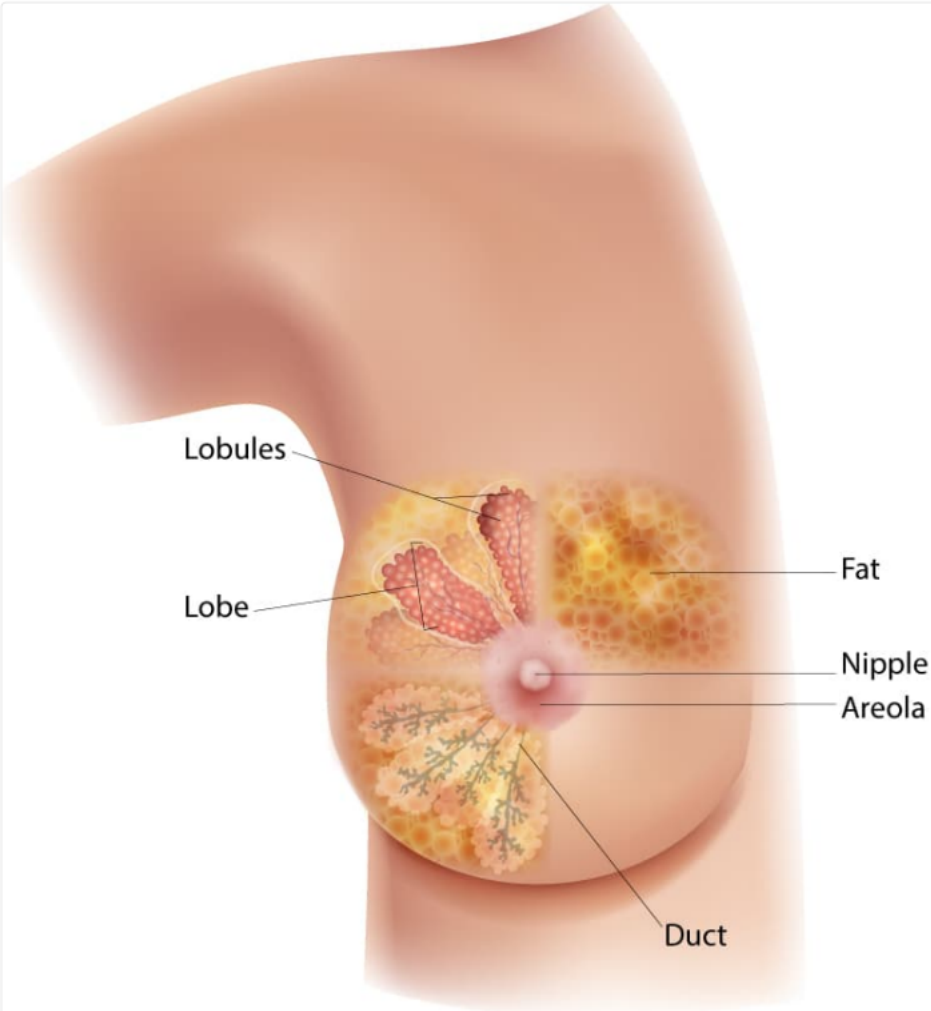
What Is Breast Cancer?

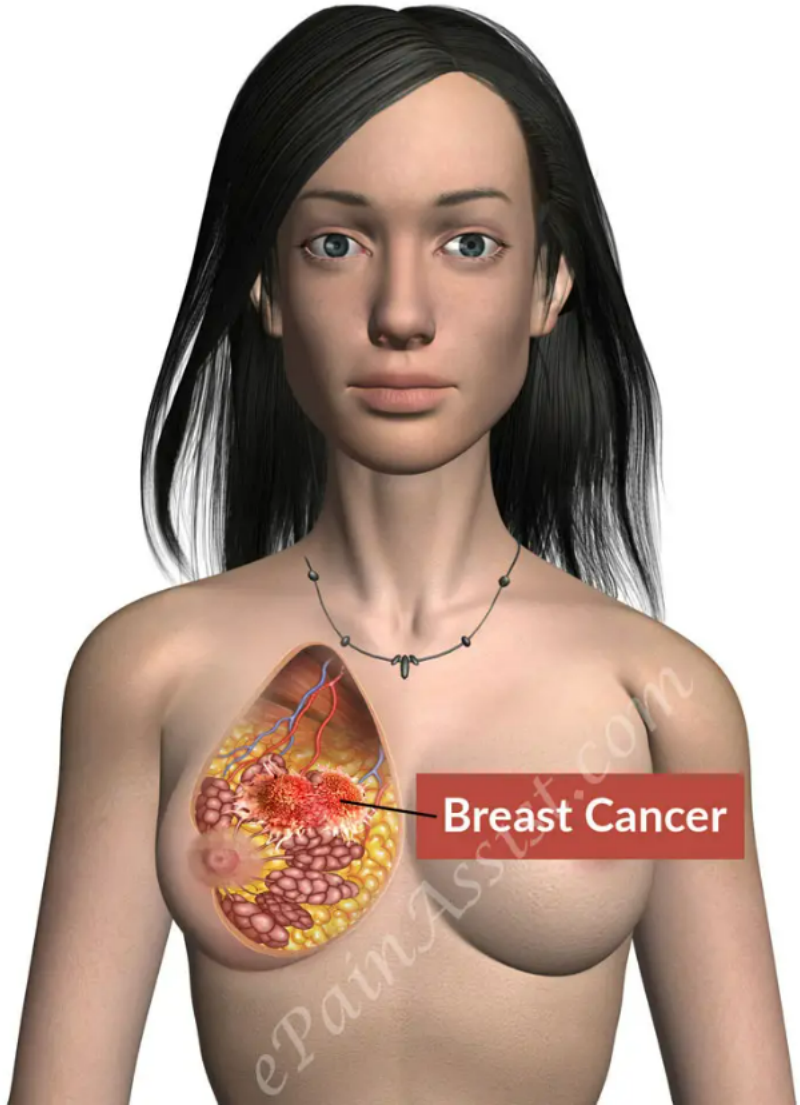
Breast cancer is a disease in which cells in the breast grow out of control. There are different kinds of breast cancer. The kind of breast cancer depends on which cells in the breast turn into cancer.

Breast cancer can begin in different parts of the breast. A breast is made up of three main parts: lobules, ducts, and connective tissue. The lobules are the glands that produce milk. The ducts are tubes that carry milk to the nipple. The connective tissue (which consists of fibrous and fatty tissue) surrounds and holds everything together. Most breast cancers begin in the ducts or lobules.

Breast cancer can spread outside the breast through blood vessels and lymph vessels. When breast cancer spreads to other parts of the body, it is said to have metastasized.



This diagram of the breast shows the location of the lobules, lobe, duct, areola, nipple, and fat.


Breast Cancer

Types of Breast Cancer

Breast cancer can occur in 2 ways. It can be either in situ or invasive.

Invasive breast cancers are those tumors which have metastasized from the lobules or ducts of the breast and have started to infiltrate into the normal tissues.

In situ breast cancers are noninvasive types of breast cancer and include lobular carcinoma in situ/LCIS or ductal carcinoma in situ/DCIS. In these types, certain aberrations in the cell cause the atypical cells to proliferate; however, they haven't spread or metastasize beyond the lobules or ducts of the breast.

According to research, some of the cases of DCIS can become invasive; however, most of them do not; and after treatment done by excision of the cancerous region, the disease often doesn't recur in majority of the cases. However, the possibility of recurrence of DCIS after simple excision cannot be completely ruled out. For this reason, additional treatment for breast cancer is commonly given.

More than half of the invasive breast cancers start in the cells present in the ducts and are termed as invasive ductal carcinomas. About 10% of the breast cancers start in the lobules or milk glands and are known as invasive lobular carcinoma. The rest of the breast cancers comprise of the less frequent types of cancer, which includes Paget's disease, which is a type of cancer which occurs in the cells under the nipple. A combination of different types of cancer can also occur.

Causes of Breast Cancer

Like any other cancer, breast cancer is caused due to some changes or mutation in the DNA of the cells resulting in uncontrollable growth and division of the cells. So, instead of dying after a certain period of time like normal cells, these cells continue to divide and grow and start to accumulate ultimately resulting in a tumor or cancer.

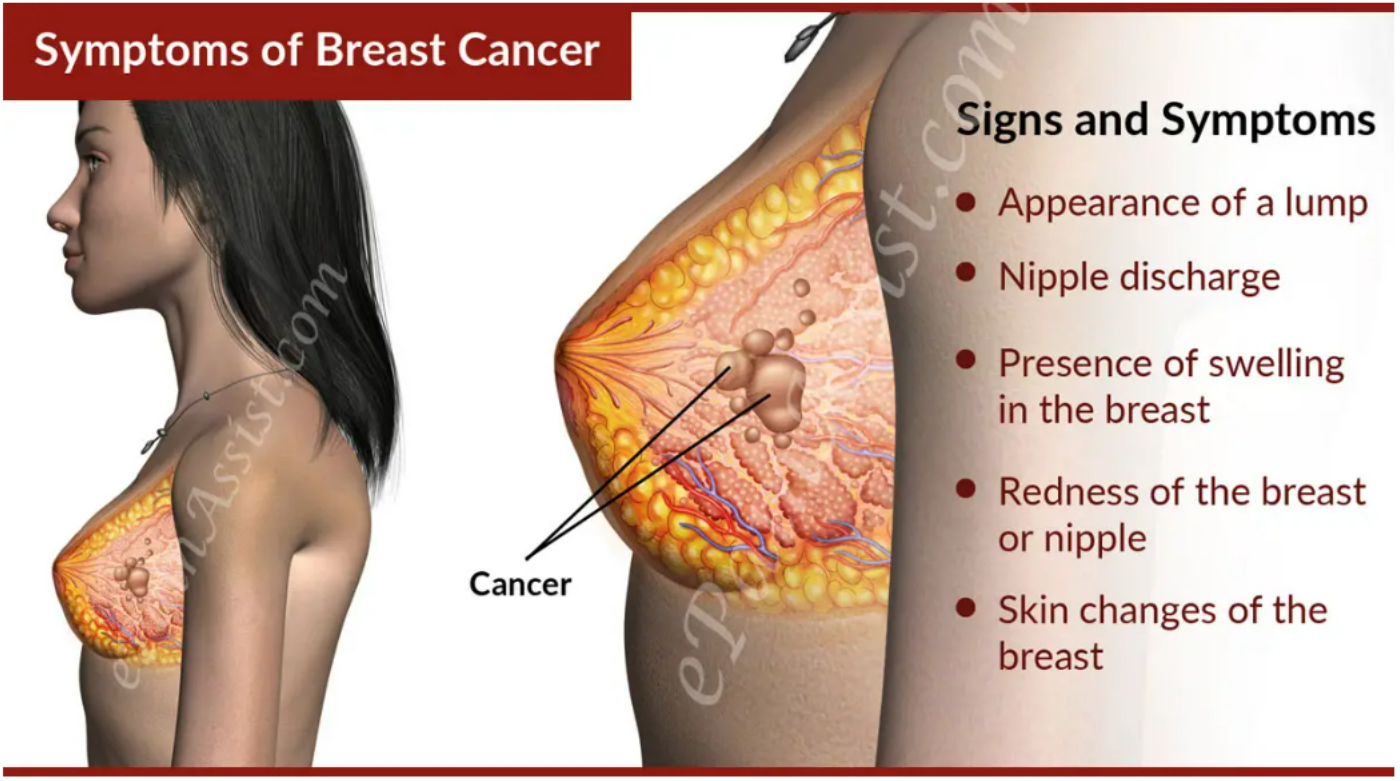
There are some risk factors which cause breast cancer and genetic factors also play a role in developing breast cancer.

Risk Factors for Breast Cancer

- Women are more prone to having breast cancer than men.
- The risk of having breast cancer increases with a person's age.
- A family history of breast cancer increases the risk of developing breast cancer.
- Certain genetic mutations, such as BRCA1 and BRCA2, greatly increase the risk of breast cancer.
- Having a previous history of breast cancer increases the chances of having another.
- Previous history of Hodgkin's disease or other cancers also increases the risk of having breast cancer.
- Women with dense breasts are at an increased risk for developing breast cancer. However, younger women have denser breasts than older women.
- Certain benign conditions of the breast, such as atypical hyperplasia, also increase the risk for having breast cancer.
- Radiation treatment for treating other cancers, such as radiation to the chest, increases the risk of breast cancer later on.
- The risk of breast cancer is also more in women who haven't given birth to their first born after 35 years of age.
- Menopause increases the risk of breast cancer.
- Obesity also increases the risk of breast cancer.
- Use of birth control pills or hormone replacement therapy also tends to increase the risk of breast cancer in women.
- Women who started their menstruation early (before 12 years of age) or who have reached menopause late (after 55 years of age) are at a slightly higher risk for breast cancer.

Signs and Symptoms of Breast Cancer

Breast cancer does not always cause signs and symptoms. For this reason, it is important to have regular screening mammograms. Some of the common symptoms of breast cancer are:



- Appearance of a lump or mass in the breast.
- Nipple discharge.
- Presence of swelling in the breast.
- Redness of the breast or nipple.
- Skin changes of the breast, like an orange-peel appearance or dimpling in the breast.

Investigations for Breast Cancer

- Screening mammography helps in detecting breast cancer before the appearance of any signs or symptoms.
- MRI scanning is also recommended for breast cancer screening.
- Biopsy where a tissue sample is taken from the affected area and sent for testing of cancer cells and determining the stage of cancer.

Specialized Investigations for Breast Cancer

- **Hormone receptor status** is a test where the tissue from the affected part of the breast is examined to look for the presence of estrogen and progesterone receptors.
- **HER2**: This test measures the excessive presence of HER2, which is a protein in breast cancer cells. If the test is positive, then targeted therapies for this protein are given.

Stages of Breast Cancer

- **Stage 0** is the initial stage and it is known as cancer in situ (LCIS or DCIS). In this stage, the tumor cells are confined to the lobules or ducts in the breast and have not metastasized yet.
- **Stage I to IV** represents invasive cancer of the breast where the cancer has metastasized to the adjacent tissues and distant organs.

Stage I is the earliest invasive stage and stage IV is the stage where the tumors have spread to distant organs, such as brain, lungs or bones.

Treatment for Breast Cancer

Treatment for breast cancer depends on the type of breast cancer, the stage of the cancer, the protein expressed by the tumor, patient's age, and treatment preferences.

A combination of different treatment approaches, such as surgery, hormone therapy, radiation therapy, chemotherapy and targeted therapy are used.

Surgery for Breast Cancer

The most common treatment choice for breast cancer is surgery. Different surgical treatments are also used. Some of the surgical procedures done are:

- **Mastectomy** in which the entire breast is removed.
- **Partial mastectomy or lumpectomy** is a breast-conserving surgery where only the affected area of the breast is removed.
- **Sentinel lymph node biopsy** where a tissue sample is taken to assess if the cancer has metastasized to adjacent lymph nodes. If it has, then axillary dissection is done to excise and test the adjacent lymph nodes.
- **Reconstructive surgery** to rebuild the structure of the breast and can be done at the time of mastectomy or at a later stage.

Radiation Therapy for Breast Cancer

Radiation therapy is commonly done after breast-conserving surgery and sometimes after mastectomy to kill any remaining cancer cells using high-energy beams. Radiation therapy can be done internally or externally (the commonest done in breast cancer).

Hormone Therapy for Breast Cancer

This is quite an effective treatment for breast cancers which are positive for ER and PR (hormone receptors). Hormone therapy works by depriving the tumor cells the hormones needed for them to grow. One of the common drugs used in hormone therapy is Tamoxifen which alters the action of estrogen in our body.

Chemotherapy for Breast Cancer

Chemotherapy is the treatment which uses medicines or drugs to destroy cancer cells. Chemotherapy is done in conjunction with other treatment and can be given before surgery (neoadjuvant chemotherapy) or after surgery (adjuvant chemotherapy). More than one drug can be used.

Targeted Therapy for Breast Cancer

Targeted therapy uses drugs which target the specific abnormalities or, in the case of breast cancer, HER2 protein which is present on the tumor cells. Targeted therapies are used in tumors which are HER2-positive. Trastuzumab (Herceptin) is one such drug used in targeted therapy.

Preventative Measures for Detecting Breast Cancer

- Women in 20s and 30s should get clinical breast exams (CBE) every 3 years. Women over 40 years of age should get them done yearly.
- Breast self-examination (BSE) should be done by women in 20s. If any changes are felt or seen, then they should consult their physician immediately. The technique of BSE should be gone over with a health care professional in order to best detect any changes.
- Getting yearly mammograms, especially women over the age 40. Ultrasound examination done with mammograms yields better results, especially in younger women, as they have denser breasts and just doing a mammogram can give a false positive result.