

Pectoral Region

Subject : Anatomy
Department: B.P.T
Batch : I yesr (2021)



A region were main supporting framework for the upper trunk and proximal upper limb located

A region where the source of nutrition for the newborn resides

A region which consists the structures connecting the upper limb





Lies on the front of the chest.



Contents of Pectoral Region

Muscles connecting upper limb and anterolateral chest wall

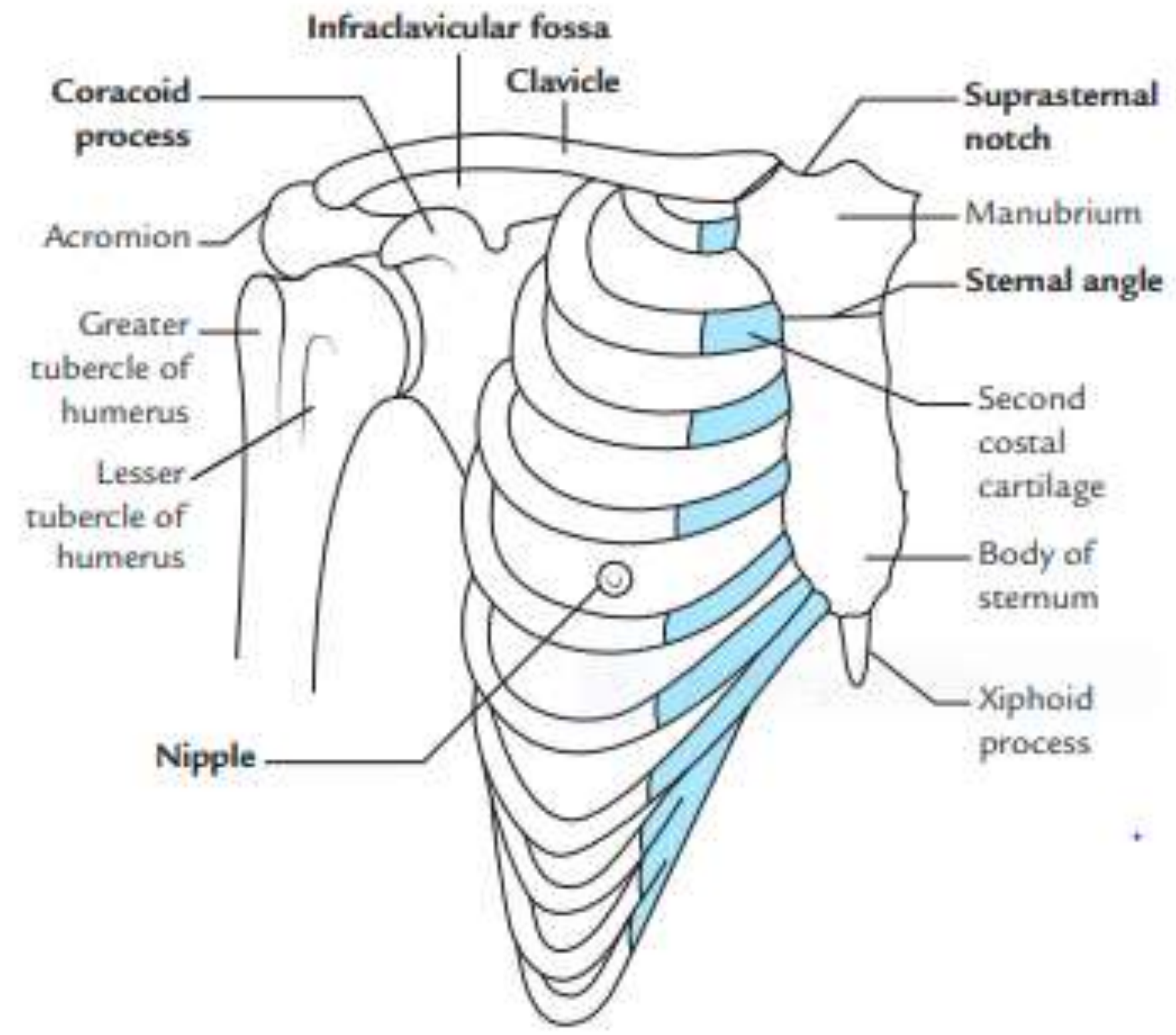
Mammary gland

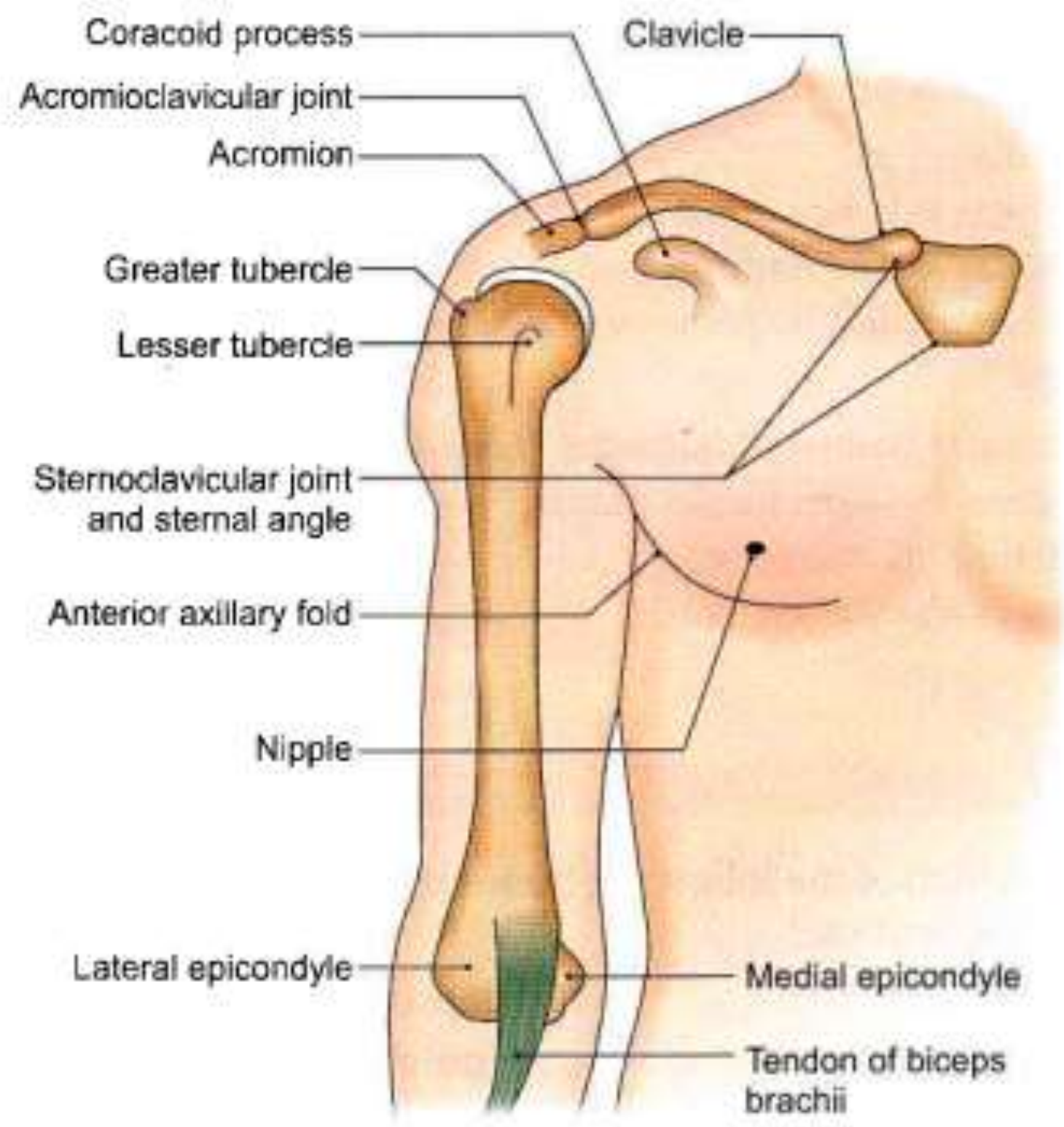


Surface Landmarks



1. **Clavicle:** subcutaneous & palpable (whole length at the junction of root of the neck and front of the chest).
2. **Suprasternal notch (jugular notch):** palpable notch at the upper border of manubrium sterni between the medial ends of two clavicles.
3. **Sternal angle (angle of Louis):** 5 cm below the suprasternal notch. It marks the junction of manubrium and the body of the sternum.
4. **Infraclavicular fossa:** triangular depression below the junction of middle and lateral third of the clavicle.
5. **Coracoid process:** tip is felt in the infraclavicular fossa, 2.5 cm below the clavicle.
6. **Nipple:** lies in the 4th intercostal space just medial to the midclavicular line



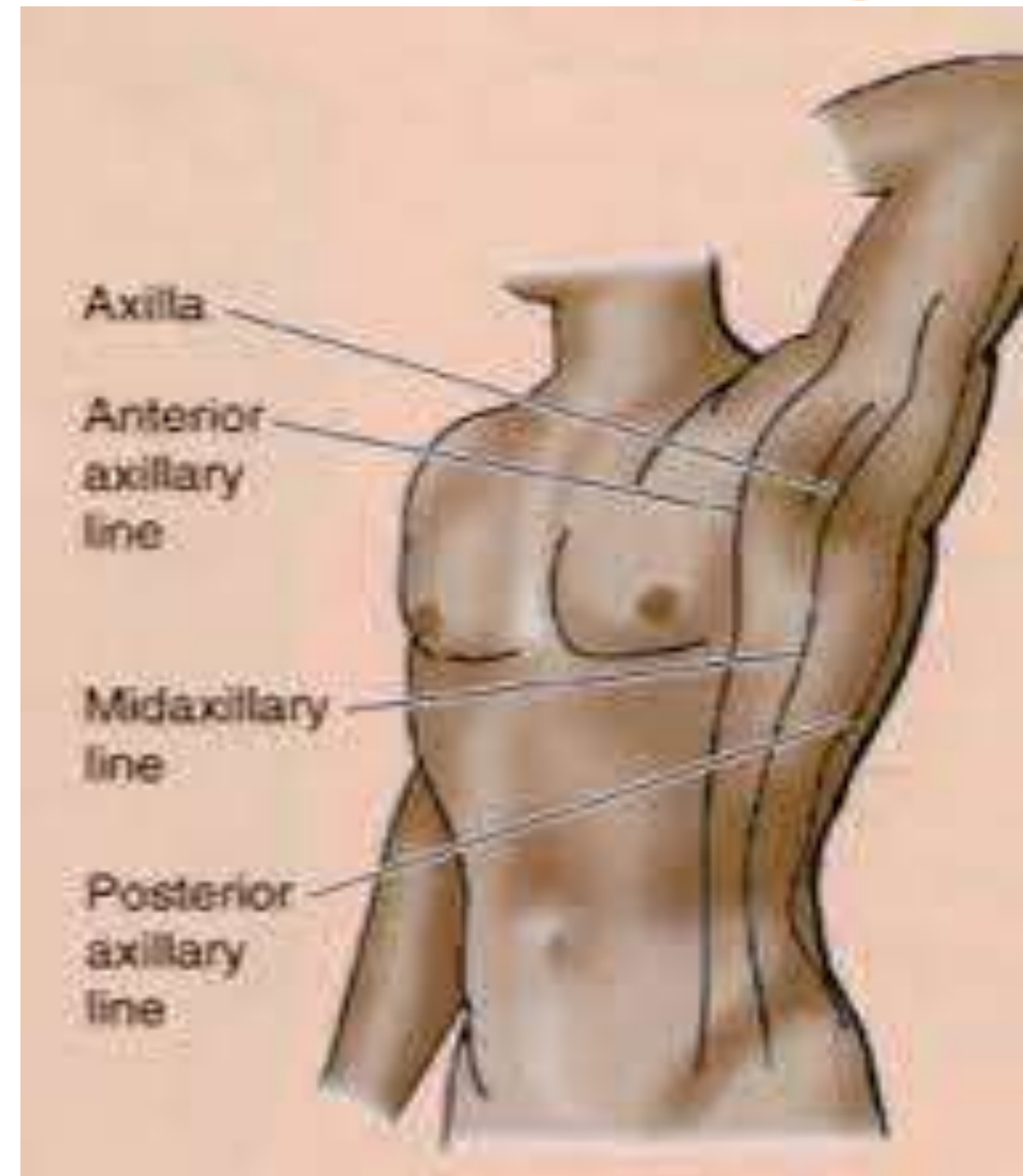
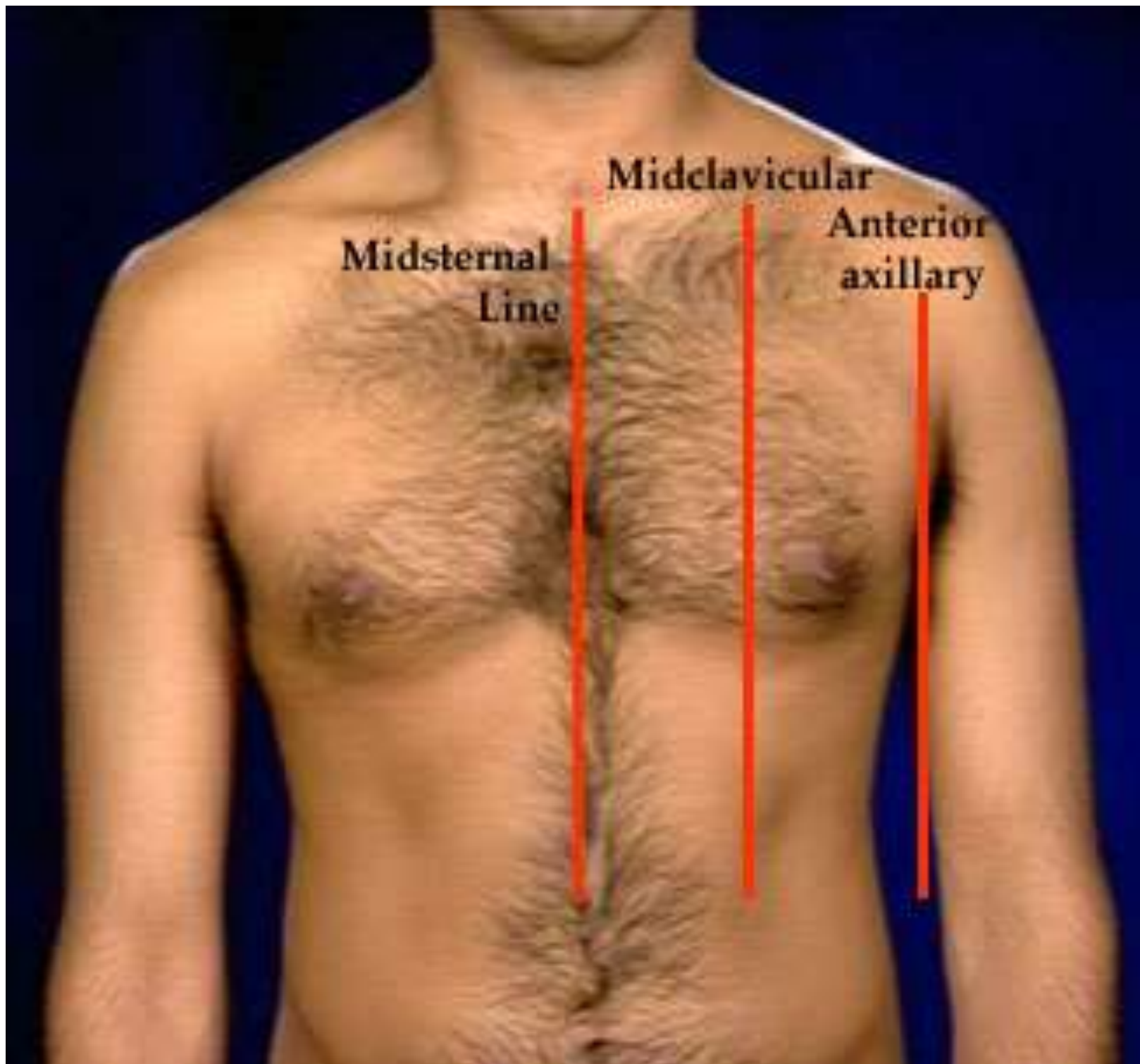




Lines of Orientation



1. **Midsternal line:** vertically downwards in the median plane on the front of the sternum.
2. **Midclavicular line:** vertically downwards from midpoint of the clavicle to midinguinal point.
3. **Anterior axillary line:** vertically downwards from the anterior axillary fold.
4. **Midaxillary line:** vertically downwards from point located midway between the anterior and posterior axillary folds.
5. **Posterior axillary line:** vertically downwards from the posterior axillary fold





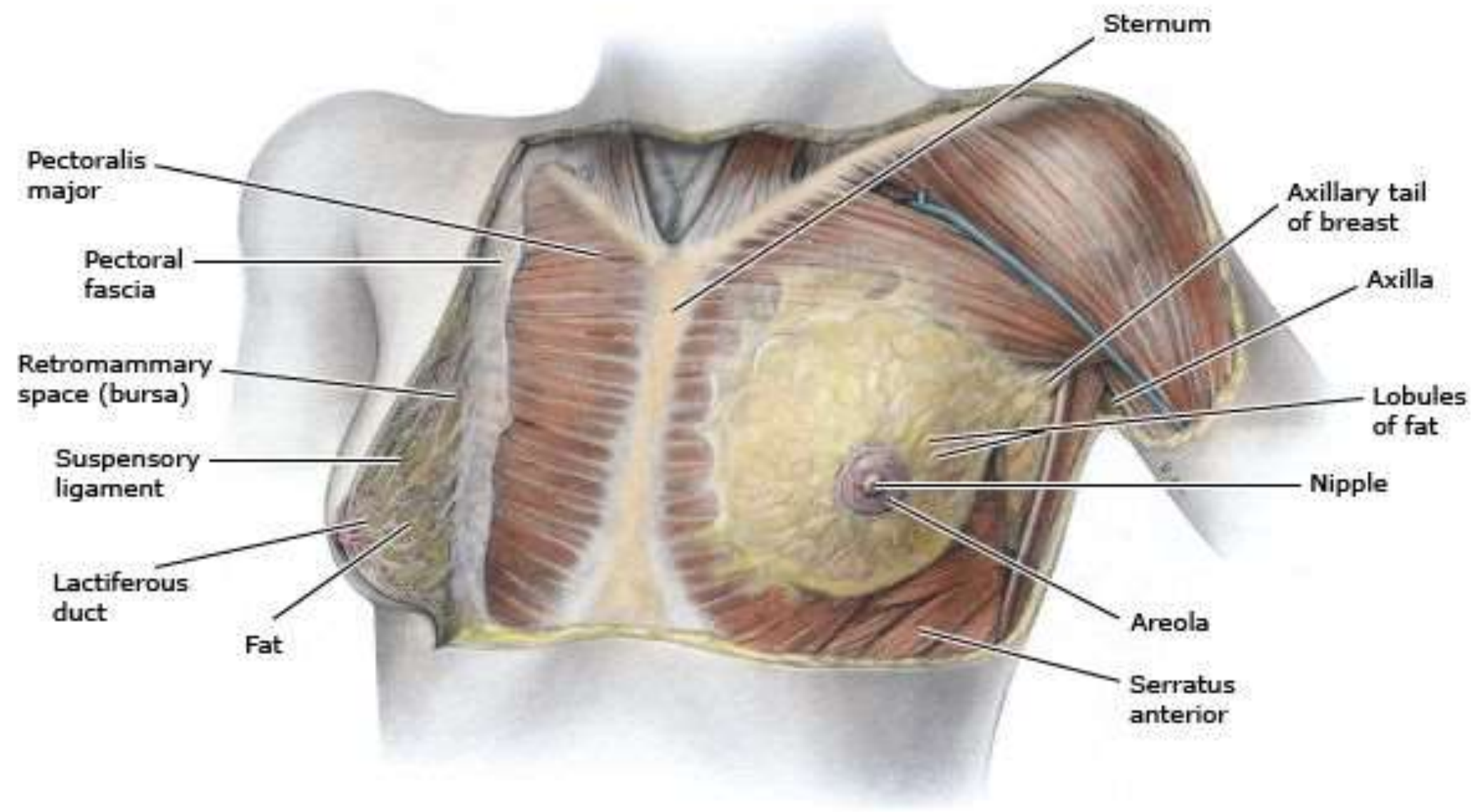
Superficial Fascia



- After incising; Superficial fascia is visualised after the skin.
- Major content moderate amount of fat.

Contents:

- i. Cutaneous nerves** derived from the cervical plexus & intercostal nerves.
- ii. Cutaneous branches** from the internal thoracic and posterior intercostal **arteries.**
- iii. Platysma**
- iv. Breast**



Cutaneous Innervation

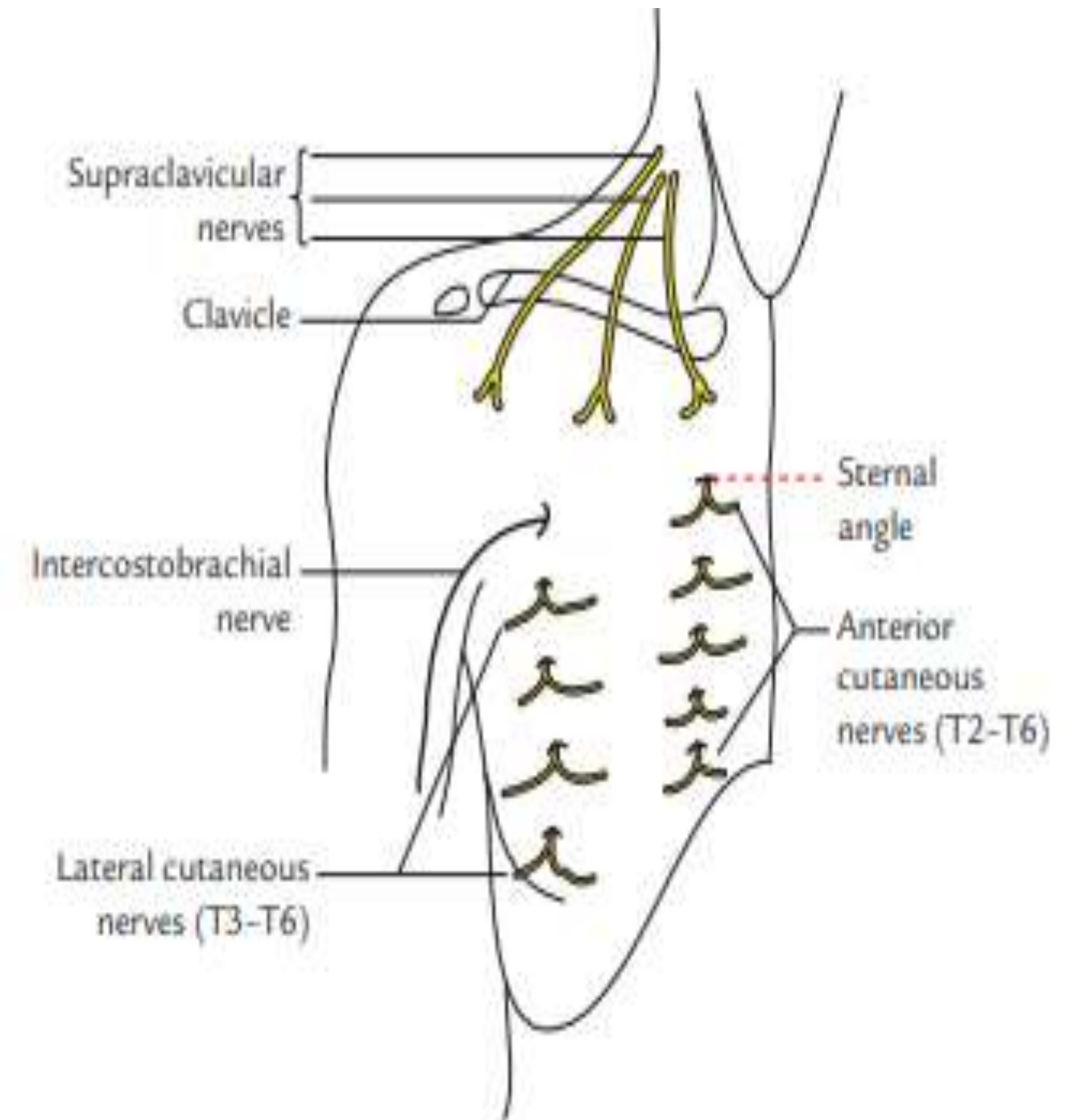
1. Supraclavicular nerves (C3 and C4) branches:

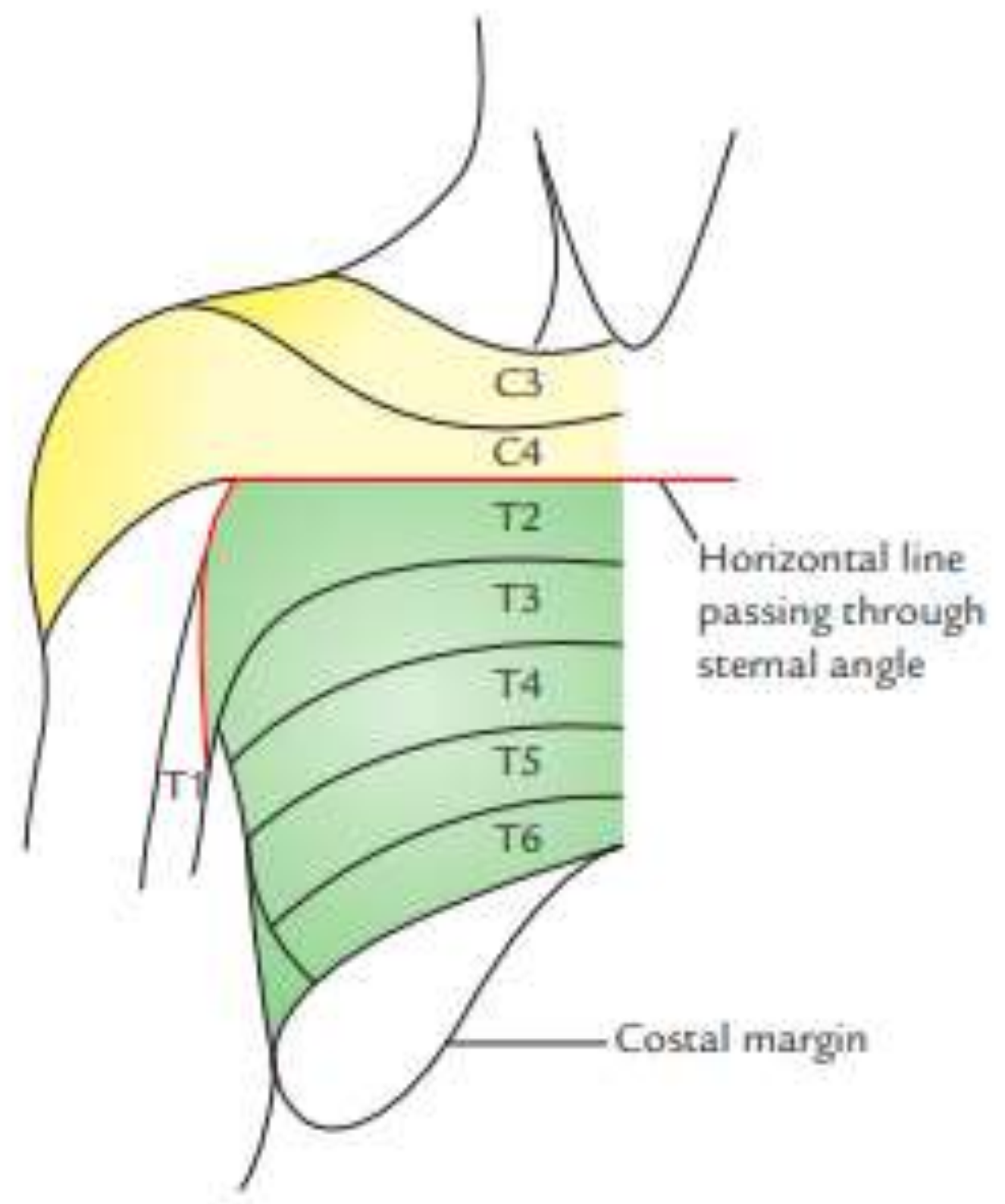
- Medial
- Intermediate
- Lateral

Supplies the skin: upper half of deltoid & clavicle to 2nd rib

2. Anterior and lateral cutaneous branches of the 2nd–6th intercostal nerves

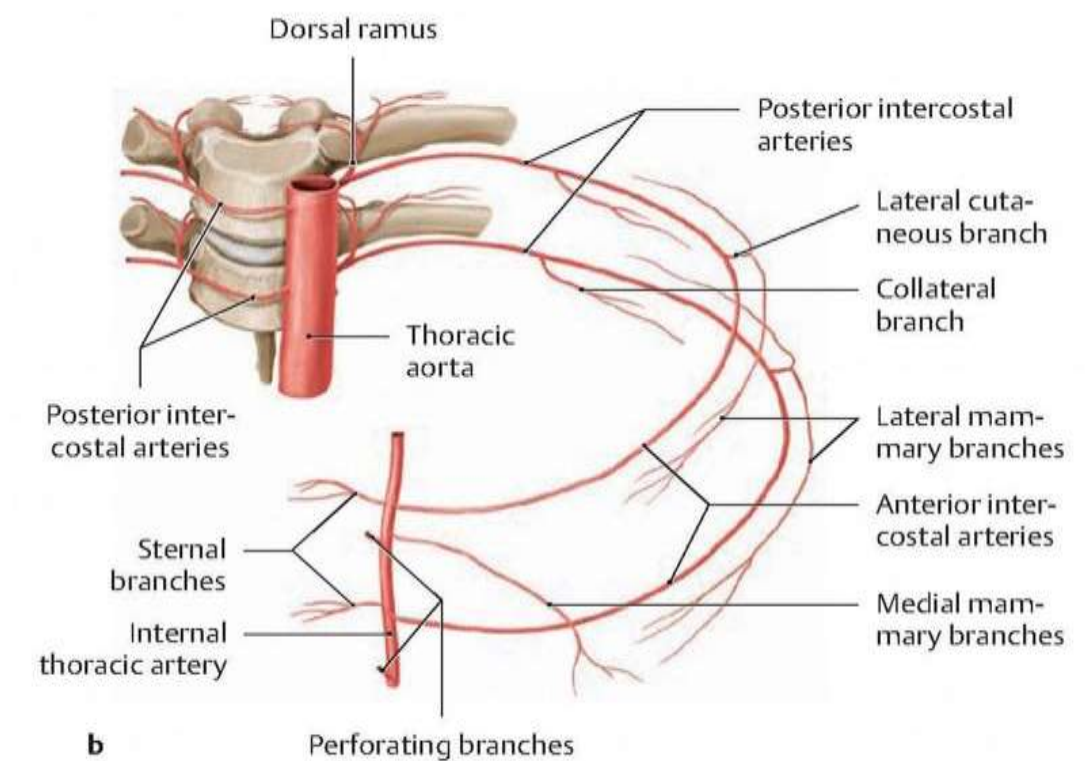
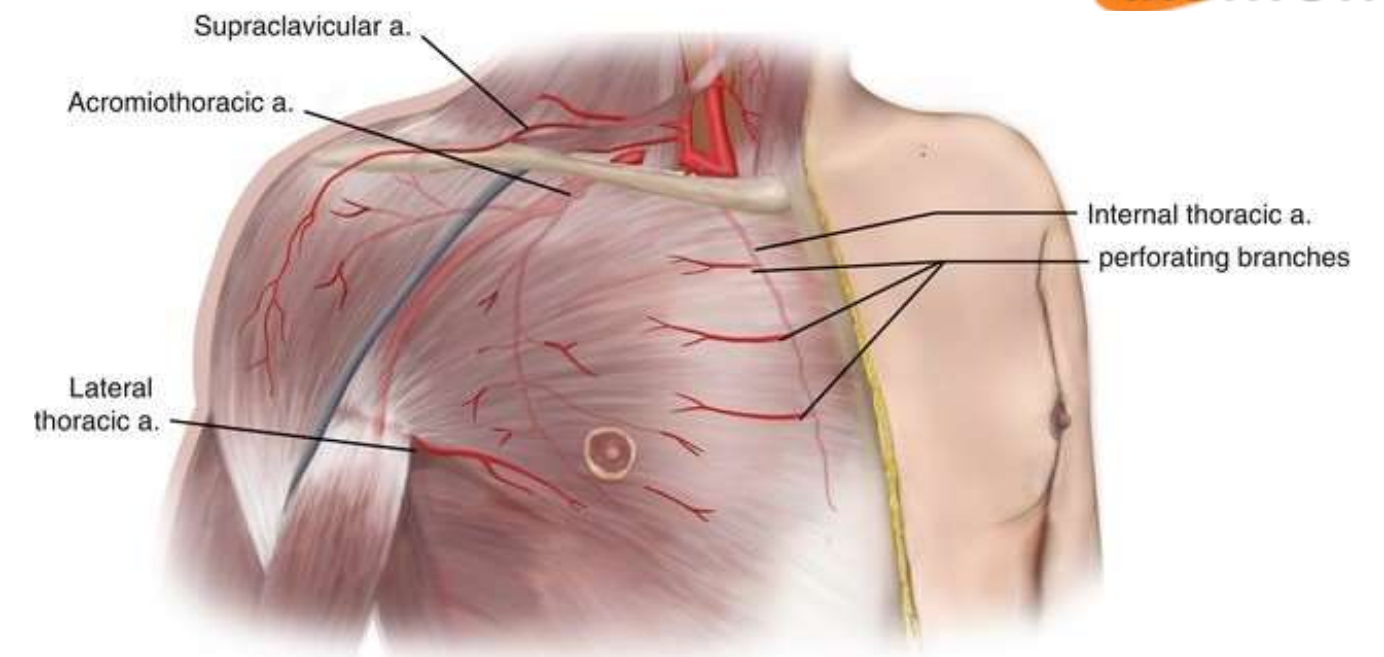
Supplies the skin: Below the level of 2nd rib.





Cutaneous Vessels

- Vessels are very small.
- The anterior cutaneous nerves are accompanied by the perforating branches of the **internal thoracic artery**.
- 2nd , 3rd & 4th of these branches are large in females for supplying the breast.
- The lateral cutaneous nerves are accompanied by the **lateral cutaneous branches of the posterior intercostal arteries**.



Platysma

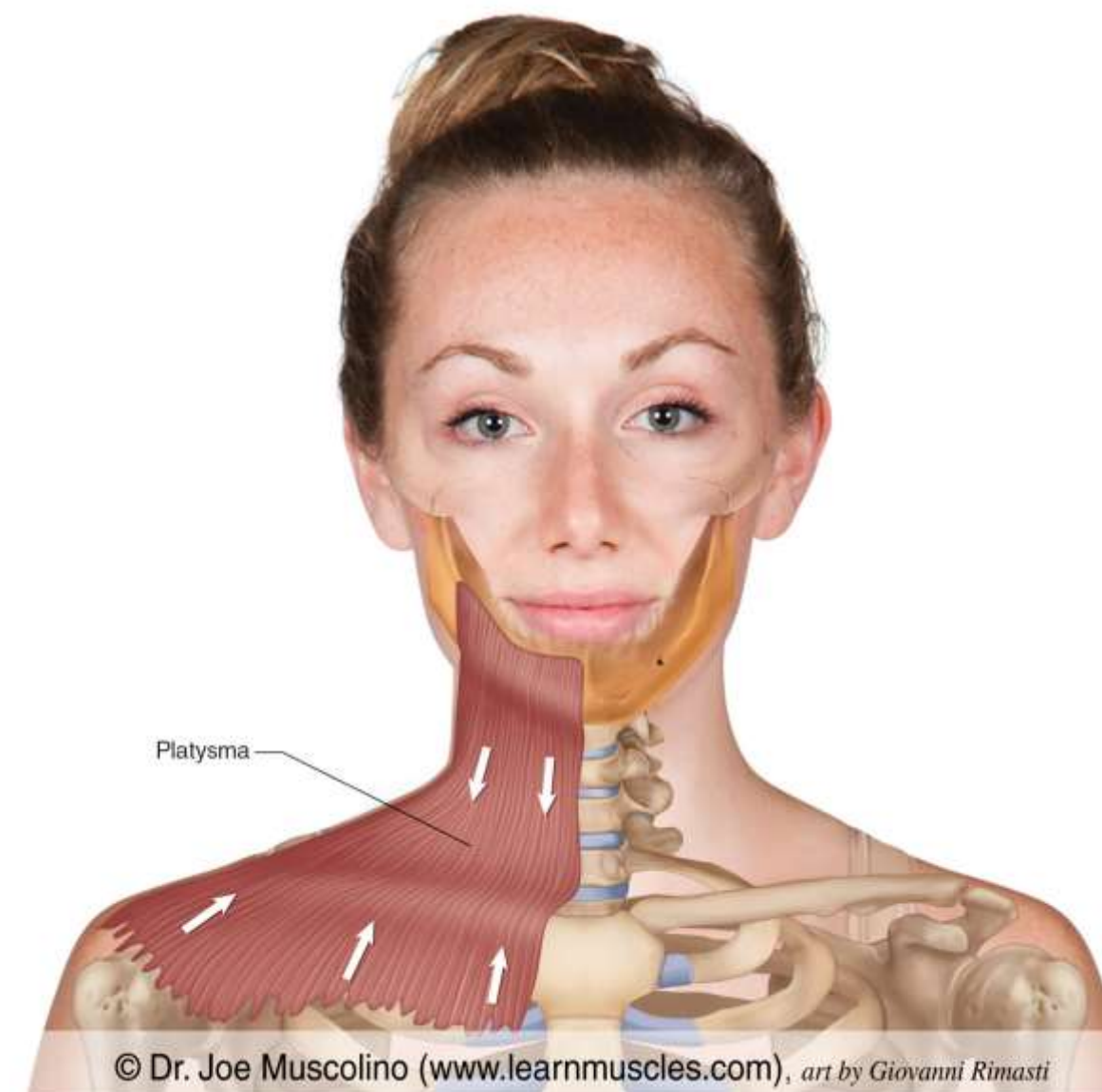
(Greek broad)

Features : Thin, broad sheet of subcutaneous muscle.

Origin : Fibers from the deep fascia covering the pectoralis major; run upwards and medially, crossing the clavicle and the side of the neck;

Insertion : Base of the mandible & into skin over the posterior and lower part of the face.

Nerve supply : Branch of facial nerve.



Platysma (Contnd..)

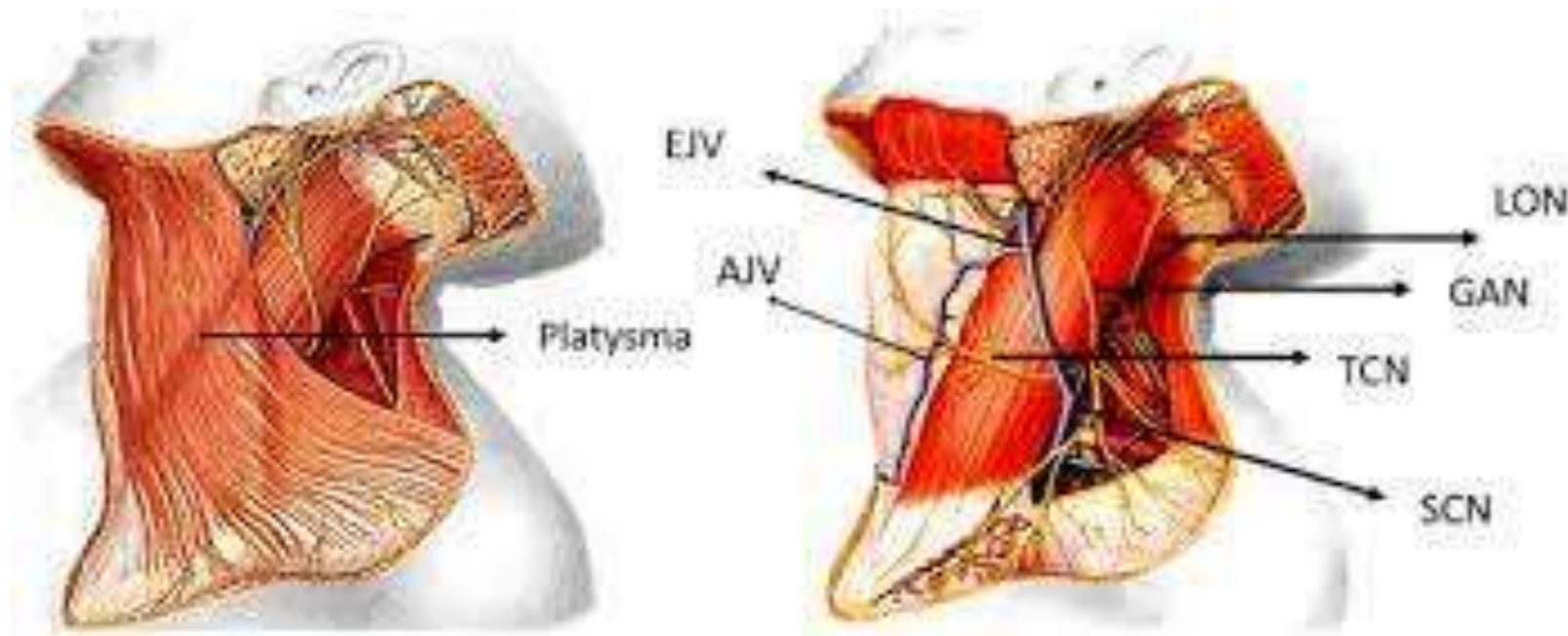


repose

platysma contraction

Obvious seen when...

When the angle of the mouth is pulled down, the muscle contracts and wrinkles the skin of the neck.

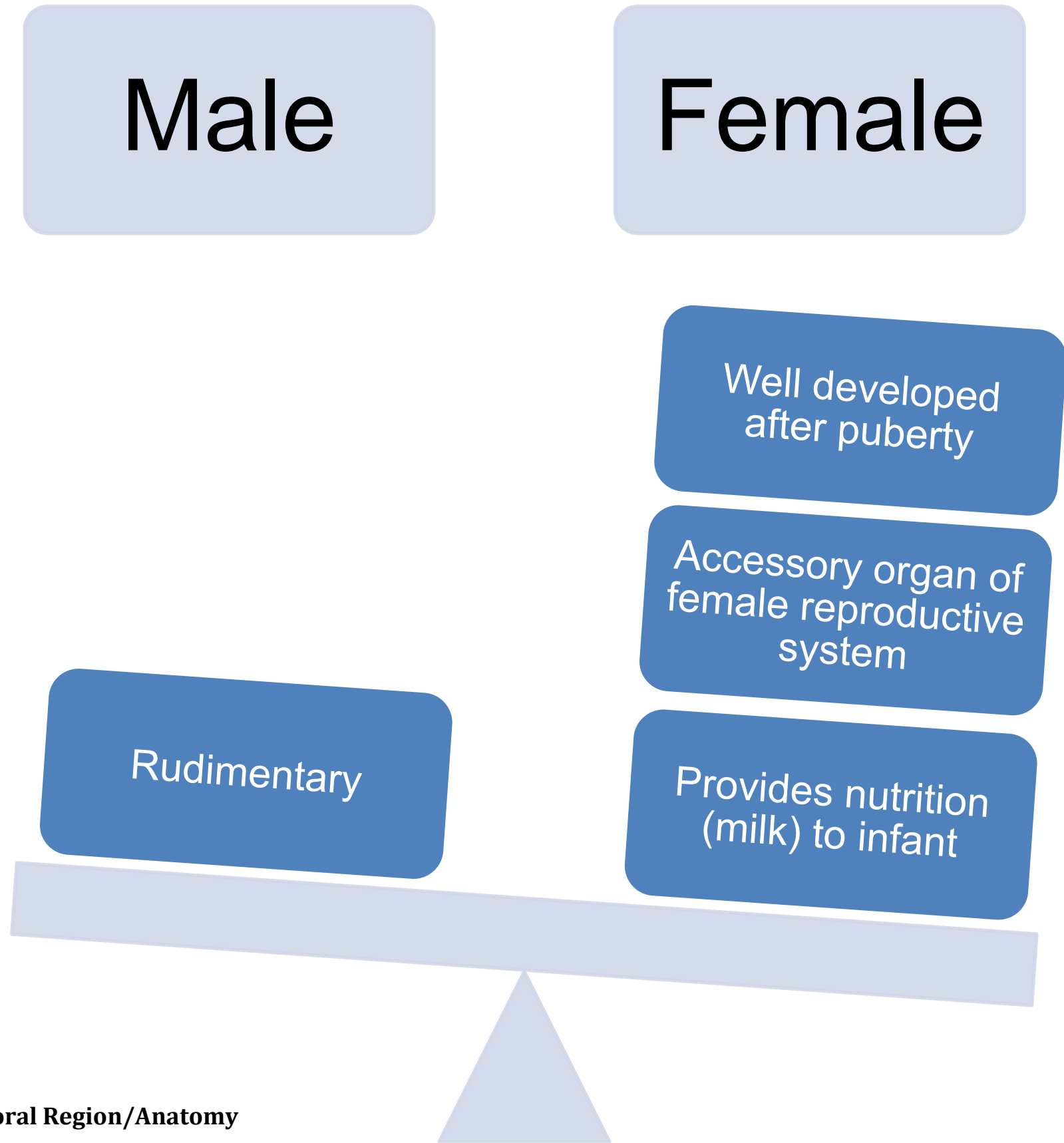


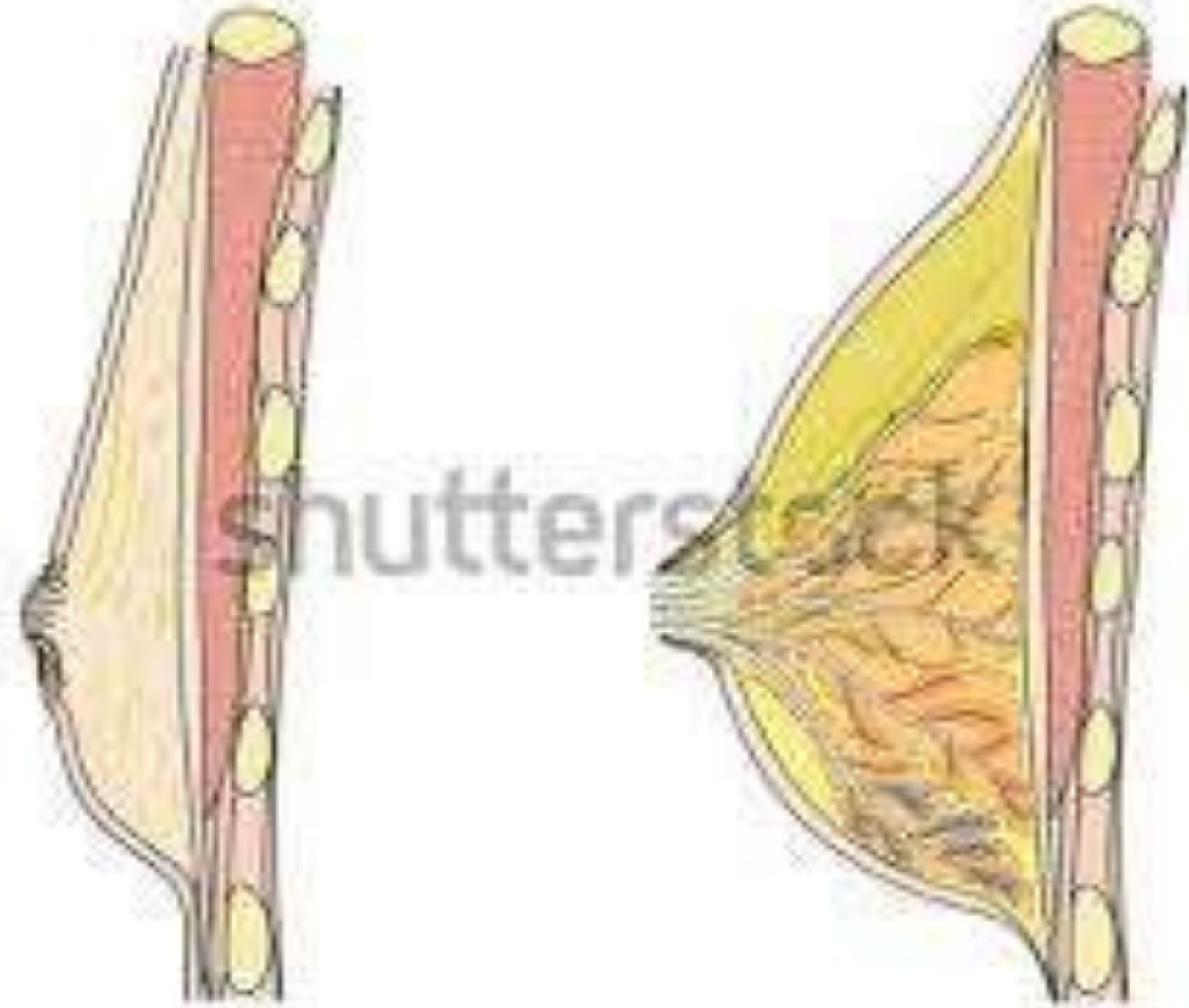
Other role : protect the external jugular vein from external pressure

Breast / Mammary Glands

Important structure in pectoral region
(having vast practical and clinical importance)

Found in both sexes





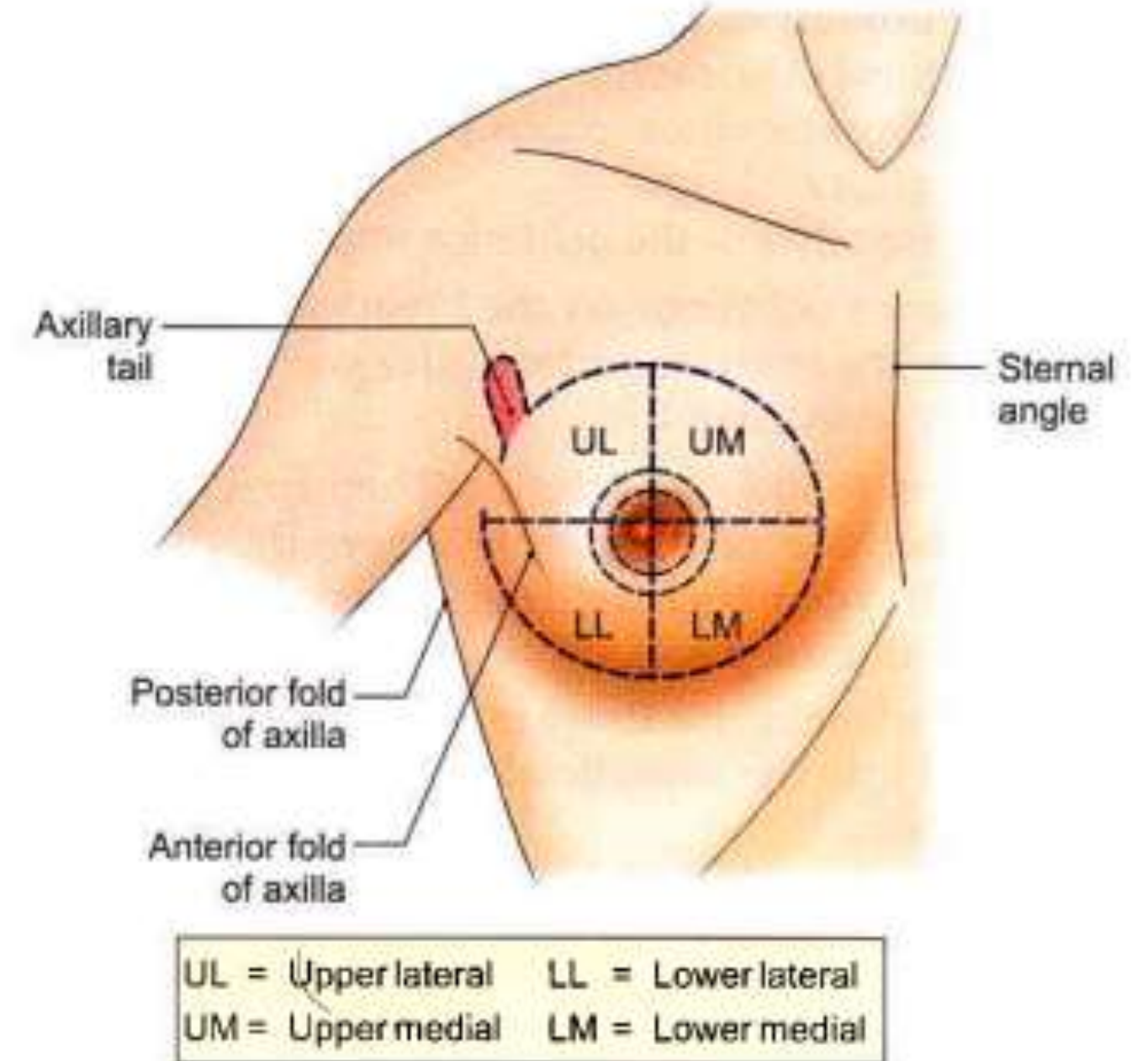
www.shutterstock.com · 24127894

Situation

Lies in the superficial fascia of the pectoral region.

Divided into four quadrants

- Upper medial
- Upper lateral
- Lower medial
- Lower lateral.



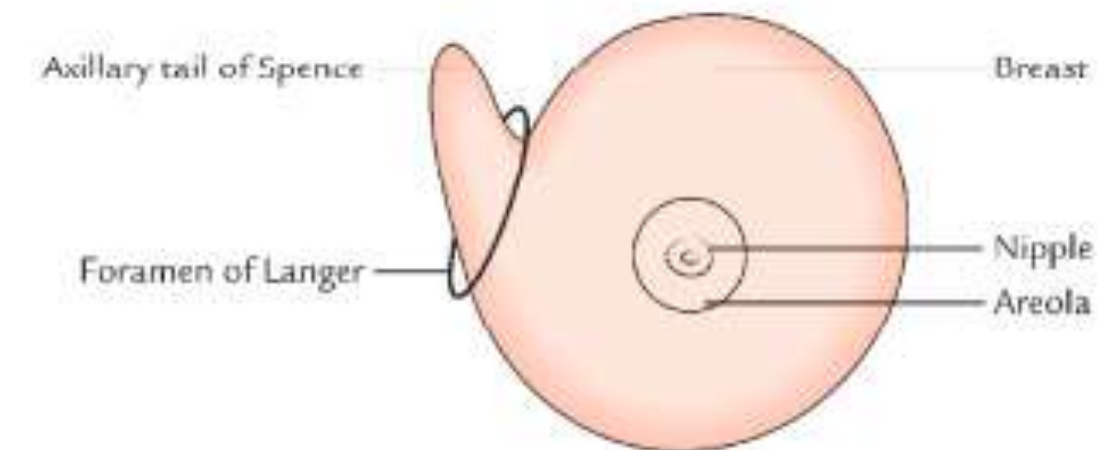
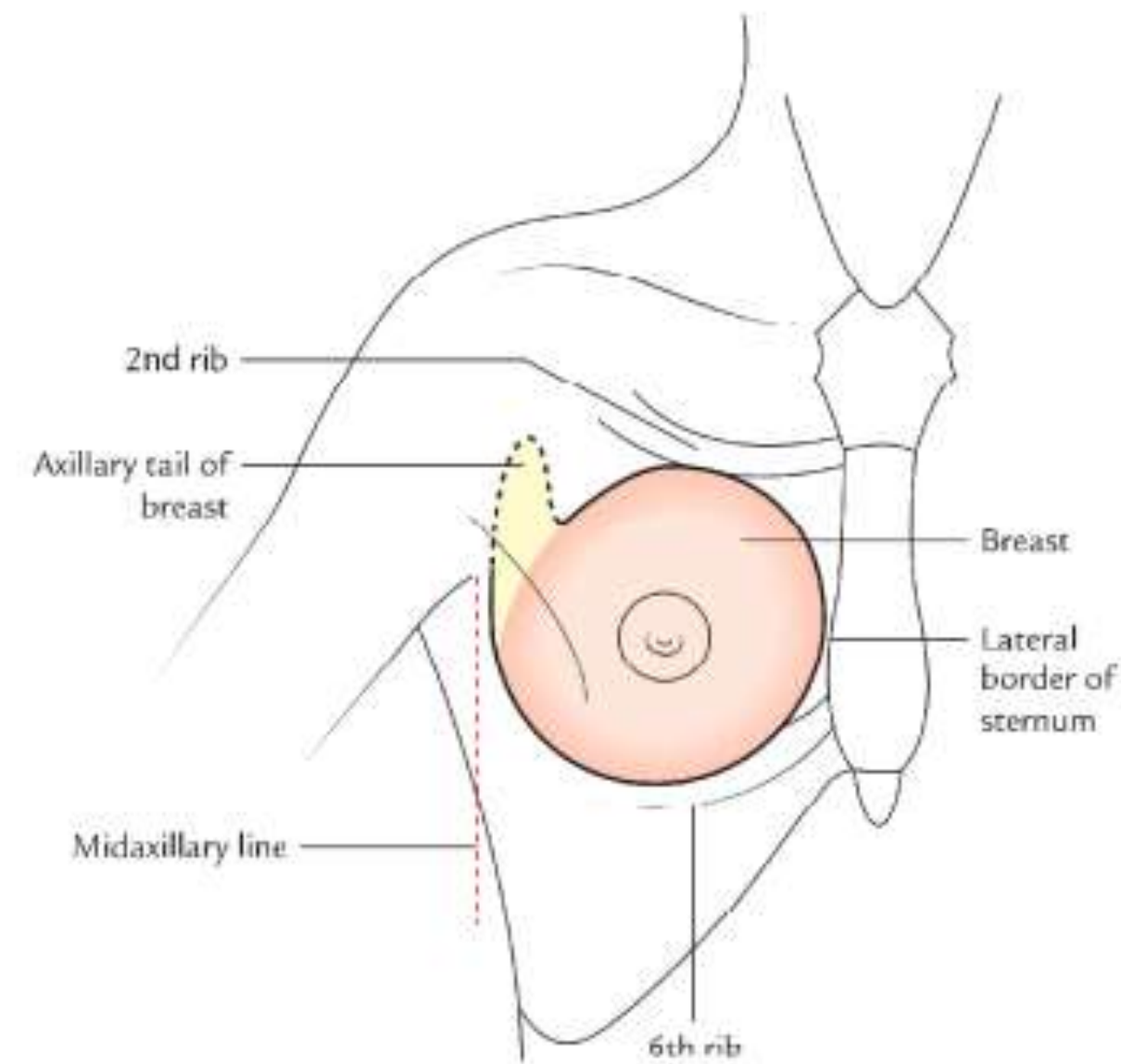
A small extension of the upper lateral quadrant called the **axillary tail of Spence**

(passes through an opening in the deep fascia and lies in the axilla).

The opening is called **foramen of Langer**.

(The aperture in the deep fascia through which axillary tail passes into the axilla)

Clinical importance : The axillary tail is the site of high percentage of breast tumor



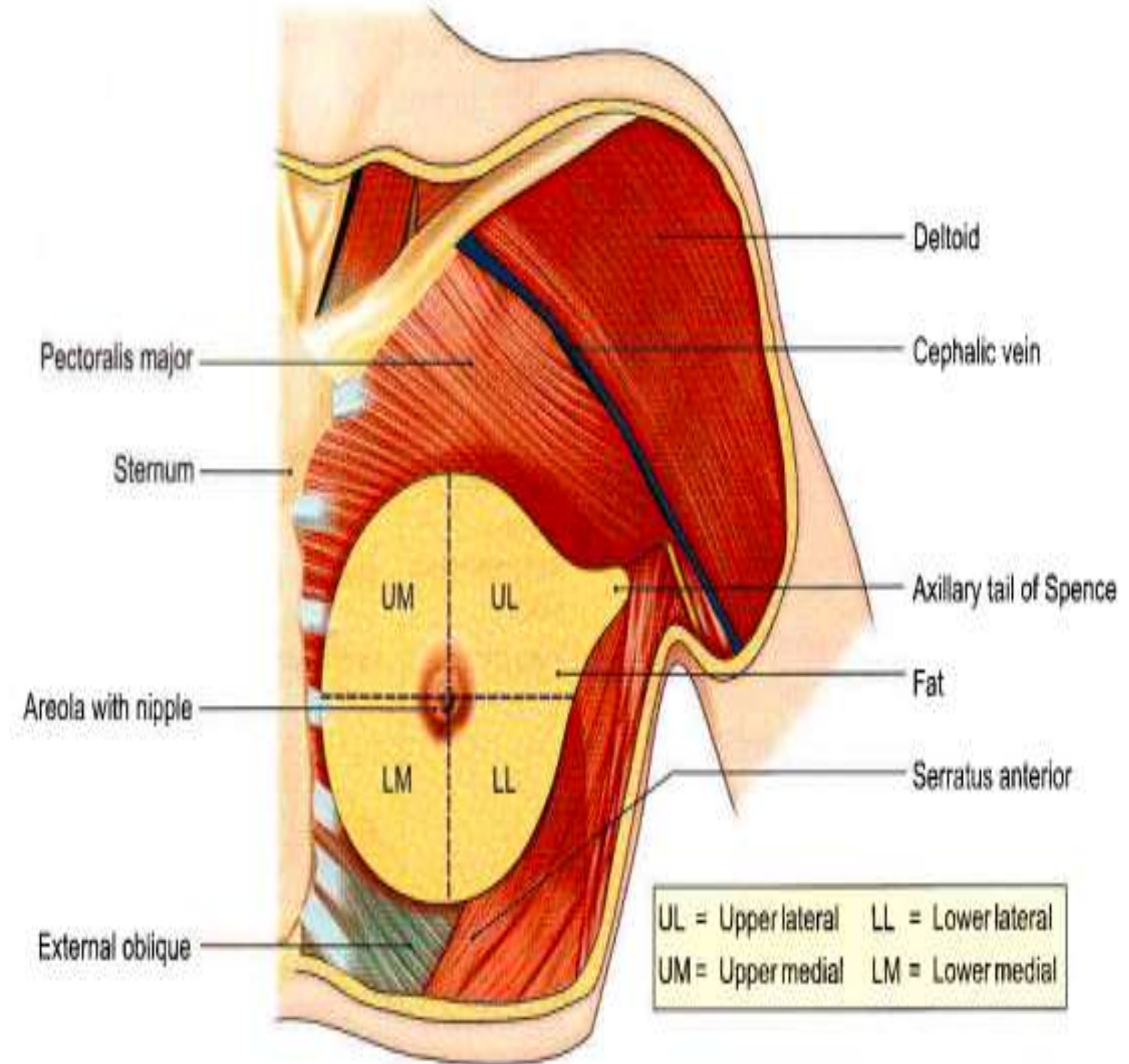
SHAPE AND EXTENT

Shape : Hemispherical bulge.

Extent :

1. **Vertically**, it extends from 2nd rib to 6th rib.

2. **Horizontally**, it extends from lateral border of the sternum to the midaxillary line

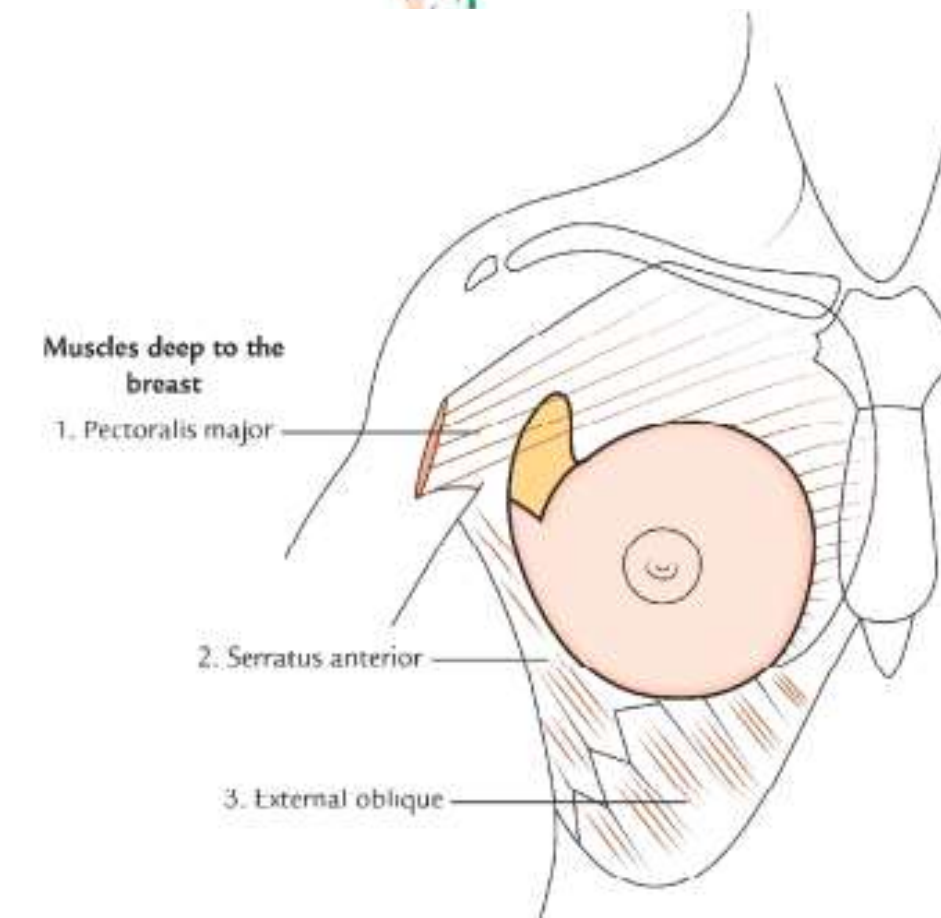
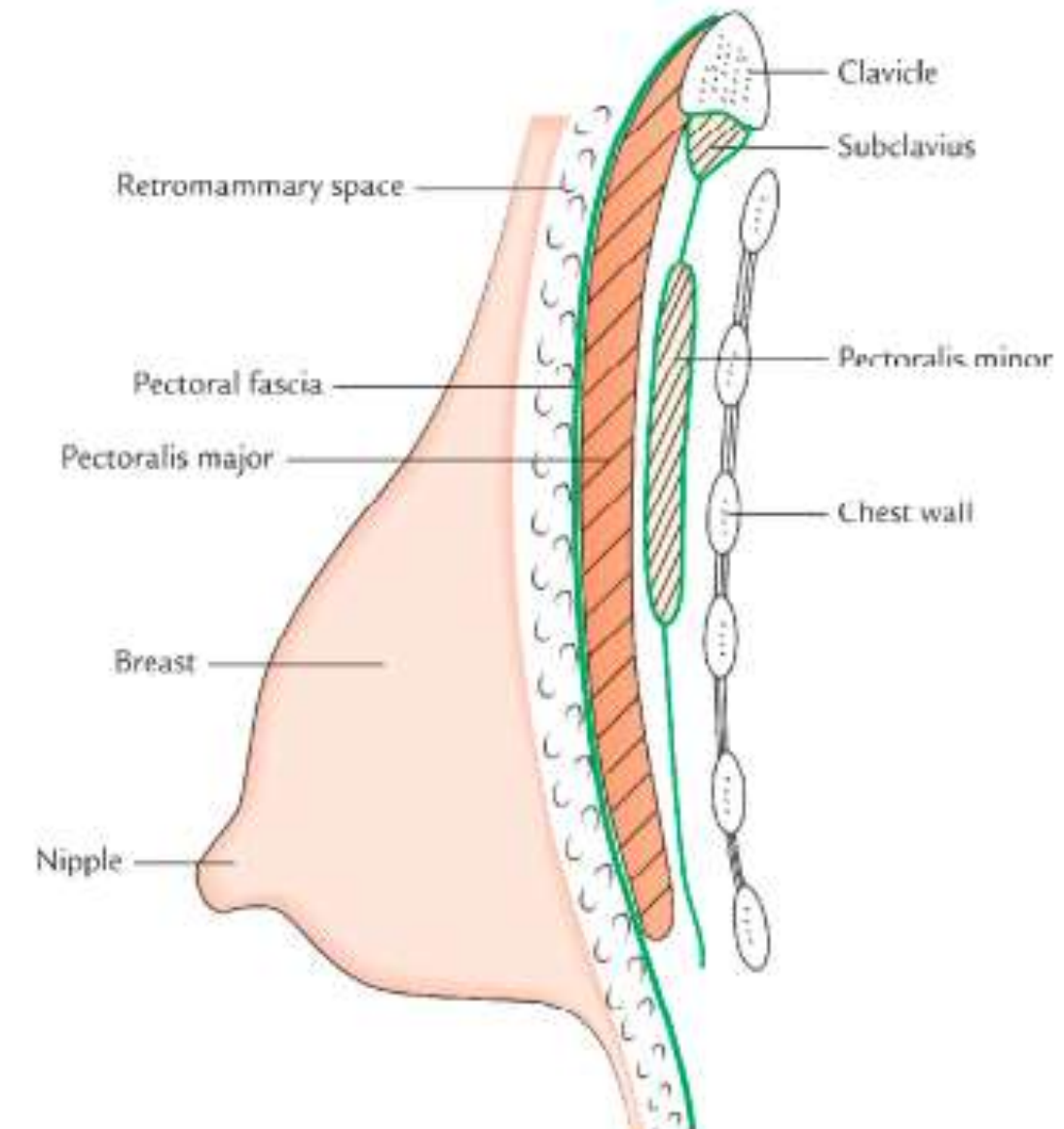


Deep Relations

1. **Pectoral fascia** - covering the pectoralis major.
2. **Three muscles** - pectoralis major, the serratus anterior, and the external oblique (abdomen muscle)

Note:- The breast is separated from the pectoral fascia by loose areolar tissue, called the retro-mammary space.

Because of the presence of this loose tissue, the normal breast can be moved freely over the pectoralis major.





Structure



The Skin

The Parenchyma

The Stroma

The Skin

Covers the breast and presents the following features:

Nipple:

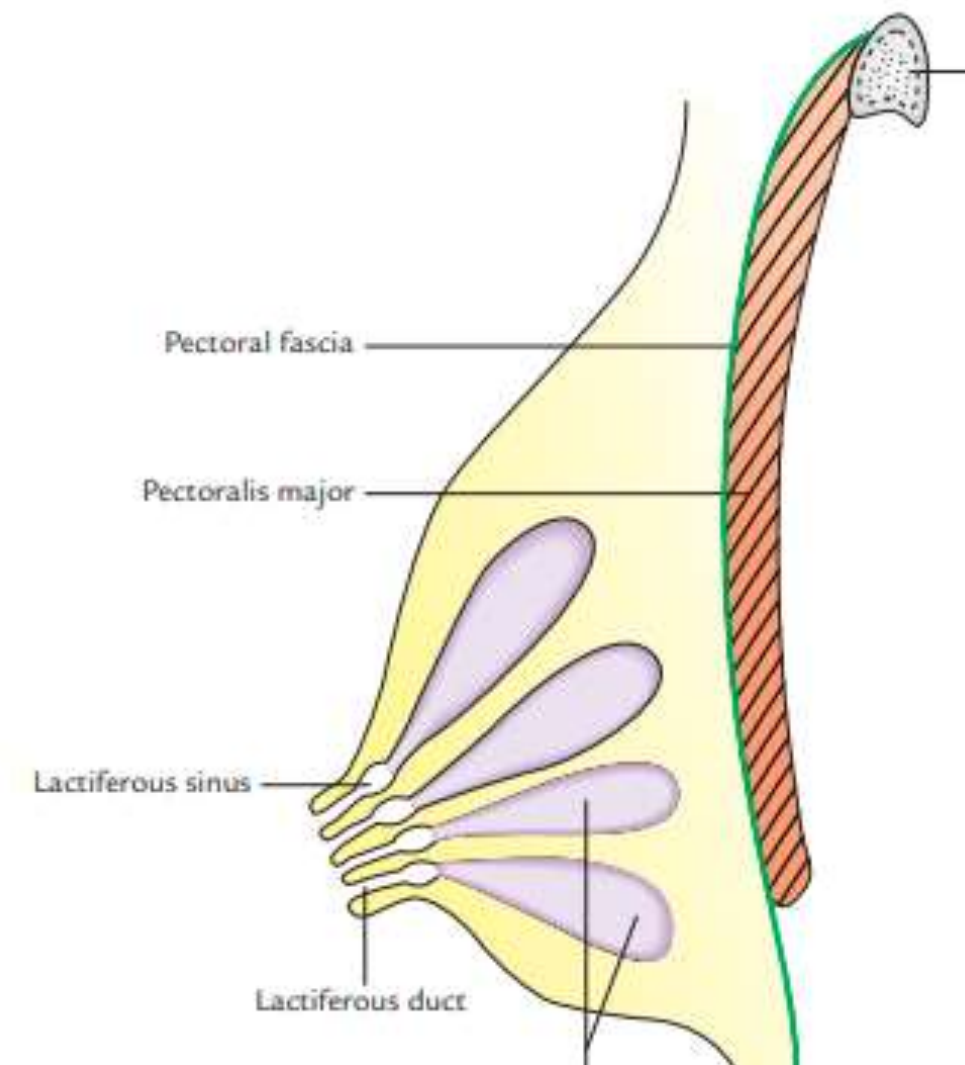
conical projection below center of breast

Level - 4th intercostal space.

Contains circular and longitudinal smooth muscle fibres, which can make the nipple stiff and erect or flatten it.

Pierced by- 15 to 20 lactiferous ducts

Richly innervated by sensory nerve endings



2. Areola:

Circular area of pigmented skin surrounding the base of the nipple.

It contains large number of modified sebaceous glands, particularly at its outer margin.

Produce oily secretion, which lubricates the nipple and areola, prevents them from drying and cracking.

Clinical note: The sebaceous glands in the areola are enlarged during pregnancy and appear as small nodular elevations called **Montgomery's tubercles**.

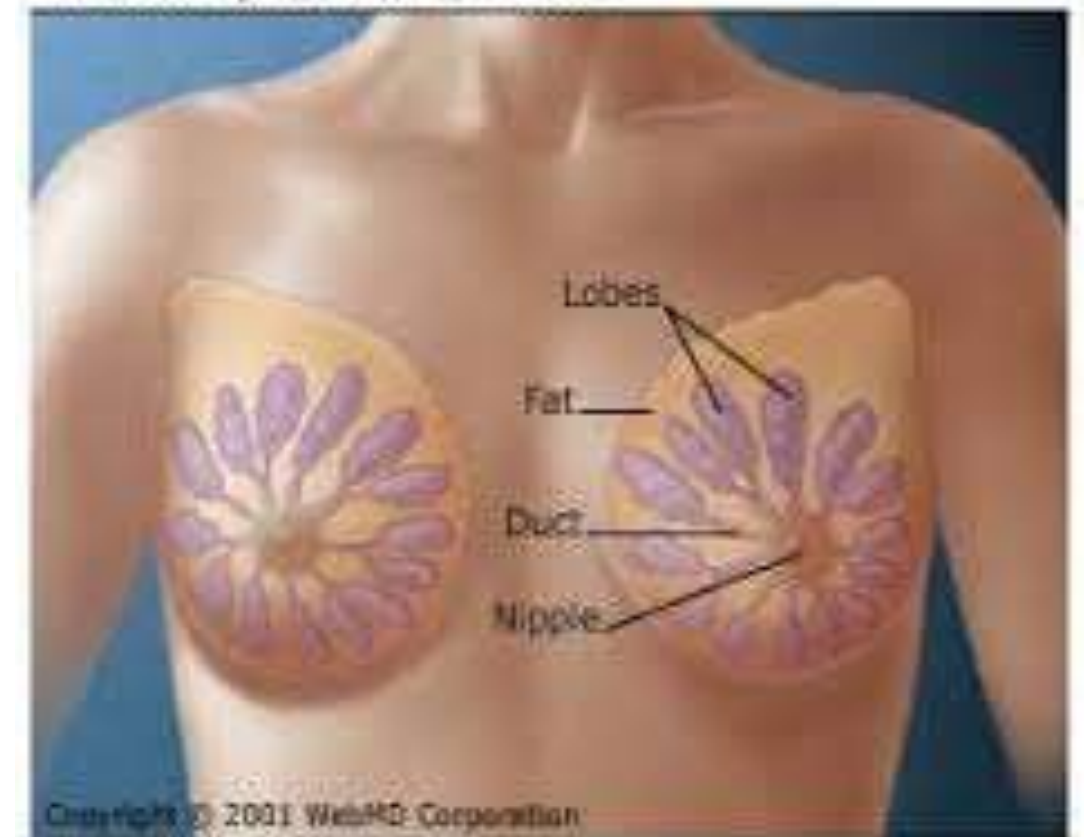


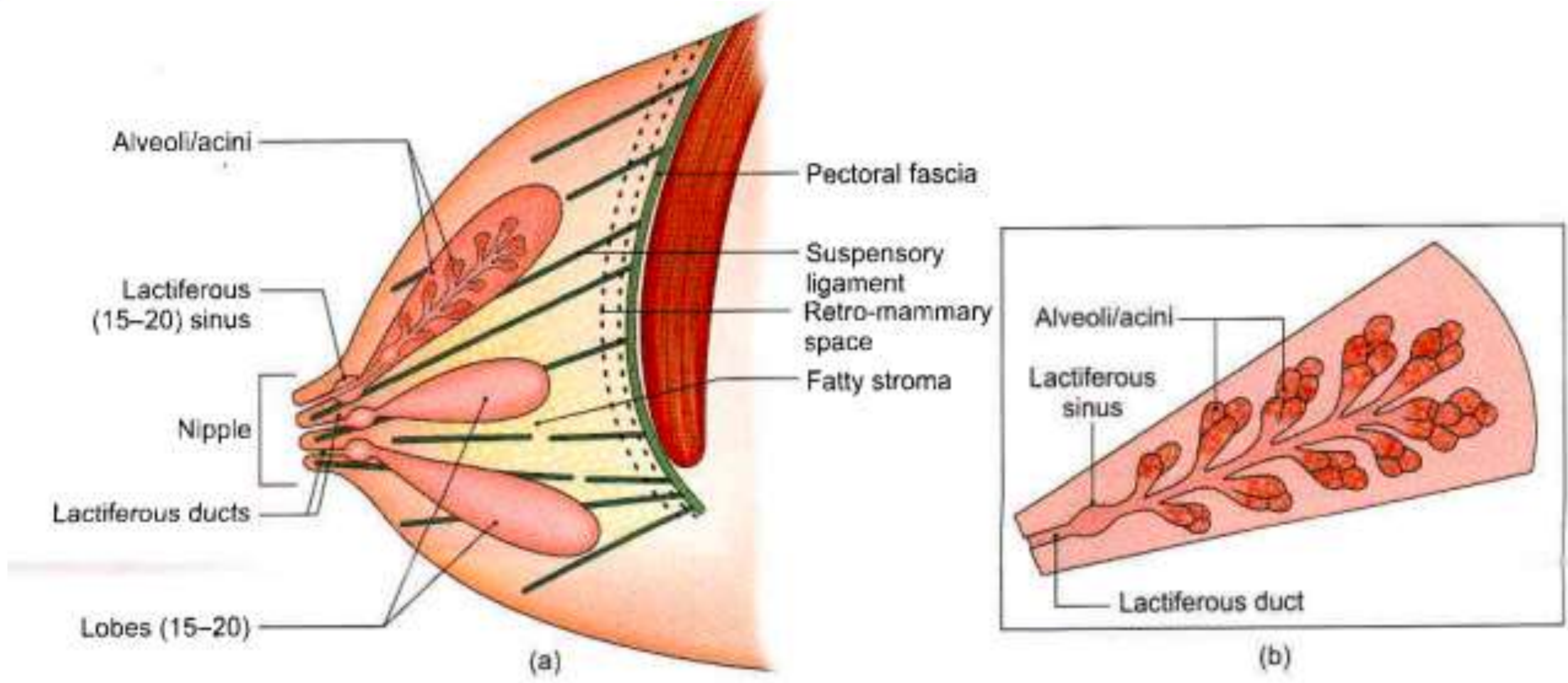
The Parenchyma

- Glandular tissue (secretes milk)
- Gland has 15 – 20 lobes
- Lobe is cluster of alveoli, drained by lactiferous duct
- Ducts converge to the nipple
(Arranged like a spokes of wheel converging towards axis)

The ducts near its termination, expands as lactiferous sinus, served as reservoir of milk during lactation

Anatomy of the Breast







The Parenchyma – Types of cells lining



Alveolar epithelium – cuboidal (resting phase) & columnar (lactation).

Distended alveoli, cuboidal

Smaller ducts - columnar epithelium

Terminal parts of the lactiferous ducts - stratified squamous keratinised epithelium.

Myoepitheliocytes by its contraction facilitates passage of the milk from the alveoli into and along the ducts

The Stroma

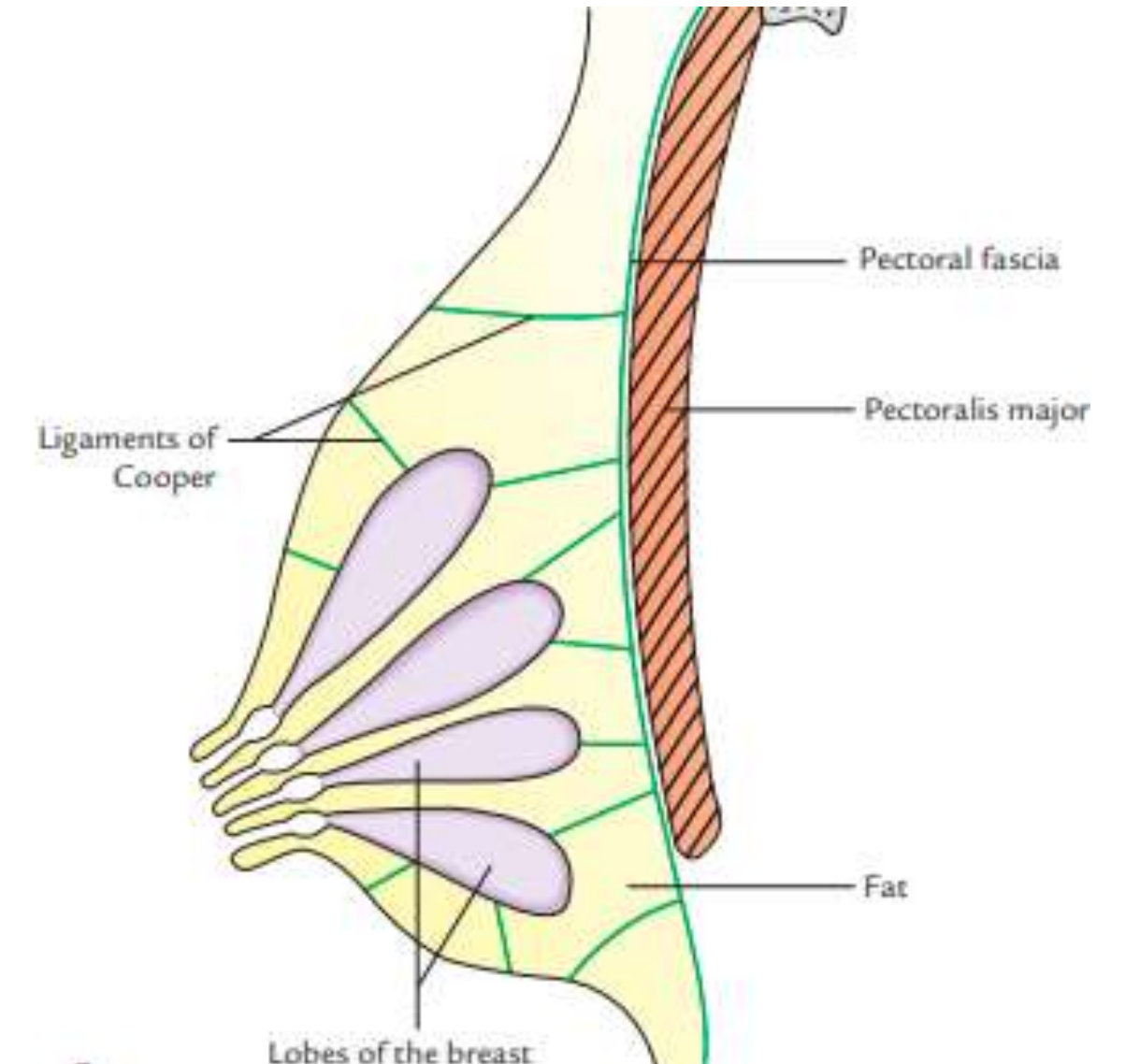
Forms the supporting framework of the gland.
Partly fibrous and partly fatty.

1) **The fibrous stroma** forms septa (suspensory ligaments of Cooper)

Function : Anchor the skin and gland to the pectoral fascia

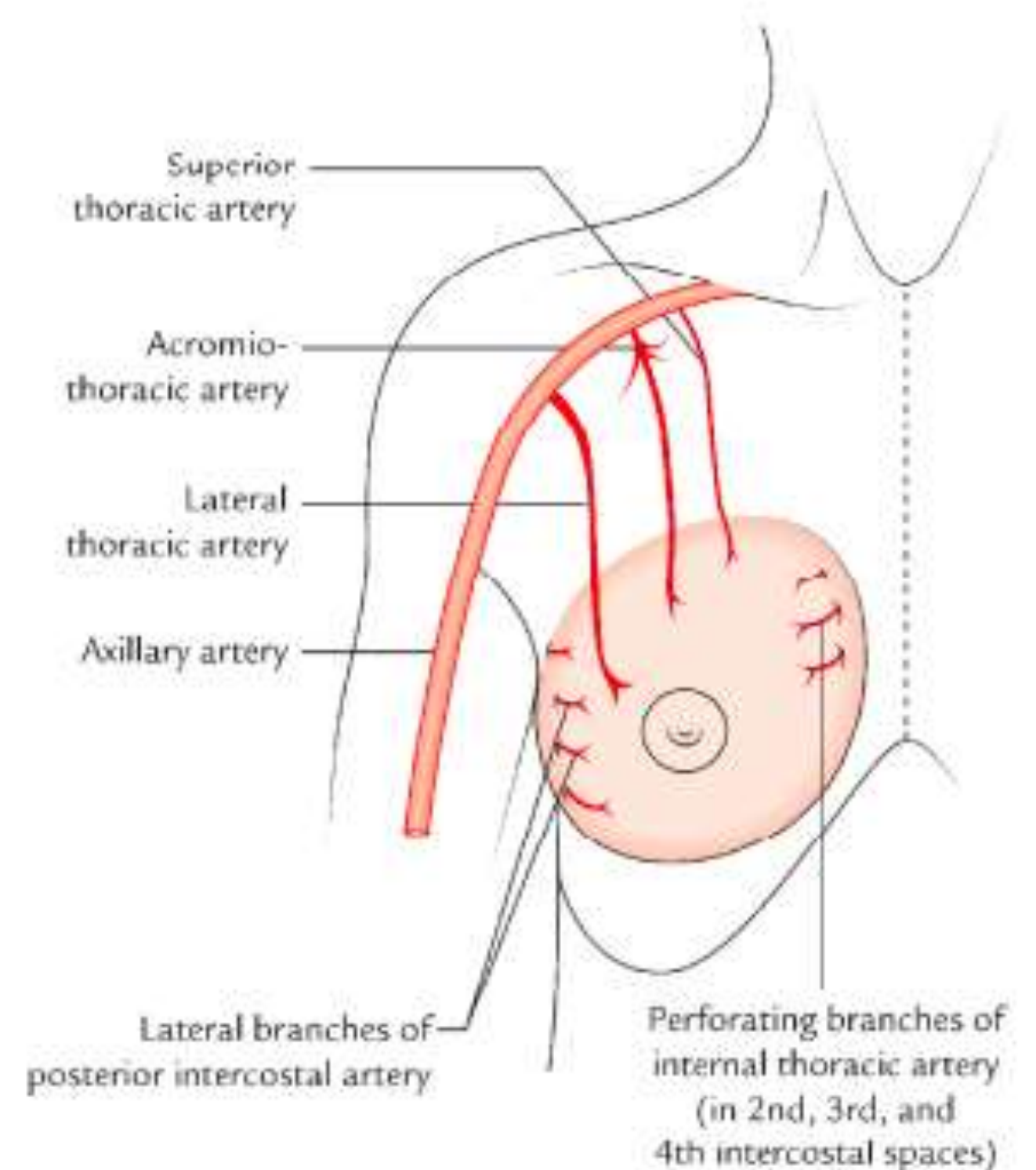
2) **The fatty stroma** forms the main bulk of the gland.

Distributed all over the breast, except beneath the areola and nipple.



Blood Supply – Arterial supply

1. **Internal thoracic artery**, a branch of the subclavian artery, through its perforating branches.
2. **Axillary artery** through its branches lateral thoracic, superior thoracic and acromiothoracic arteries
3. **Posterior intercostal arteries** through its lateral branches of the





Venous Drainage



The veins follow the arteries.

1. Internal thoracic vein
2. Axillary vein
3. Posterior intercostal vein

Converge towards the base of the nipple forming an anastomotic venous circle and run in superficial and deep sets.

The superficial veins drain into the internal thoracic vein and into the superficial veins of the lower part of the neck.

The deep veins drain into the axillary and posterior intercostal veins.



Nerve Supply



Anterior cutaneous branches

Lateral cutaneous branches (4th to 6th intercostal nerves)

Role :

Sensory fibres to the skin

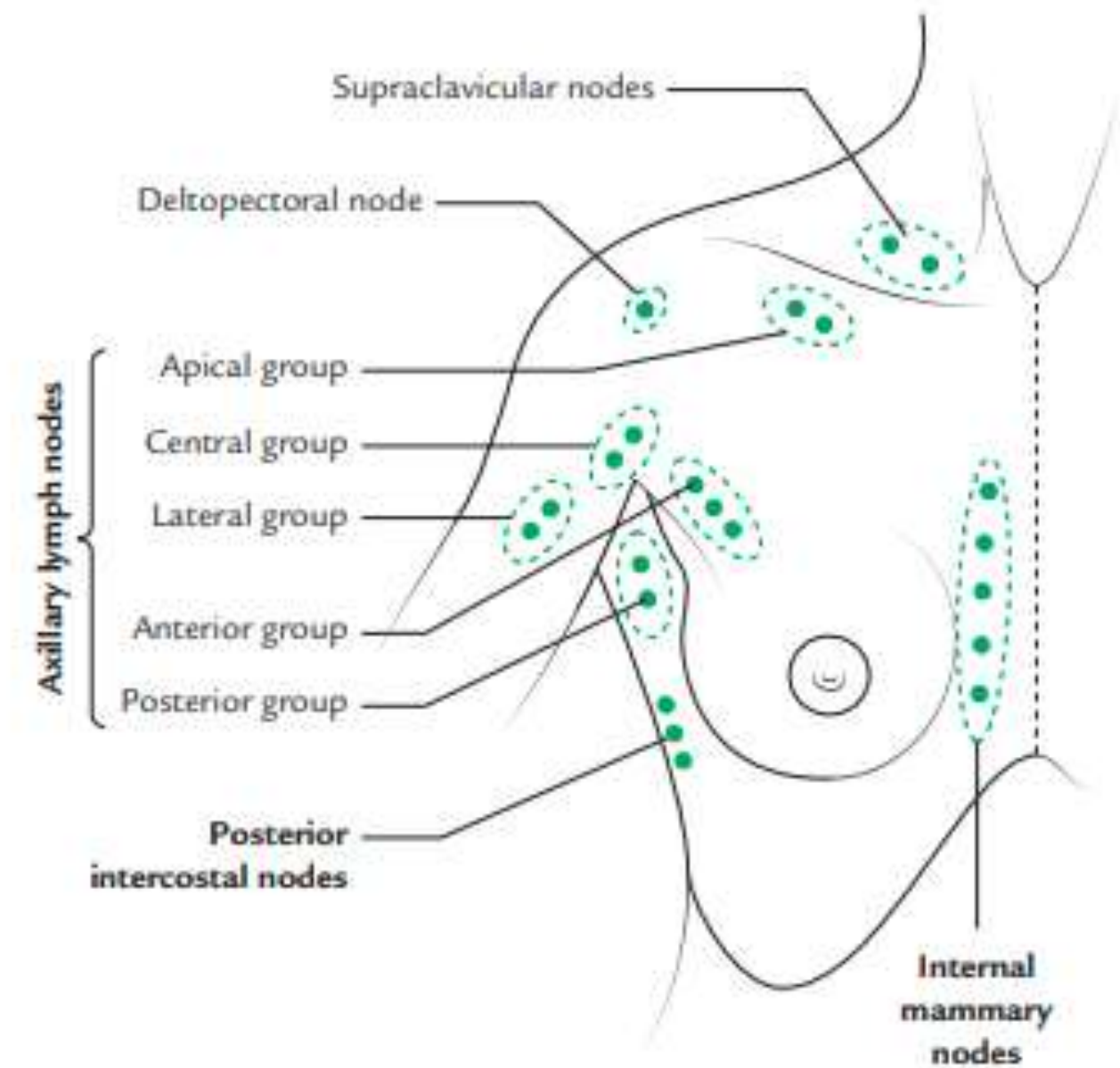
Autonomic fibres to smooth muscle and to blood vessels.

The nerves do not control the secretion of milk

(Note:- Lactation is controlled by hormones like Prolactin – secreted by pituitary gland)

Lymphatic Drainage – Lymph Nodes

- Axillary lymph nodes
- Internal mammary (parasternal) nodes
- Supraclavicular nodes
- Posterior intercostal
- Cephalic (deltopectoral) node
- Subdiaphragmatic
- Subperitoneal lymph plexuses





Lymphatic Drainage – Lymphatics



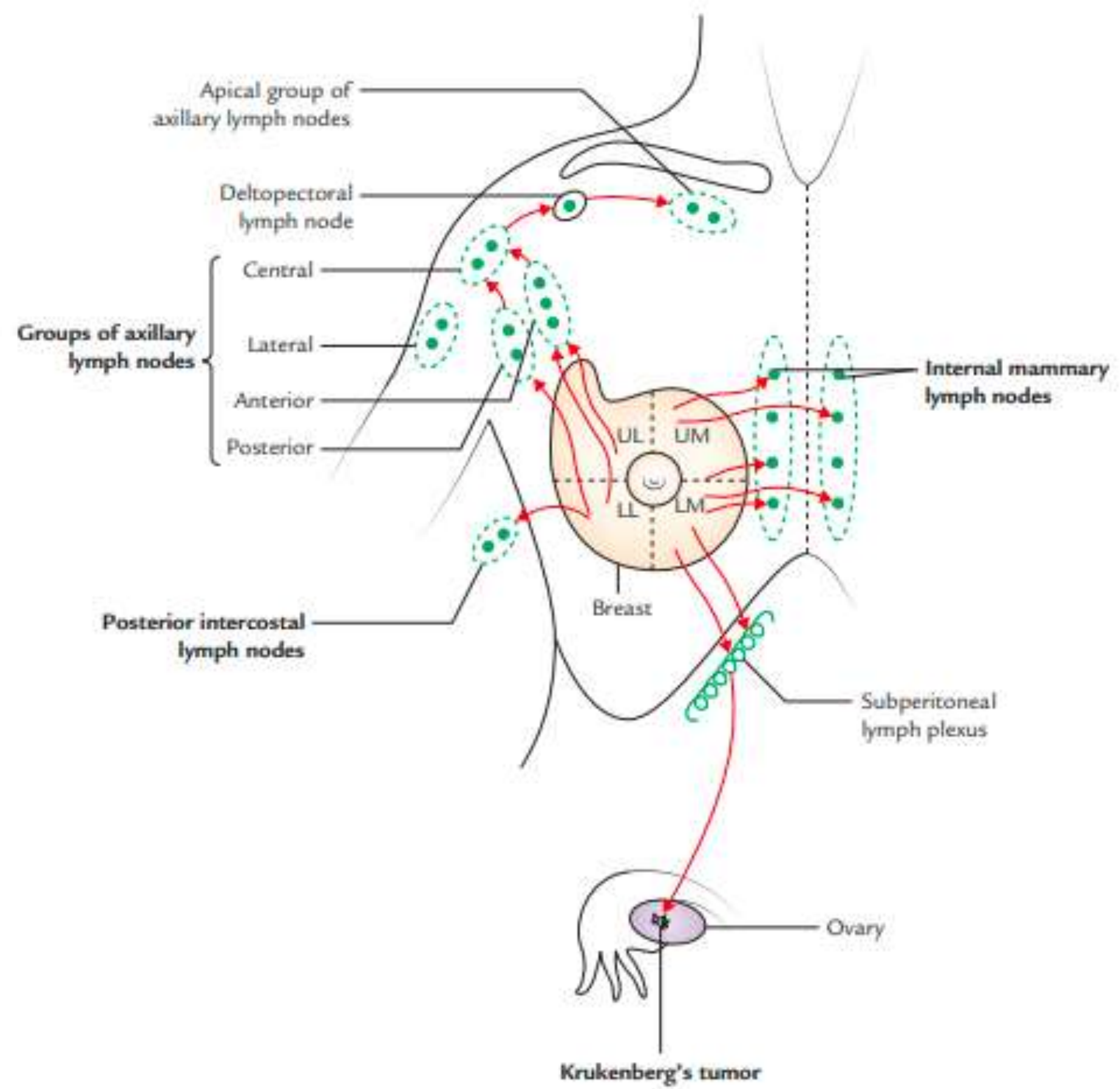
Divided into two groups:

(a) **Superficial** - drain the skin of the breast except that of nipple and areola

(b) **Deep** - drain the parenchyma of the breast, and skin of the nipple and areola.

A plexus of lymph vessels deep to the areola is called subareolar plexus of Sappey

The subareolar plexus and most of the lymph from the breast drain into the anterior group of axillary lymph nodes.





Lymphatic Drainage – Lymphatics



The lymphatic drainage from the breast occurs as follows

1. Lateral quadrants → anterior axillary or pectoral group of lymph nodes.
2. Medial quadrants → internal mammary lymph nodes
3. Lower lateral quadrant → posterior intercostal nodes.
4. Lower medial quadrant (pierce the anterior abdominal wall) communicate with subdiaphragmatic and subperitoneal lymph plexuses.
5. Deep surface of the breast (pierce pectoralis major and clavipectoral fascia) apical group of axillary lymph nodes

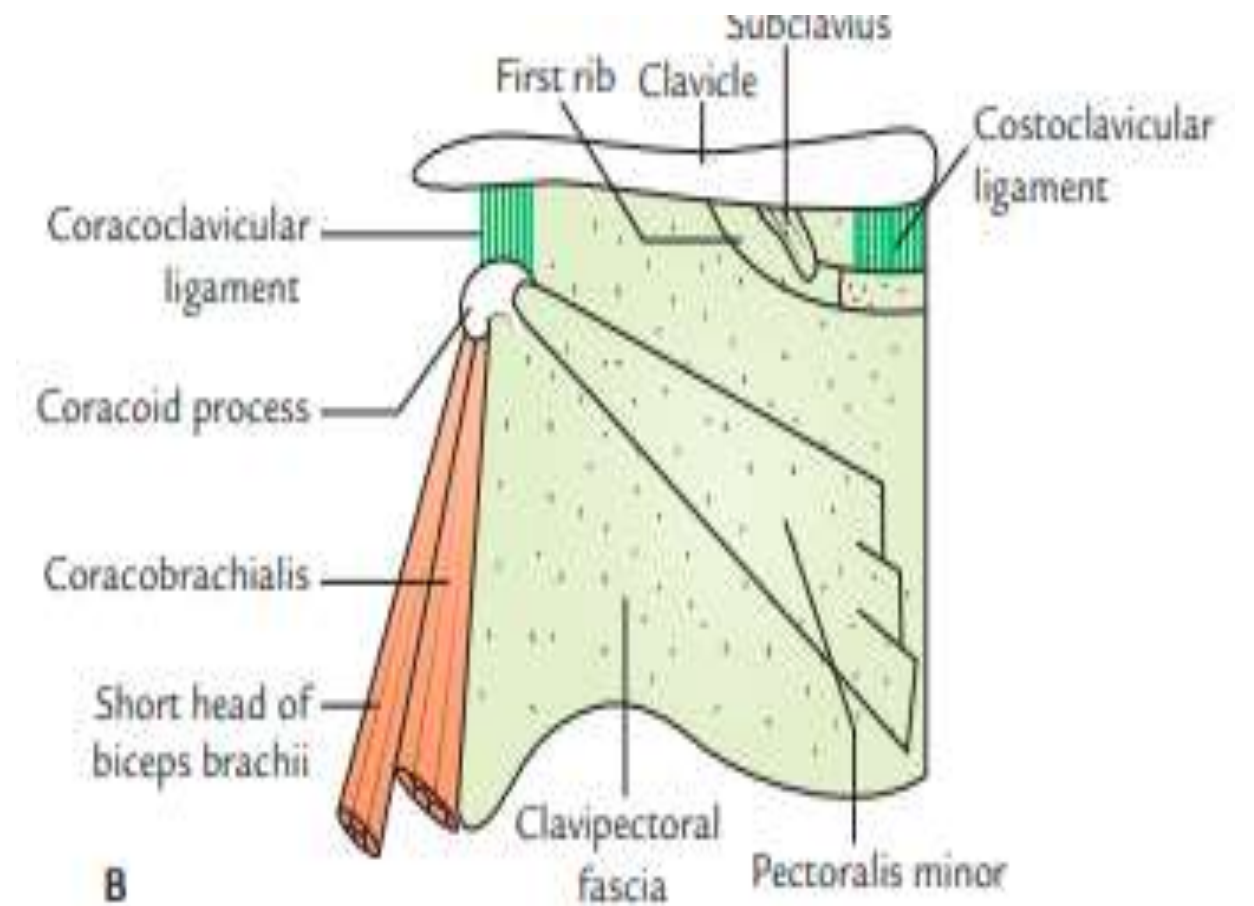
Deep fascia- Clavipectoral Fascia

Strong fascial sheet deep to the clavicular head of the pectoralis major muscle

Fills the space between the clavicle and the pectoralis minor muscle.

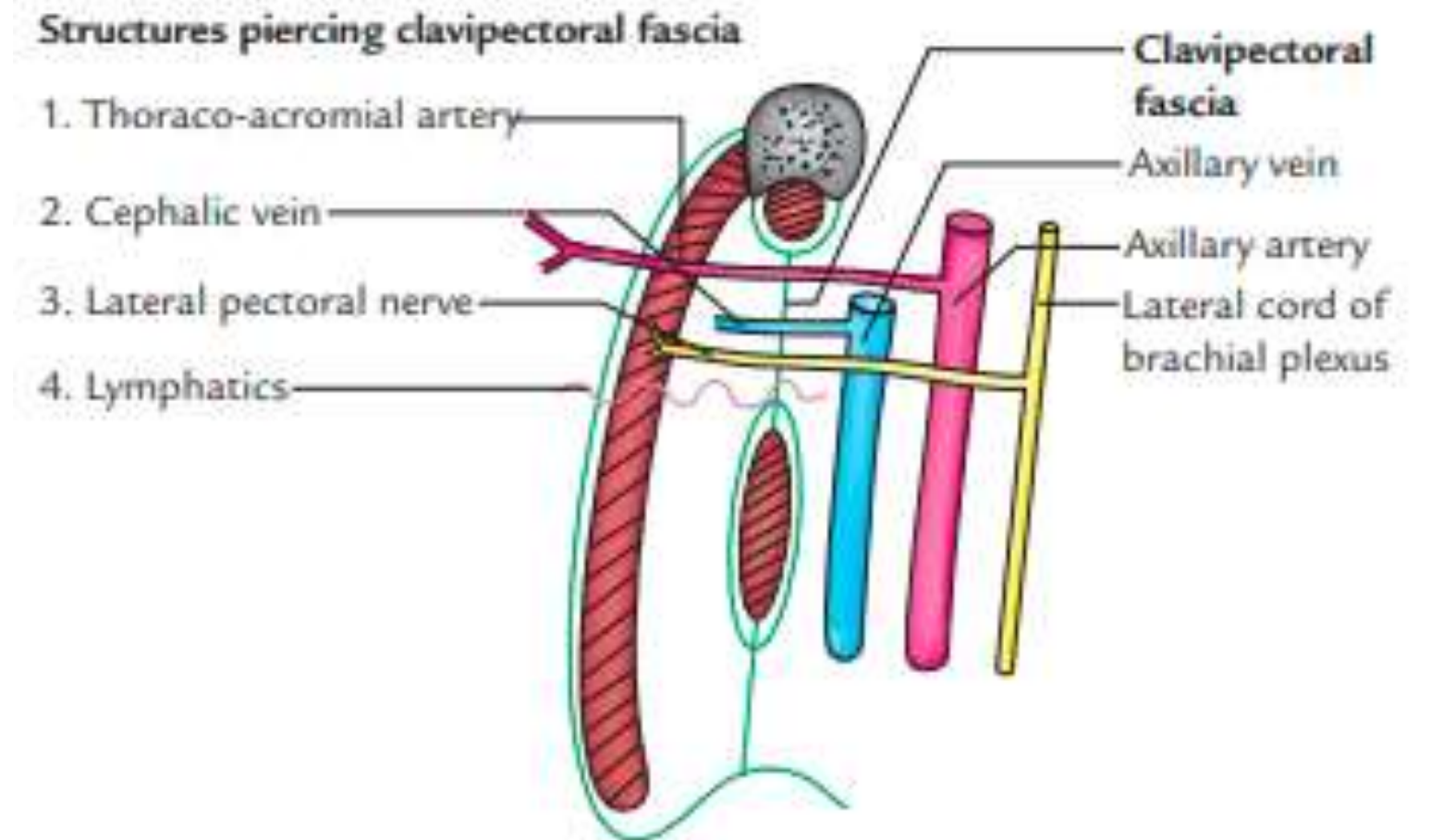
Attachment :

- Vertically, it extends from clavicle above to the axillary fascia below
- Medially, clavipectoral fascia is attached to the first rib and costoclavicular ligament
- Laterally, it is attached to the coracoid process and blends with the coracoclavicular ligament



Structures Piercing the Clavipectoral Fascia

1. Lateral pectoral nerve.
2. Thoraco-acromial artery.
3. Lymphatics from the breast to the apical group of axillary group of lymph nodes.
4. Cephalic vein.





Muscles of the Pectoral Region



1. Pectoralis major.
2. Pectoralis minor.
3. Subclavius.
4. Serratus anterior.



Muscles of the Pectoral Region



1. Pectoralis major.
2. Pectoralis minor.
3. Subclavius.
4. Serratus anterior.

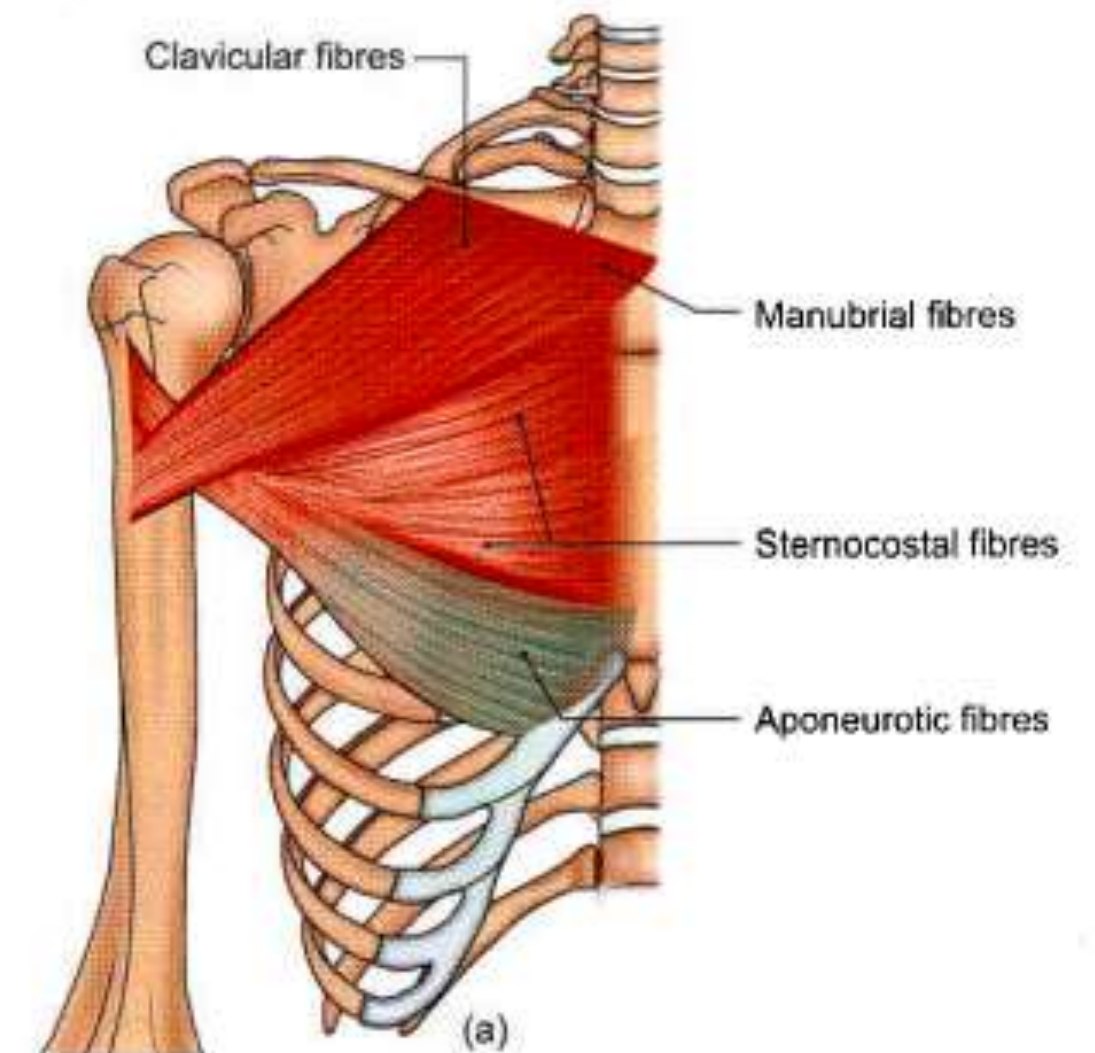
Pectoralis major

Largest muscle of the pectoral region
Fan shaped

- **Origin:**

Arises from two head

a) Clavicular head - arises from the medial half of the anterior aspect of the clavicle.

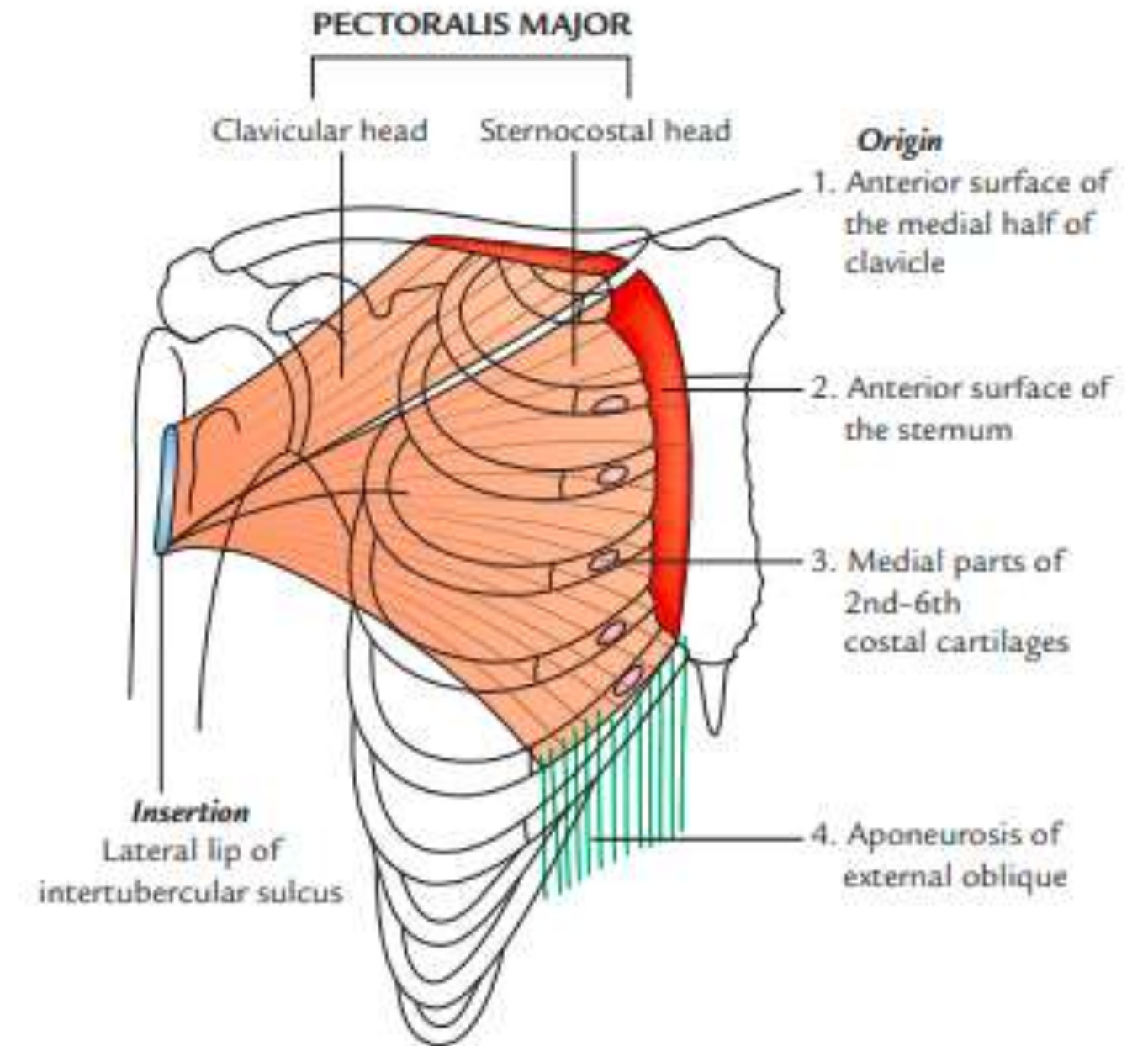


b) Sternocostal head :

(a) lateral half of the anterior surface of the sternum, up to 6th costal cartilage

(b) medial parts of 2nd–6th costal cartilages

(c) aponeurosis of the external oblique muscle of the abdomen



Pectoralis major

Insertion :

U-shaped (bilaminar) tendon on to the **lateral lip of the bicipital groove.**

Anterior lamina → clavicular fibres

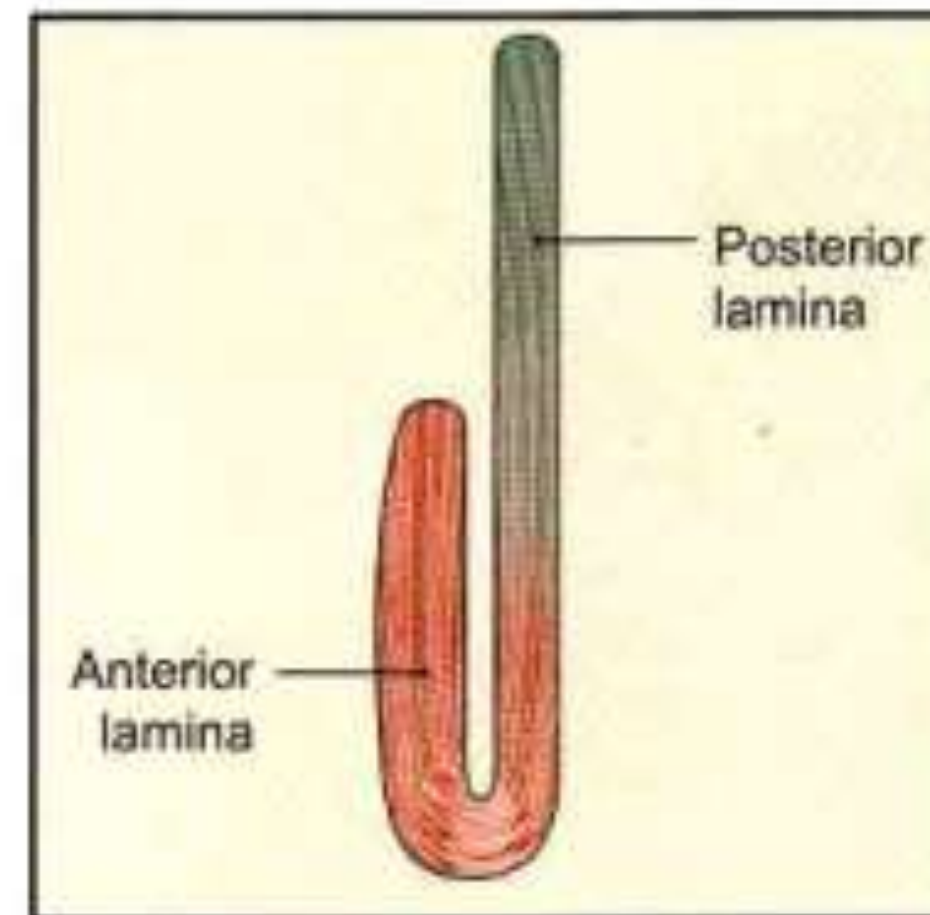
Posterior lamina → sternocostal fibres.

The two laminae are continuous with each other inferiorly

Medial border and upper surface of coracoid process
Subclavian groove (middle one-third of clavicle).

Nerve Supply

Lateral (C5 to C7) and Medial pectoral (C8 and T1) nerves



Actions

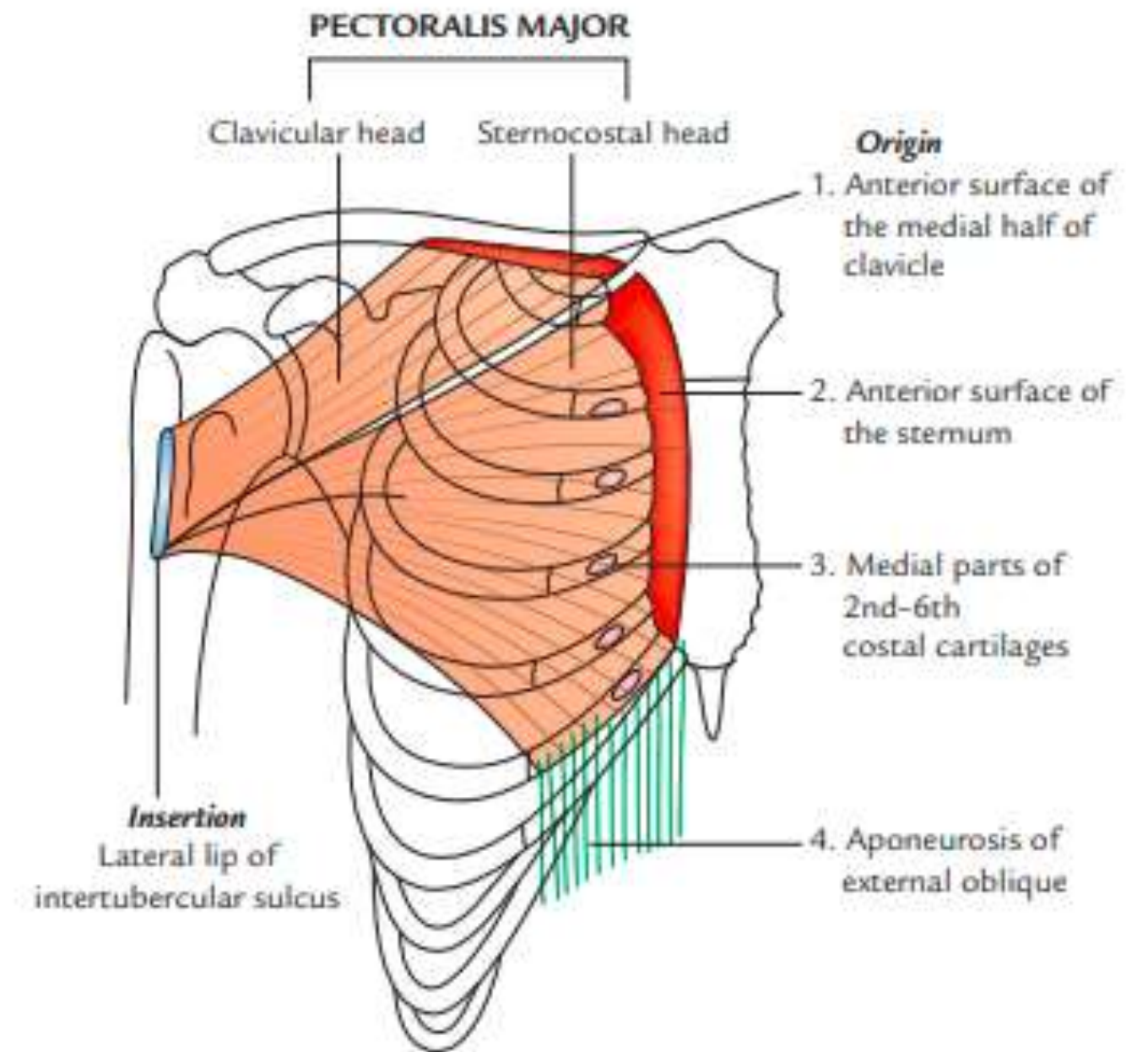
Whole the muscle causes: **Adduction** and **medial rotation** of the shoulder joint (arm) .

- Clavicular part produces: **Flexion of the arm .**

- Sternocostal part is used in –

Extension of flexed arm against resistance

Climbing



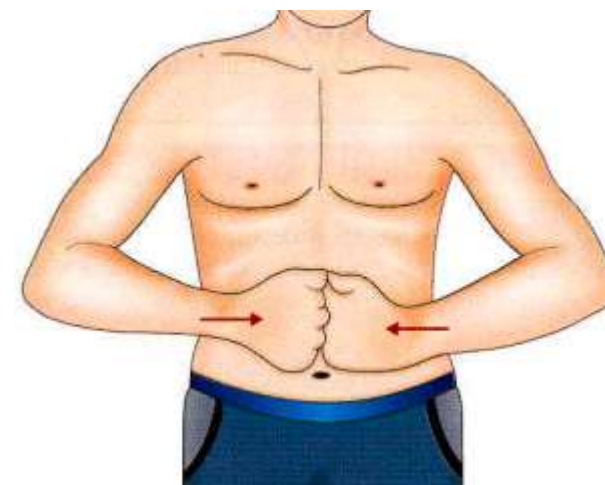
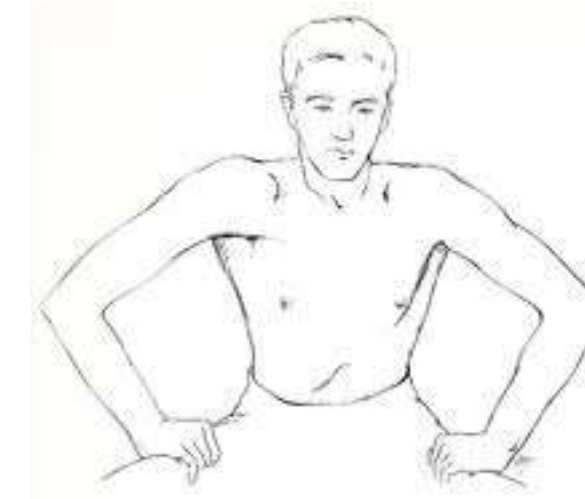
Clinical testing



The clavicular head → attempting to lift a heavy table/rod.

The sternocostal head → depress a heavy table/rod.

Press the fists against each other



Actions



Clavicular head being made prominent by flexing the arm to right angle

Sternocostal head being made prominent by abducting arm to 60° and touching the physician's hand kept at the opposite hip





Structures undercover the Pectoralis Major



- a. **Bones and cartilages:** Sternum, ribs, and costal cartilages.
- b. **Fascia:** Clavipectoral.
- c. **Muscles:** Subclavius, pectoralis minor, serratus anterior, intercostals and upper parts of the biceps brachii and coracobrachialis.
- d. **Vessels:** Axillary.
- e. **Nerves:** Cords of brachial plexus with their branches.



Pectoralis Minor

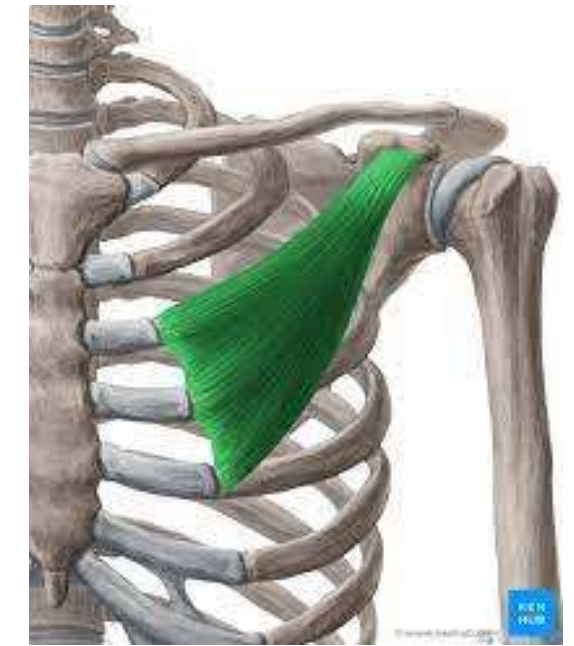


It is the small triangular muscle that lies deep to the pectoralis major muscle

Origin : from 3rd, 4th, and 5th ribs, near their costal cartilages.

Insertion :

Short thick tendon into the **medial border and upper surface of the coracoid process of the scapula**



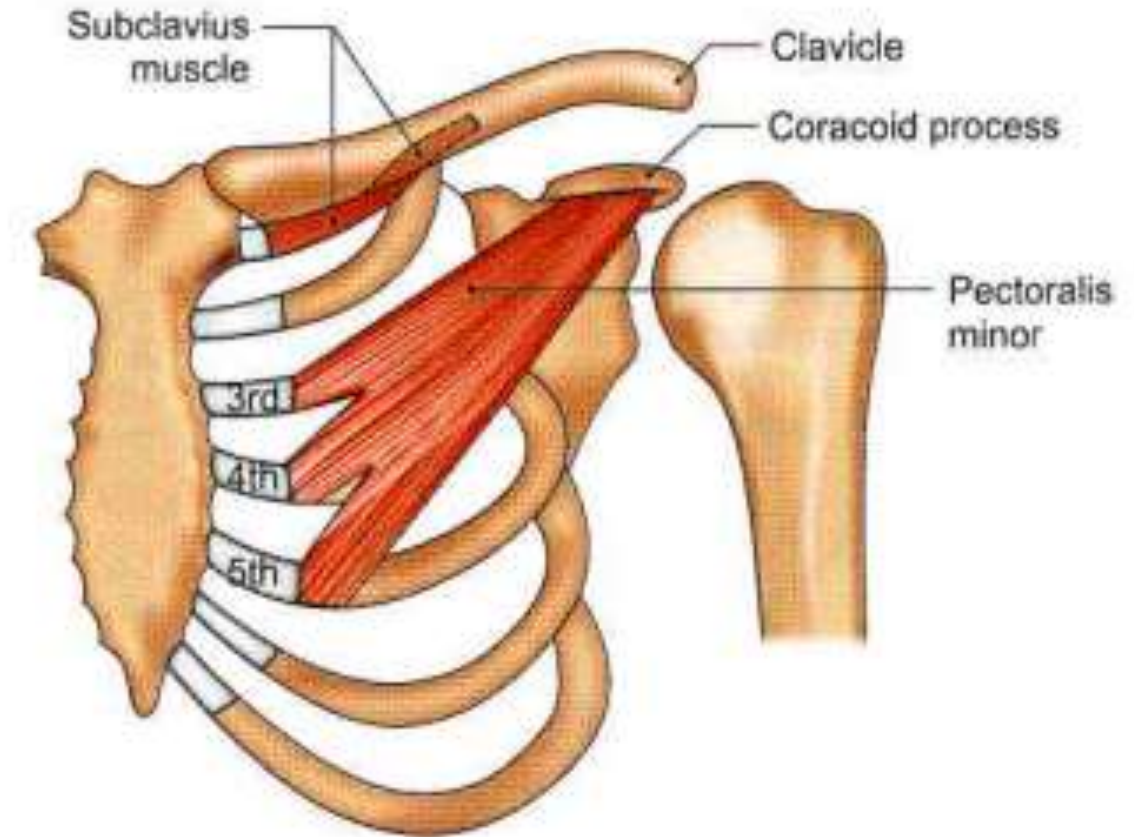
Pectoralis Minor

Nerve supply

Medial and lateral pectoral nerves.

Action :

- Draws the scapula forward (with serratus anterior) .
- Depresses the point of the shoulder . Helps in forced inspiration





Subclavius



Small round muscle lies horizontally inferior to clavicle

Origin : First rib at the costochondral junction

Insertion : Subclavian groove in the middle one-third of the clavicle

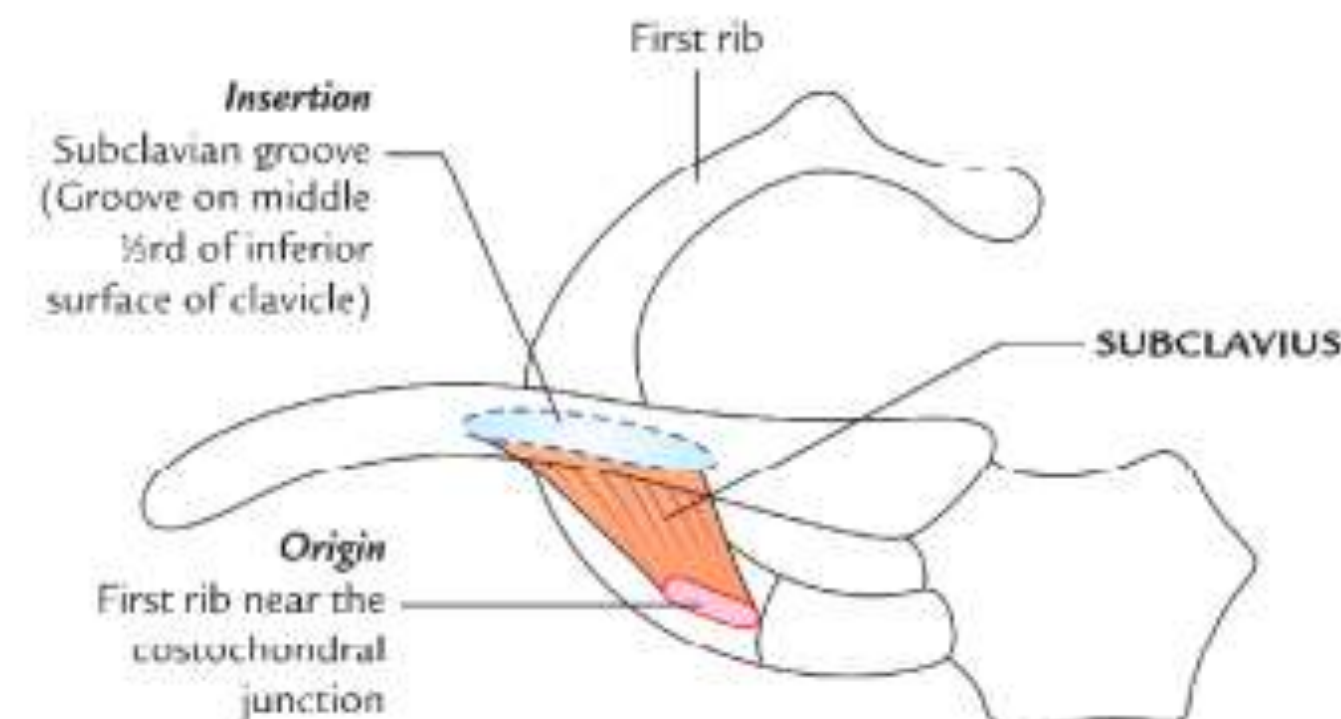


Nerve supply:

Nerve to subclavius from **upper trunk of brachial plexus**

Action:

- Steadies the clavicle during movements of the shoulder joint.
- Forms a cushion for axillary vessels and divisions of trunks of brachial plexus



Serratus Anterior

Serratus anterior muscle is not strictly muscle of the pectoral region, but it is convenient to consider it here.

Origin :

- Arises by eight digitations from the upper eight ribs
- The fascia covering the intervening intercostal muscles

Insertion :

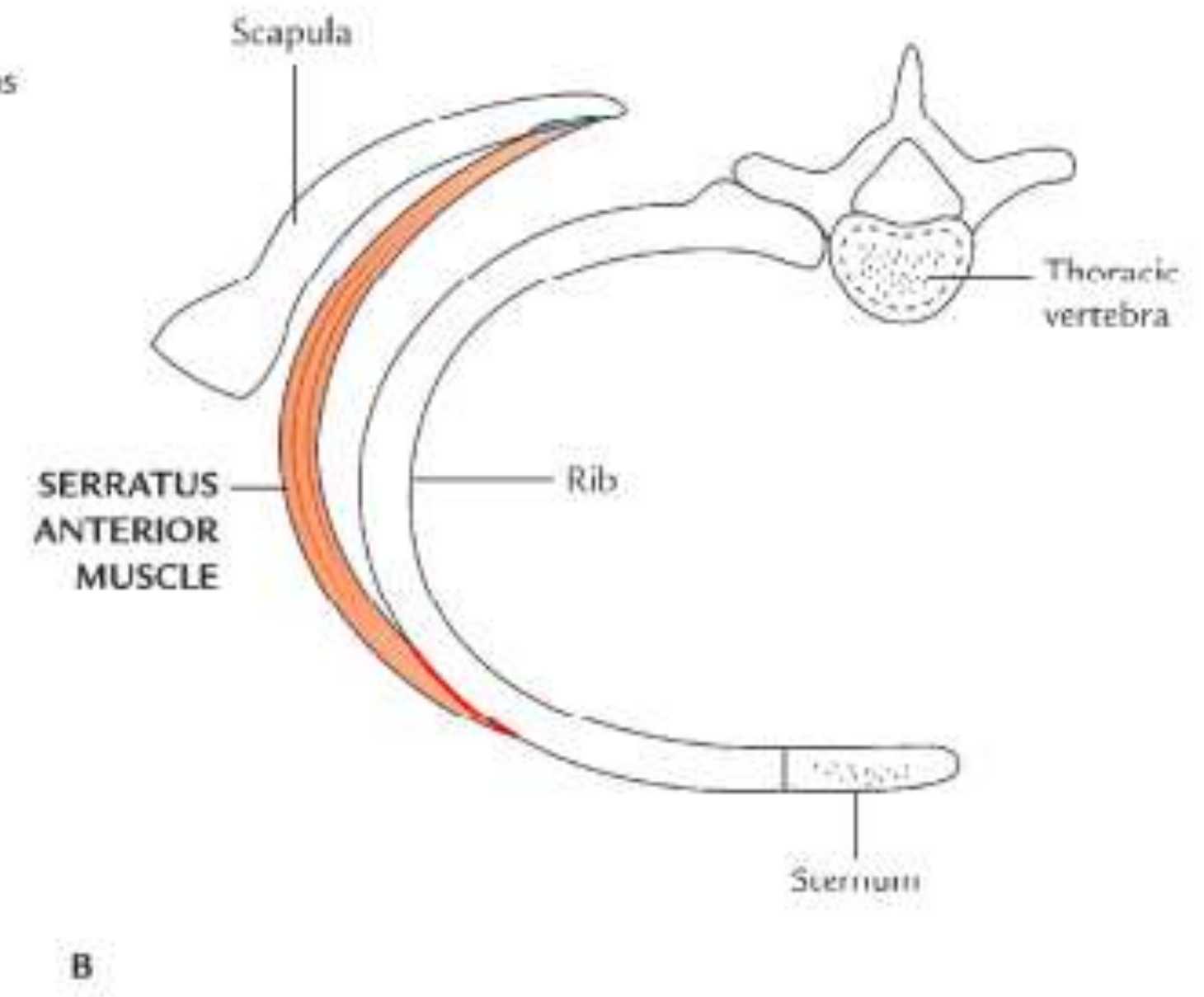
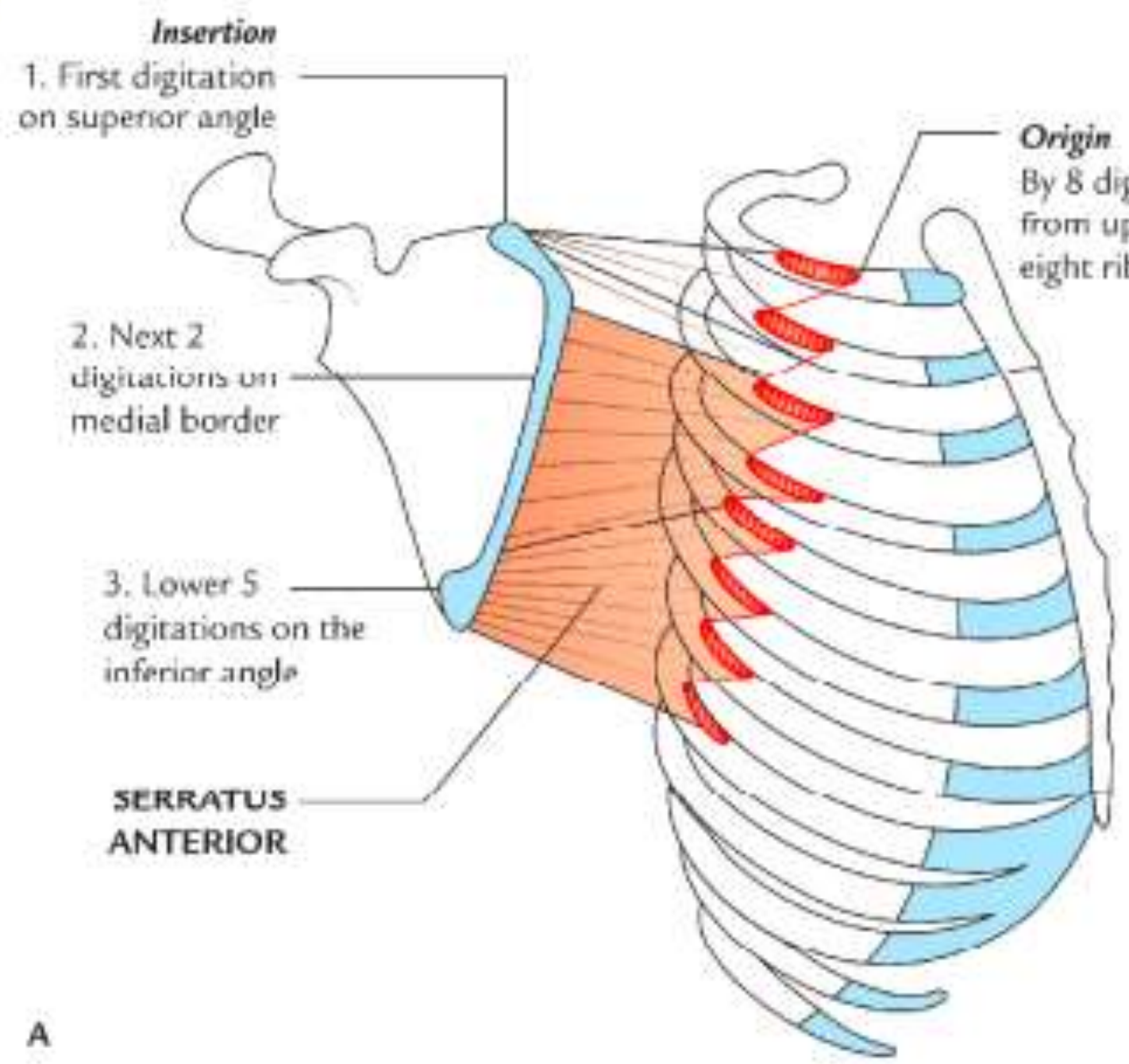
Costal surface of the scapula - medial border.

1st digitation -superior angle to the root of the spine.

2nd & 3rd - lower down on the medial border.

lower five digitations - large triangular area over the inferior angle.





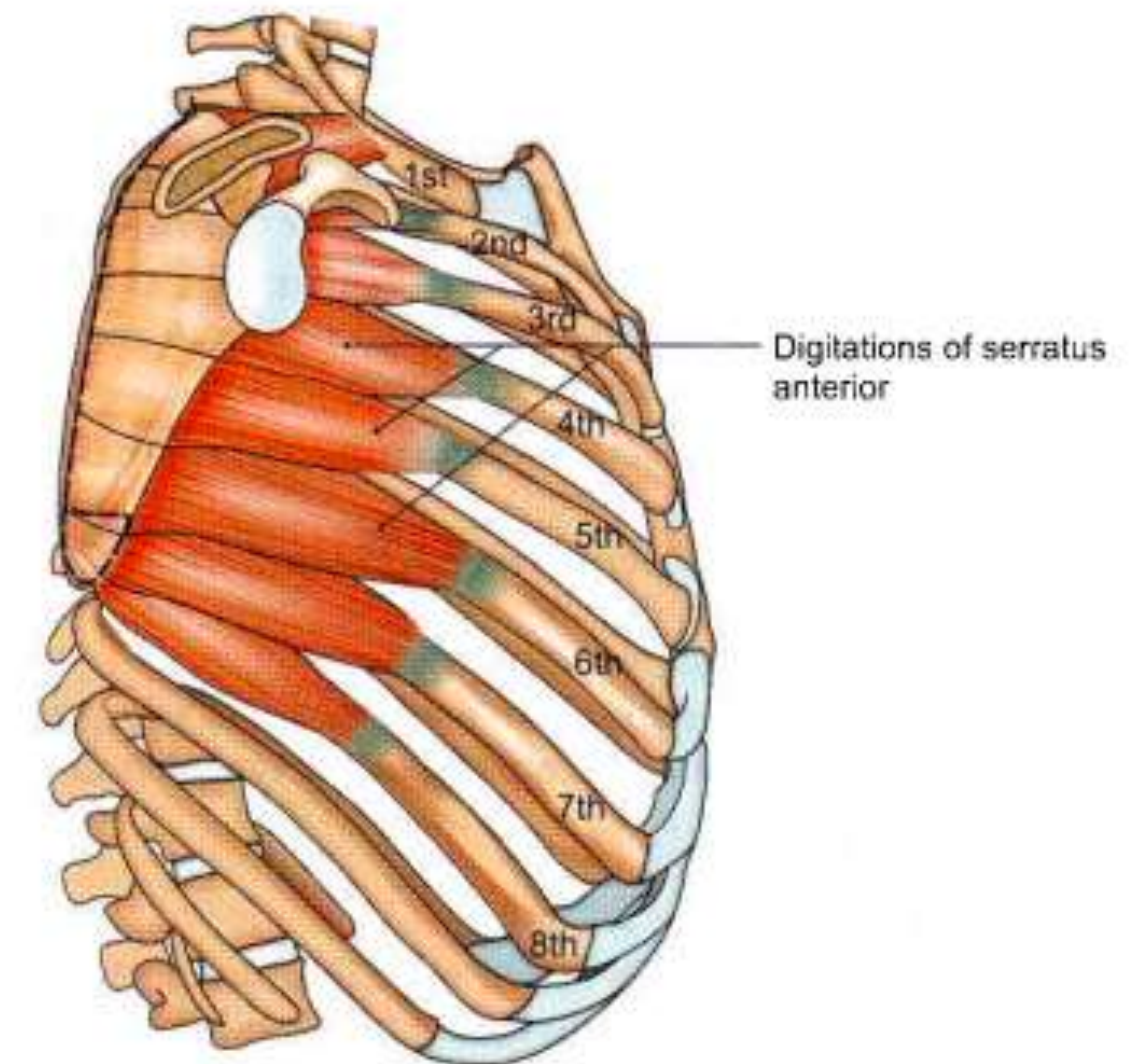
Nerve Supply

Branch of the brachial plexus.

Arises from roots C5, C6 and C7 and is also called **Long thoracic nerve.**

Actions

- Muscle pulls the scapula forwards around the chest wall to protract the upper limb
E.g., Pushing and Punching movements





Serratus Anterior



- Fibres inserted into the inferior angle of the scapula pull it forwards and rotate the scapula which turns glenoid cavity upwards.
- For this action trapezius and serratus anterior act as force couple pulling the acromion upwards and backwards
- Steadies the scapula during weight carrying.
- It helps in forced inspiration.



Applied Anatomy



Paralysis of the serratus anterior

'winging of scapula' in which the inferior angle and the medial border of the scapula are more prominent.

The patient is unable to do any pushing action, nor can he raise his arm above the head.

Any attempt to do these movements makes the inferior angle of the scapula still more prominent. 2



Serratus Anterior

Clinical testing:

Forward pressure with the hands against a wall, or against resistance offered by the examiner, makes the medial border and the inferior angle of the scapula prominent (winging of scapula) if the serratus anterior is paralysed





Applied Anatomy – Breast Cancer



The upper and outer quadrant of breast is a frequent site of carcinoma (cancer).

Several anatomical facts are of importance in diagnosis and treatment of this condition.

Abscesses may also form in the breast and may require drainage

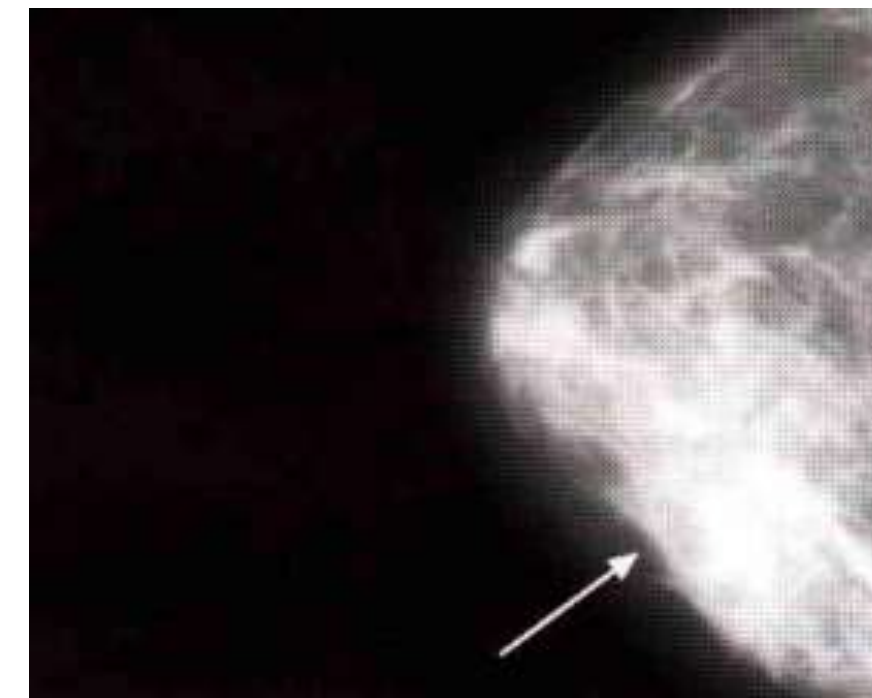
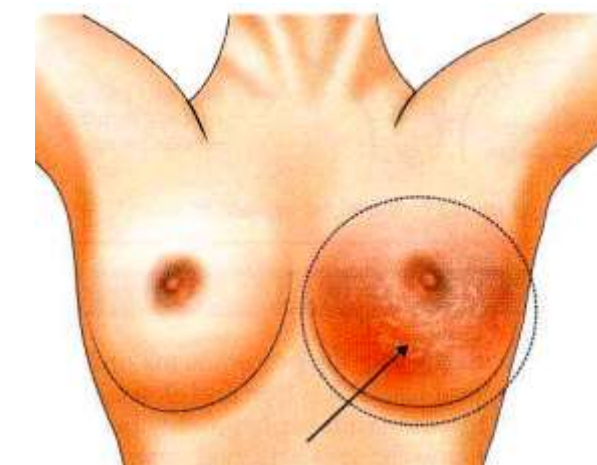
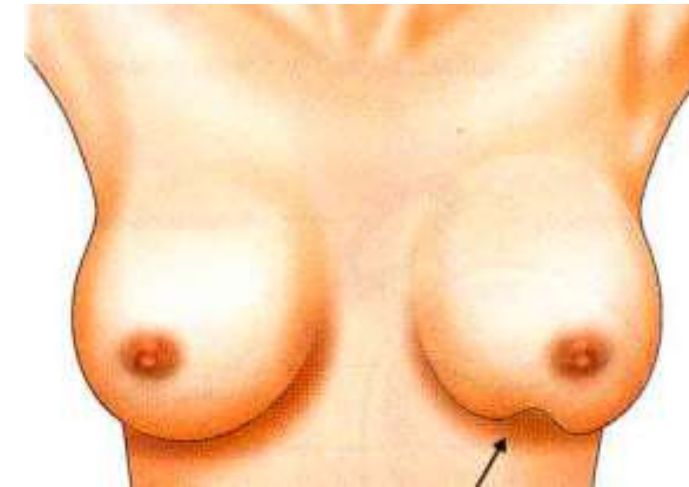
Self-examination of breasts

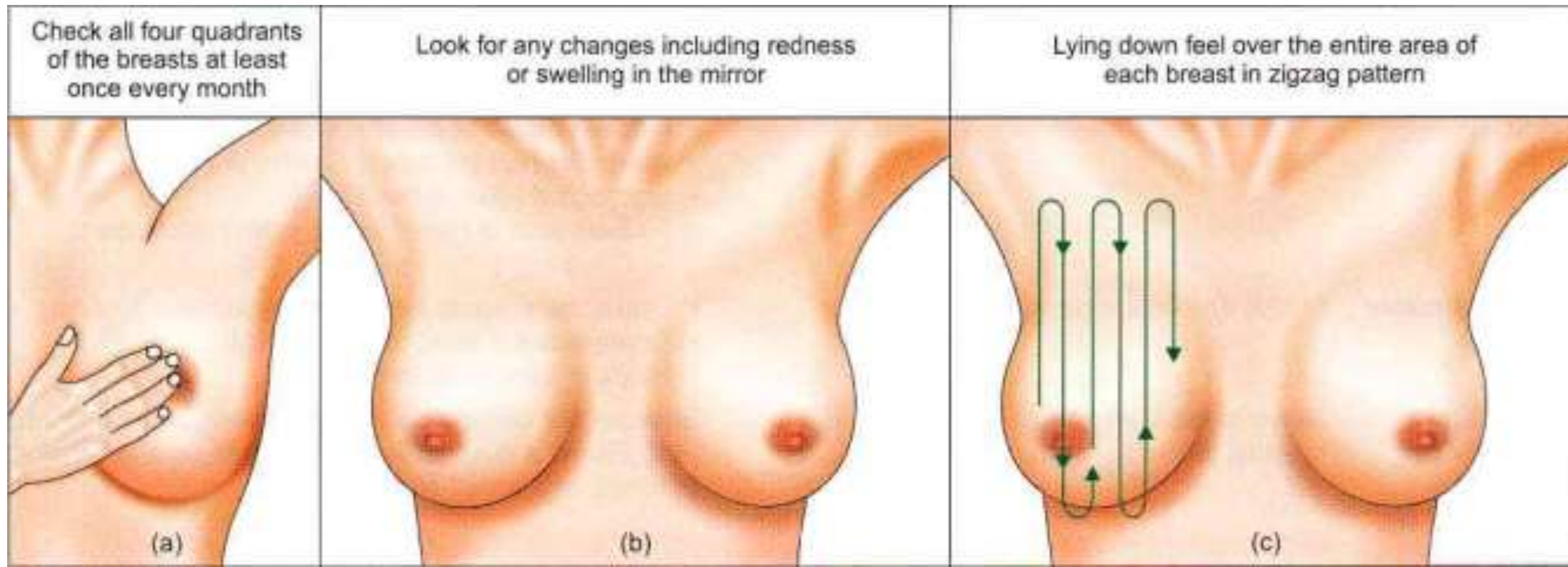
- a. **Inspect:** Symmetry of
- b **Change in colour of skin.** areolas and nipples.
- c. Retraction of nipple is a sign of cancer.
- d. Discharge from nipple on squeezing it.
- e. Palpate all four quadrants with palm of hand.

Note: any palpable lump.

- f. Raise the arm to feel lymph nodes in axilla.

Mammogram may reveal cancerous mass







QUESTIONS RELATED TO ABOVE SLIDES



REFERENCES & THANKING SLIDE