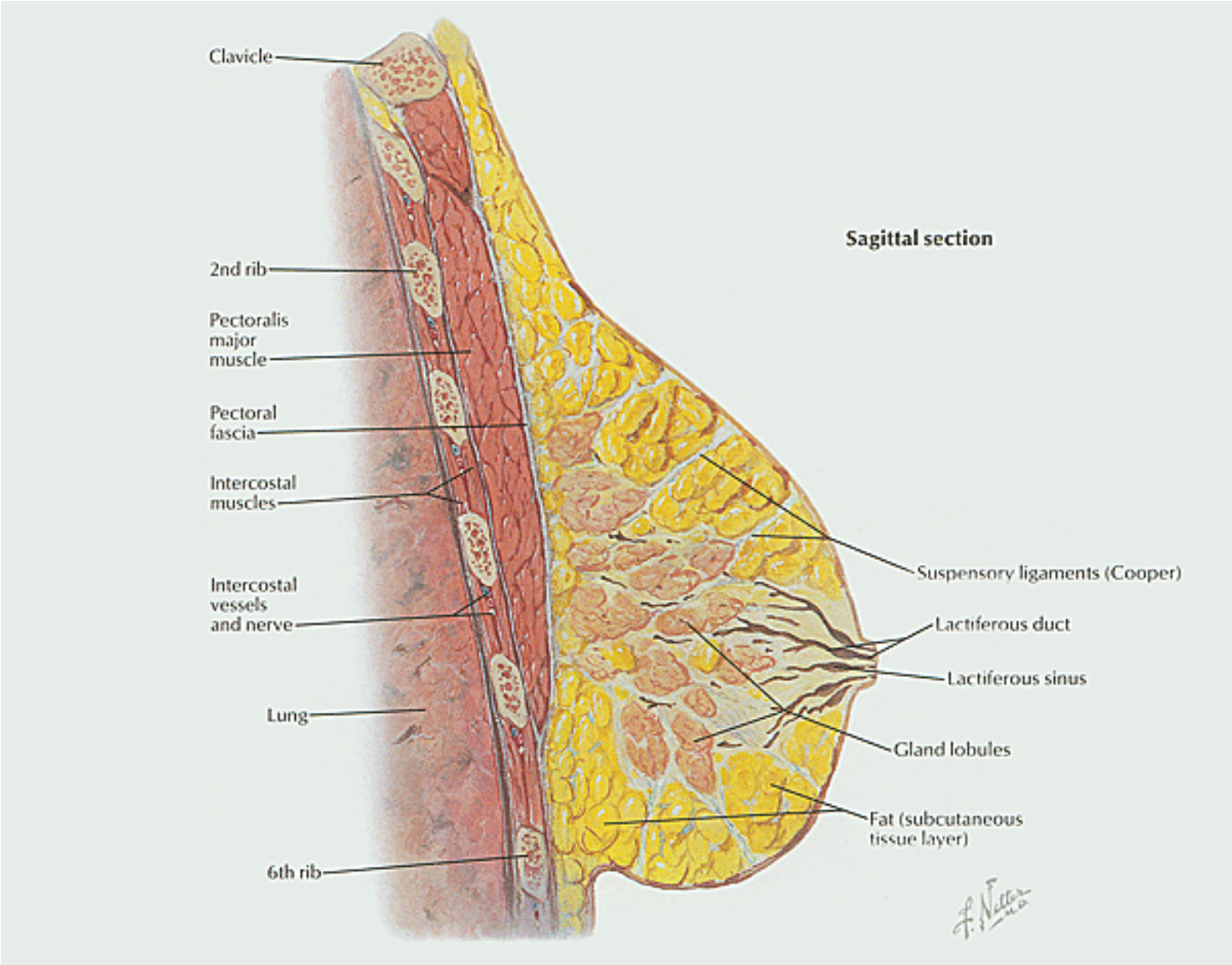
Structure of the Breast

- Compartmentalized fat bounded by CT septa
- Glandular lobules drained by 15-20 lactiferous ducts
- Lactiferous ducts converge & open onto nipple
- Areola surrounds nipple & conceals sebaceous glands
- (i.e., produce lubrication for nipple)

Compartmentalization



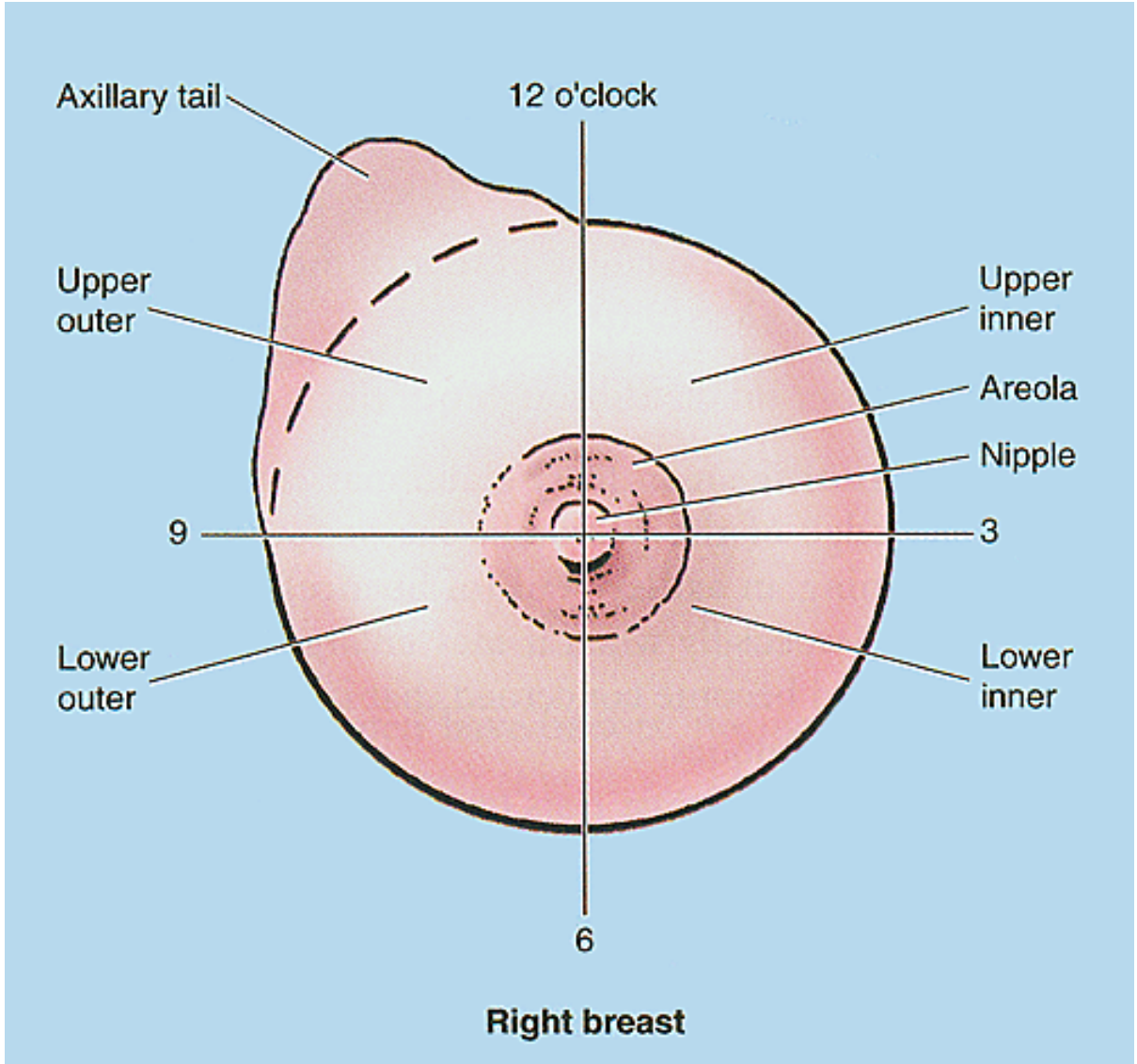
Gland Lobules & Lac. Ducts



Four Quadrants of the Breast

- Upper outer (superolateral) quadrant
- Upper inner (superomedial) quadrant
- Lower outer (inferolateral) quadrant
- Lower inner (inferomedial) quadrant

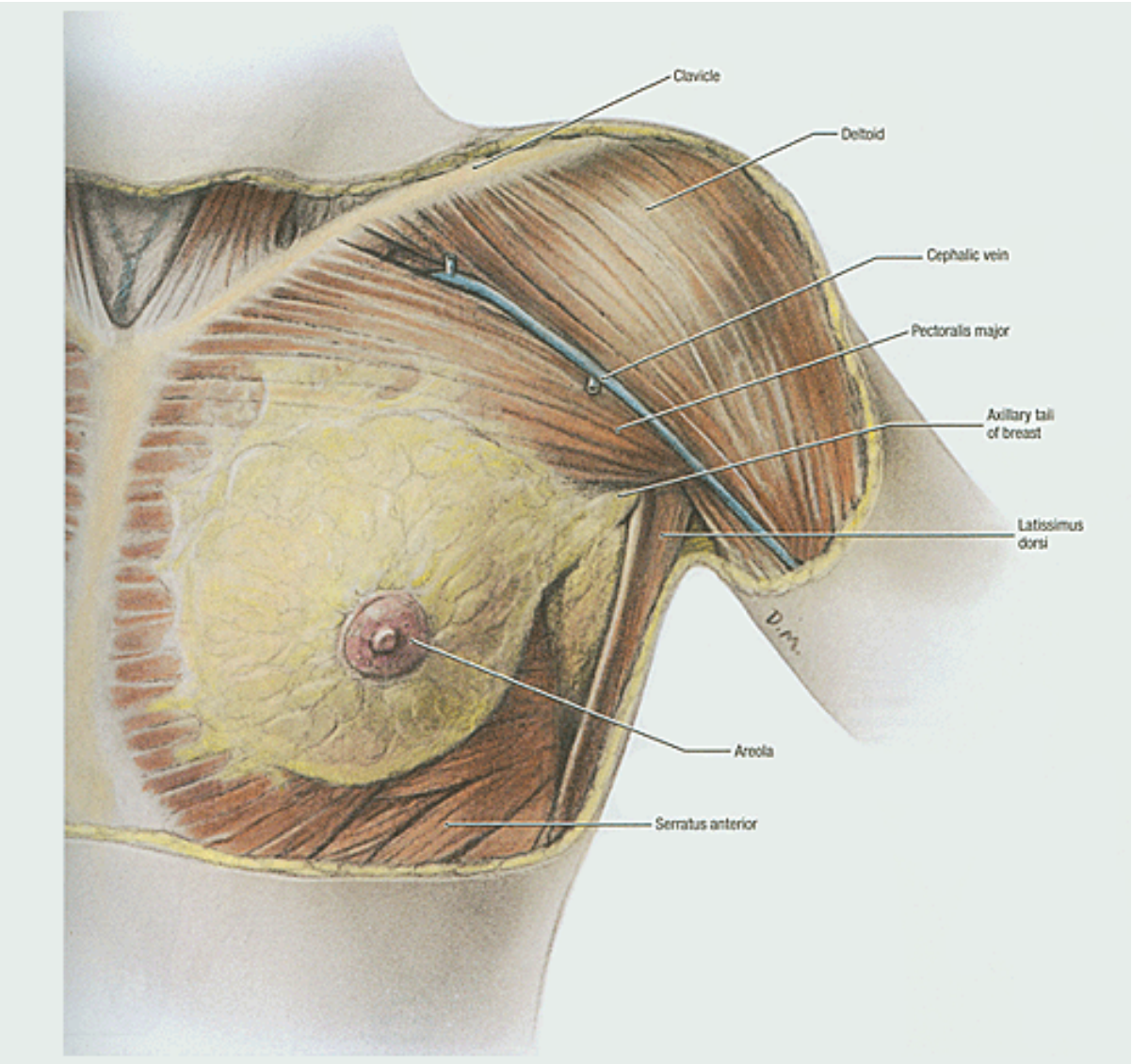
4 Quadrants of the Breast



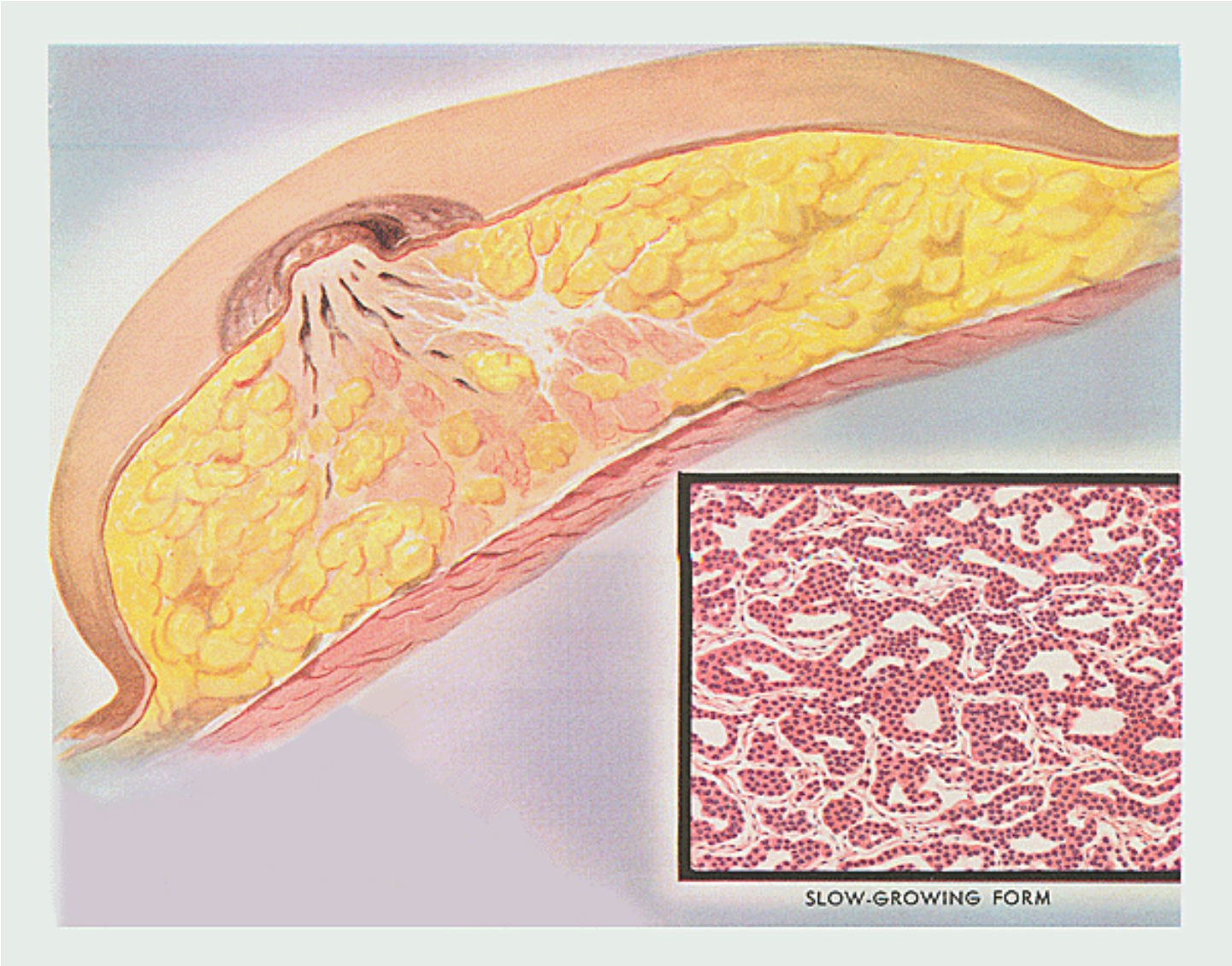
Clinical Notes on Breast Cancer

- Majority of cancers develop in upper outer quadrant
- Large amount of glandular tissue here
- An axillary tail of breast tissue often extends into axilla

Axillary Tail of the Breast



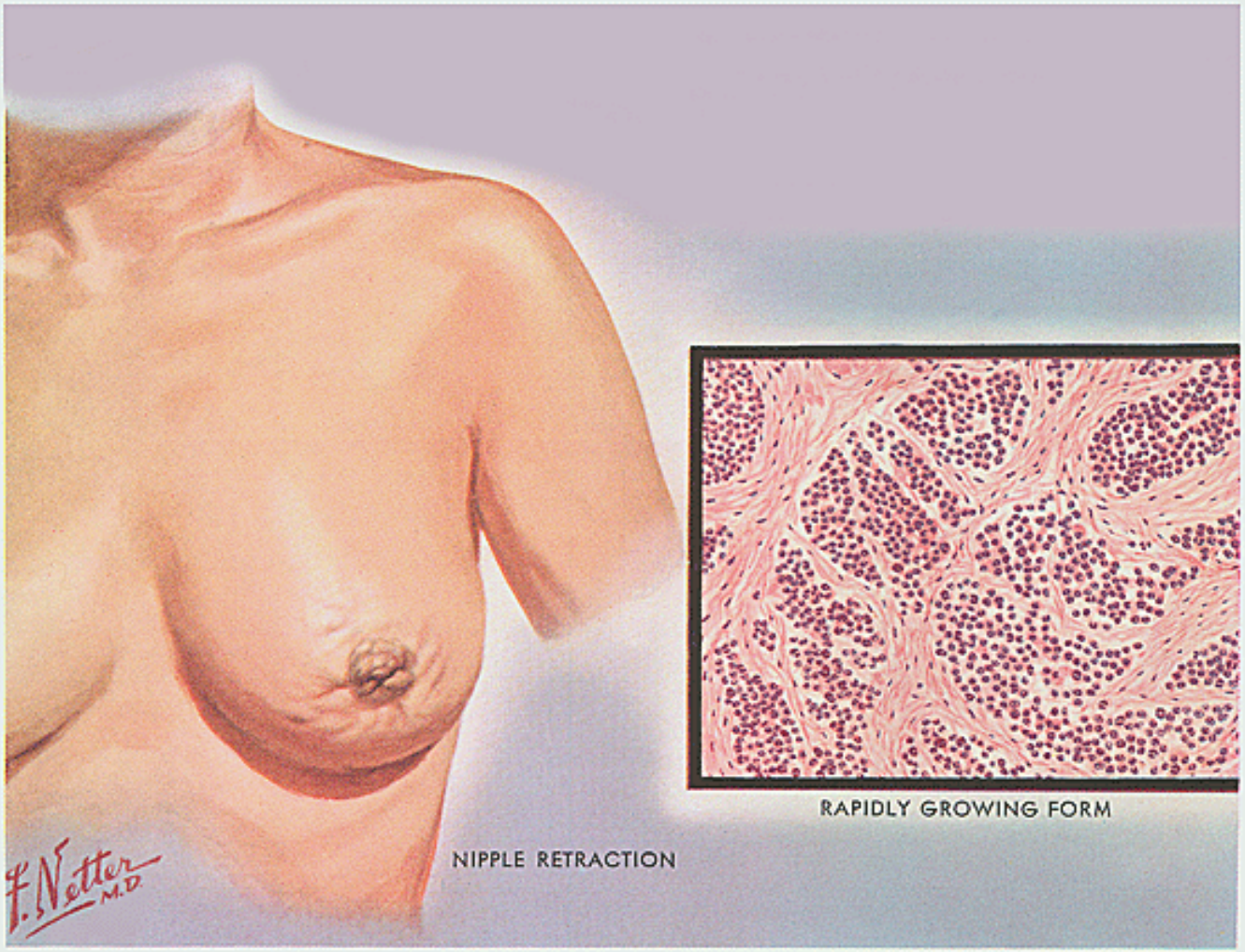
Early Breast Carcinoma



Advanced Breast Cancer

- Tumors may grow thru retromammary space
- Subsequently invade deep fascia & pec. major m.
- Leads to fixation of malignant breast lesion to chest wall
- Shortens suspensory (Cooper's) ligs.
- Leads to irregular dimpling of skin or retraction of nipple

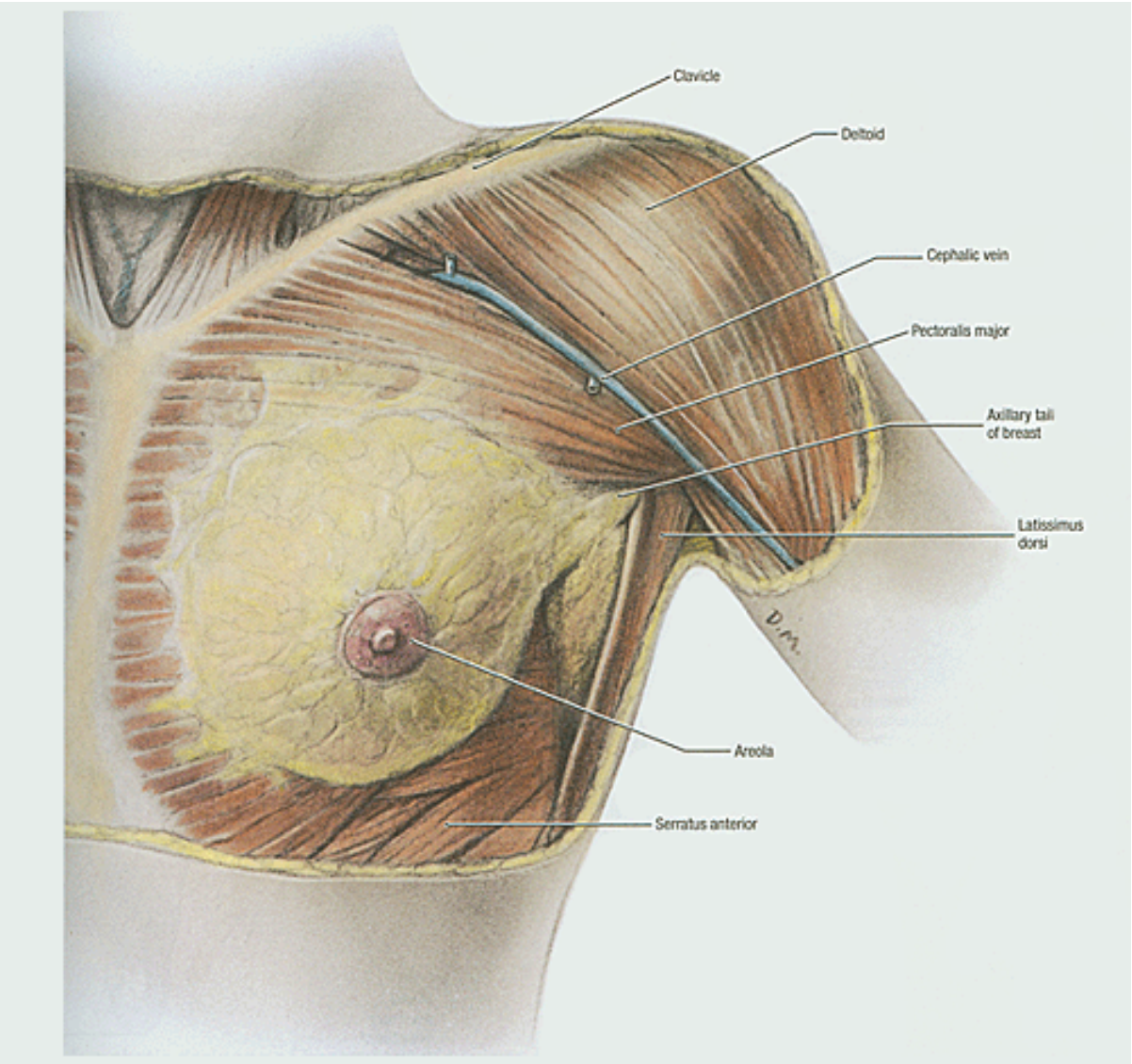
Advanced Carcinoma



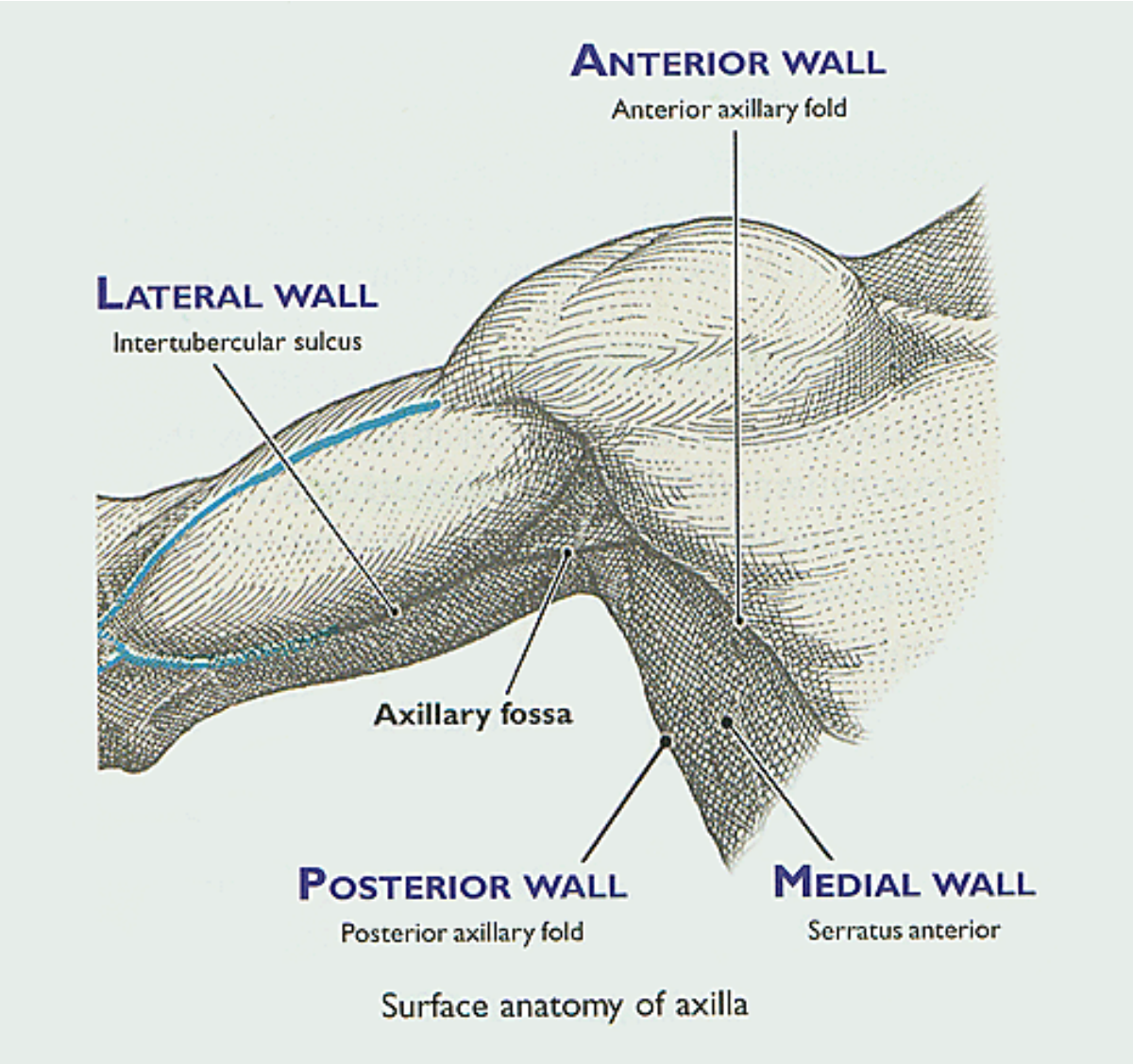
Four Boundaries for a Mastectomy

- Clavicle – superior boundary
- Inframammary fold (above rectus sheath) – inferior boundary
- Sternum (midline) – medial boundary
- Latissimus dorsi (ant. border) – lateral boundary

Mastectomy Boundaries



The Axilla

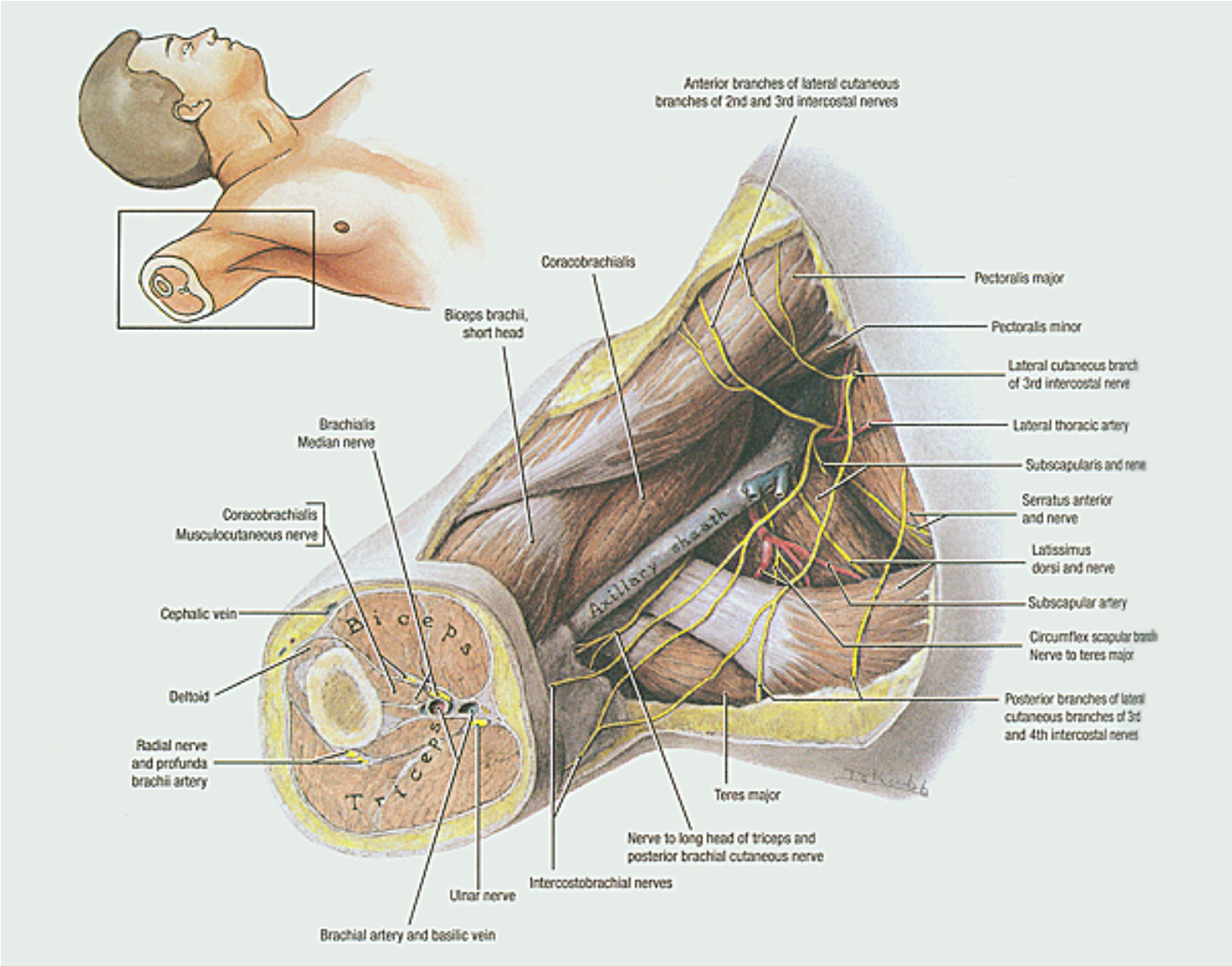


Surface anatomy of axilla

Contents of the Axilla

- Axillary sheath (axillary a. & brachial plexus)
- Axillary v. & lymphatics (outside sheath)
- Fat & connective tissue
- Cutaneous nerves

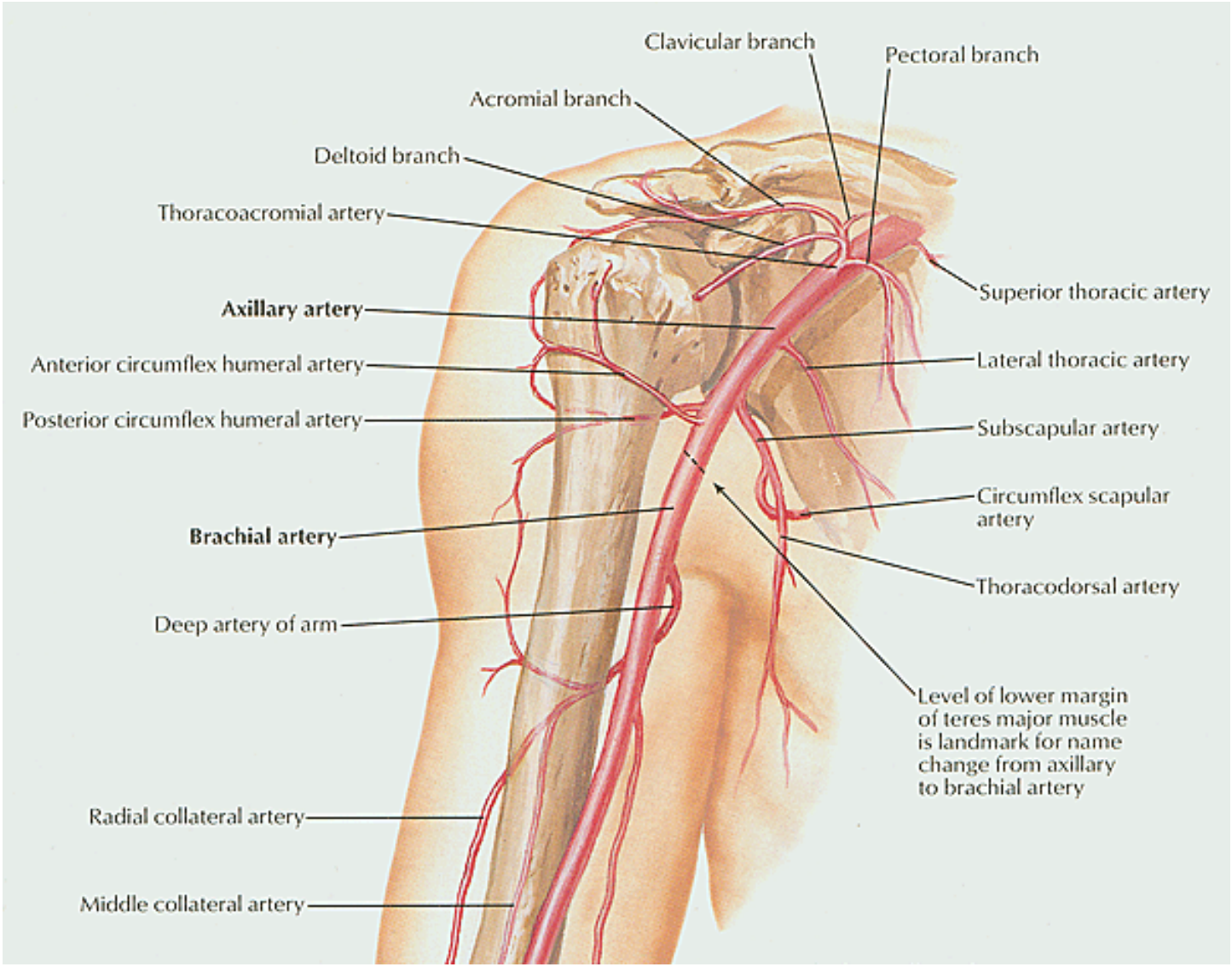
Contents of the Axilla



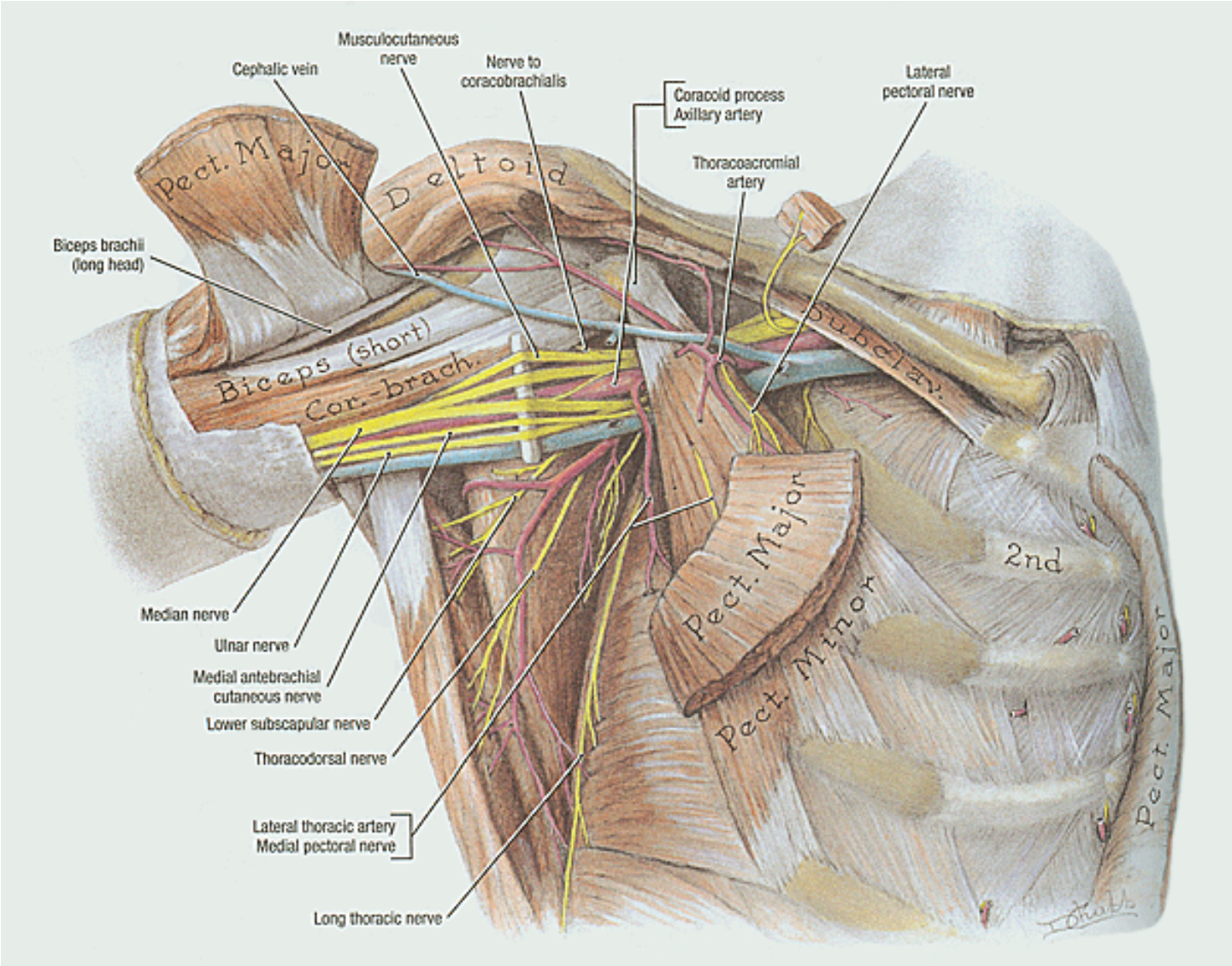
The Axillary Artery

- Arises from subclavian a. at lat. border of 1st rib
- Becomes brachial a. at infr. border of teres major
- Surrounded by cords & brs. of brachial plexus
- Can be divided into 3 parts relative to pec. minor

Axillary Artery (Exposed)



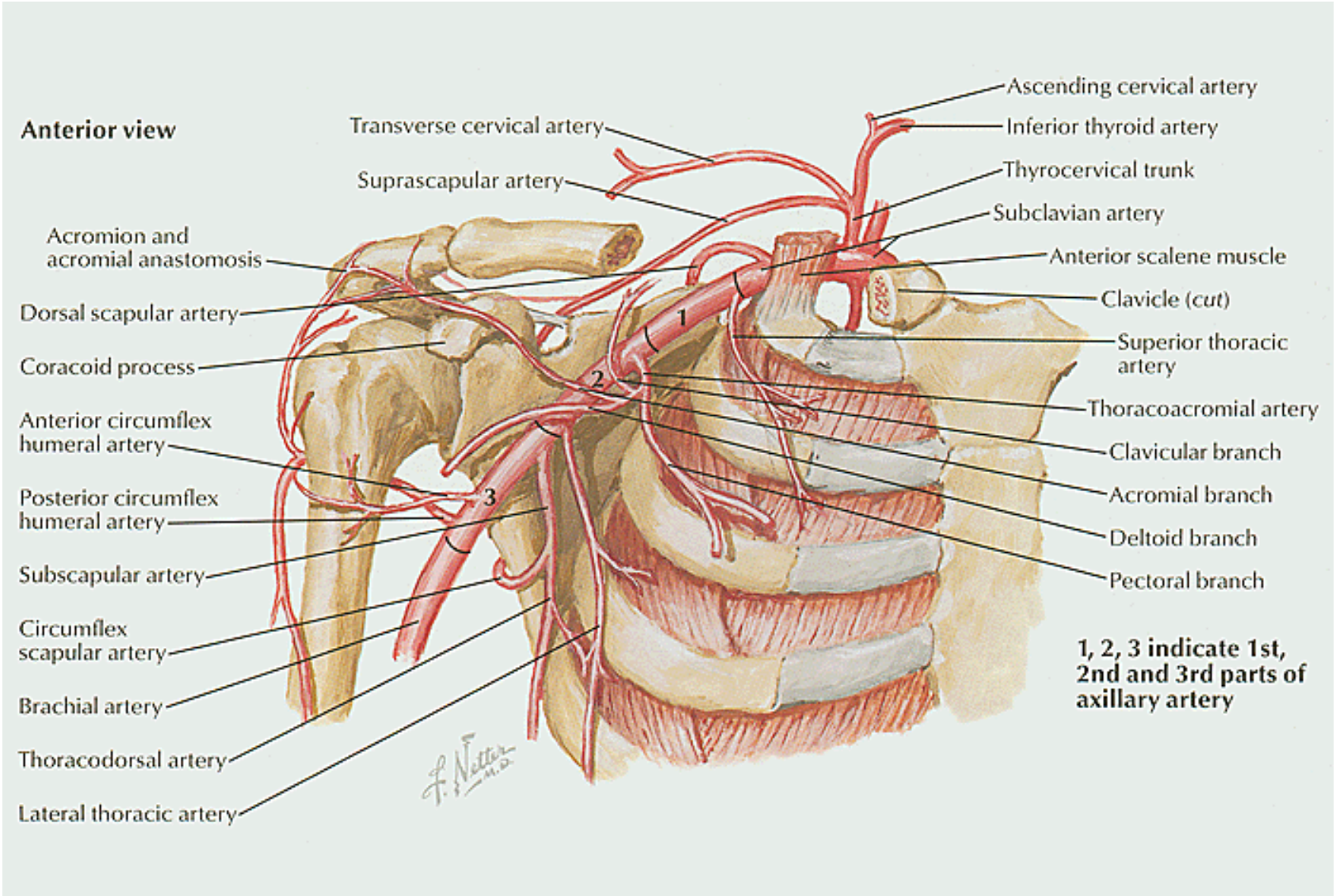
Axillary Artery (Concealed)



3 Parts of the Axillary Artery

- Part 1 – btwn. 1st rib & pec. minor
- (i.e., gives off supr. thoracic a.)
- Part 2 – deep to pec. minor
- (i.e., gives off thoracoacromial & lat. thoracic aa.)
- Part 3 – btwn. pec. minor & teres major
- (i.e., gives off subscapular, ant. & post. circ. humeral aa.)

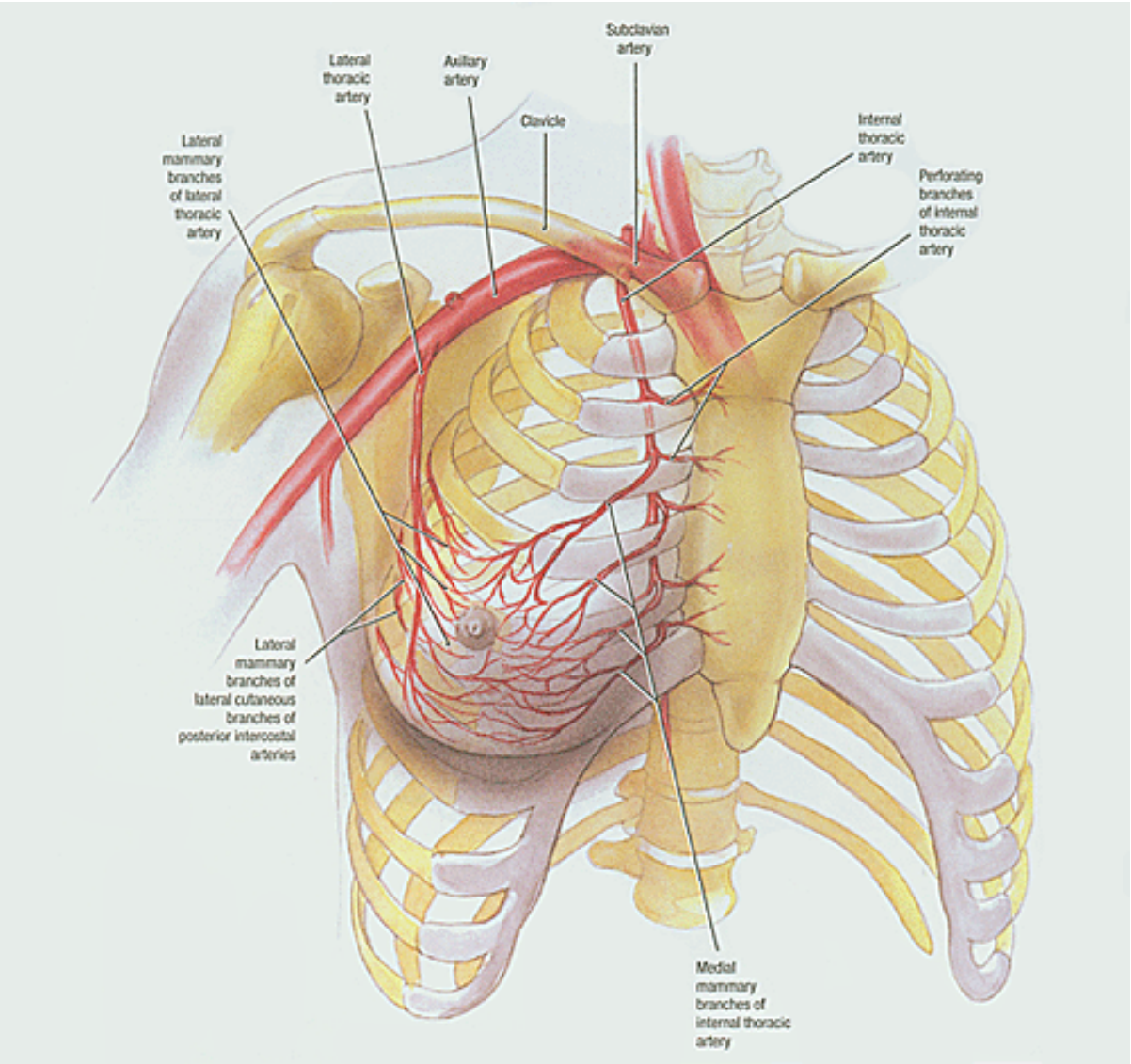
3 Parts of the Axillary A.



Vessels of the Breast

- Enter from supr./med. & supr./lat. aspects
- Penetrate deep surface of breast
- Exhibit extensive brs. & anastomoses

Anastomoses of the Breast



Arterial Supply of the Breast

- Lateral (mammary) thoracic a.
- Internal (mammary) thoracic a.
- Intercostal aa.
- Thoracoacromial a.

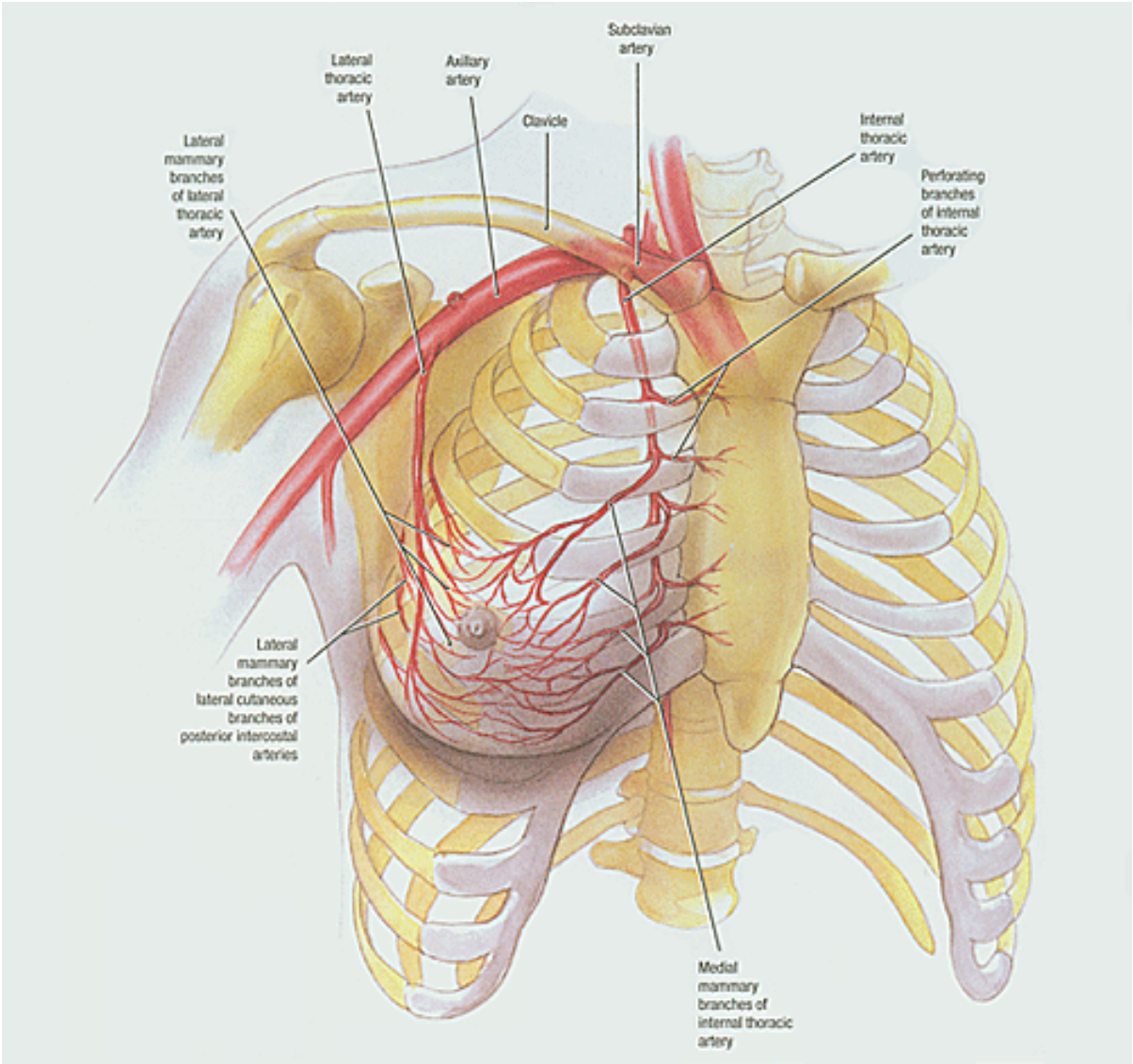
Lateral (Mammary) Thoracic Artery

- Branch of axillary a. (under pec. minor)
- Located along lat. aspect of thorax
- Supplies lat. thorax & lat. mammary gland
- Specific blood supply from lat. mammary brs.
- Runs with lat. thoracic v. & long thoracic n.
- Vein is a tributary to axillary v.

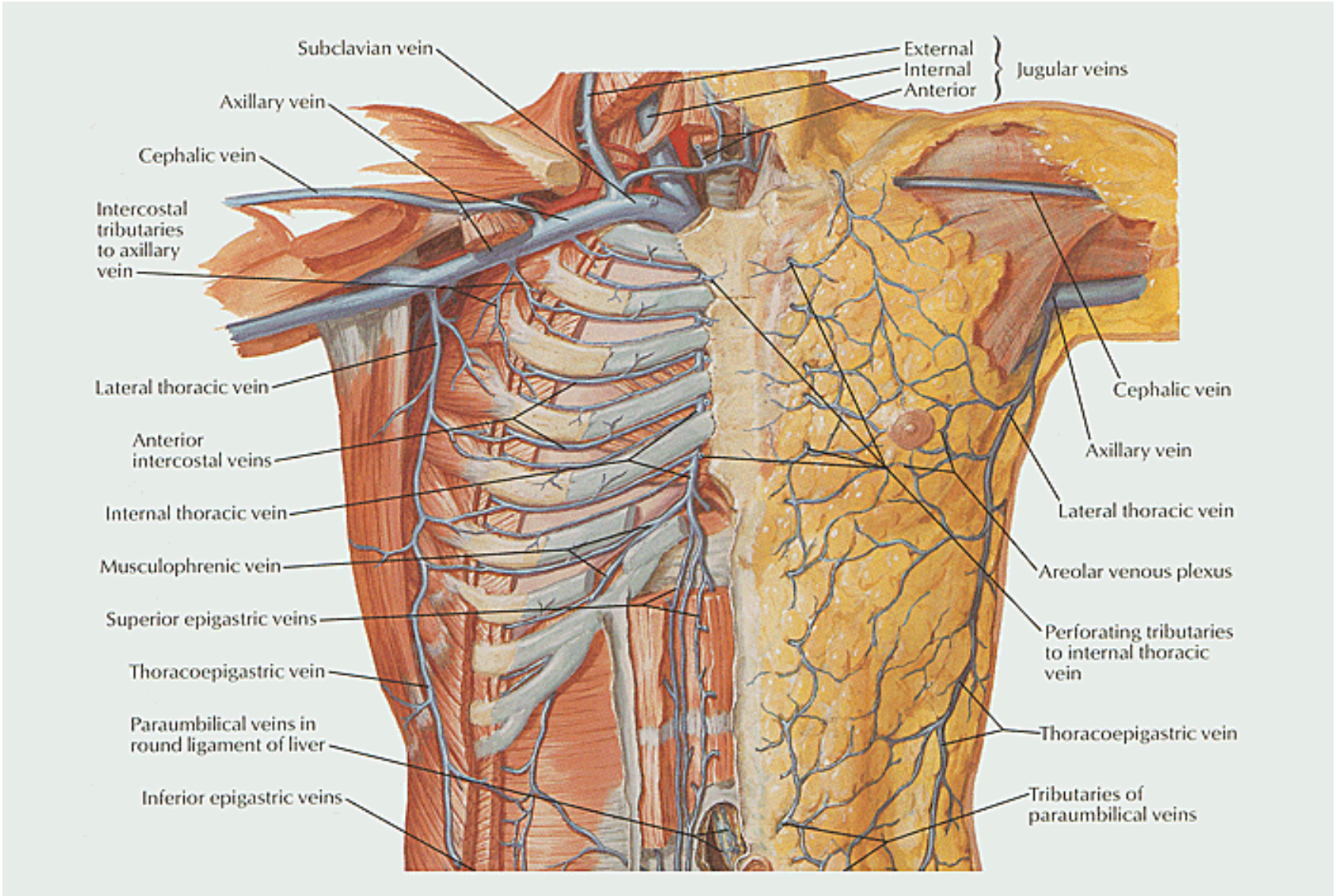
Internal (Mammary) Thoracic Artery

- Branch of subclavian a.
- Located inside thorax just lat. to sternum
- Descends vertically across intercostal spaces
- Supplies ant. thorax & med. mammary gland
- Specific blood supply from med. mammary brs.
- Runs with int. thoracic v.
- Vein is a tributary to brachiocephalic v.

Lateral & Internal Thoracic Aa.



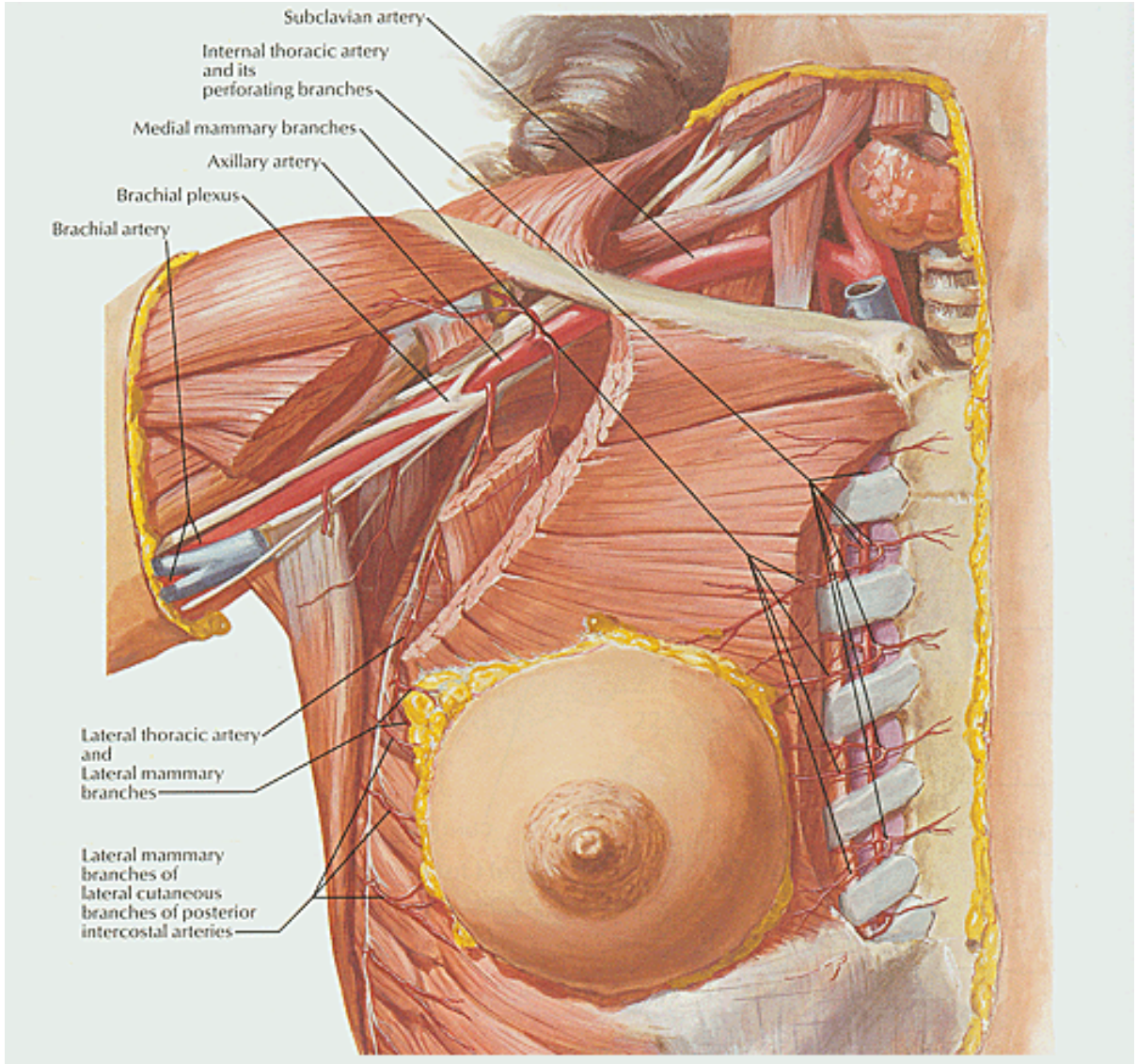
Lateral & Internal Thoracic Vv.



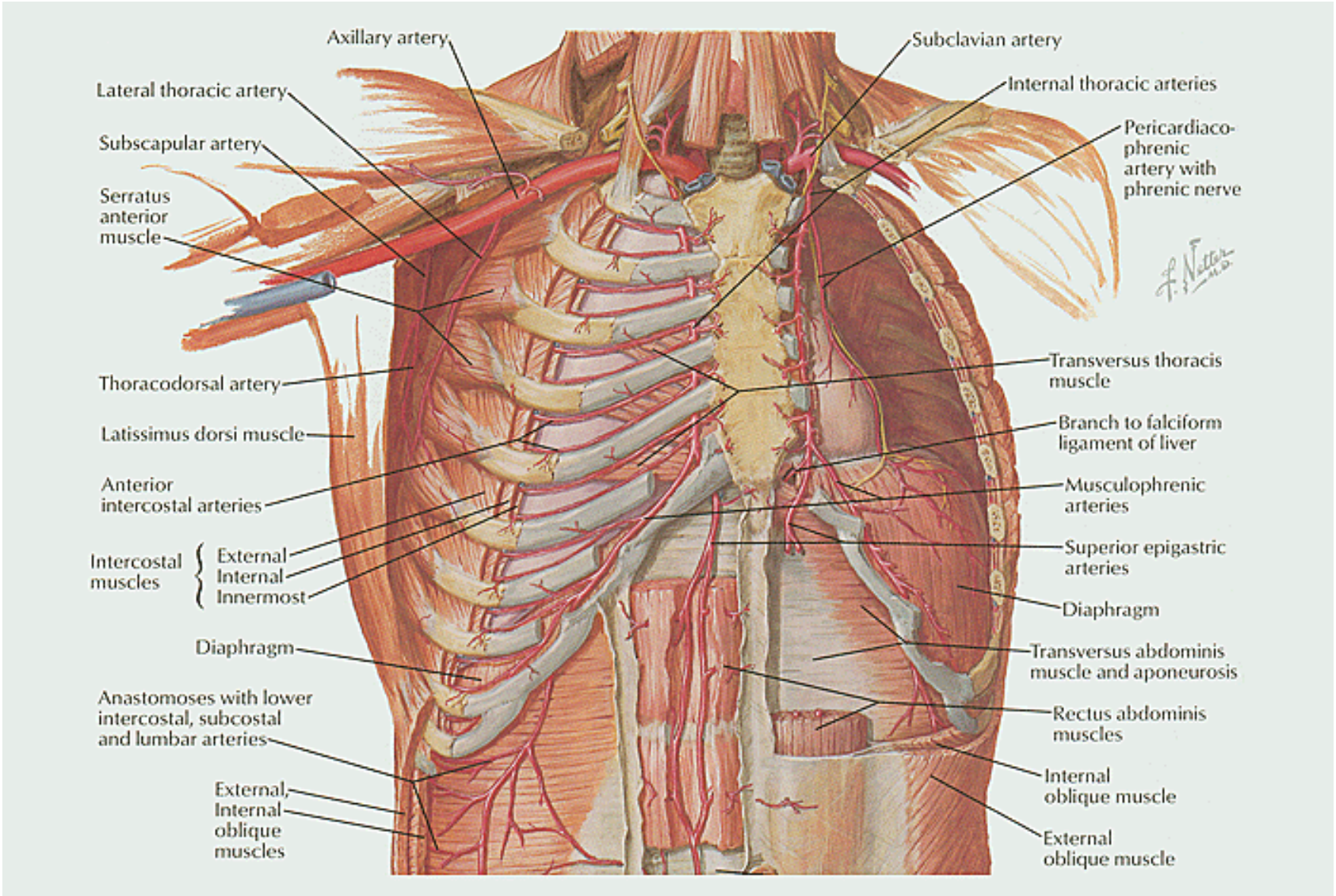
Intercostal Arteries

- Brs. of aorta or int. (mammary) thoracic aa.
- Located in intercostal spaces (btwn. ribs)
- Supply ant., post. & lat. thorax & breast
- Specific blood supply is from lat. mammary brs.
- (i.e., lat. cutaneous brs. of post. intercostal aa.)
- Run with intercostal vv. & nn.
- Veins are tributaries to azygos v. or int. thoracic v.

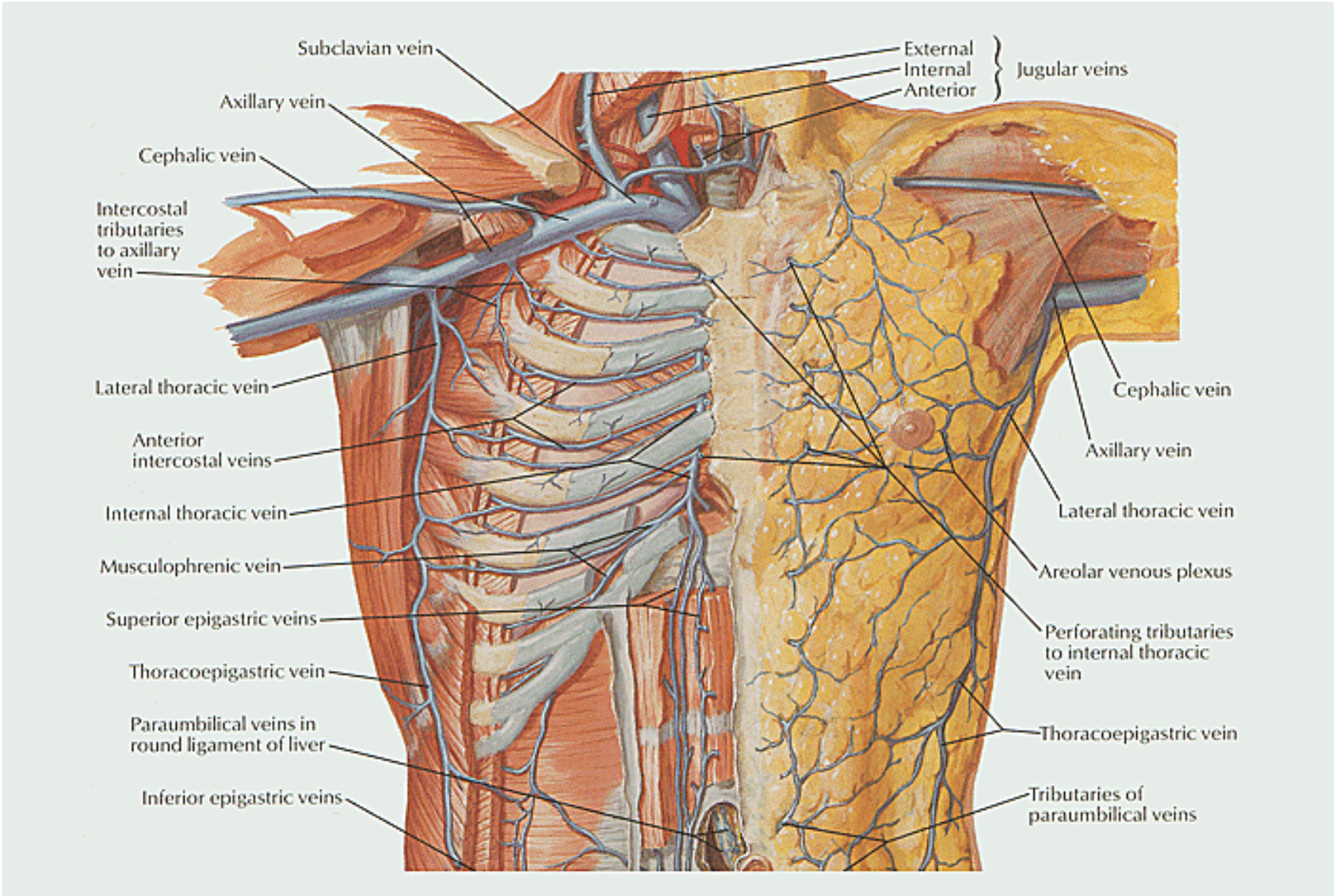
Lateral Mammary Brs.



Intercostal Arteries



Intercostal Veins



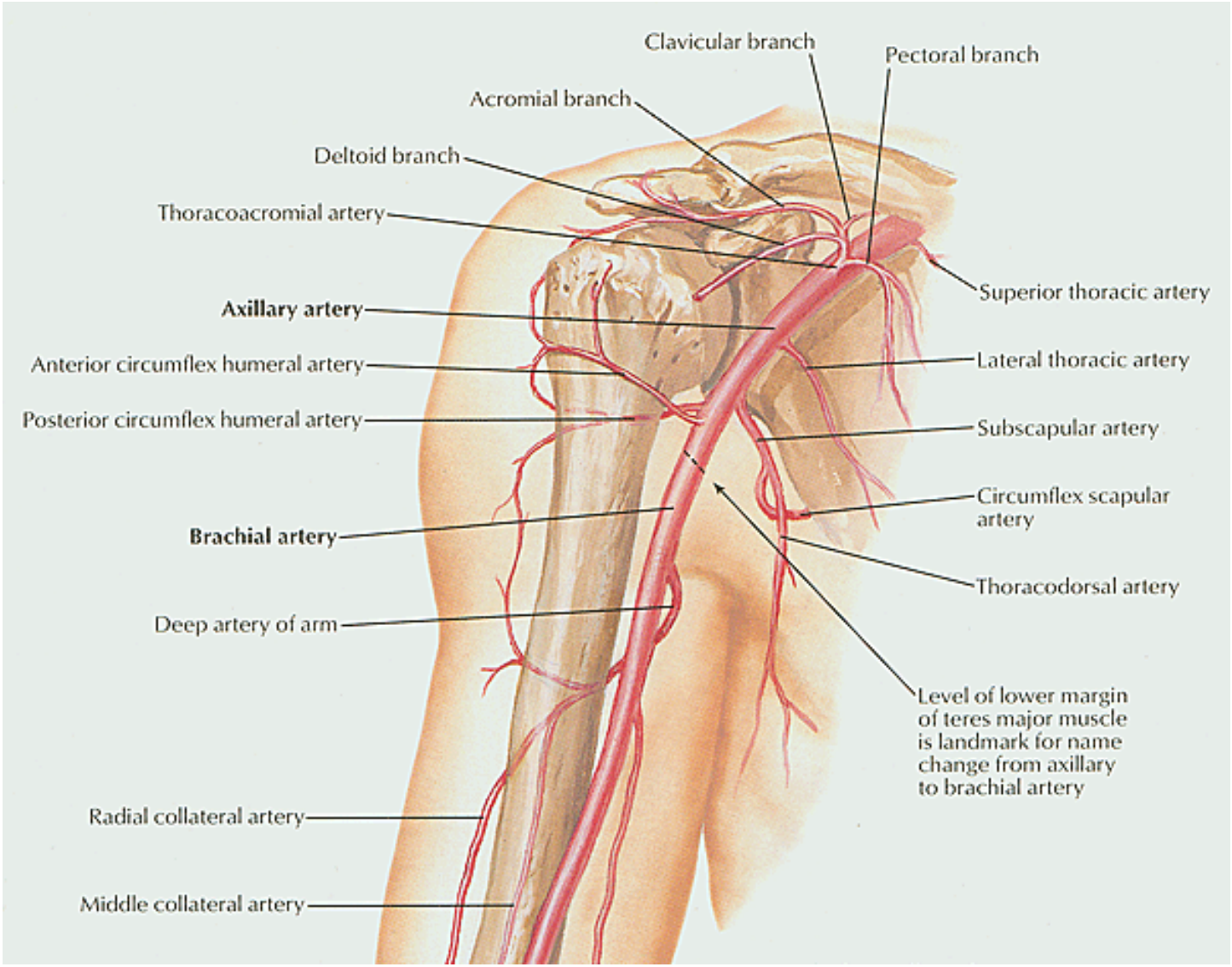
Thoracoacromial Artery

- Branch of axillary a. (under pec. minor)
- Located in ant. shoulder region
- Sends off 4 subsequent brs.
- Not generally major source of blood supply to breast

Four Branches of the Thoracoacromial Artery

- Pectoral br. – supplies pectoral region & upper breast
- Clavicular br. – supplies clavicle region
- Acromial br. – supplies upper shoulder region
- Deltoid br. – supplies lower shoulder region
- All accompanying vv. are tributaries to axillary v.

Thoracoacromial Artery



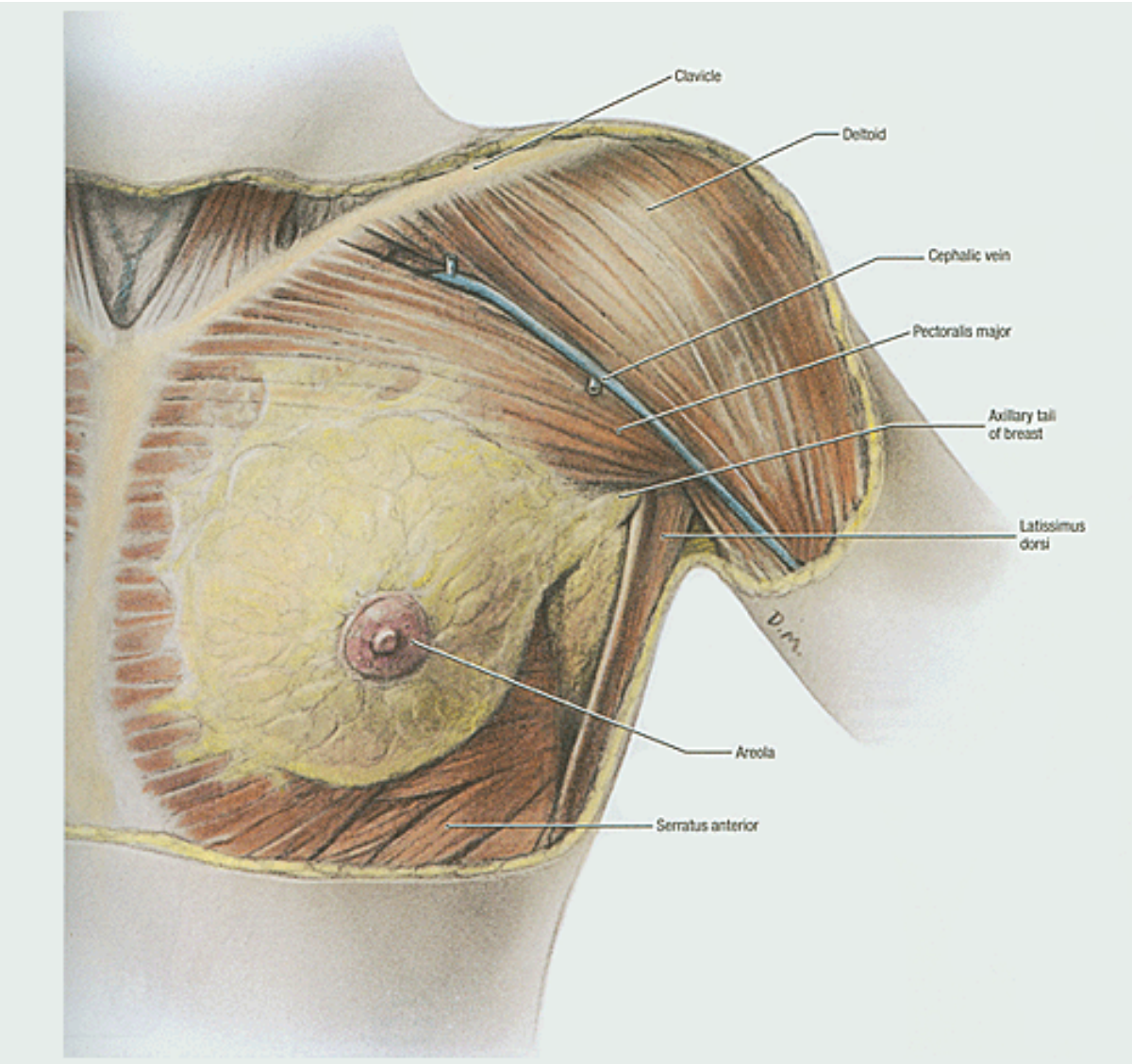
Additional Venous Drainage of the Breast

- Cephalic v.

Cephalic Vein

- Tributary to axillary v.
- Only major supf. v. in vicinity of breast
- Primarily drains UL into deltopectoral triangle
- Some supf. venous drainage of breast

Cephalic Vein



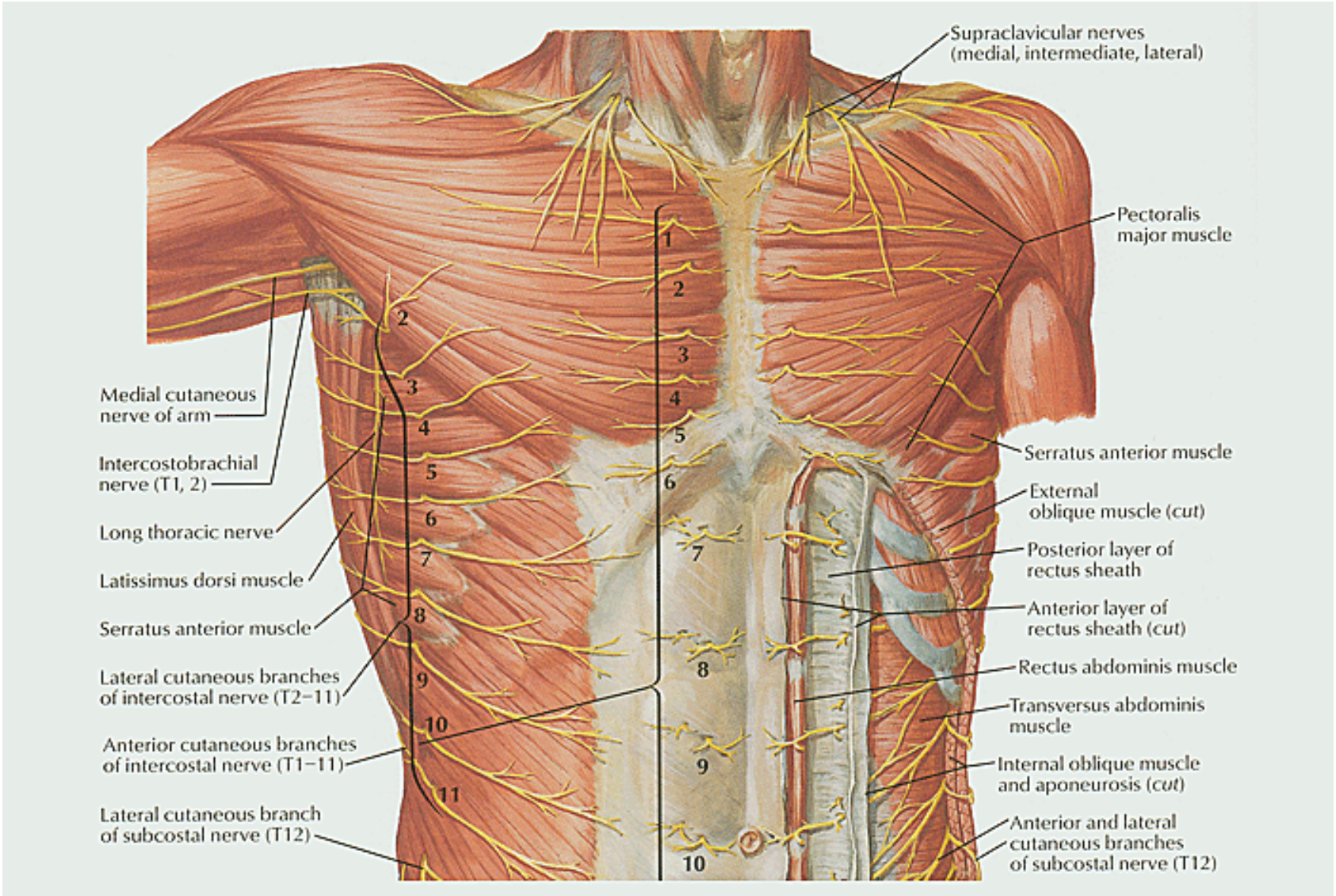
Nerves of the Breast

- Cutaneous innervation
- Medial pectoral n.
- Lateral pectoral n.
- Long thoracic n.

Cutaneous Innervation

- Via general sensory brs. of T1-T6
- (i.e., lat. & ant. cutaneous brs. of intercostal nn.)
- Note: T2 is of specific clinical significance

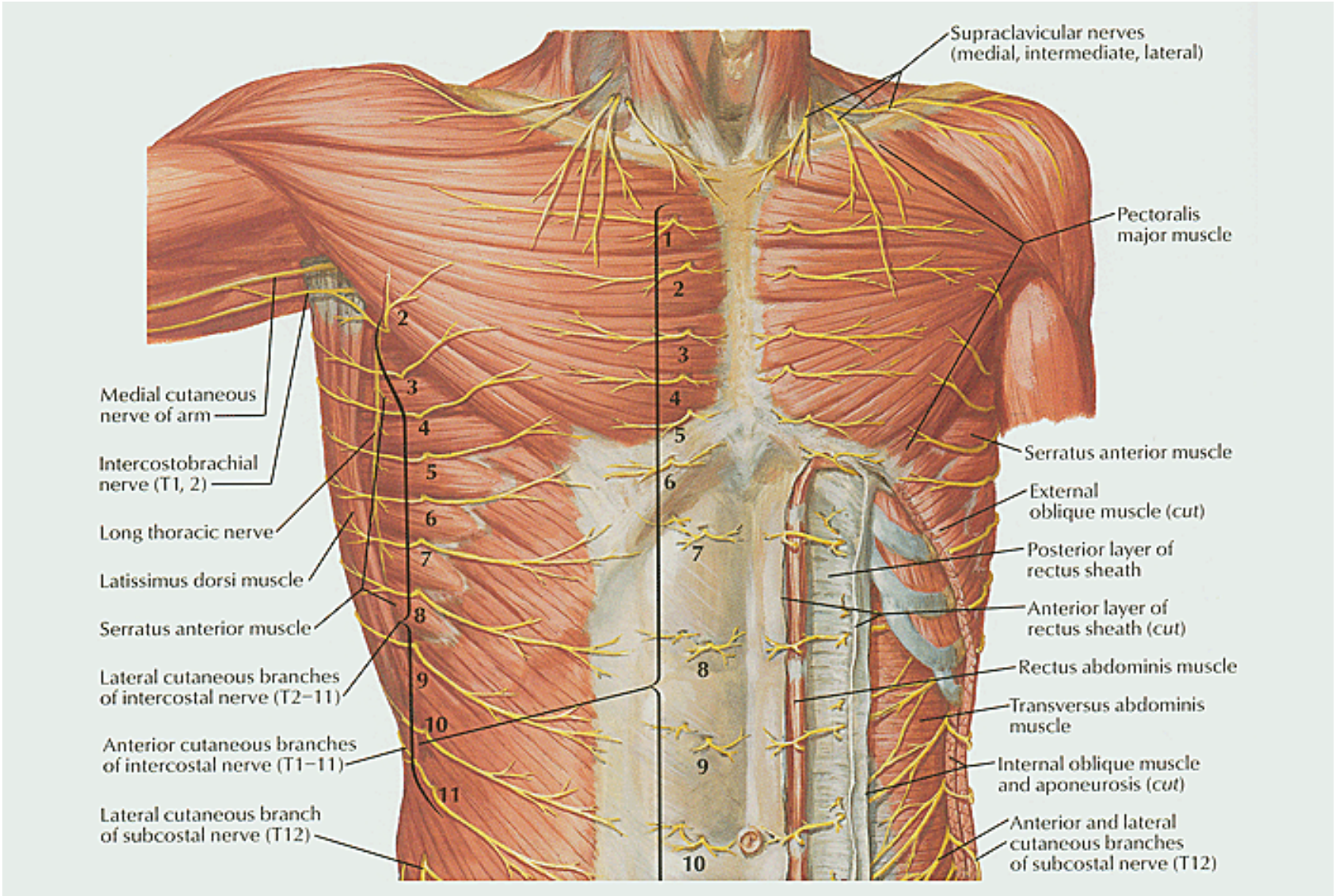
Cutaneous Innervation



Intercostobrachial Nerve

- Lat. cutaneous branch of T2
- Emerges from 2nd intercostal space
- Supplies skin on med. & post. arm
- Assoc. with referred pain from angina or heart attacks
- Heart symp. nn. carry afferents back to upper thoracic cord
- Visceral heart pain referred to somatic thoracic nn.

Intercostobrachial Nerve



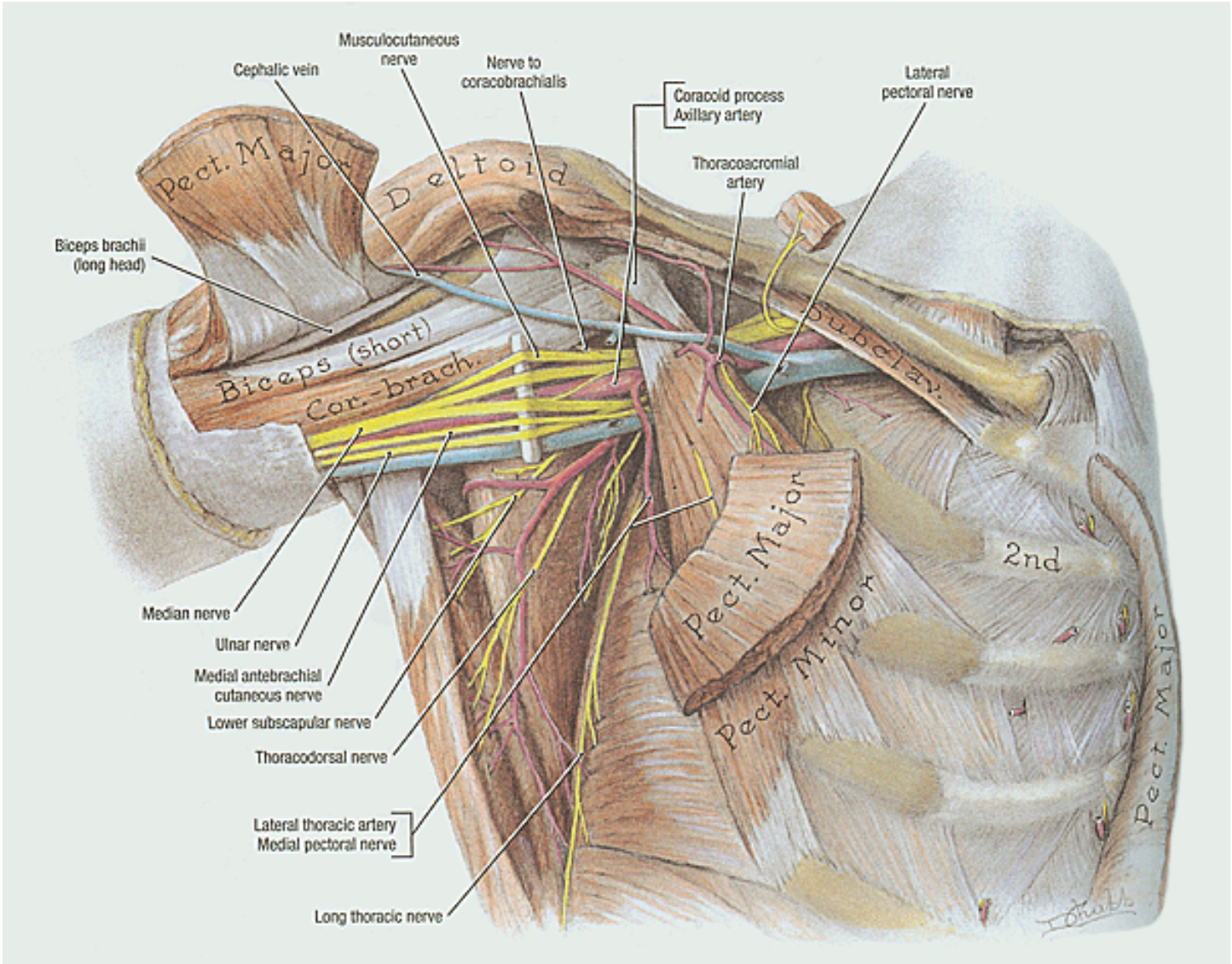
Medial Pectoral Nerve

- Branch of med. cord of brachial plexus
- Derived from ventral rami of C8-T1
- Pierces pec. minor to enter pec. major
- Supplies pec. minor & part of pec. major

Lateral Pectoral Nerve

- Branch of lat. cord of brachial plexus
- Derived from ventral rami of C5-C7
- Runs above pec. minor to enter pec. major
- Supplies remainder of pec. major

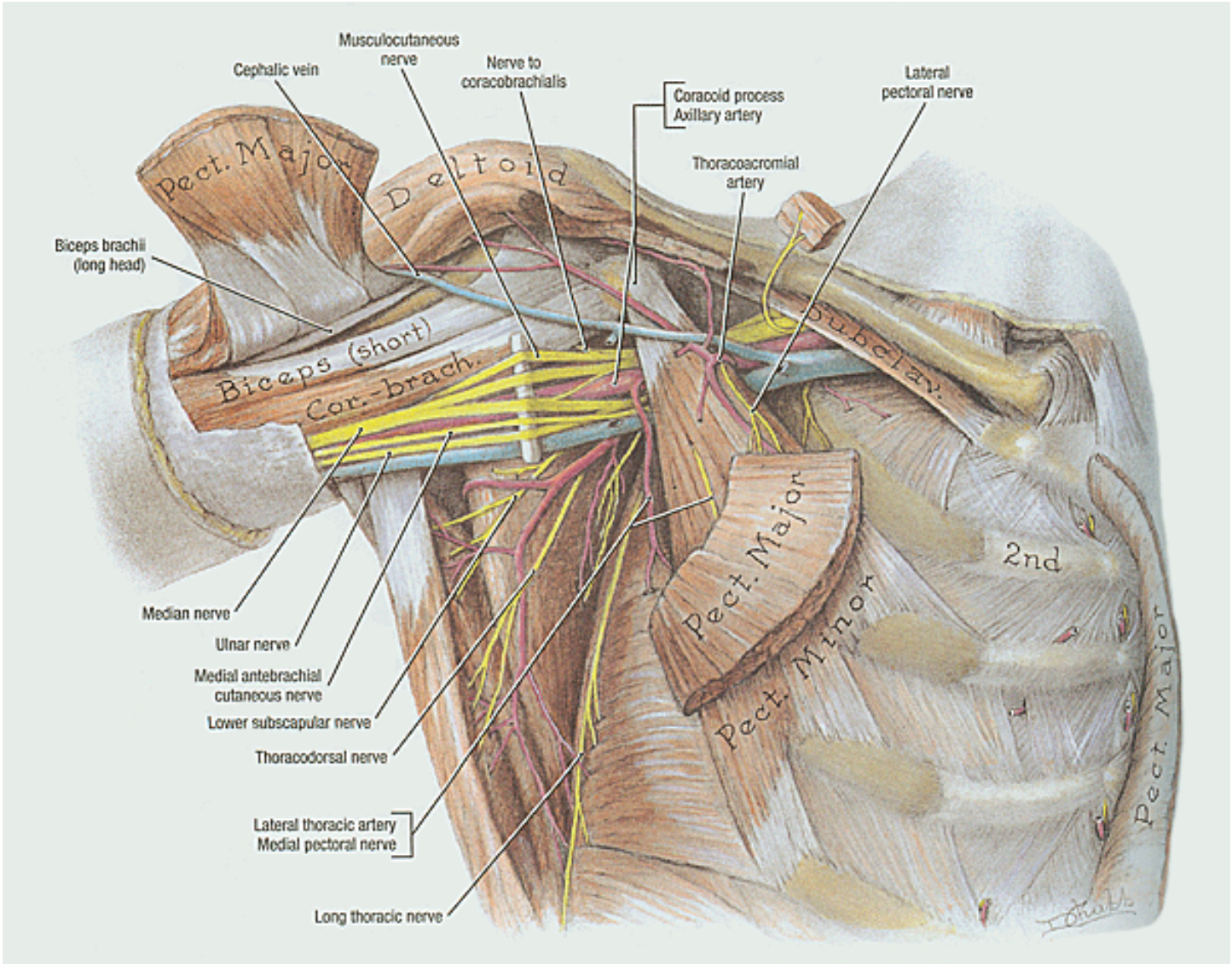
Med. & Lat. Pectoral Nn.



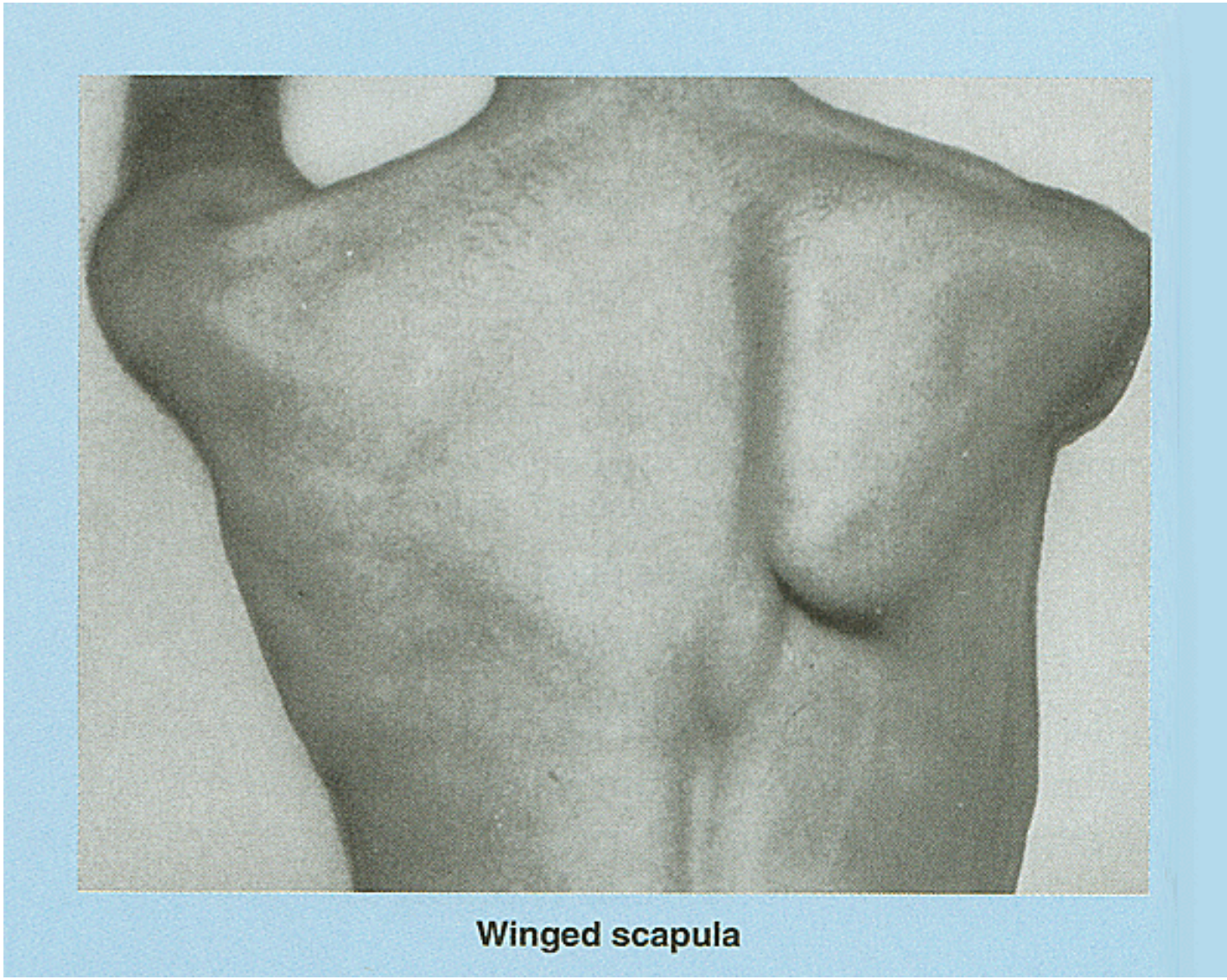
Long Thoracic Nerve

- Derived from ventral rami of C5-C7
- Supplies serratus anterior superficially
- (i.e., holds UL to thoracic wall)
- Damage to this n. can occur during mastectomy
- Results in “winged scapula”

Long Thoracic Nerve



“Winged Scapula”

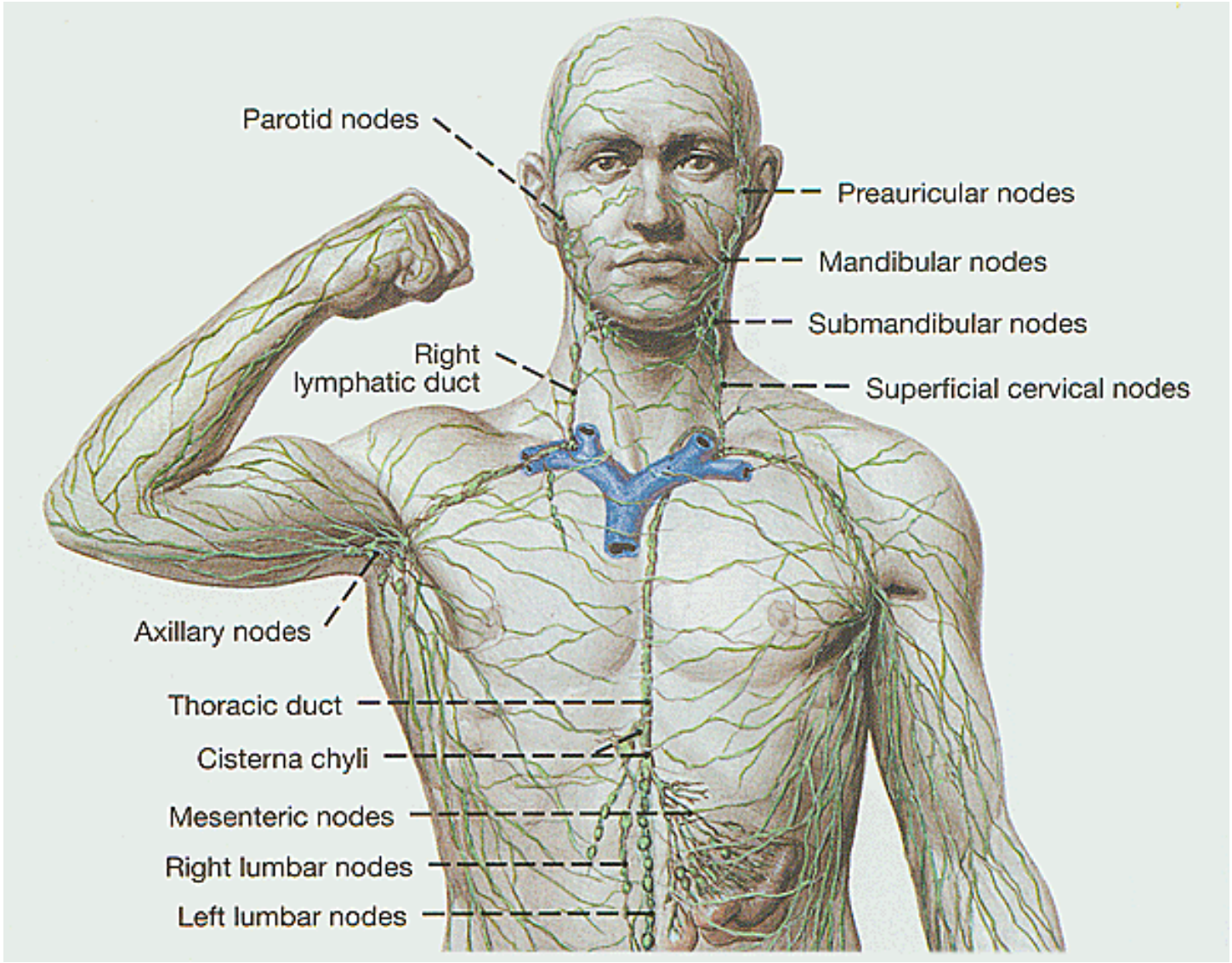


Winged scapula

Lymphatics of the Breast

- Drain lymph from breast to series of nodes
- Lat. drainage is via 5 groups of axillary nodes
- Supr. drainage is via 1 group of interpectoral nodes
- Med. drainage is via 1 group of parasternal nodes
- Ultimate drainage is via subclavian lymph trunk to vv.
- (i.e., jxn. of subclavian v. & IJV)

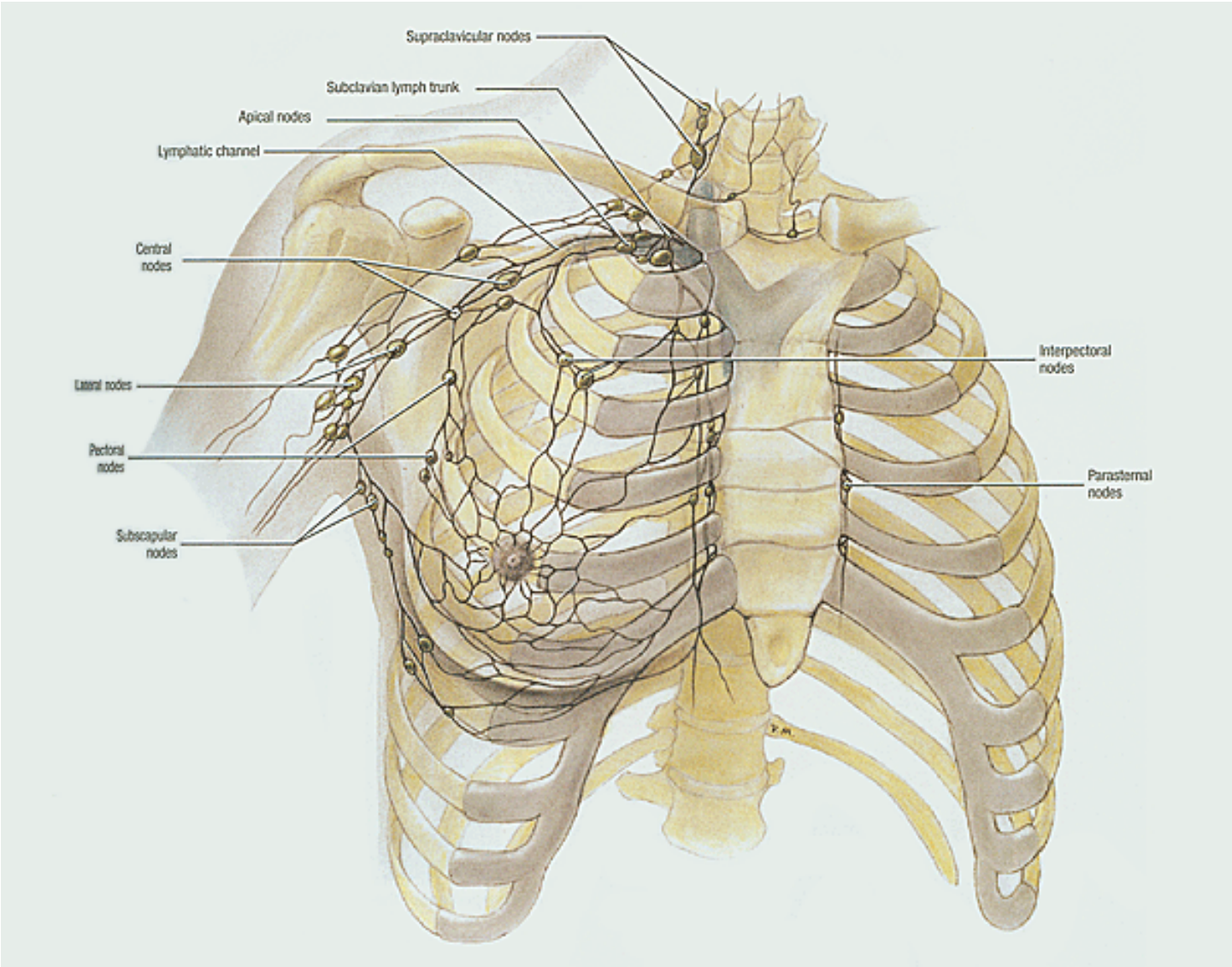
Lymphatic Drainage



Lymph Nodes of the Breast

- Pectoral (anterior) nodes
- Subscapular (posterior) nodes
- Humeral (lateral) nodes
- Central nodes
- Apical nodes
- Interpectoral (Rotter's) nodes
- Parasternal nodes

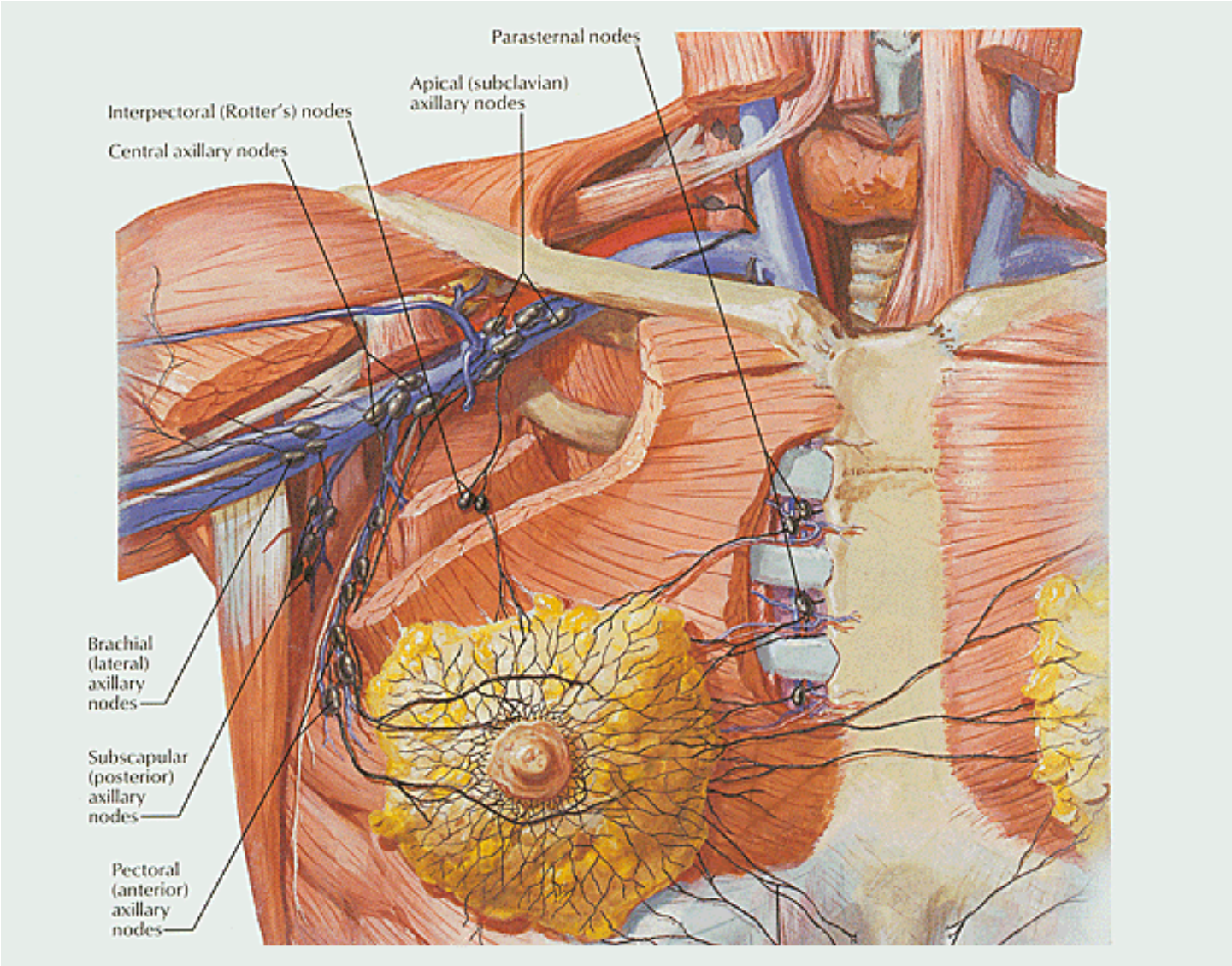
Lymph Nodes of the Breast



Vascular Associations of the Breast Lymph Nodes

- Pectoral – assoc. with lat. thoracic vessels
- Subscapular – assoc. with subscapular vessels
- Humeral – assoc. with distal (3rd) part of axillary v.
- Central – assoc. with middle (2nd) part of axillary v.
- Apical – assoc. with proximal (1st) part of axillary v.
- Interpectoral – assoc. with pectoral vessels
- Parasternal – assoc. with int. thoracic vessels

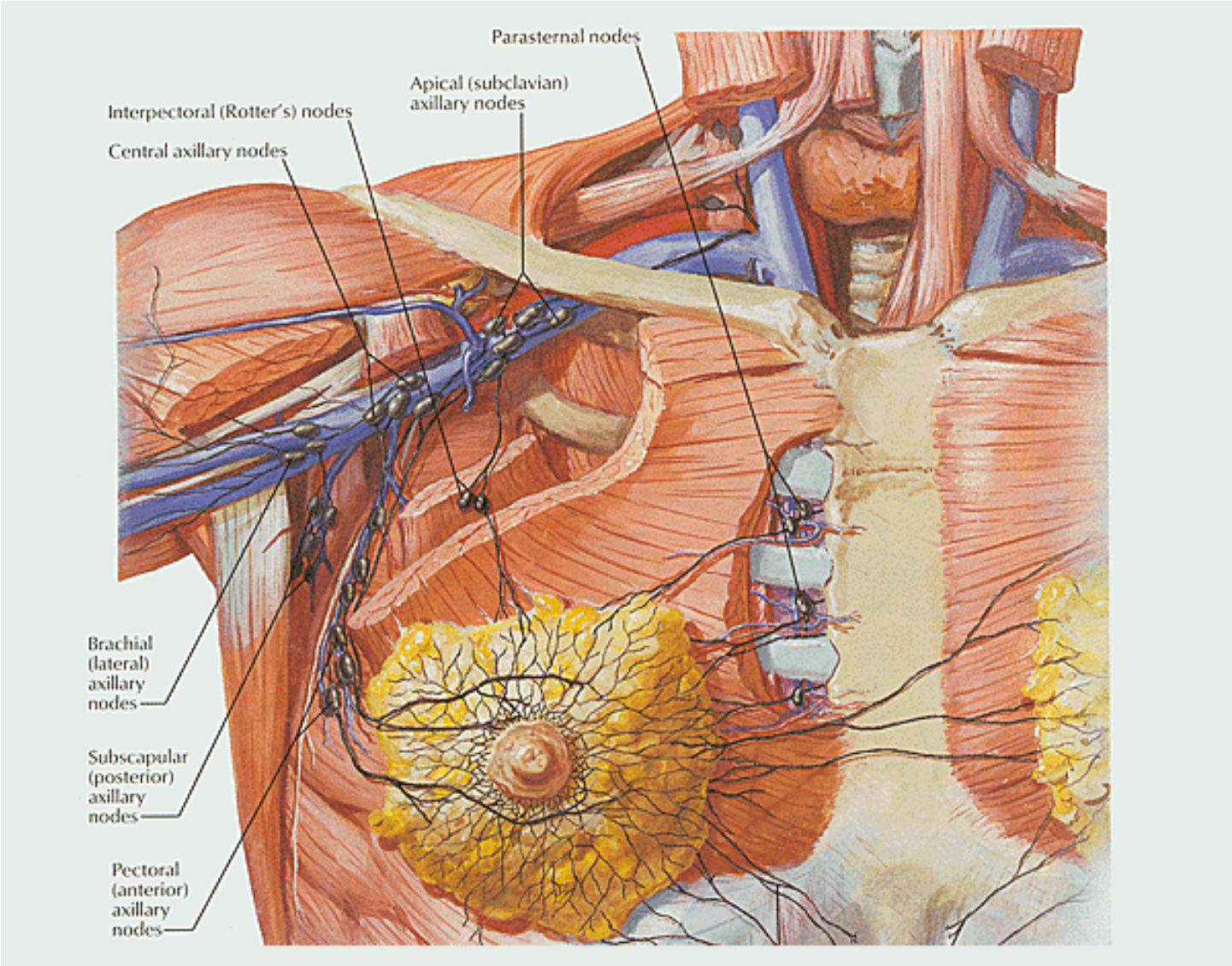
Vascular Associations



Clinical Notes on Axillary Lymph Node Dissections

- 3 Levels of surgical dissections relative to pec. minor
- (i.e., opposite arrangement of 3 parts of axillary vessels)
- Level I – below (lateral to) pec. minor
- Level II – deep to pec. minor
- Level III – above (medial to) pec. minor

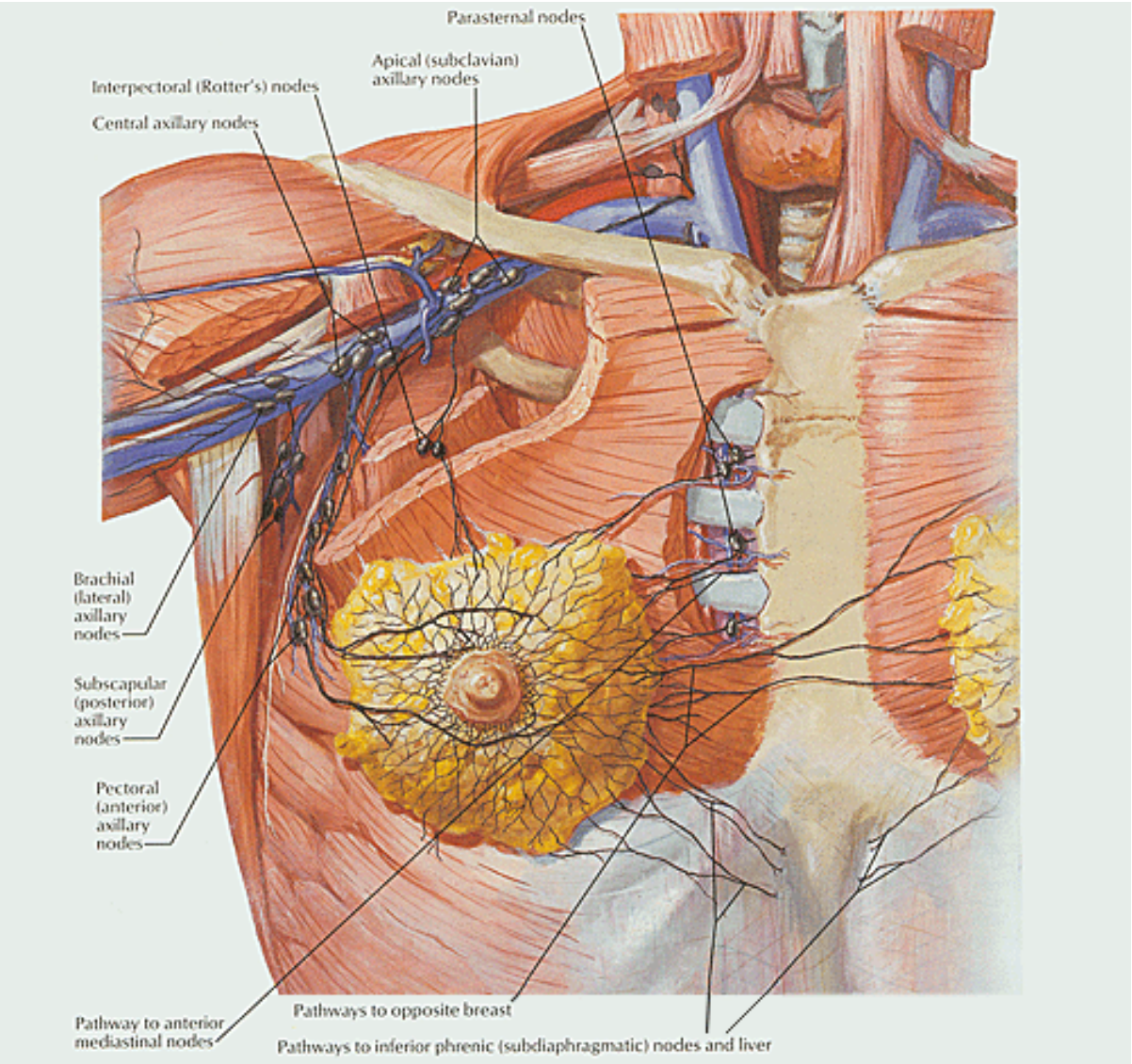
Pectoralis Minor Dissections



Clinical Significance of Breast Lymphatics

- Cancer cells tend to spread along lymph passages
- Typical spread is supr./laterally to axillary lymph nodes
- More than 75% of drainage via axillary lymph nodes
- Most remaining drainage is medially to parasternal nodes
- Unilateral lymphatic blockage may occur
- Lymph (with cancer cells) can then drain to opposite side

Drainage to Opposite Side



The End

References

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