



WITH NOTES

# ANATOMY & DEVELOPMENT OF THE BREAST

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M N U



# Intended Learning Outcomes (ILOs)

- **By the end of the lecture, the student should be able to:**
  1. Describe the shape and position of the female breast.
  2. Describe the structure of the mammary gland.
  3. List the blood supply of the female breast.
  4. Describe the lymphatic drainage of the female breast.
  5. Describe the applied anatomy in the female breast.
  6. Describe the development of the female breast.

# Agenda

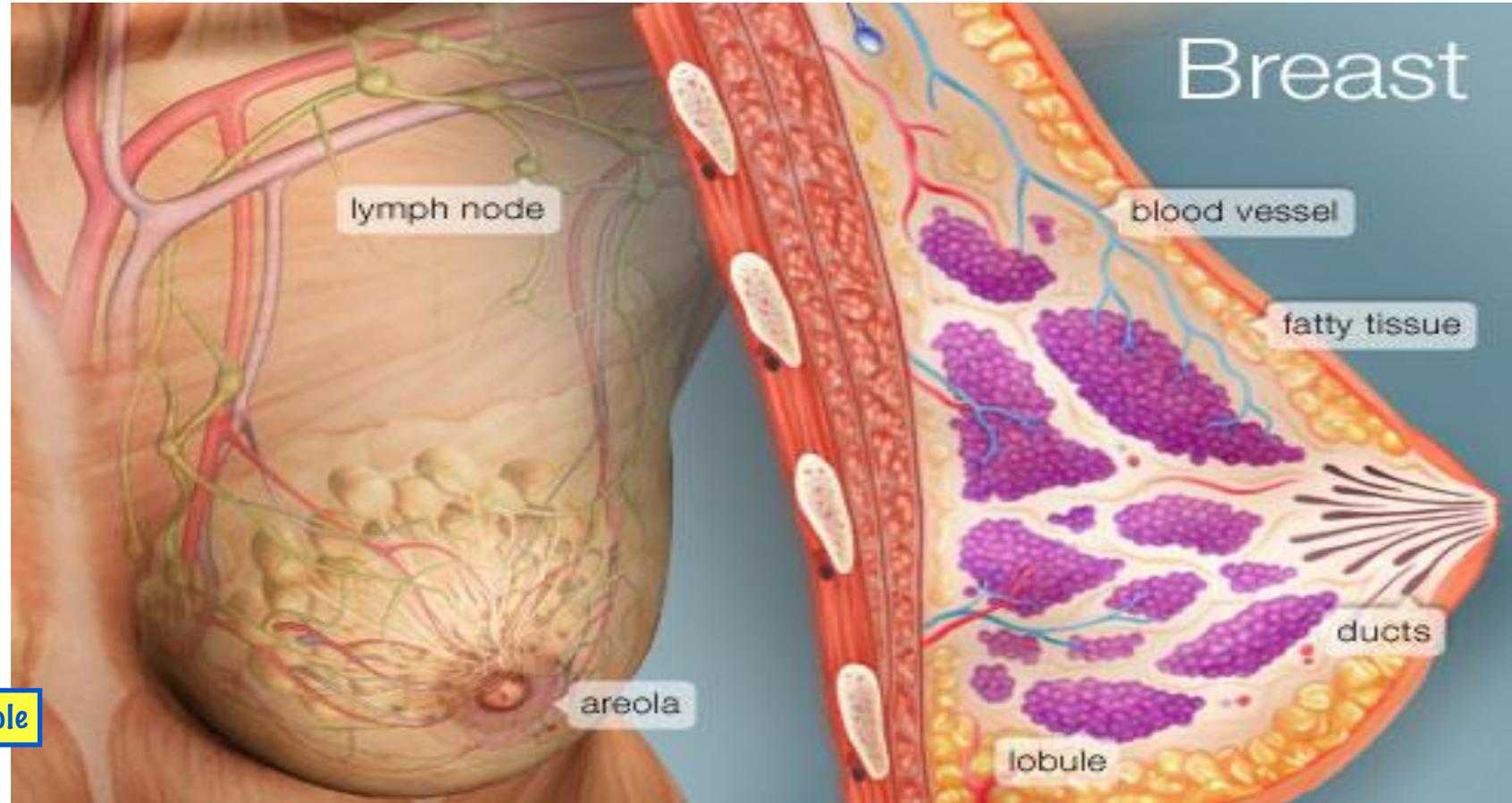
1. Anatomy of the breast
2. Blood and nerve supply of the breast ← مهمة جدا
3. Lymphatic drainage of the breast ← مهمة جدا
4. Development of the female breast.



# Anatomy of Female Breast

# Parts & Shape of the breast

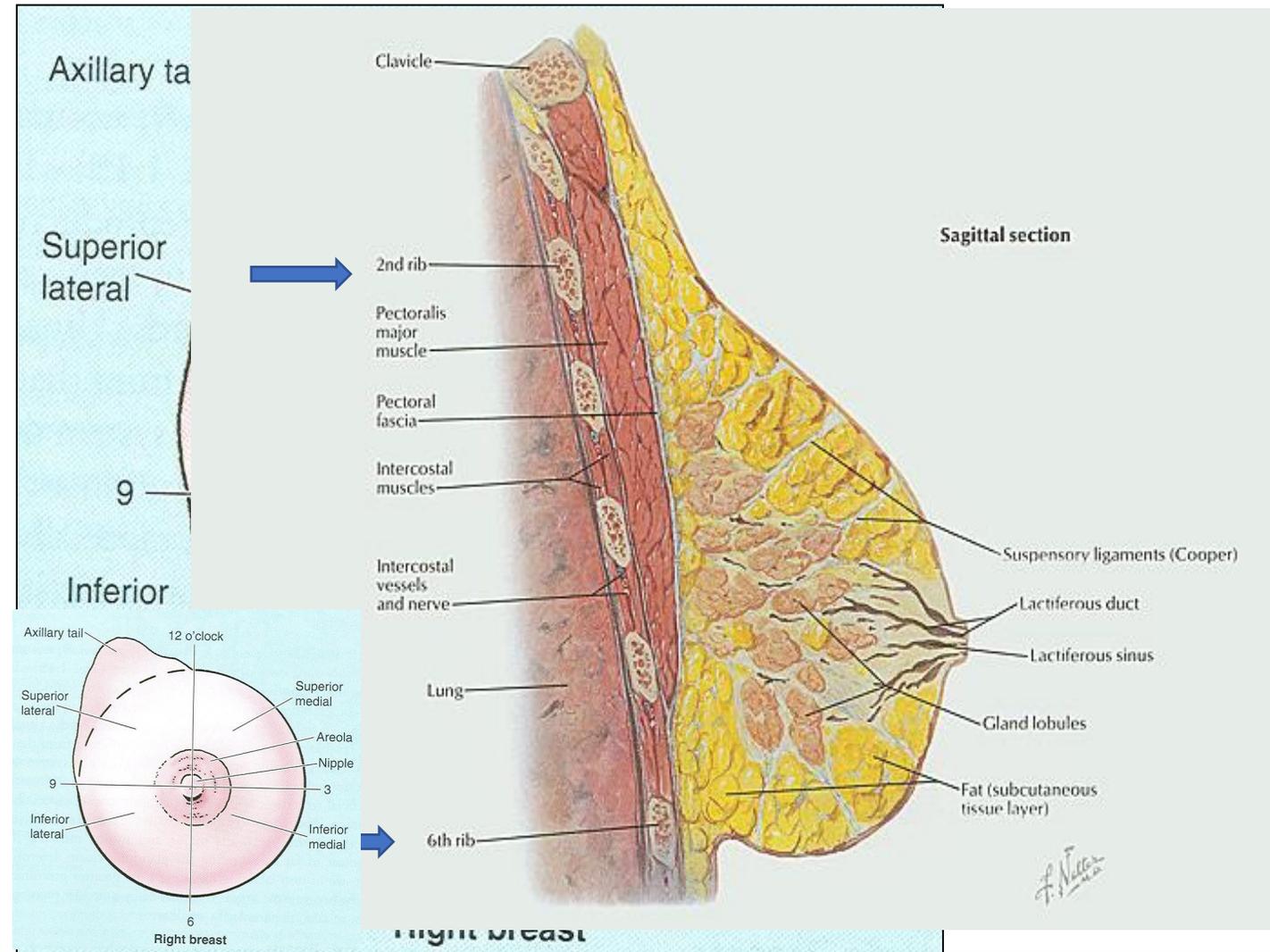
- Are specialized accessory glands of the skin that are capable of secreting milk and present in both sexes.
- It is conical in shape.
- It lies in **superficial fascia** of the front of chest.
- It has a **base, apex** and **tail**.



# Position and Extension of the breast

- Its **base** extends from **2<sup>nd</sup> to 6<sup>th</sup> ribs**.
- It extends from the **sternum** to the **midaxillary line laterally**.
- **It has no capsule.**
- **Axillary tail (Tail of Spence):** small part that extends upwards and laterally, pierces the **deep fascia** at the lower border of the **pectoralis major** and comes in **contact with the axillary vessels**. It contains a **large amount of glandular tissue** and is the site of **60 % of carcinomas of the breast**

الجزء دا مهم



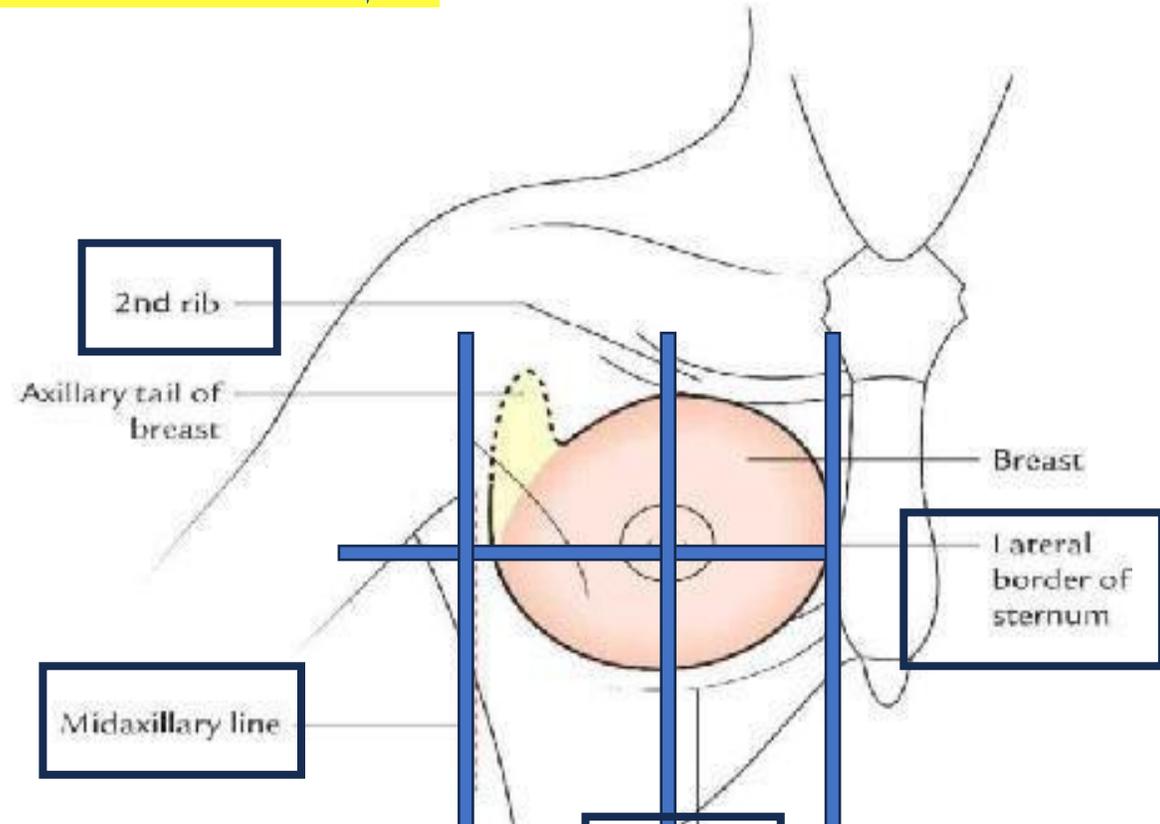
# Extension of the Gland

مهم نعرفها عشان ال cancer بيكبر الحجم شوية

**1. Vertical extension:** Along the mid-clavicular line from 2nd to 6th rib. **MCQ**

**2. Horizontal extension :** At level of 4th rib from lateral margin of sternum to mid-axillary line **MCQ**

**3. The nipple lies** opposite **4<sup>th</sup> intercostal space.** **MCQ**



- MCQ : What is the vertical extent of the breast? From 2nd to 6th rib
- MCQ : The horizontal extension of the breast is from: Lateral border of sternum to midaxillary line
- MCQ : The nipple is located opposite to ? 4th intercostal space

# Deep relations of the breast

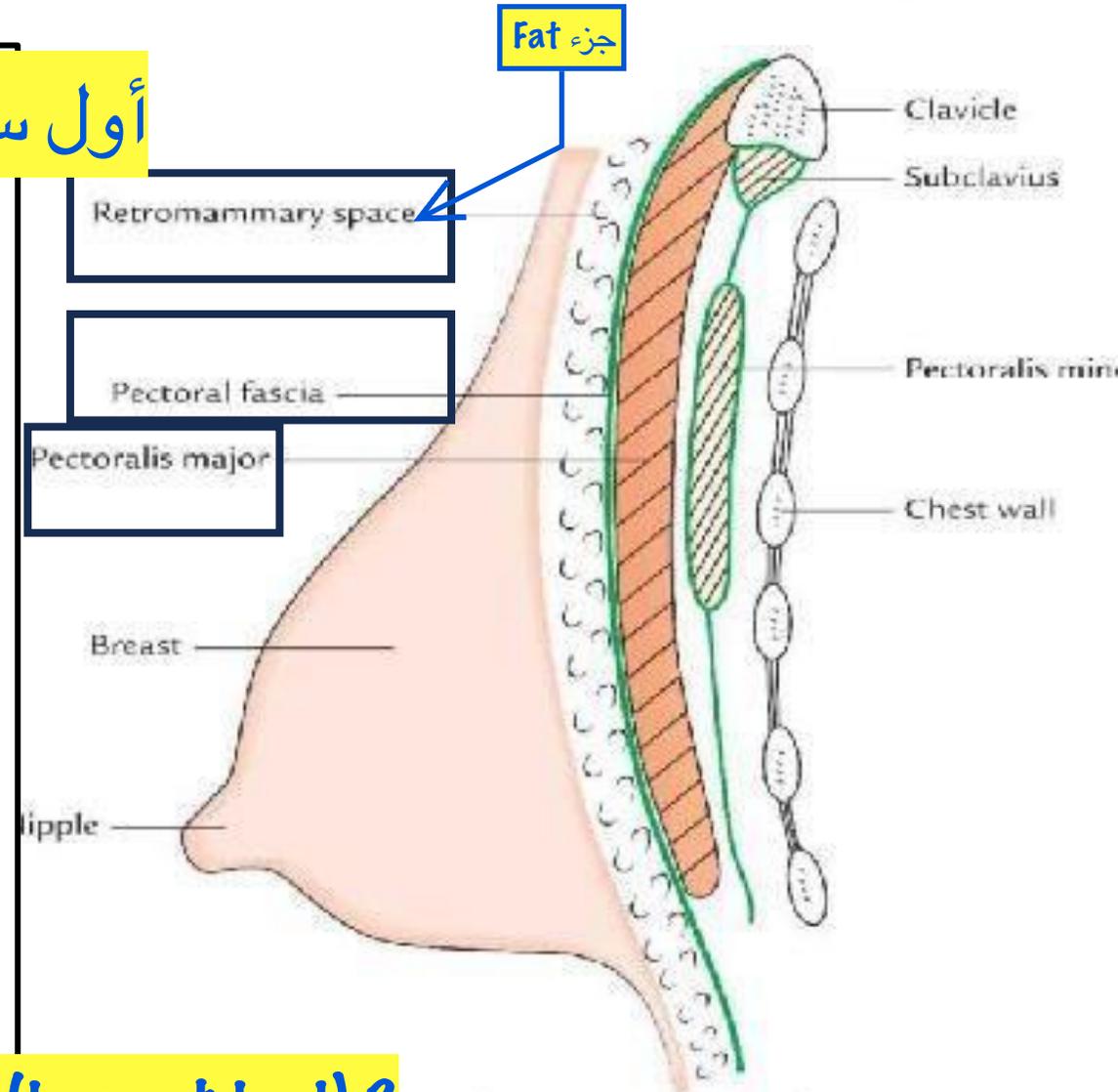
**Breast bed:** أول سؤال SAQ في المحاضرة

**Retro-mammary space:-** Makes the breast movable over pectoralis major muscle.

**Pectoral fascia [deep fascia]:** covers pectoralis major.

**Muscular bed:-**

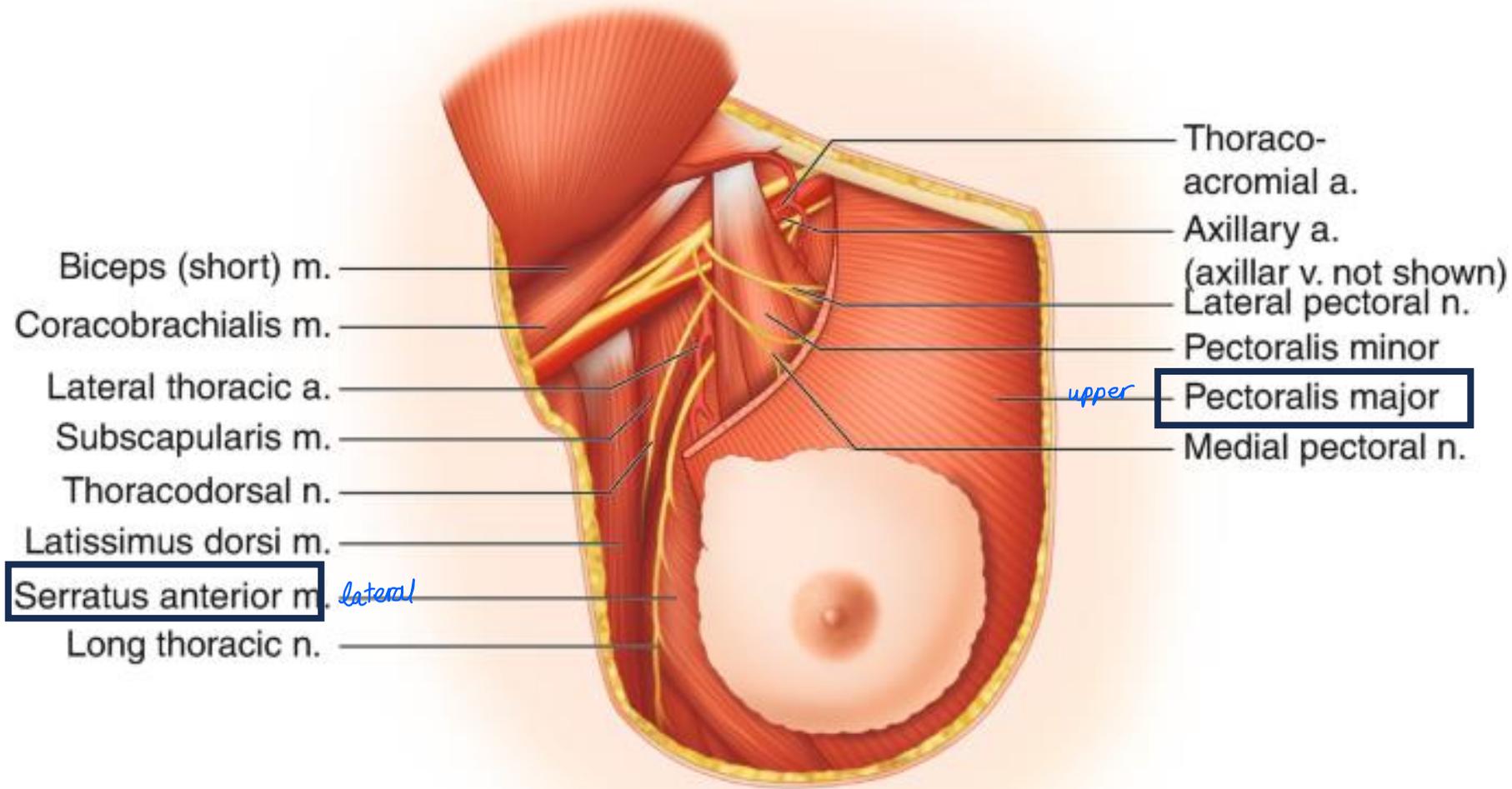
- i. **Pectoralis major:** **supero-lateral  $\frac{2}{3}$**  of breast lies on it.
- ii. **Serratus anterior.** **Infro-lateral part**
- iii. **External oblique aponeurosis:-** **lower  $\frac{1}{3}$**  of breast lies on them



**SAQ : Describe the deep relations of the breast (breast bed) ?**

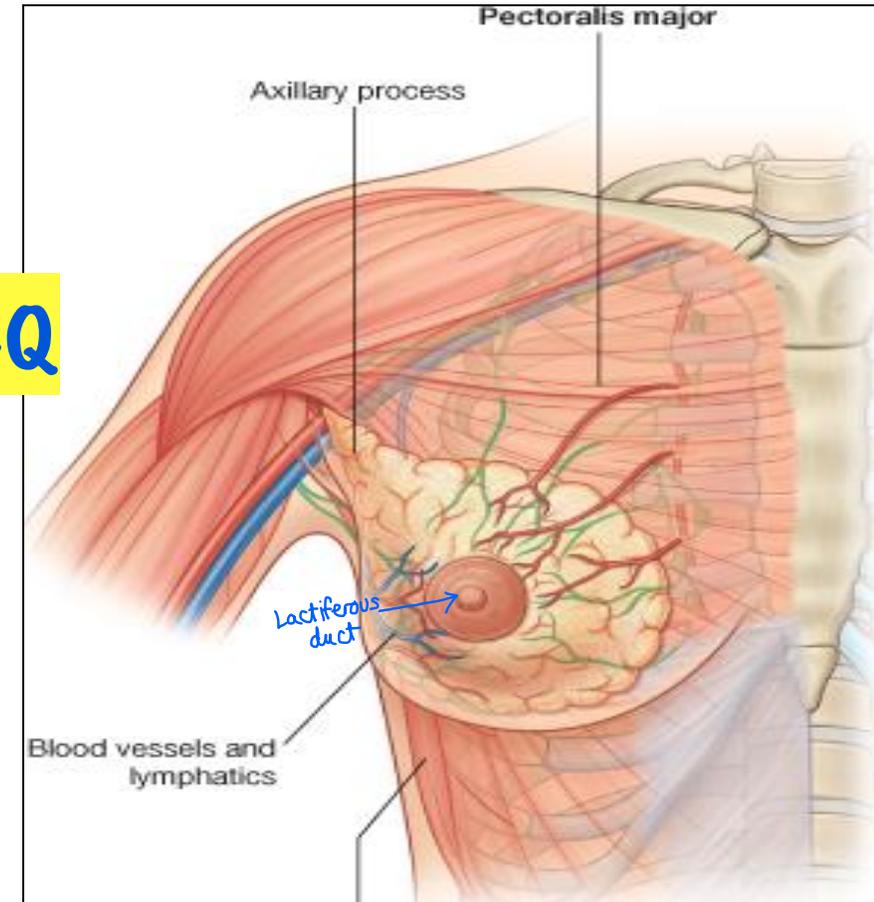
relations of the breast.

# Deep relations of the breast



# PARTS OF MAMMARY GLAND

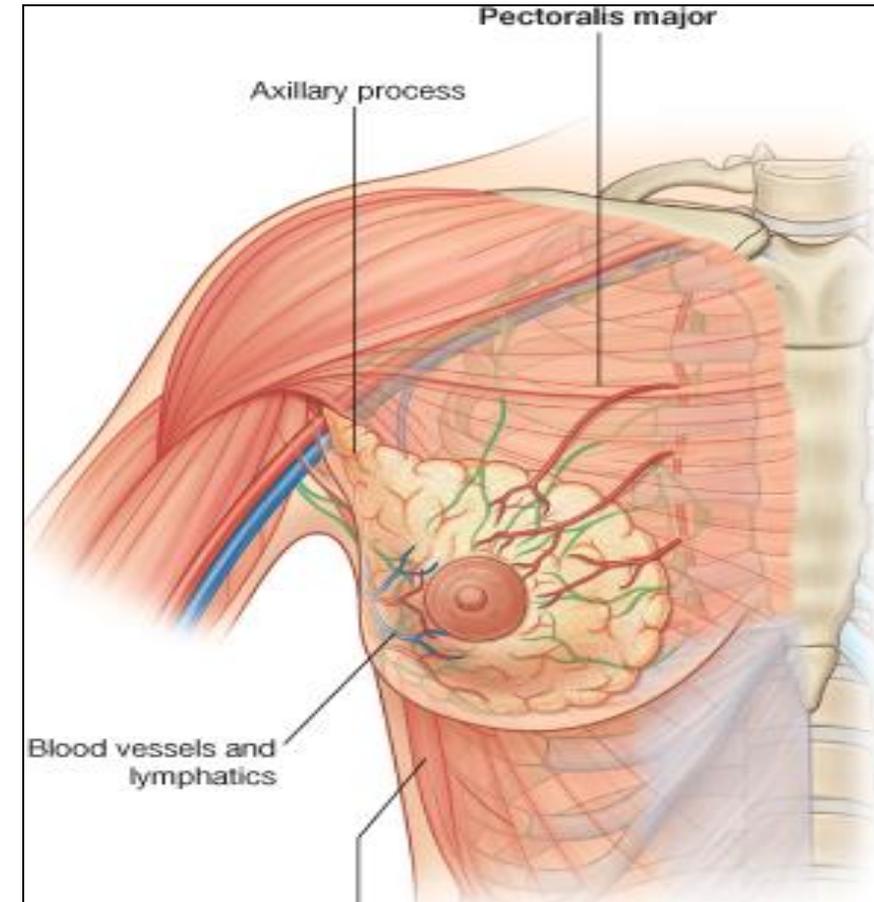
- **Nipple:**
- It is a **conical eminence** that projects forwards from the anterior surface of the breast.
- The nipple lies opposite **4<sup>th</sup> intercostal space.** **MCQ**
- It carries **15-20** narrow pores of the **lactiferous ducts.** **MCQ**
- It contains **smooth muscle fibers**, which can make the nipple stiff



# PARTS OF MAMMARY GLAND

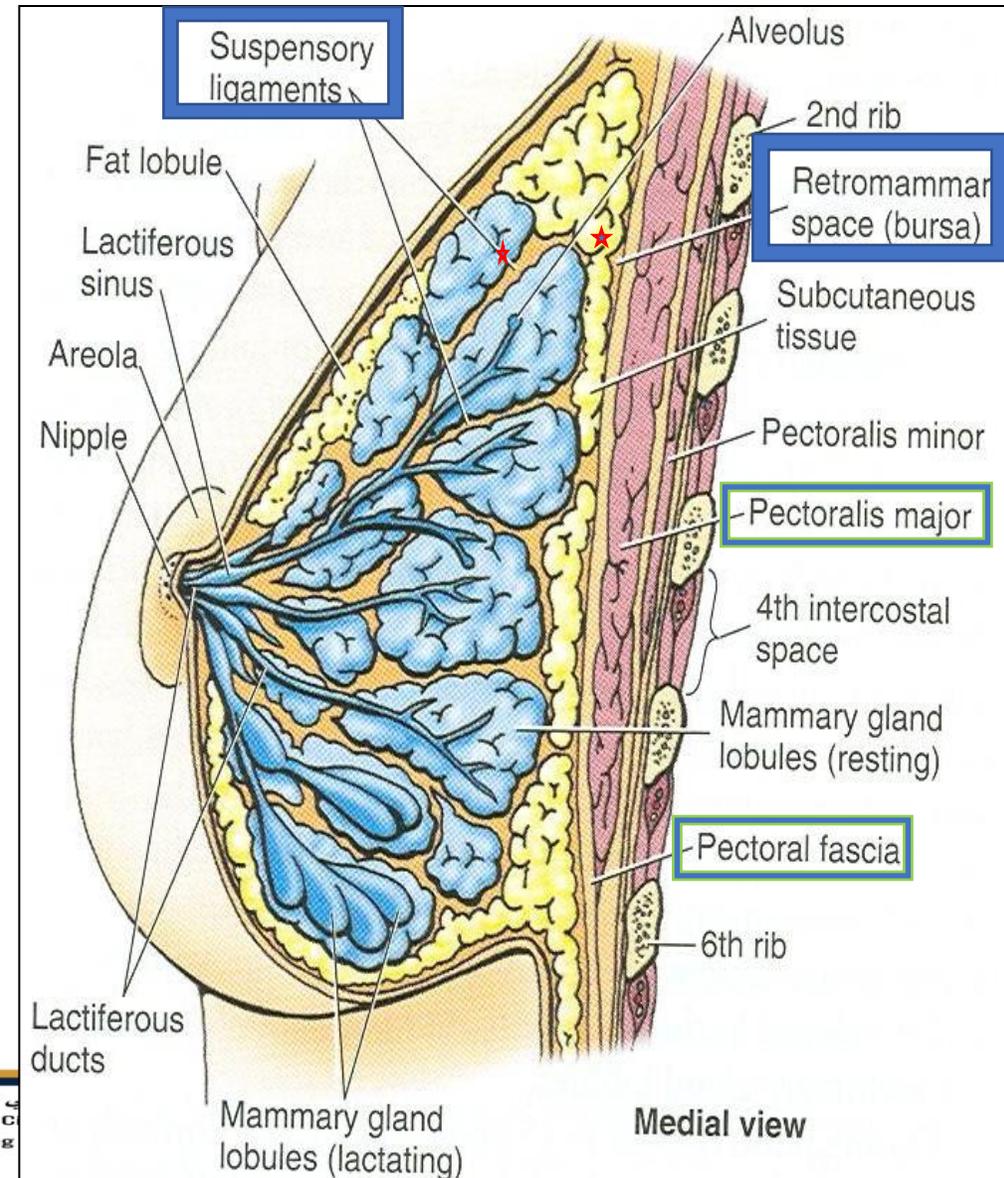
## Areola :

- It is a **dark pink brownish circular area** of **skin** that surrounds the nipple.
- The **subcutaneous tissues** of nipple & areola are **devoid of fat**.
- It contains sebaceous glands called areolar gland (**Montgomery Glands**) which produces tubercles on the skin of the areola.



# STROMA OF MAMMARY GLAND

- It is **non capsulated** gland.
- It consists of lobes and lobules which are embedded in the subcutaneous fatty tissue of superficial fascia.
- It has fibrous strands (**ligaments of cooper**) which **connect** the skin with deep fascia of pectoralis major.
- It is **separated** from the deep fascia covering the underlying muscles by a layer of loose areolar tissue which forms the **retromammary space**. **Which allows breast movements.**

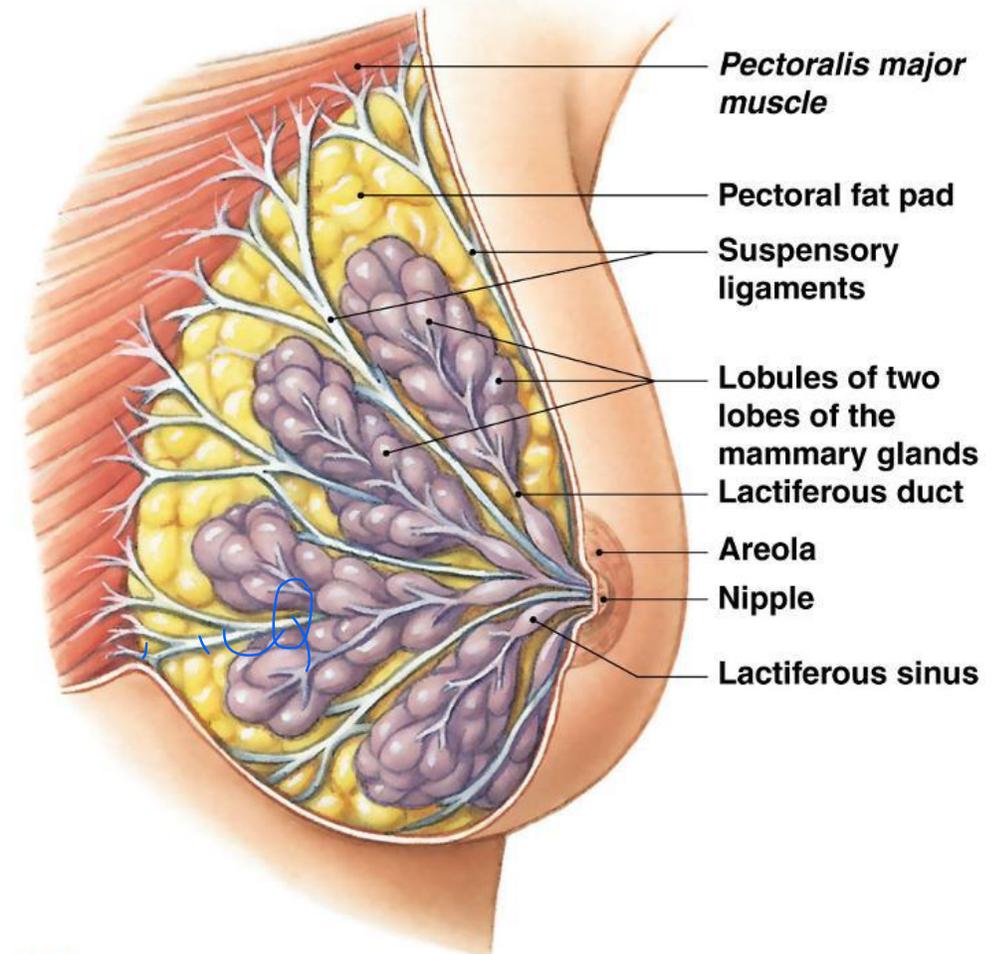


# PARYNCHYMA OF MAMMARY GLAND

- It is formed of **15-20 lobes**. **MCQ**
- Each lobe is formed of a number of lobules.
- The lobes and lobules are separated by interlobar and interlobular fibrous & fatty tissue, called **ligaments of Cooper**.

## Q: Importance ligaments of Cooper?

- These ligaments give the breasts support by connecting the skin of the breasts to the pectoralis muscles below them.
- It has from **15-20 lactiferous ducts** which open by the same number of openings on the summit of the nipple.

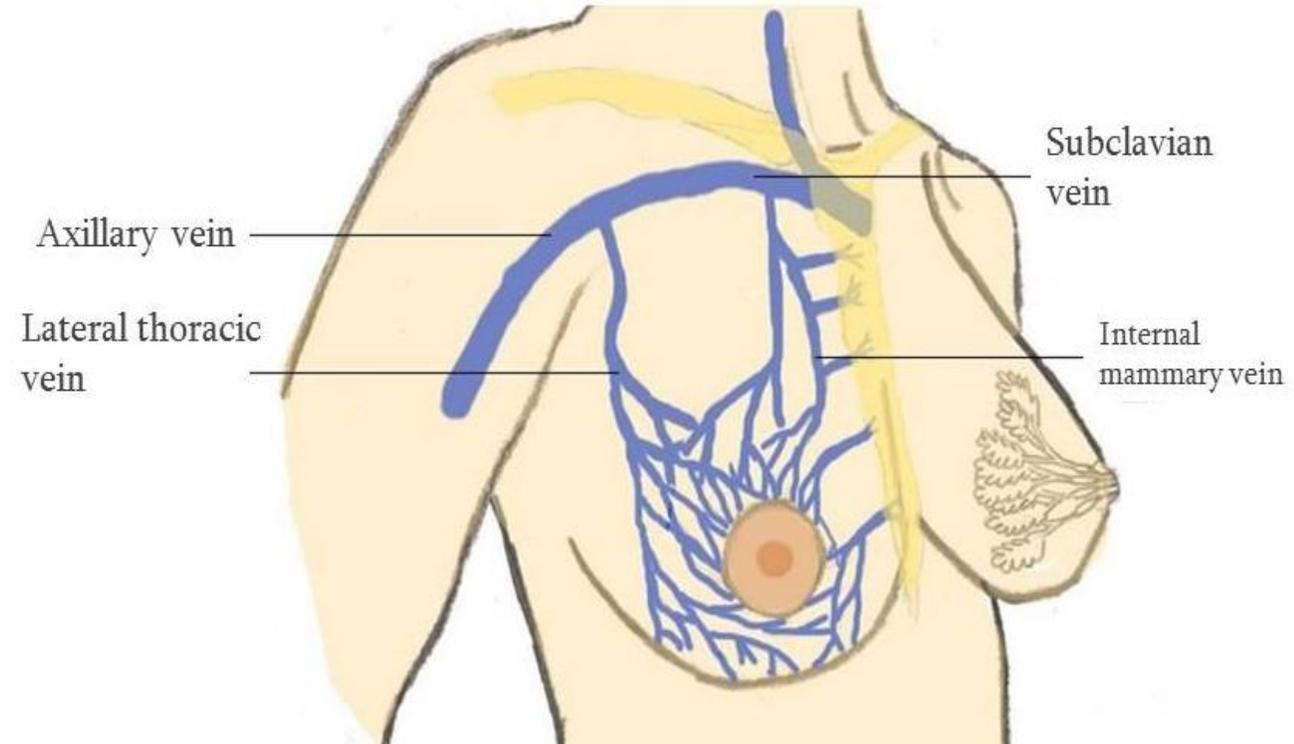


**a** The mammary glands of the left breast



# VENOUS SUPPLY

- Veins are corresponding to the arteries.
- **Circular venous plexus** are found at the **base of nipple**.
- **Finally**, veins of this plexus **drain** into **axillary, internal thoracic and intercostal veins**.



# 1. Lymphatics from skin covering mammary gland:-

مهمة جدا

**A. Skin covering lateral part of breast:** to ipsilateral anterior [pectoral] axillary L.N.

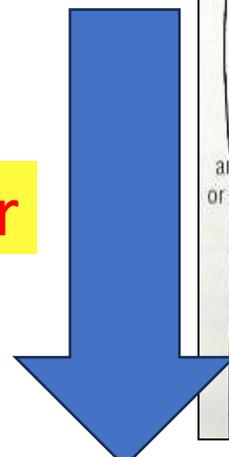
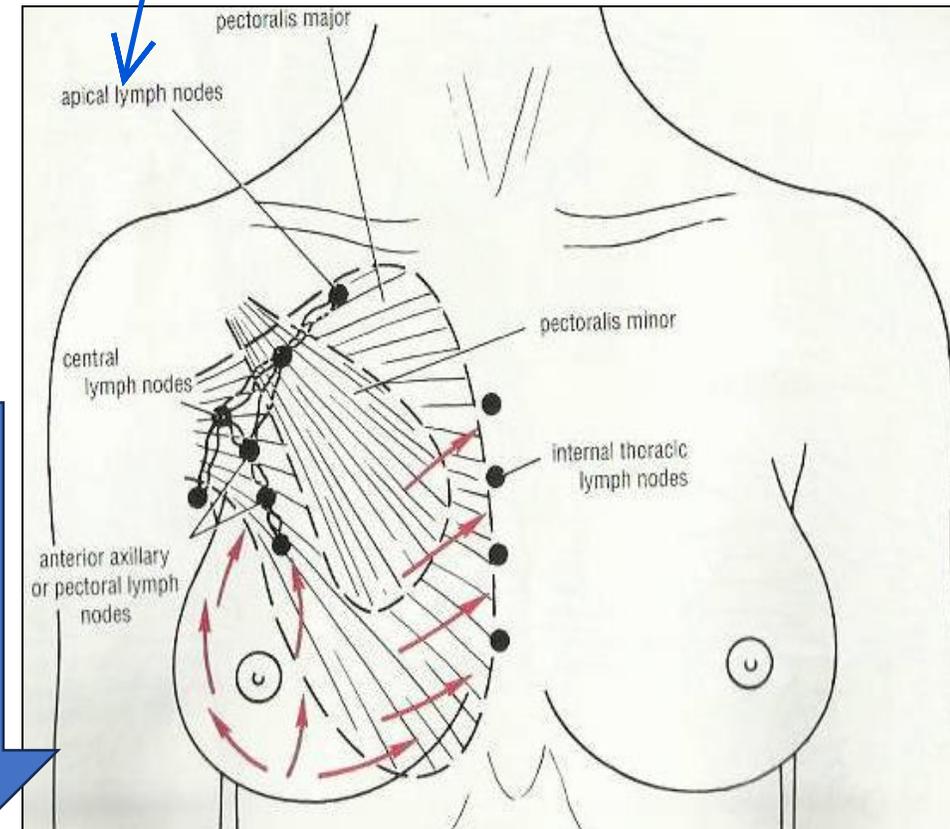
**B. Skin covering medial part of breast:** to ipsilateral & contralateral parasternal L.N.

**C. Skin covering upper part of breast:** to ipsilateral deep cervical L.N.

**D. Skin covering Lower part of breast:** to ipsilateral Sub-diaphragmatic and Retro-peritoneal LN

**E. From nipple & areola:** Pass to subareolar lymphatic plexus

ال Apical LN تتوصل لل cervical LN





# Deep Regional Lymphatics

**Definition:** It is an **Efferent lymphatic** from breast & their lymphatic plexus that accompany the arteries supplying the gland.

**Types:-**

**A) Efferent from lateral & central parts of gland:**

- ✓ Pass to ipsilateral anterior **[pectoral]** axillary L.N. **[main]**
- ✓ Few pass to ipsilateral **subscapular** & **apical** axillary L.N.

**B) Efferent from medial parts of gland:-**

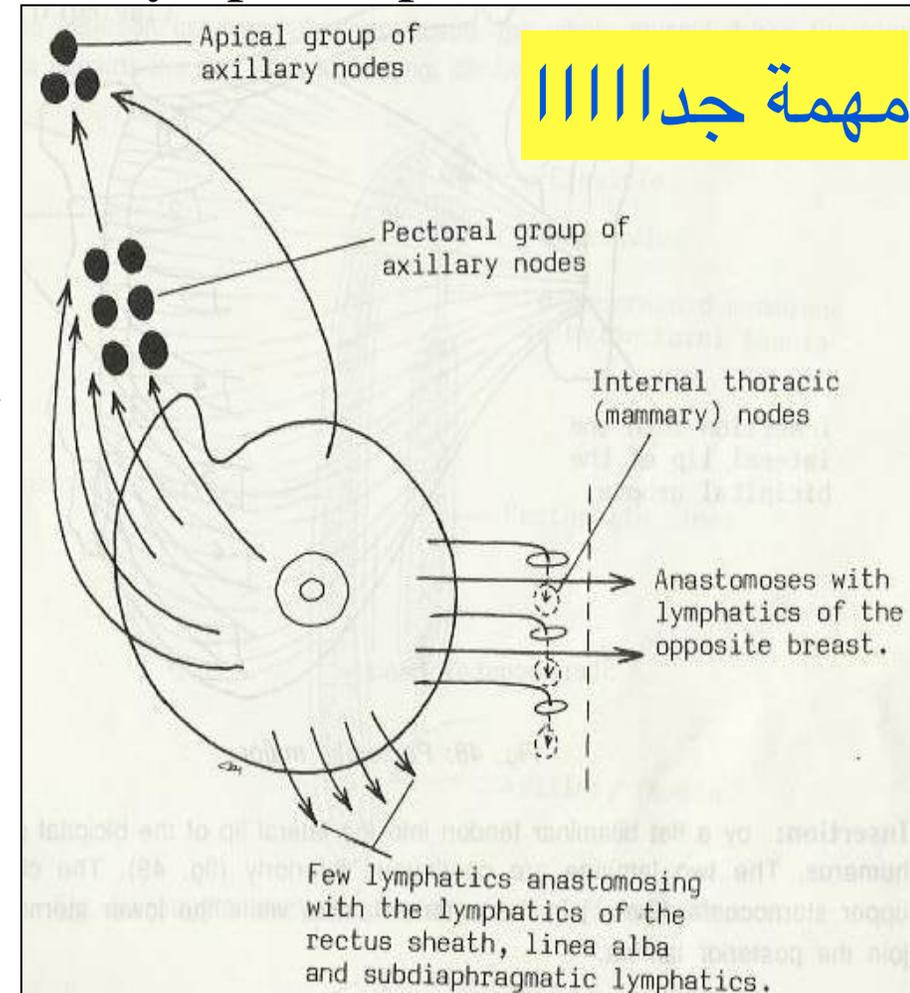
- ✓ Pass to ipsilateral & contralateral **parasternal** L.N.
- ✓ Few pass to posterior intercostals L.N.

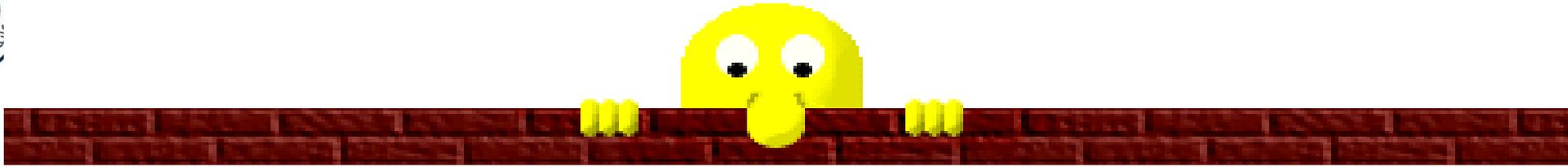
**C) Efferent from upper parts of gland:-**

- ✓ Pass to ipsilateral **apical** axillary L.N.

**D) Efferent from lower parts of gland:-**

- ✓ Pass to ipsilateral **Sub-diaphragmatic** & **Retro-peri. L.N**





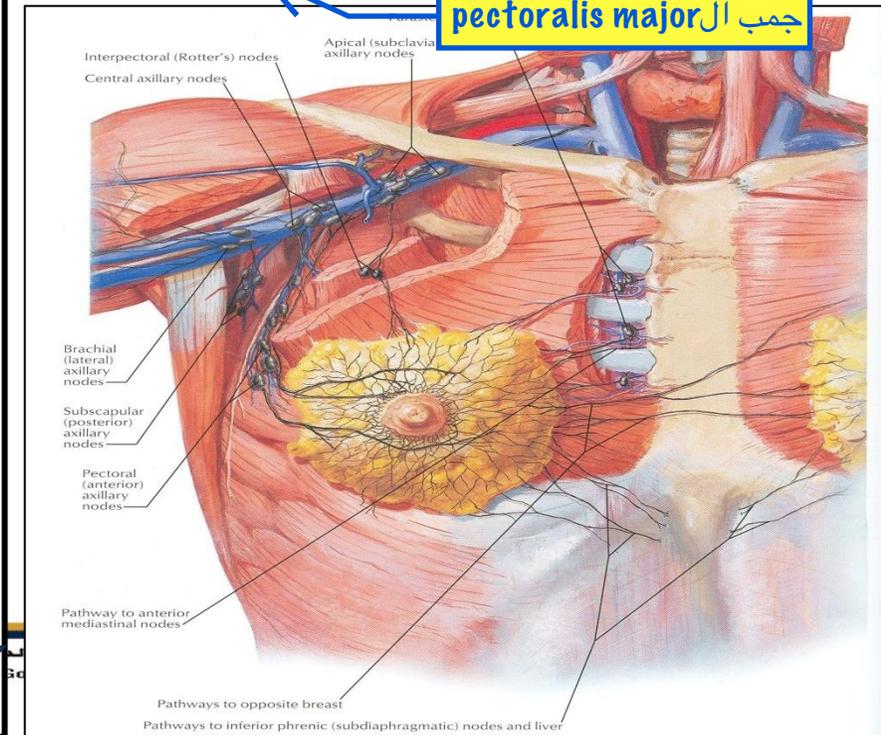
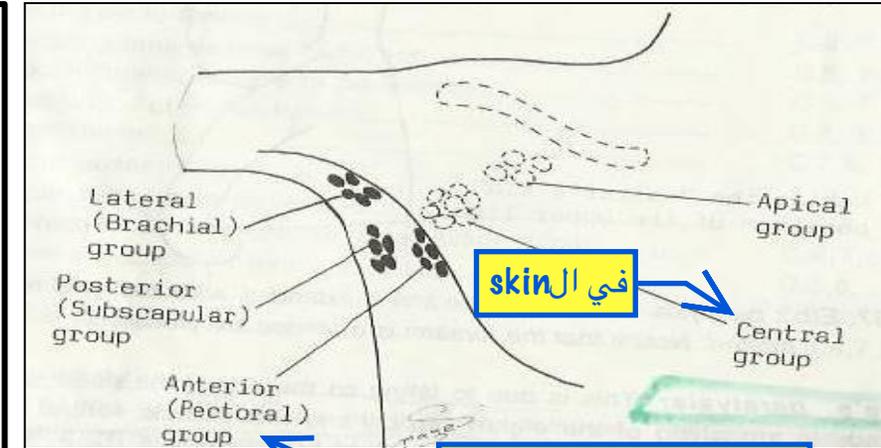
# AXILLARY LYMPH NODES



# AXILLARY LYMPH NODES

مهمة جدا

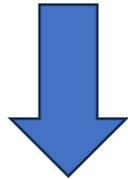
- They are arranged into 5 groups which lie in axillary fat :
- **Pectoral (Anterior) group** : which lies on the pectoralis minor **along lateral thoracic vessels.**
- **Subscapular (Posterior) group** : which lies on posterior wall of axilla on lower border of subscapularis **along subscapular vessels.**
- **Brachial (Lateral) group** : lies on lateral wall of axilla **along 3<sup>rd</sup> part of axillary vessels.**
- **Central group** : lies in axillary fat **at the base of axilla.**
- **Apical group** : lies **at apex of axilla.**



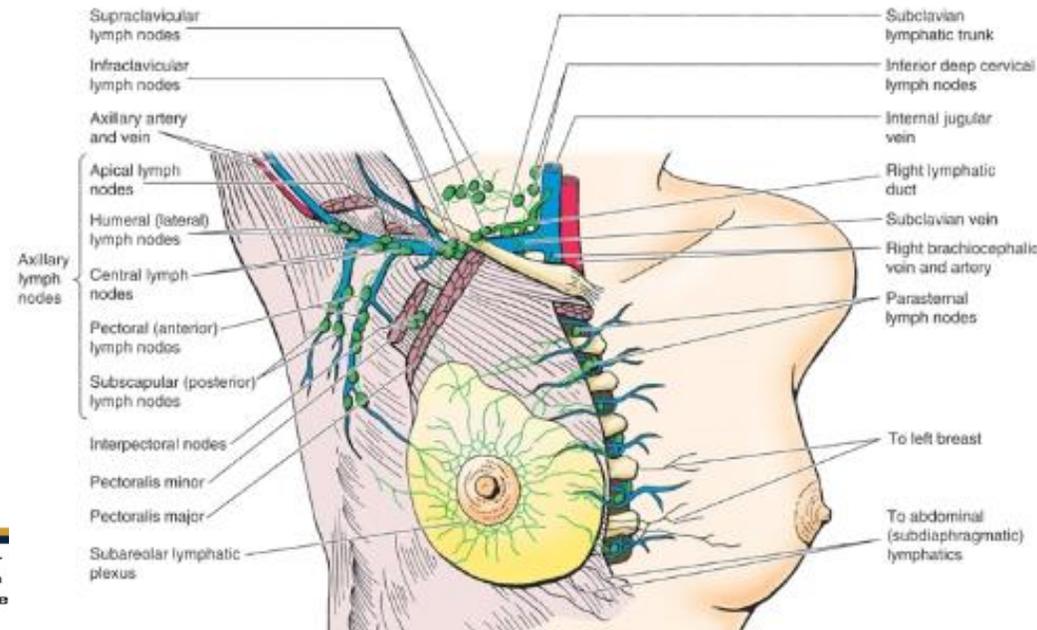
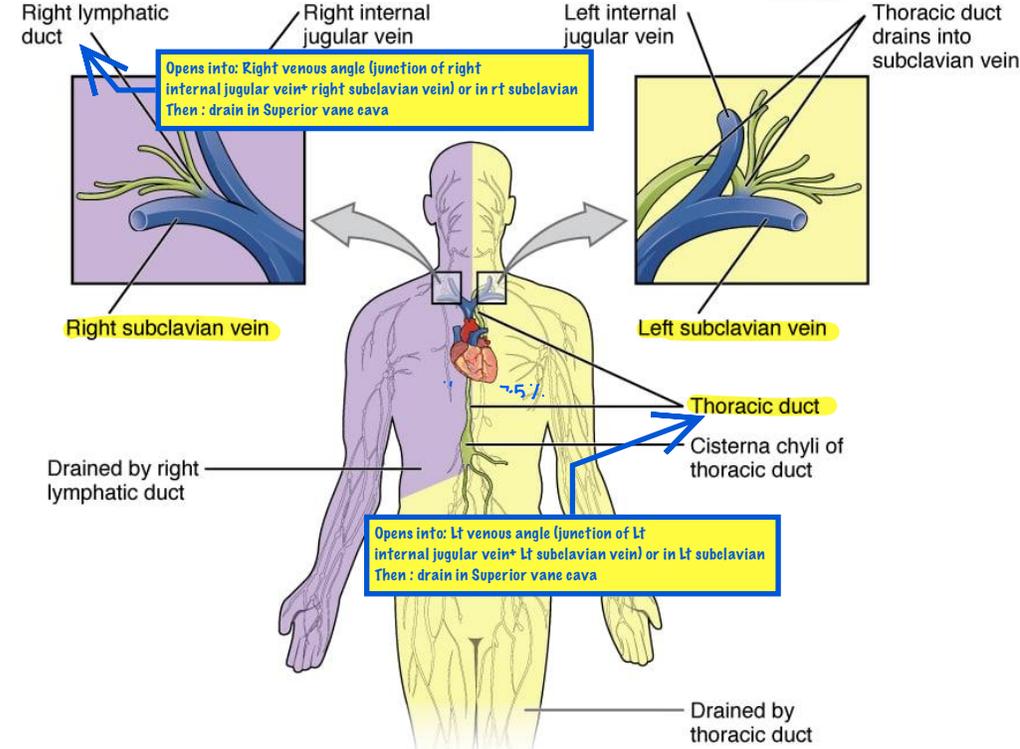
# Efferent lymph vessels of apical group



## Subclavian lymph trunk

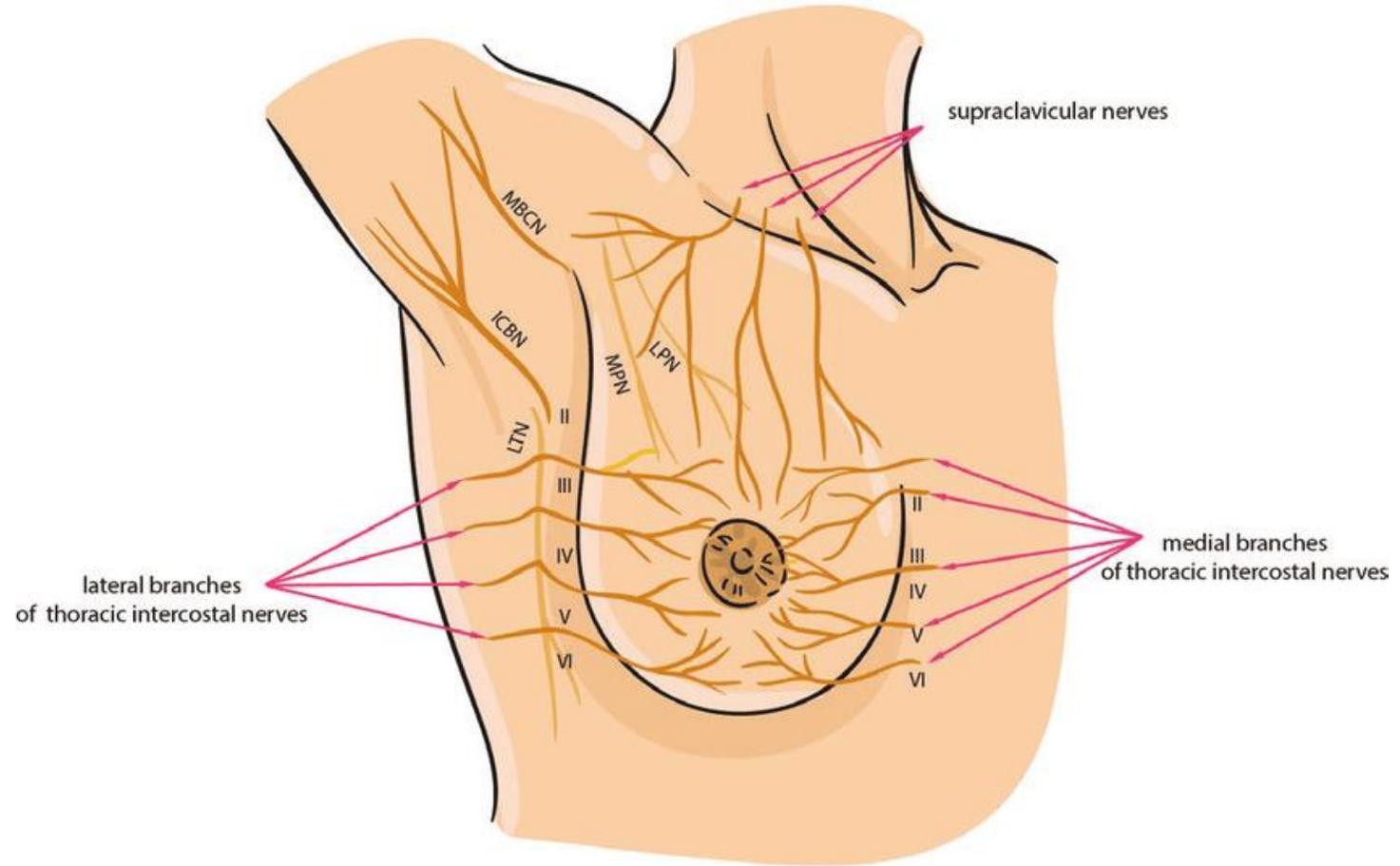


**On the right side:** continues to form the **right lymphatic duct.**  
**On the left side:** it usually opens into **thoracic duct.**



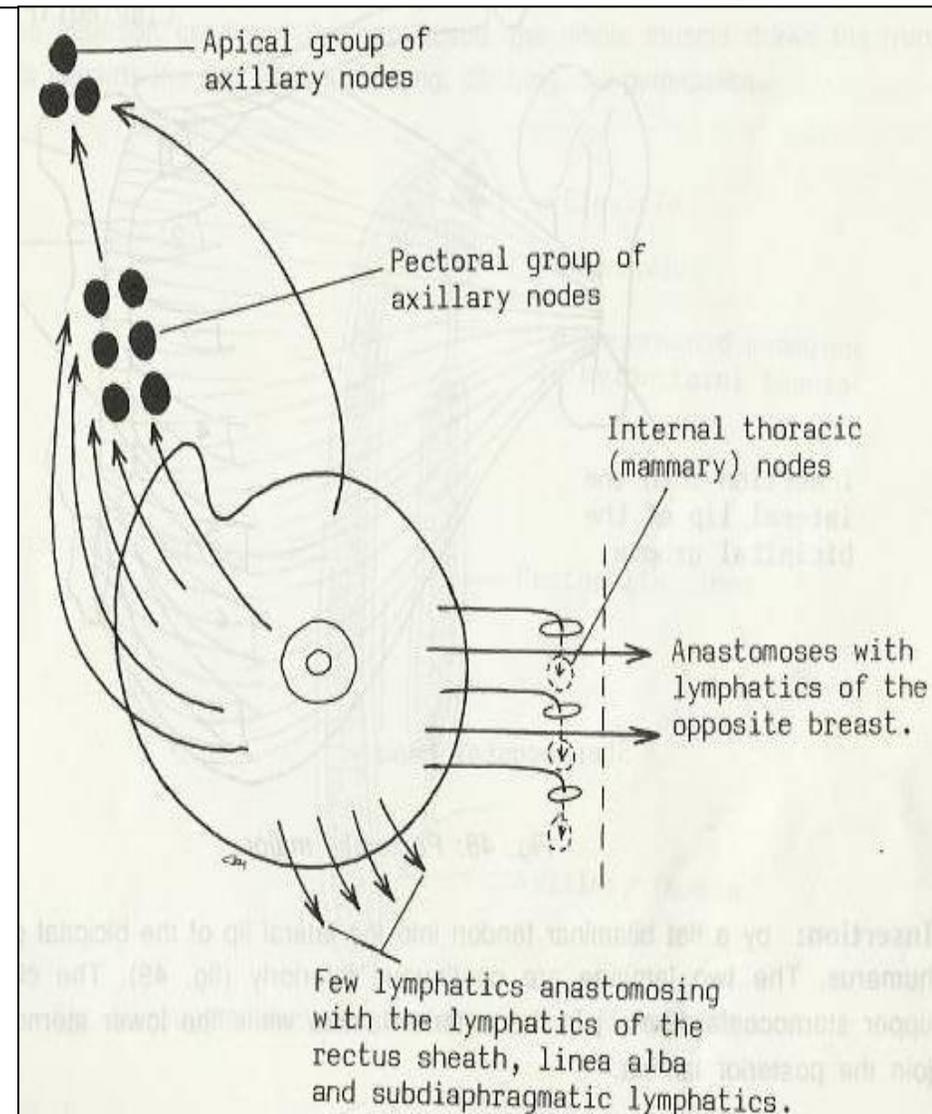
# Innervation of the axilla and breast

1. Cutaneous branches of 3-6 intercostal nerves
2. Long thoracic nerve
3. Lateral pectoral nerve
4. Medial pectoral nerve

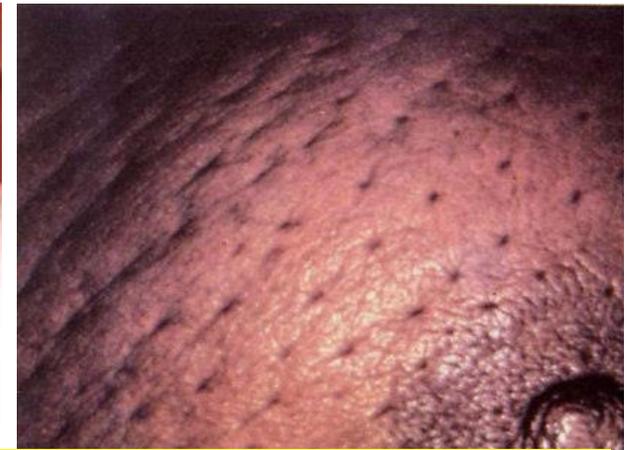
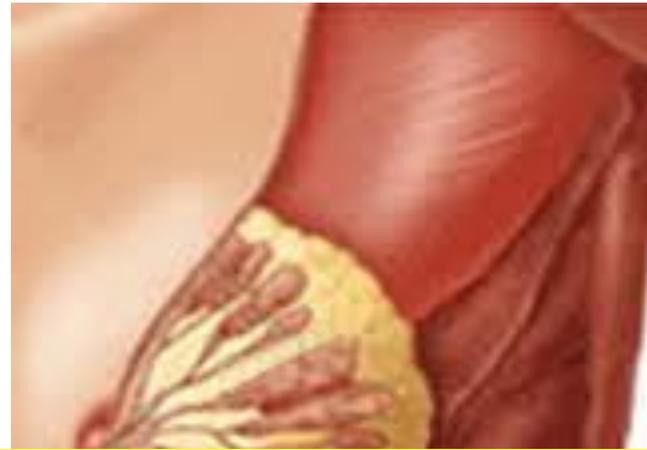
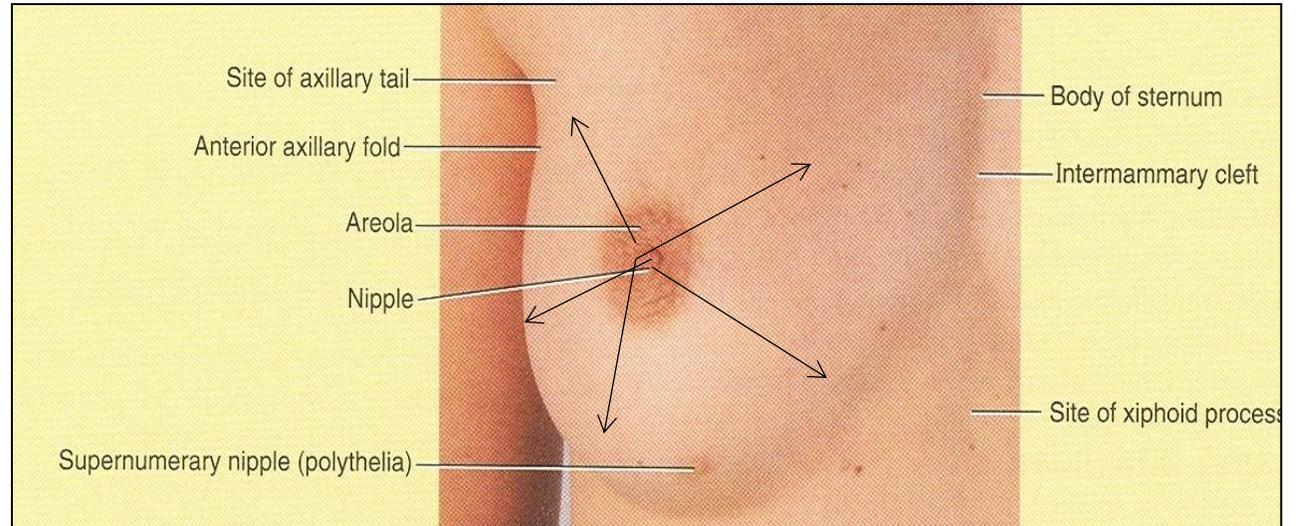


وغالباً عشان جزء منسي

- It is a common surgical condition.
- **60%** of **carcinomas of breast** occur in the upper lateral quadrant and **axillary tail.**
- **75%** of lymph from the breast drains into the **axillary lymph nodes.**
- In case of **carcinoma** of one breast, the **other breast** and the **opposite axillary lymph nodes** are **affected.**
- In patients with **localized cancer breast**, a **simple mastectomy**, followed by **radiotherapy** to the axillary lymph nodes is the **treatment of choice.**



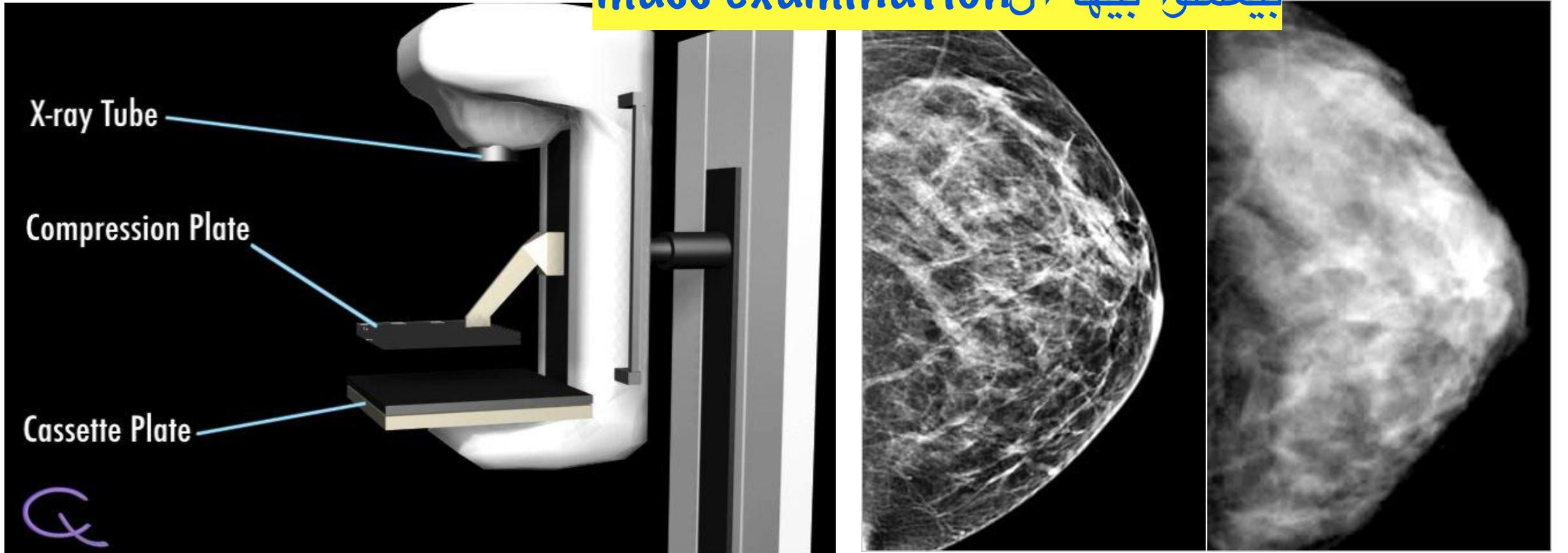
- The lactiferous ducts are **radially arranged from the nipple**, so **incision of the gland should be made in a radial direction** to avoid cutting through the ducts.
- Infiltration of the ligaments of Cooper by **breast cancer** leads to its shortening giving **peau de'orange appearance** of the breast.



**MCQ : Why does the breast in some cases of breast cancer appear (peau d'orange)?**  
**A) Due to stretching of ligaments of Cooper**

# Mammography

بيعملوا بيها ال mass examination



X-ray Tube

Compression Plate

Cassette Plate



M N U





# DEVELOPMENT OF FEMALE BREAST

جزء ال development يجي MCQ

أما ال anomalies فممكن يجي SAQ أو MCQ



# When does breast development begin?

- Breasts begin to form while the unborn baby is still growing in the mother's uterus.
- This starts with a thickening in the chest area called the **mammary ridge or milk line** which is a downgrowth of the **epidermis (ectoderm)** into the underlying **dermis (mesoderm)**.
- By the time a baby girl is born, nipples and the beginnings of the milk-duct system have formed. In general, breast **development begins between the ages of 8 and 13**

**MCQ**

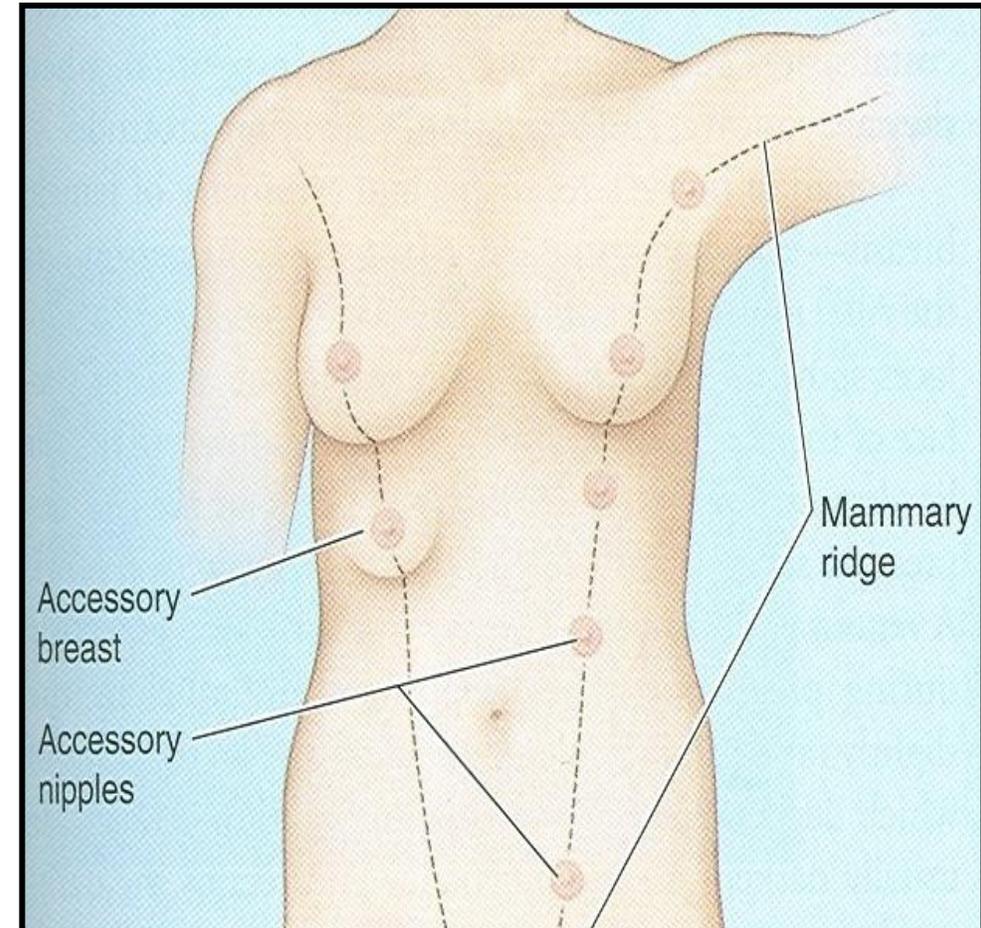
5 stages of human female breast development



**MCQ : Which of the following best describes the embryological origin of the breast?**  
**Ectoderm**

# Mammary ridge

- **Mammary ridge** extends from the **axilla** to the **inguinal region**. **MCQ**
- **In human**, the ridge **disappears EXCEPT** for a **small part** in the **pectoral region**. **MCQ**
- **In animals**, **several** mammary glands are **formed** along this ridge.
- **Canalization** results in formation of **alveoli** and **lactiferous ducts**.



**MCQ : What is the extent of the mammary ridge in the embryo? Axilla to inguinal region**

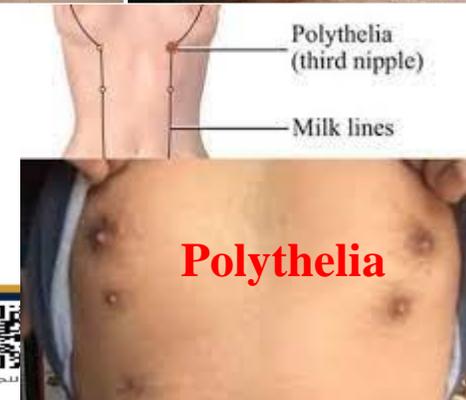
**MCQ : In humans, which part of the mammary ridge remains? Pectoral region**

# Congenital Anomalies

موضوع سؤال SAQ + MCQ

## I-Anomalies of the Nipple

- Athelia:** • Congenital absence of the nipple (rare).
- Polythelia:** • Multiple nipples that may occur anywhere along the mammary line extending from the anterior axillary fold to the inguinal region, due to persistence of milk line cells. • They may be mistaken for moles or warts.
- Retraction of the Nipple:** • It is present since birth & should be differentiated later from nipple retraction due to breast cancer or chronic inflammation. • It is treated by massage, stretching, or surgery



SAQ : Enumerate 2 or 3 congenital anomalies of the nipple ?

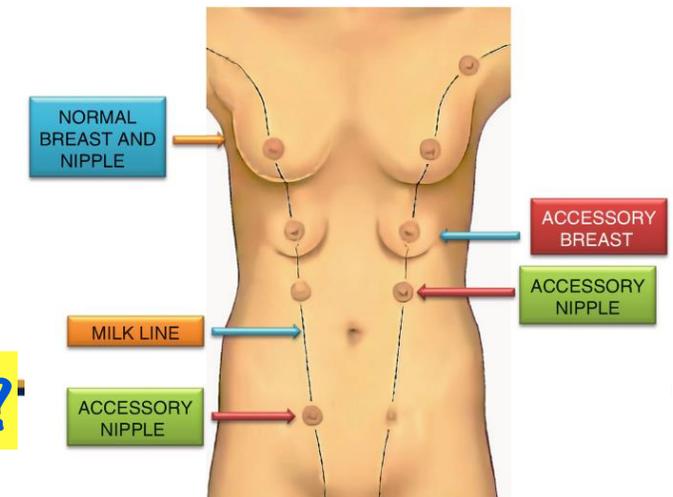


# II. Anomalies of the Breast

موضوع سؤال  
SAQ + MCQ

- Amazia (Breast hypoplasia):** Absence of the breast (usually unilateral). May be associated with absence of the sternal part of the pectoralis major muscle.
- Micromazia (micromastia):** A unilateral or bilateral **small** breast. Usually associated with congenital anomalies of the ovary.
- Polymazia (polymastia):** Multiple or **accessory** breasts due to persistence of the extramammary part of the milk line (very rare). Usually present (**along the milk line**) in the axilla, groin, thigh or vulva or, most commonly, on the chest wall. May function during lactation and may suffer from disease as the ordinary breast.

Or nipple line



SAQ : Enumerate 2 or 3 congenital anomalies of the breast ?

4. **Ectopic breast**: another breast present **outside** the **milk line** such as in **axillary LNs**.
5. **Gynecomastia**: Painless enlargement of the **male** breast (unilateral or bilateral) that may occur at **puberty**. Treatment: **surgical excision**. ← **hepatic disease** لوجت في الold age فده غالبا
6. **Breast hypertrophy** may occur early in **infancy**.
7. **Gigantomastia** (Gigantomastia = Massive or Diffuse Hypertrophy of the Breast: Due to **abnormal sensitivity of the breast to estrogen**. Usually occurs at **puberty & rarely during the first pregnancy**. Treatment: **Reduction mammoplasty** (i.e. reduction of the breast size).



# What breast changes happen at puberty

Female breast developmental stages	Description
Stage 1	Preteen. Only the tip of the nipple is raised.
Stage 2	Buds appear, and breast and nipple are raised. The dark area of skin around the nipple (the areola) gets larger.
Stage 3	Breasts are slightly larger, with glandular breast tissue present.
Stage 4	The areola and nipple become raised and form a second mound above the rest of the breast.
Stage 5	Mature adult breast. The breast becomes rounded and only the nipple is raised.

# Nice to know السلايد كلها

# Quiz 1

1. Which is correct regarding the mammary gland ?

- A. It extends from the 2<sup>nd</sup> to 8<sup>th</sup> ribs.
- B. Its base lies on the pectoralis major muscle.
- C. It has 4-8 lactiferous ducts.
- D. Its most lymph drains into the parasternal lymph nodes.

**Answer : B**

# Quiz 2

**2. The lymphatics from upper part of mammary gland drain into :**

- A. The parasternal lymph nodes.
- B. Subdiaphragmatic lymph nodes.
- C. Apical group of axillary lymph nodes.
- D. Pectoral group of axillary lymph nodes.

**Answer : C**

# Quiz 3

**3. The lactiferous ducts of mammary gland are :**

- A. Less than 10.
- B. From 10-15.
- C. From 15-20.
- D. More than 20.

**Answer : C**



## References

**Gray's Anatomy for Students**  
**Last Anatomy**  
**Snell Anatomy**



