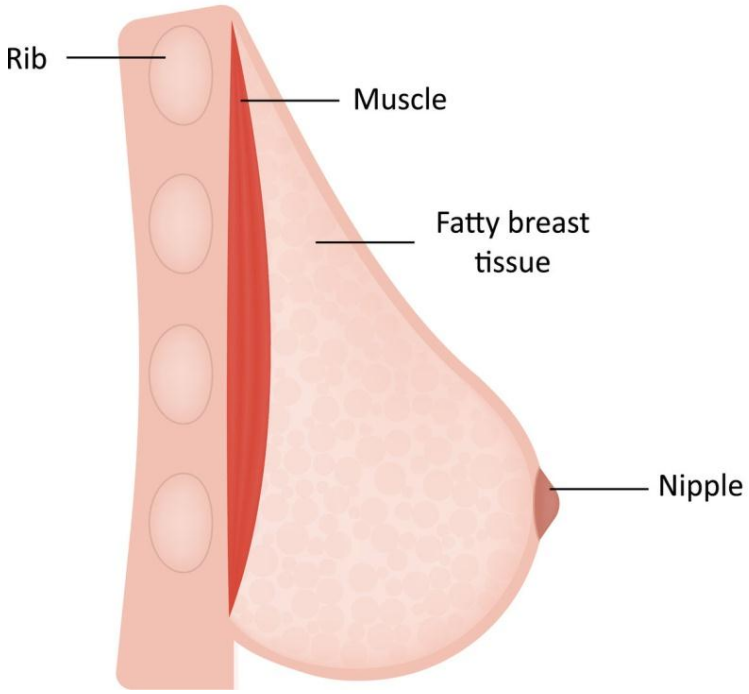
BREAST CANCER

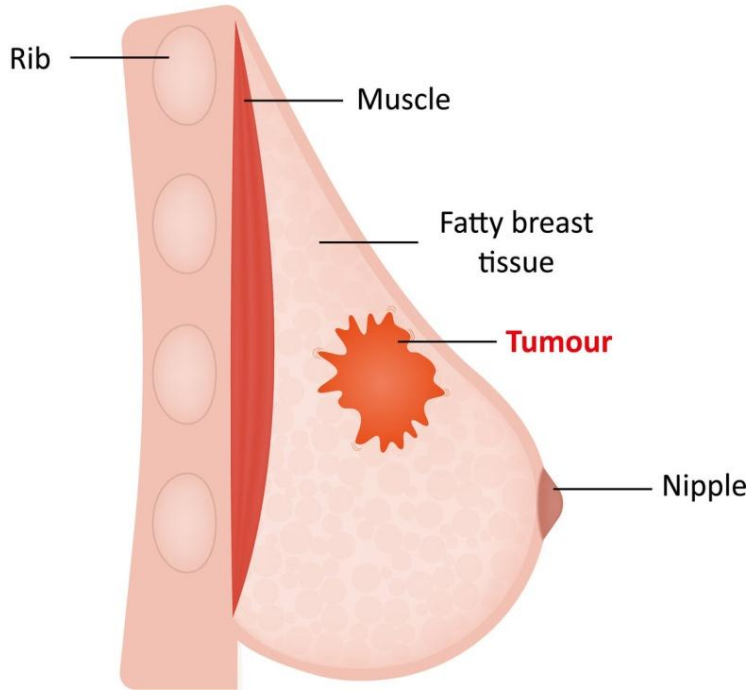
by T.N.Nesterovich

Breast Cancer

Healthy Breast



Breast Cancer



EPIDEMIOLOGY

- incidence increasing in most countries
- the most frequent cancer among women with an estimated 1.7 million new cancer cases diagnosed in 2012
- second leading cause of death in women next to lung cancer
- 1% of all cases effect men
- the 5-year survival rate for localized breast cancer is 97%
- regionally spread cancer drops the rate to 78%
- distant metastases drop the survival rate even lower to 23%

RISK FACTORS

Reproductive risk factors	Non-reproductive factors
early menarche	age
late menopause	anthropometric factors of body (mass index and height)
childbearing	diet
breastfeeding	alcohol
abortion	genetic predisposition
use exogenous hormones	environmental factors

BENIGN BREAST LESIONS

- developmental abnormalities
- inflammatory lesions (mastitis, mammary duct ectasia, fat necrosis)
- Fibrocystic changes
- Neoplasms (fibroadenoma, lipoma, adenoma, nipple adenoma, hamartoma granular cell tumor)

CLASSIFICATION OF BREAST CANCER

Histopathological classification

Noninvasive cancer

ductal carcinoma in situ

lobular carcinoma in situ

Invasive cancer

ductal carcinoma

lobular carcinoma

medullary carcinoma

mucinous(colloid) adenocarcinoma

comedocarcinoma

Paget's disease

papillary carcinoma

tubular adenocarcinoma

inflammatory carcinoma

other types

MOLECULAR CLASSIFICATION

- luminal A (ER and/or PR-positive, HER2 negative, Ki-67≤14%, histologically low-grade and slowly proliferative tumors)
- luminal B (high-grade ER and/or PR-positive tumors, HER2 negative or positive, Ki-67>14% or any)
- HER2-positive (tumors driven by amplification of HER2 gene)
- basal-like (tumors characterized, although not invariably, by negative expression for ER, PR and HER2, also referred to as the triple negative phenotype)

TNM CLASSIFICATION

- T - tumor size or extent
- N - number of loco-regional nodes involved
- M- the absence or presence of distant metastasis

The clinical staging (cTNM) is based on information gathered through clinical and radiological assessment prior to any treatment. The pathological staging (pTNM) is given after pathological assessment of a surgical specimen. Using the TNM classification, patients can be assigned to a stage which can give an idea of overall prognosis. Early breast cancer is considered to be stage 1 and 2, stage 3 represents locally advanced breast cancer, and stage 4 is metastatic breast cancer.

REGIONAL LYMPH NODES

The regional lymph nodes are:

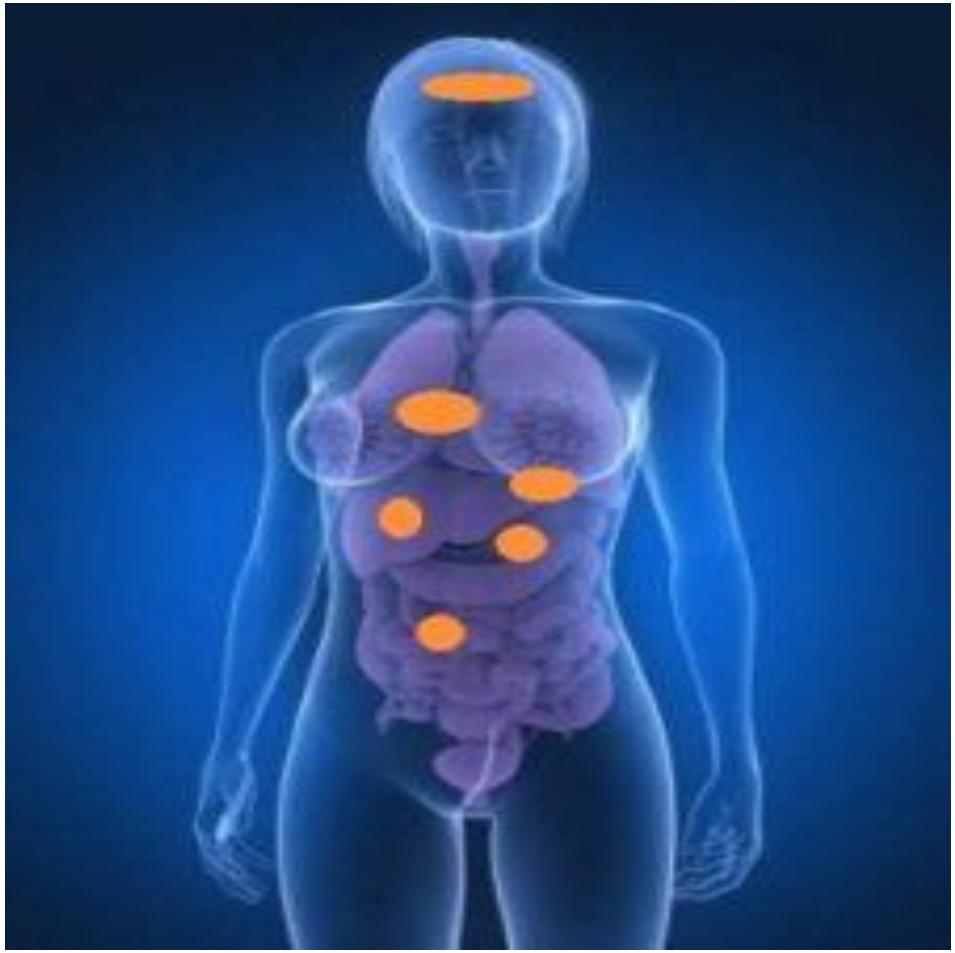
1. Axillary (ipsilateral): interpectoral (Rotter's) nodes and lymph nodes along the axillary vein and its tributaries that may be (but are not required to be) divided into the following levels:
   - a. Level I (low axilla): lymph nodes lateral to the lateral border of pectoralis minor muscle
   - b. Level II (midaxilla): lymph nodes between the medial and lateral borders of the pectoralis minor muscle and the interpectoral (Rotter's) lymph nodes
   - c. Level III (apical axilla): lymph nodes medial to the medial margin of the pectoralis minor muscle including those designated as subclavicular, infraclavicular, or apical

   Note: Intramammary lymph nodes are coded as axillary lymph nodes.
2. Internal mammary (ipsilateral): lymph nodes in the intercostal spaces along the edge of the sternum in the endothoracic fascia

   Any other lymph node metastasis is coded as a distant metastasis (M1), including supraclavicular, cervical, or contralateral internal mammary lymph nodes.

DISTANT METASTASIS

- bone
- lung
- brain
- liver



SIGNS AND SYMPTOMS

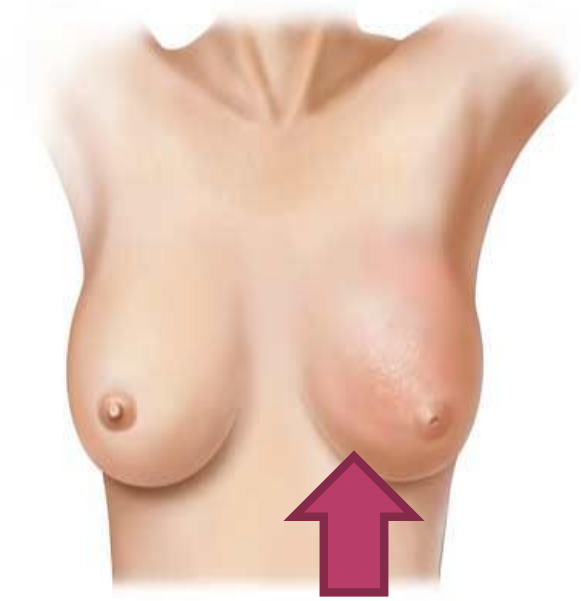
Lump in breast or underarm area

Change in size or shape of breast

Discharge or bleeding from the nipple

Change in colour or appearance of breast skin or areola

Nipple pulled into areola



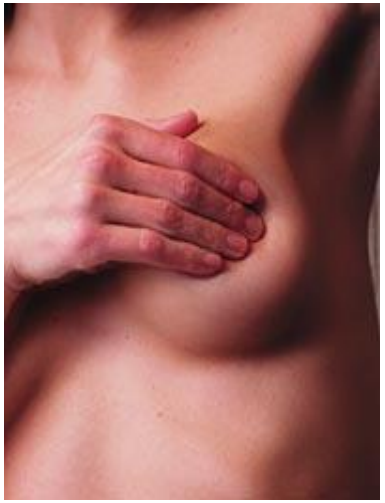
Redness or pitting of skin over the breast, like the skin of an orange

DIAGNOSES

- physical examination
- radiological evaluation
- tissue diagnosis

BREST SELF/DOCTOR EXAMINATION

- includes visual inspection and careful feeling of the breasts, the armpits, and the around the collarbone
- looking for lumps or abnormalities around the breast
- best time for examination is immediately after the monthly period

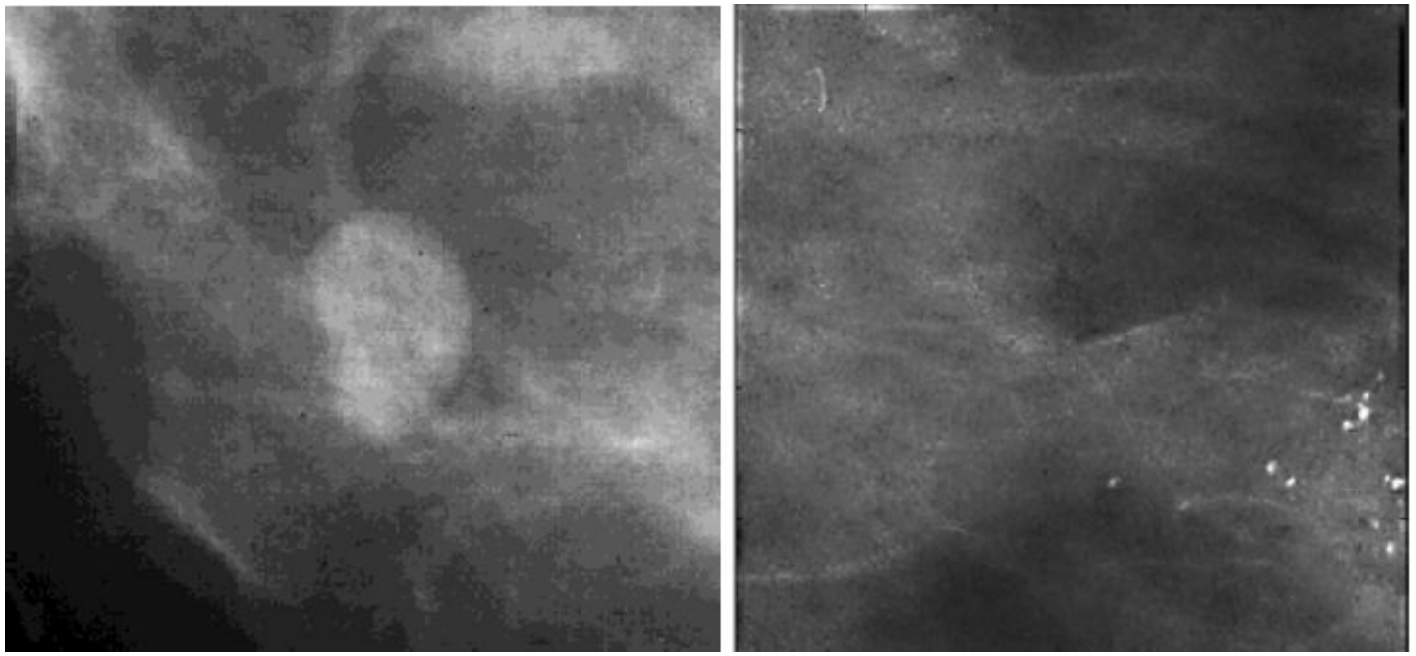


MAMMOGRAPHY

- use a low-dose x-ray system to examine breasts
- mammography can show changes in the breast up to two years before a physician can feel them
- mammography allows for efficient diagnosis of breast cancers at an earlier stage

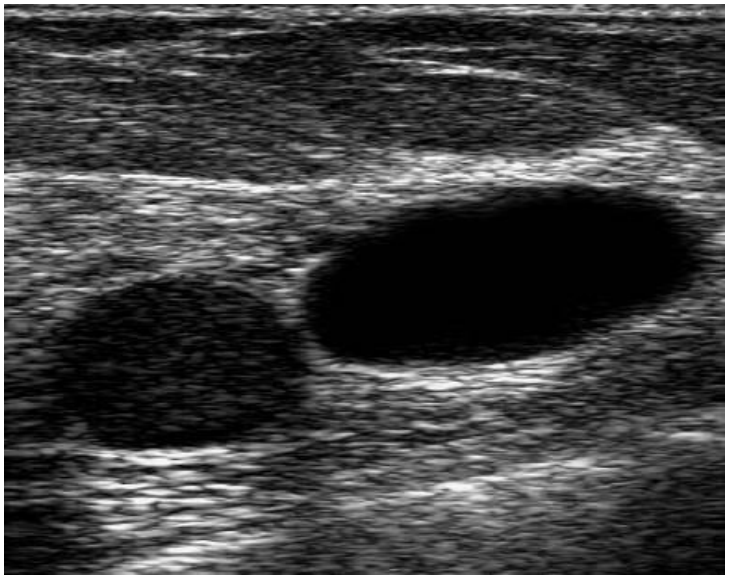
Two of the most important mammographic indicators of breast cancer:

- masses
- microcalcifications: tiny flecks of calcium – like grains of salt – in the soft tissue of the breast that can sometimes indicate an early cancer



ULTRASOUND

- usually done in addition to the mammogram
- shows whether a mass is filled with fluid or solid. Cancer is solid.

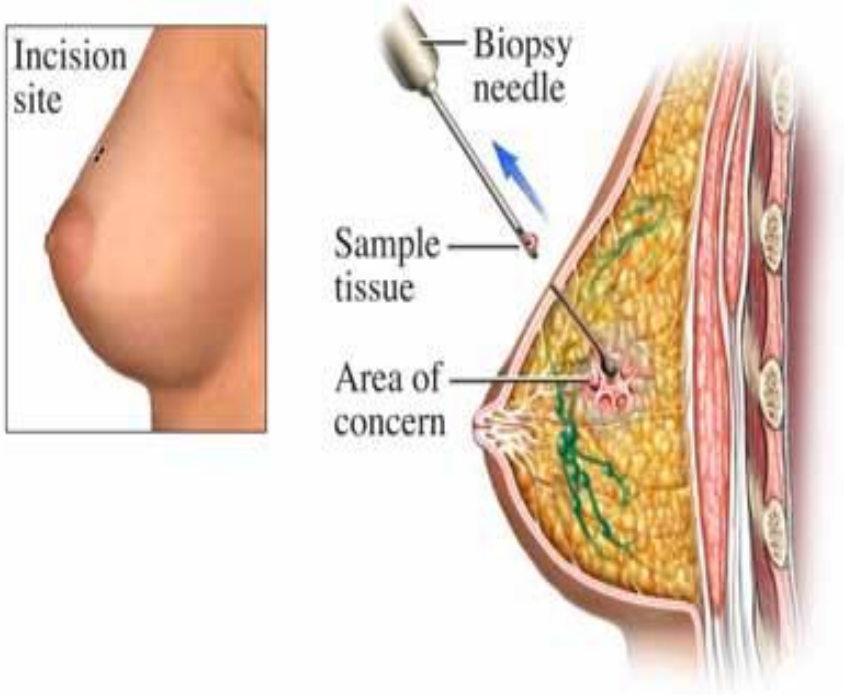


MRI

Magnetic resonance imaging (*MRI*) can sometimes reveal lesions hidden to mammography.

BIOPSY

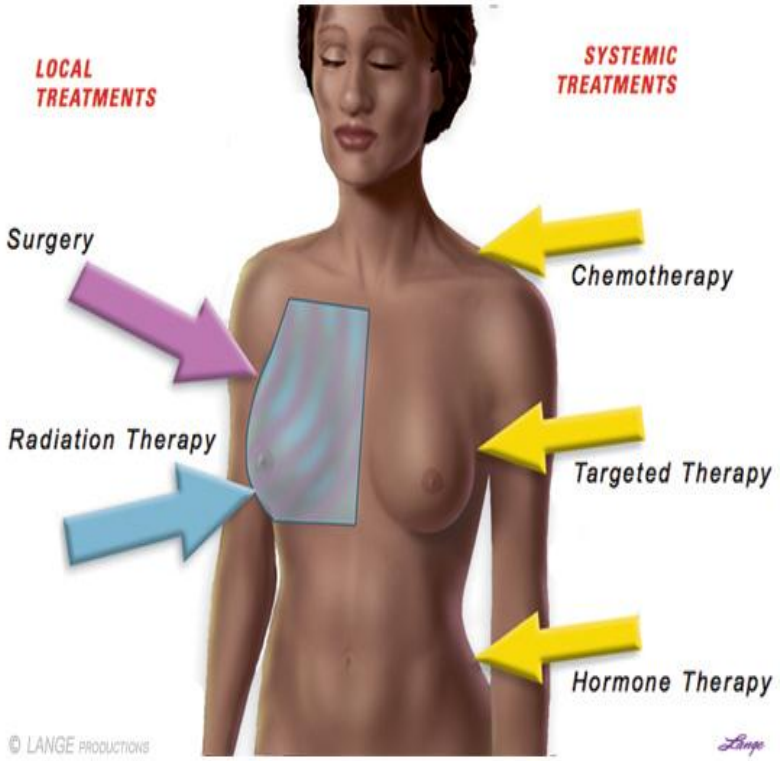
- take a small piece of tissue from the body for examination and testing
- examined by a pathologist
- 100% accurate



TREATMENT

Treatment for breast cancer is often a combination of the following:

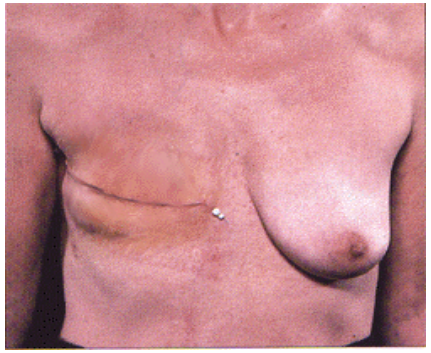
- surgery
- chemotherapy
- radiation
- hormone therapy
- targeted therapy



SURGERY

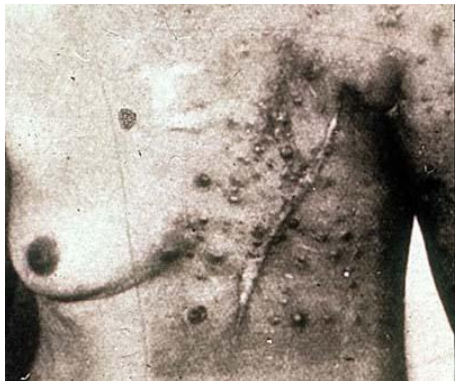
- lumpectomy (removal of the cancerous tissue and surrounding area of normal tissue)

- simple mastectomy (removes the entire breast but no other structures)



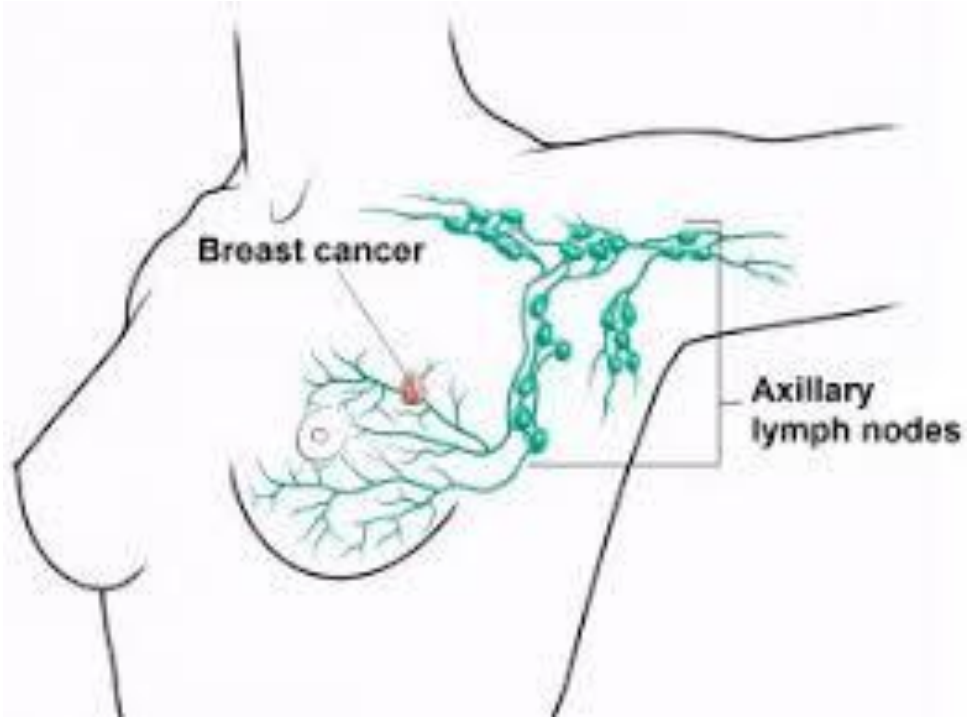
- modified radical mastectomy (removes the breast and underarm lymph nodes)

- radical mastectomy (removal of the breast and the underlying chest wall muscles, as well as the underarm contents)



EVALUATION OF REGIONAL LYMPH NODES

- Axillary lymph node dissection
- Biopsy of sentinel lymph node



RADIATION THERAPY

2 main types

- External beam radiation
- Internal radiation (brachytherapy)

INDICATION FOR RADIATION THERAPY

- After breast-conserving surgery (BCS)
- After a mastectomy, especially if the cancer was larger than 5 cm (about 2 inches), or if cancer is found in the lymph nodes
- If cancer has spread to other parts of the body, such as the bones or brain

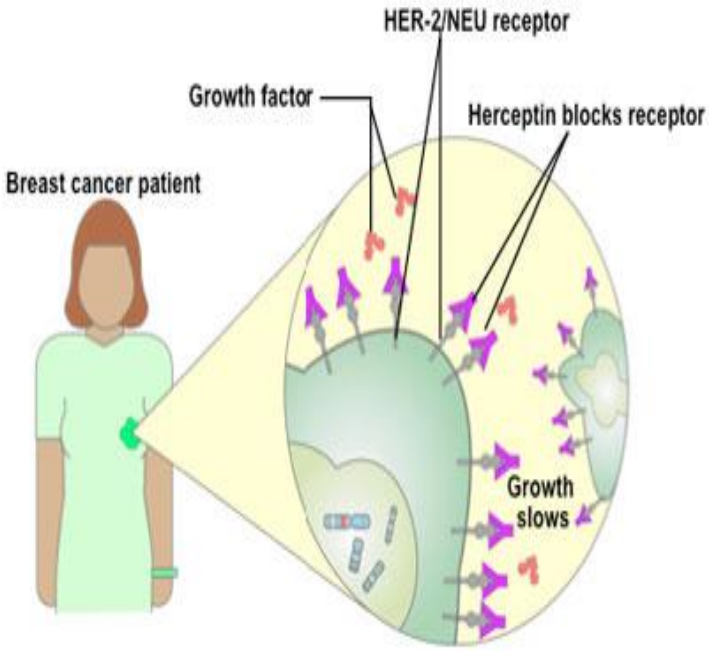
CHEMOTHERAPY

Use of a combination of intravenous drugs:

- Cyclophosphamide, Methotrexate, and 5-Fluorouracil (CMF)
- Adriamycin and Cyclophosphamide (AC)
- 5-Flurouracil, Adriamycin (Epirubicin), and Cyclophosphamide (FAC or FEC)

TRASTUZUMAB/HERCEPTIN

Given to patients whose cancer cells overexpress Her-2-neu as measured by IHC or FISH (25 to 30% of patients)



HORMONE THERAPY

It's recommended for ER-positive and/or PR positive breast cancers

- Tamoxifen
- Aromatase Inhibitors
- Ovarian ablation

TYPICAL TREATMENT OPTIONS FOR BREAST CANCER BY STAGE

Cancer stage and type	Primary treatment	Node evaluation	Adjuvant therapy: Hormone receptor negative	Adjuvant therapy: Hormone receptor positive	Adjuvant therapy: ERBB2 overexpression
Stage 0: in situ					
Lobular carcinoma in situ	No treatment or consider prophylaxis with tamoxifen[5]	—	—	—	—
Ductal carcinoma in situ	Breast-conserving surgery (consider mastectomy if extensive or multifocal) and radiation therapy	—	—	—	—
Stages I and II: early-stage invasive	Breast-conserving surgery[7] and radiation therapy[8]	SLN biopsy[9-11] or ALN dissection*	Chemotherapy†	Chemotherapy and endocrine therapy[12]	Chemotherapy and trastuzumab (Herceptin)[13,14]
Stage III: locally advanced					
Noninflammatory	Induction chemotherapy,[15] followed by breast-conserving surgery‡[16-19] and radiation therapy	ALN dissection or SLN biopsy[20]	Induction chemotherapy[15,21]	Induction chemotherapy and post-operative endocrine therapy	Induction chemotherapy and postoperative trastuzumab
Inflammatory	Induction chemotherapy, followed by mastectomy and radiation therapy	ALN dissection			
Stage IV: metastatic					
Initial or recurrent	Address patient's treatment goals; radiation therapy or bisphosphonates for bone pain	—	Chemotherapy	Endocrine therapy with or without chemotherapy	Trastuzumab with or without chemotherapy
Recurrent					
Local after breast-conserving surgery	Mastectomy	ALN dissection§	Chemotherapy‖	Chemotherapy and endocrine therapy¶	Chemotherapy and trastuzumab
Local after mastectomy	Wide excision	ALN dissection**			
Local inoperable	Induction chemotherapy	ALN dissection			