The breast is a modified skin gland. It extends between the clavicle and the 8\textsuperscript{th} rib. Medially reaches the sternum and laterally the midaxillary line.
The breast is divided into incomplete compartments by connective tissue and the Cooper’s ligaments.
The breasts develop from the mammary ridges in the 5th week of gestation. These ridges extend from the axilla to the groin.
Usually only the middle portion of the upper third of the mammary line remains. Accessory breast tissue may appear along the milk line.
In the newborn there is a simple network of branching ducts. Lobules appear only in the adolescence.
Complete maturation of the breast may take place after a full-term pregnancy or at age 30.
The Breast is composed of 15 – 20 lobes. Each lobe consists of numerous lobules and small branch ducts that join to form larger ducts until is only one main subareolar duct draining the whole lobe.
The functional unit of the breast is the TDLU, and is composed of a lobule and its terminal duct.
The number of TDLUs in the breast varies from patient to patient, with age, and with hormonal influence.
Epithelial cells line each ductule and are surrounded by myoepithelial cells that contract during lactation.
Most breast pathology arises within the TDLUs.

Most ductal carcinomas arise within the terminal duct near its junction with the lobule.
Larger central ducts give rise only to intraductal papillomas, but may be involved secondarily by DCIS that grow centrally from peripherally arising cancers.
The breast has an extension of tissue towards the axilla called the axillary segment or tail.
In the **UOQ** is the greatest volume of breast tissue and there is slower regression of tissue with age thus **the greater number of breast lesions appear in this quadrant**
Each mammary lobe has a fascia that lies in its anterior surface, separating it from the subcutaneous fat—*Anterior fascia*, and a fascia in its posterior surface that separates the lobe from the retromammary fat—*Posterior fascia*.
The Anterior fascia is scalloped and lies continuous with the Cooper ligaments.
A few TDLUs may extend into the Cooper ligaments in the subcutaneous fat.

*A few cancers may arise in this location*
Lymphatic drainage of the breast

Most of the breast lymphatics drain superficially towards a rich layer of lymphatics anterior to the Anterior Fascia, then to the periareolar plexus and finally to the axilla. The axillary lymph nodes are the most common site of lymphatic involvement.
Axillary lymph nodes are divided into levels by the Pectoralis Minor muscle.
Axillary dissections usually involve level I and II nodes. Sentinel node involves only the lowest of level I nodes.
Internal Mammary Lymph Nodes lie within the 2\textsuperscript{nd} through 4\textsuperscript{th} intercostal spaces, along the course of the internal mammary vessels.
The medial part of the breast drains into the *Internal Mammary Nodes*.
Lymphatic drainage can reach the Supraclavicular Nodes after first passing through the Subclavian Nodes.
Intramammary lymph nodes are usually in the axillary segment or lateral quadrant of the breast.
Nipple and Areola

composed of smooth muscle fibers and dense network of nerve endings
Vascular supply

The lateral thoracic artery branches from the axillary artery and supplies the UOQ.
The medial and central part of the breast is supplied by branches of the internal mammary artery.
Venous drainage is back through the axillary, internal mammary, and intercostal veins.
Supporting structures

Fibrous tissue that courses between the anterior and posterior fascia represented by the Cooper’s ligaments.
Duct epithelium can be found directly beneath the dermis and reaching the pectoralis muscle, so even complete mastectomy does not remove all the ducts.
SCREENING MAMMOGRAPHY

TWO VIEW POSITIONING

OBLIQUE AND CRANIO-CAUDAL FILM
Mammographic positioning
The technologist must strive to work with the patient to position the breast as completely over the imaging field as possible to avoid missing deep tissues.
The breast must be appropriately compressed to spread overlapping structures.
Compression prevents motion, spreads overlapping structures, reduces scatter by reducing the thickness of the tissue and reduces blurring.
Analyzing mammograms

Find it
Is it real?
Where is it?
What is it?
On previous films?
What should be done about it?

Perception
Verification
Localization
Analysis
Comparison
Proper management
Causes of missed breast cancer

- Dense parenchyma*
- Poor positioning
- Poor technique
- Lack of perception
- Incorrect interpretation
Guidelines for optimization of screening efficacy

properly positioned, high # quality mammographic images  
special training of the radiologist  
double reading of all screening mammograms
BIRADS classification of breast parenchyma

**type 1** – breast almost entirely fat (<25% glandular)

**type 2** – scattered fibroglandular tissue (25-50% glandular)

**type 3** – heterogeneously dense (51-75% glandular)

**type 4** – extremely dense (>75% glandular)
Mammography sensitivity is lower among women under age of 50, have denser breasts or are under HRT.
Additional views may be useful when a suspected abnormality is detected at screening or by clinical examination.