

# Review on Breast Cancer

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## Abstract

**In this research paper, our primary focus on breast cancer and a survey of breast cancer (B.C.), & also comparison the male and female breast cancer. This research article very useful/fruitful for new researchers.**

## 1 Introduction of Breast cancer and literature

Breast cancer or breast carcinoma is an uncontrolled growth of epithelial cells within the breast. It is the second most common cancer in women, but can also on rare occasion affect men as well. Breast cancer is also the second leading cause of cancer deaths in women after lung cancer. This is largely due to the fact that oftentimes breast cancers do not cause any pain or discomfort until they spread to nearby tissues. The breasts are milk-producing glands that sit on the chest wall on either side of the breastbone.

They lie on top of the ribs and the pectoral muscles and they're divided into three main parts. The glandular tissue that makes the milk is made up of 15 to 20 lobules. Inside each of these lie a bunch of grape-like structures called the AVO lie. Which are modified sweat glands surrounded by a basement membrane made largely of collagen. Zooming in on the AVO there's a layer of alveolar cells that secrete breast milk into the lumen. Which is the space in the center of the gland? Wrapping around the alveolus are special myoepithelial cells. That squeeze down and push the milk out of the lumen of the alveolus down the lactiferous ducts and out one of the pores of the nipple.

Now surrounding the glandular tissue is the

stroma which contains adipose or fat tissue and this makes up the majority of the breast. Suspensory ligaments called Cooper's ligaments run through the stroma and help keep it in place. These ligaments attach to the inner surface of the breast on one end and the pectoralis muscle on the other. Just beneath the skin covering the breast there's a network of tiny lymphatic vessels that drain the lymph. Which is a fluid containing cellular waste products and white blood cells.

These lymphatic vessels mainly drain into a group of lymph nodes in the axilla or the armpit. Now the cells of glandular tissue have receptors for certain hormones like estrogen and progesterone which are released by the ovaries in prolactin, which is released by the pituitary gland. These hormones stimulate the alveolar cells to divide and increase in number which makes the lobule enlarged. Without these hormones the glandular cells particularly the alveolar cells can survive and undergo apoptosis, which is programmed cell death for example after menopause estrogen production stops. Which leads to death of the alveolar cells and over time that breast tissue gets replaced by fat. During the menstrual cycle there's increased secretion of estrogen and progesterone from the ovaries and right after menstruation that secretion decreases as. A result during every menstrual cycle the alveolar cells undergo division and apoptosis. Men have some breast tissue as well, but they lack milk-secreting alveolar cells. Each time cells divide there's a chance that a genetic mutation will occur and a mutation can lead to tumor formation. So with more menstrual cycles, there's an increased risk of tumor formation. That's why there's an increased risk of breast cancer with things that increase the number of menstrual cycles, like early age of menarche. Which is the first menstrual bleeding and late

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age of menopause? Similarly Medications containing estrogen also increase the risk of breast cancer There are also other environmental risk factors such as ionizing radiation like from chest x-rays and CT scans on The flip side some things that are associated with a decreased risk of breast cancer include early pregnancy and a longer time breastfeeding Breast cancer has also been linked to specific mutations in tumor suppressor genes such as breast cancer gene or brca1 and brca2 And T p53 which normally slowed down cell division or make cells die if they divide uncontrollably mutations in brca 1 or brca 2 are both autosomal dominant mutations, which can be inherited and cause familial breast cancer in addition to breast cancer. They also cause an increased risk of ovarian cancer. Some breast cancers also have mutations in the erbb2 gene that increased human epidermal growth factor receptor 2 or her 2 which when activated promotes the growth of cells in Males breast cancer is usually caused by inherited mutations in the brca1 and 2 genes. Once a cancer-causing mutation does occur the affected cell which is most commonly an epithelial cell that lines the ducts or the lobules begins to grow and replicate out of control forming a tumor. This tumor also called an in situ carcinoma is initially localized within the basement membrane of the apo eye and can be of two types.

The first type is called ductal carcinoma in situ or DCIS And that's where tumor cells grow from the wall of the ducts into the women If left untreated DCIS over time can cross the basement membrane to become invasive ductal carcinoma Also cancer cells from DCIS can migrate along the elective first duct and through the pore onto the skin over the nipple? This is called Paget disease of the nipple these cancer cells release a substance called mobility factor Which helps them break into and settle in between the squamous epithelial cells as the cancer cells move into the epithelium. There's inflammation which brings ex-

tracellular fluid out through breaks in the skin this fluid then dries and forms crusts over the skin surface. The second type is called lobular carcinoma in situ or LC is and that's where clusters of tumor cells grow within the lobules Without invading the ducts causing the affected a voi to enlarge Unlike DCIS over time LC is doesn't cross the basement membrane to form invasive lobular carcinoma LC is got its name many years ago Before it was realized that it's not a breast cancer in the sense that it doesn't invade surrounding tissues Just like healthy avio ourselves some breast cancer cells have hormone receptors that allow them to grow in the presence of the hormones Based on the type of hormone receptors breast cancers can be divided into three major types Estrogen receptor or ER positive and her2 negative carcinoma, which is most common her2 positive and ER positive negative carcinoma and ER negative in her to negative carcinoma Breast cancer can cause a few complications First the tumor causes local inflammation which causes damage to the suspensory ligaments and latias ducts resulting in their fibrosis Next the cancer can invade nearby tissues like the pectoral muscles below and the skin above?

## **1.1 Types of Breast Cancer**

There are many different types of breast cancer. To determine an appropriate approach to treating the disease, your doctor will first evaluate the specifics of the breast tumor, including: (Breast cancer occurs in two broad categories: invasive and noninvasive.)

- Invasive (infiltrating) breast cancer
- Noninvasive (in situ) breast cancer
- Aggressive breast cancers
- Triple-negative breast cancer:
- Inflammatory breast cancer:

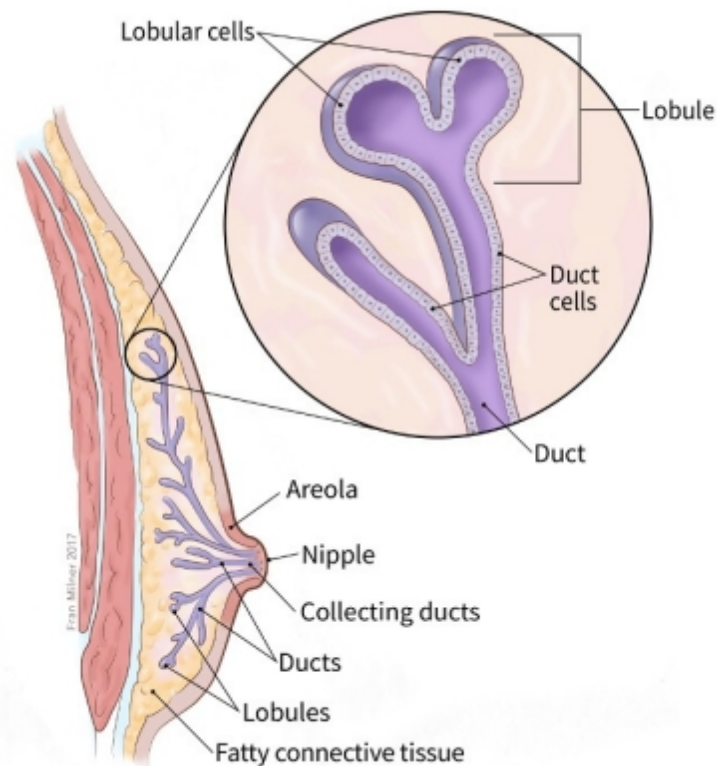


Figure 1: Cross Section structure of female breast

Cancer cells can also enter and block the thin lymphatic vessels which causes lymph to build up in the interstitial space. Normally this fluid buildup, what causes swelling, but the attachment of suspensory ligaments doesn't allow the skin to stretch. So the skin becomes thickened and dimpled like an orange peel, called the "peau d'orange" appearance. Finally, tumor cells can spread via the blood to the spine, brain, and bone, or the lymph to other sites like axillary lymph nodes and the other breast. In males, breast tissue is very thin, which makes it easier for the cancer to spread to underlying tissues. The first symptom of breast cancer is a hard, painless lump or swelling, which is most commonly in the upper and outer part of the breast. Additionally, there may be a swelling under the armpit if cancer is spread to the axillary lymph nodes. The breast can become mobile and fixed or stuck onto the chest wall due to infiltration if cancer cells

spread into the pectoral muscles. Another symptom is dimpling of the skin over the breast due to involvement of the skin. Fibrosis of Cooper's ducts and suspensory ligaments causes retraction or pulling in of the nipples. When Paget disease is present, it can cause itching, redness, crusting, and discharge from the nipple. Diagnosis of breast cancer usually begins by feeling a breast lump. Breast cancer can be treated effectively when it is detected early in the course of the disease, that's why regular screening with mammography, which is an x-ray of the breasts, is done in high-risk individuals. In addition, imaging using ultrasound and MRI may be done to detect the tumor. Finally, a biopsy of the swelling or a fine needle aspiration and cytology, where fluid from the swelling is taken, may be done to confirm the diagnosis.

To determine the risk of breast cancer, each one is staged by the TNM system. T indicates the

size of the tumor and whether or not it is grown in nearby areas For example, the chest wall muscles and describes the degree to which cancer has spread to nearby lymph nodes particularly the axillary lymph nodes and Finally M indicates the degree to which the cancer has spread to other sites or metastasized Each of these categories is ranked from zero to four with four being the most severe Finally the combinations of these sub stages determine the stage group which are assigned zero to four.

Treatment for breast cancer is based on the

type and stage of the cancer but commonly involves surgery radiation therapy chemotherapy and hormonal therapy Localized tumors are removed surgically by partial mastectomy where the affected part is removed in larger tumors Which have spread to nearby tissue are removed by total mastectomy where the entire breast is removed in Addition nearby structures like lymph nodes may also be removed if the cancer has metastasized to them Hormone therapy is used when tumor cells have hormone receptors like estrogen and her 2 in May include

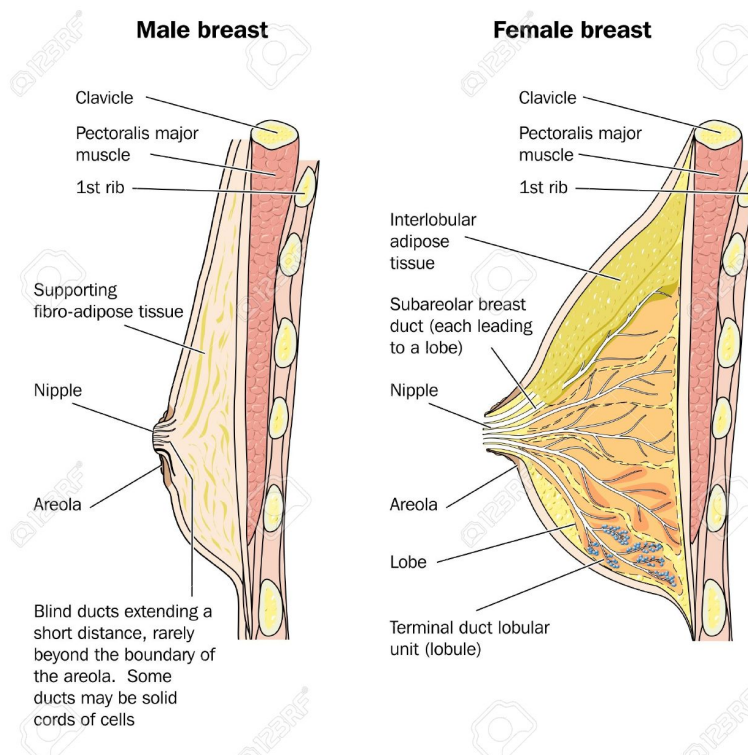


Figure 2: Cross section of male and female breast tissue

medications which block the formation or effects of estrogen All right as a quick recap Breast cancer or breast carcinoma is the uncontrolled growth of epithelial cells lining the ducts and lobules of the breast Breast cancer usually begins as an in situ carcinoma, which can either be ductal carcinoma in situ or DCIS Which is localized to the ducts or lobular carcinoma in situ or LCIS,

which is localized within the lobules Over time in situ carcinoma can invade the basement membrane to become invasive carcinoma?

involving the ducts and lobules Breast cancer screening by mammography is done for early detection of cancer Which can be treated by a variety of treatment options including surgery radiation therapy chemotherapy in hormonal therapy.



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