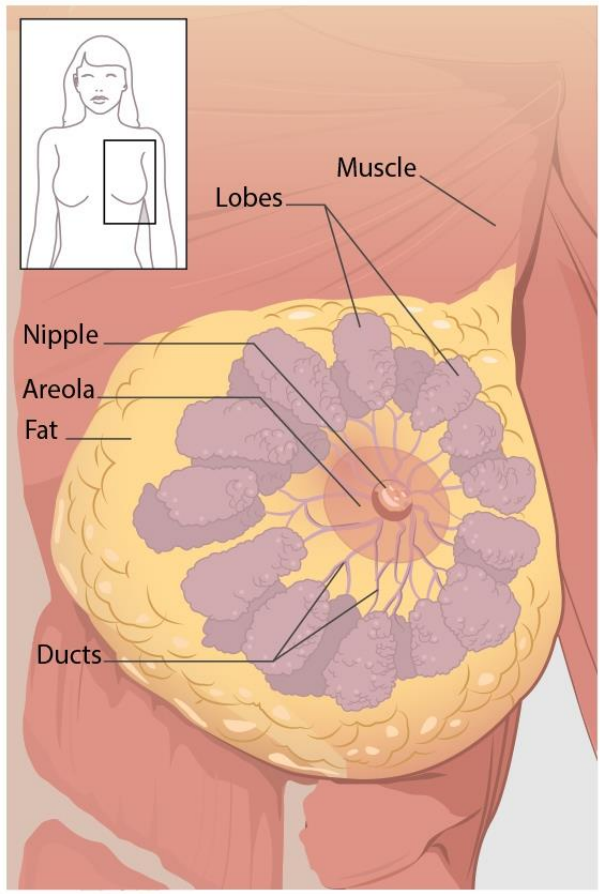
All Things Breast Cancer

By: Desiree Jamieson-Millan, MSHE, BSHS, CCMA

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.



Types of Breast Cancer

Most Common

- Invasive ductal carcinoma
- Invasive lobular carcinoma
- Ductal carcinoma *in situ* (DCIS)

Less Common

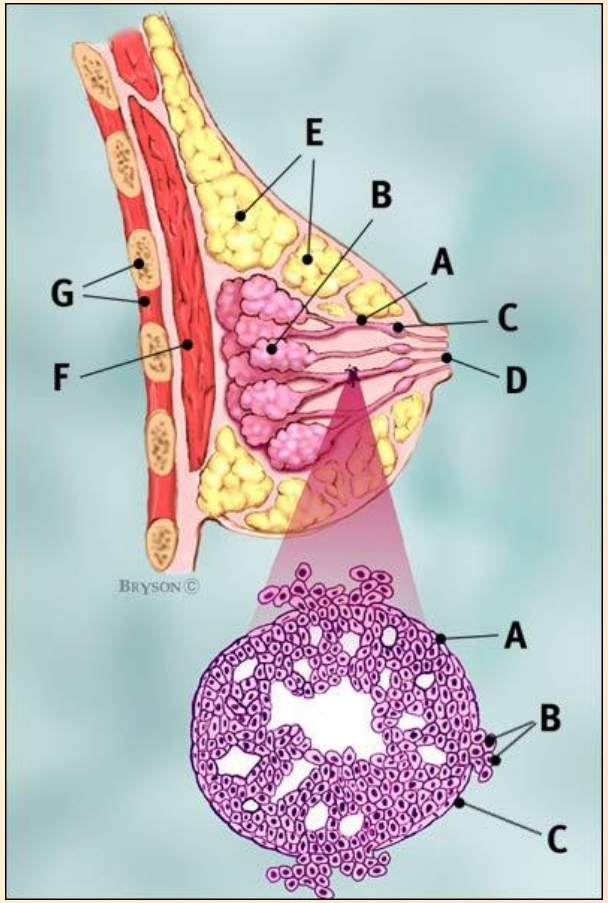
- Paget's disease
- Inflammatory breast cancer

Invasive Ductal Carcinoma

- Invasive ductal carcinoma (IDC), sometimes called infiltrating ductal carcinoma, is the most common type of breast cancer. About 80% of all breast cancers are invasive ductal carcinomas.
- According to the American Cancer Society, any of the following unusual changes in the breast can be a first sign of breast cancer, including invasive ductal carcinoma:
  - swelling of all or part of the breast
  - skin irritation or dimpling
  - breast pain
  - nipple pain or the nipple turning inward
  - redness, scaliness, or thickening of the nipple or breast skin
  - a nipple discharge other than breast milk
  - a lump in the underarm area

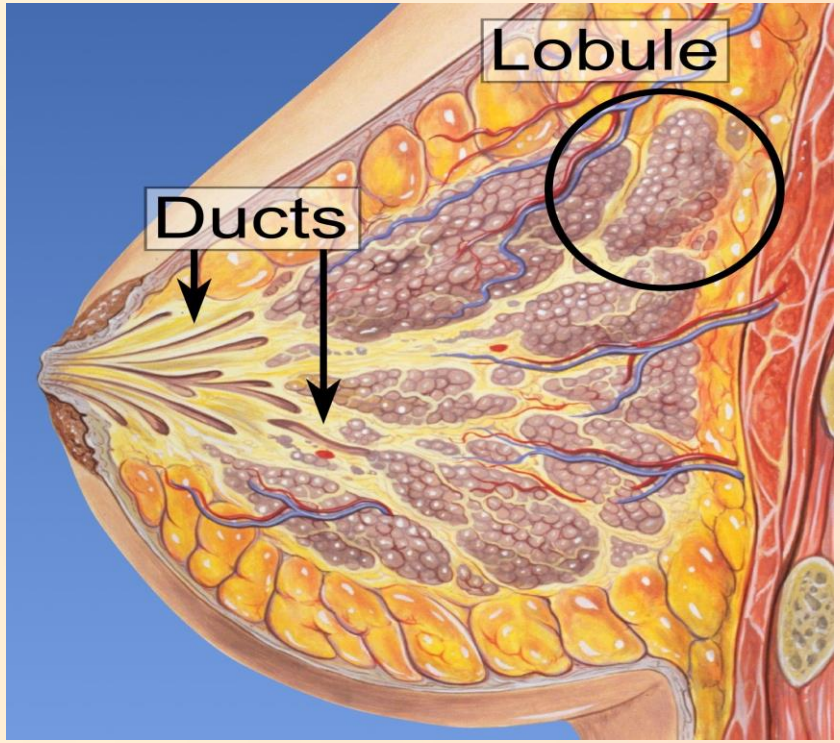
Types of Invasive Ductal Carcinoma

- Tubular carcinoma of the breast is a subtype of invasive ductal carcinoma accounting for about 8% to 27% of all cases of breast cancer.
  - Tubular carcinomas are usually small (about 1 cm or less) and made up of tube-shaped structures called "tubules."
  - These tumors tend to be low-grade, meaning that their cells look somewhat similar to normal, healthy cells and tend to grow slowly
  - Studies also suggest that the average age of diagnosis for tubular carcinoma is the early 50s, although women can be diagnosed with it at any age. This type of cancer is rare in men.
- Medullary carcinoma of the breast is a rare subtype of invasive ductal carcinoma accounting for about 3-5% of all cases of breast cancer.
  - Medullary carcinoma can occur at any age, but it usually affects women in their late 40s and early 50s.
  - Medullary carcinoma is more common in women who have a *BRCA1* mutation.
  - Studies have shown that medullary carcinoma is also more common in Japan than in the United States.
- Invasive papillary carcinomas of the breast are rare, accounting for less than 1-2% of invasive breast cancers.
  - In most cases, these types of tumors are diagnosed in older women who have already been through menopause.
  - An invasive papillary carcinoma usually has a well-defined border and is made up of small, finger-like projections
  - In most cases of invasive papillary carcinoma, ductal carcinoma in situ (DCIS) is also present.



Invasive Lobular Carcinoma

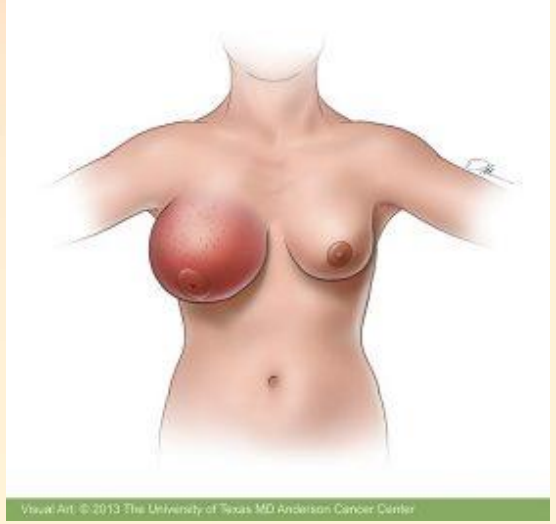
- Invasive lobular carcinoma (ILC), sometimes called infiltrating lobular carcinoma, is the second most common type of breast cancer after invasive ductal carcinoma
- About 10% of all invasive breast cancers are invasive lobular carcinomas
- Although invasive lobular carcinoma can affect women at any age, it is more common as women grow older.
  - According to the American Cancer Society, about two-thirds of women are 55 or older when they are diagnosed with an invasive breast cancer.
  - ILC tends to occur later in life than invasive ductal carcinoma — the early 60s as opposed to the mid- to late 50s.
- Some research has suggested that the use of hormone replacement therapy during and after menopause can increase the risk of ILC.
- According to the American Cancer Society, any of the following unusual changes in the breast can be a first sign of breast cancer, including invasive lobular carcinoma:
  - swelling of all or part of the breast
  - skin irritation or dimpling
  - breast pain
  - nipple pain
  - redness, scaliness, or thickening of the nipple or breast skin
  - a nipple discharge other than breast milk
  - a lump in the underarm area

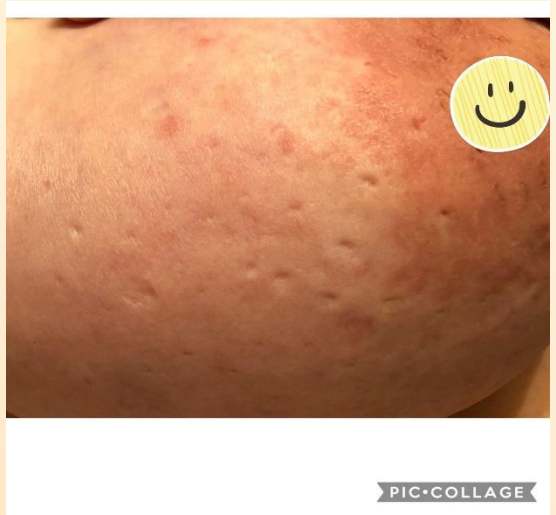


Ductal Carcinoma in Situ (DCIS)

- Ductal carcinoma in situ (DCIS) is non-invasive breast cancer.
  - Ductal means that the cancer starts inside the milk ducts,
  - In situ means "in its original place."
- DCIS is called "non-invasive" because it hasn't spread beyond the milk duct into any normal surrounding breast tissue.
- DCIS isn't life-threatening but having DCIS can increase the risk of developing an invasive breast cancer later on.
- When you have had DCIS, you are at higher risk for the cancer coming back or for developing a new breast cancer than a person who has never had breast cancer before. Most recurrences happen within the 5 to 10 years after initial diagnosis. The chances of a recurrence are under 30%.
  - Women who have breast-conserving surgery (lumpectomy) for DCIS without radiation therapy have about a 25% to 30% chance of having a recurrence at some point in the future.
  - Including radiation therapy in the treatment plan after surgery drops the risk of recurrence to about 15%
- According to the American Cancer Society, about 60,000 cases of DCIS are diagnosed in the United States each year, accounting for about 1 out of every 5 new breast cancer cases.
  - There are two main reasons this number is so large and has been increasing over time:
    - People are living much longer lives. As we grow older, our risk of breast cancer increases.
    - More people are getting mammograms, and the quality of the mammograms has improved. With better screening, more cancers are being spotted early.
- DCIS generally has no signs or symptoms. A small number of people may have a lump in the breast or some discharge coming out of the nipple.
  - According to the National Cancer Institute, about 80% of DCIS cases are found by mammography

Inflammatory Breast Cancer

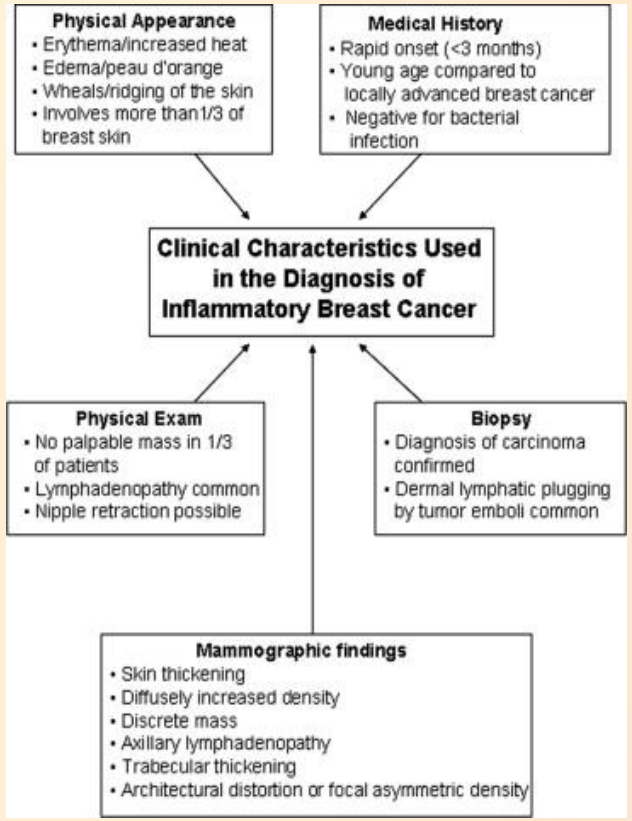




- Inflammatory breast cancer (IBC) is a rare and aggressive form of breast cancer. According to the American Cancer Society, about 1% of all breast cancer cases in the United States are inflammatory breast cancers.
- Inflammatory breast cancer usually starts with the reddening and swelling of the breast instead of a distinct lump. IBC tends to grow and spread quickly, with symptoms worsening within days or even hours. It's important to recognize symptoms and seek prompt treatment.
  - IBC often gets confused with Mastitis in younger females
- Inflammatory breast cancer symptoms vary from person to person. If you have symptoms, they may include:
  - Breast swelling that appears suddenly with one breast much larger than the other
  - Itching of the breast- sometimes with a bug bite or rash appearance
  - Pink, red, or dark colored area on the breast, sometimes with a dimpling of the breast skin that looks like an orange peel (called peau d'orange)
  - Ridges and thickened areas of the skin on the breast
  - Breast that feels warm to the touch
  - Flattened or retracted nipple
  - Breast pain or tenderness

How Inflammatory Breast Cancer differs from other types of breast cancer?

- Inflammatory breast cancer differs (IBC) from other types of breast cancer in several ways:
  - IBC doesn't look like a typical breast cancer. It often does not cause a breast lump, and it might not show up on a mammogram. This makes it harder to diagnose.
    - Tends to require an MRI and skin punch biopsies
  - IBC tends to occur in younger women (younger than 40 years of age).
  - African American women appear to develop IBC more often than white women.
  - IBC is more common among women who are overweight or obese.
  - IBC also tends to be more aggressive—it grows and spreads much more quickly—than more common types of breast cancer.
  - IBC is always at a locally advanced stage when it's first diagnosed because the breast cancer cells have grown into the skin. (This means it is at least stage III.)
  - In about 1 of every 3 cases, IBC has already spread (metastasized) to distant parts of the body when it is diagnosed. This makes it harder to treat successfully.
  - Women with IBC tend to have a worse prognosis (outcome) than women with other common types of breast cancer.



Pagets Disease

Paget's disease of the nipple

- Paget's disease of the nipple is a rare form of breast cancer in which cancer cells collect in or around the nipple.
- The cancer usually affects the ducts of the nipple first (small milk-carrying tubes), then spreads to the nipple surface and the areola (the dark circle of skin around the nipple).
- The nipple and areola often become scaly, red, itchy, and irritated.
- According to the National Cancer Institute, Paget's disease of the nipple accounts for less than 5% of all breast cancer cases in the United States.
- Being aware of the symptoms is important, given that more than 97% of people with Paget's disease also have cancer, either DCIS or invasive cancer, somewhere else in the breast.
- The unusual changes in the nipple and areola are often the first indication that breast cancer is present.

Molecular Subtypes of Breast Cancer

There are five main intrinsic or molecular subtypes of breast cancer that are based on the genes a cancer expresses:

- **Luminal A** breast cancer is hormone-receptor positive (estrogen-receptor and/or progesterone-receptor positive), HER2 negative, and has low levels of the protein Ki-67, which helps control how fast cancer cells grow. Luminal A cancers are low-grade, tend to grow slowly and have the best prognosis.

- **Luminal B** breast cancer is hormone-receptor positive (estrogen-receptor and/or progesterone-receptor positive), and either HER2 positive or HER2 negative with high levels of Ki-67. Luminal B cancers generally grow slightly faster than luminal A cancers and their prognosis is slightly worse.

- **Triple-negative/basal-like** breast cancer is hormone-receptor negative (estrogen-receptor and progesterone-receptor negative) and HER2 negative. This type of cancer is more common in women with *BRCA1* gene mutations. Researchers aren't sure why, but this type of cancer also is more common among younger and Black women.

- **HER2-enriched (HER2+)** breast cancer is hormone-receptor negative (estrogen-receptor and progesterone-receptor negative) and HER2 positive. HER2-enriched cancers tend to grow faster than luminal cancers and can have a worse prognosis, but they are often successfully treated with targeted therapies aimed at the HER2 protein,).
  - human epidermal growth factor receptor 2 (HER2). This protein promotes the growth of cancer cells

- **Normal-like** breast cancer is similar to luminal A disease: hormone-receptor positive (estrogen-receptor and/or progesterone-receptor positive), HER2 negative, and has low levels of the protein Ki-67, which helps control how fast cancer cells grow. Still, while normal-like breast cancer has a good prognosis, its prognosis is slightly worse than luminal A cancer's prognosis.

Triple Negative Breast Cancer

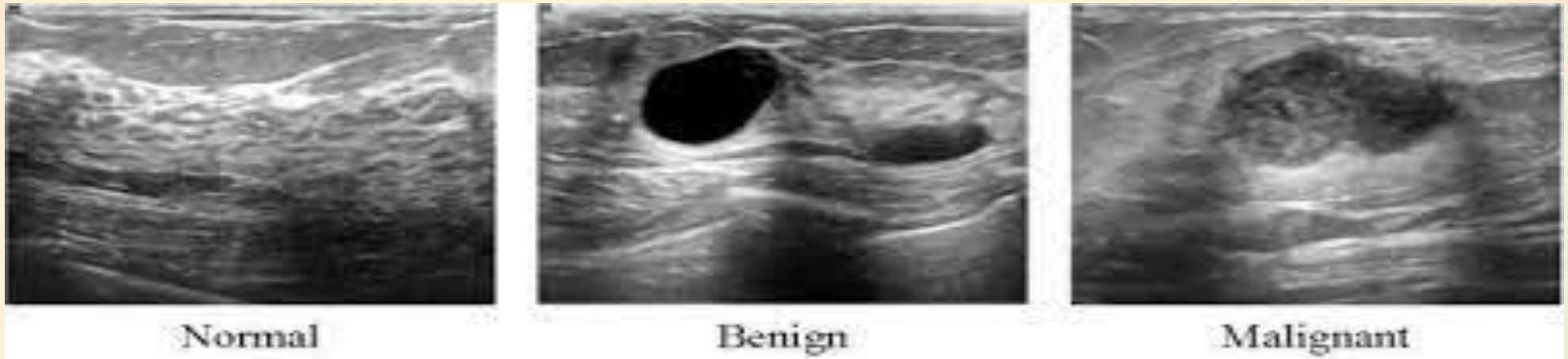
- Triple-negative breast cancer is cancer that tests negative for estrogen receptors, progesterone receptors, and excess HER2 protein.
- These results mean the growth of the cancer is not fueled by the hormones estrogen and progesterone, or by the HER2 protein.
- Triple-negative breast cancer does not respond to hormonal therapy medicines or medicines that target HER2 protein receptors. Still, other medicines are used to successfully treat triple-negative breast cancer.
- About 10-20% of breast cancers are triple-negative breast cancers.
- For doctors and researchers, there is intense interest in finding new medications that can treat this kind of breast cancer.
- Studies are trying to find out whether certain medications can interfere with the processes that cause triple-negative breast cancer to grow.

Think of a cancer cell as a house. To get inside to destroy the cancer, we must bypass three locks on the front door: estrogen, progesterone, and HER2.

If your cancer tests positive for these three locks, which are known as *receptors,* then doctors have a few keys they can use to get inside the cell to destroy it.

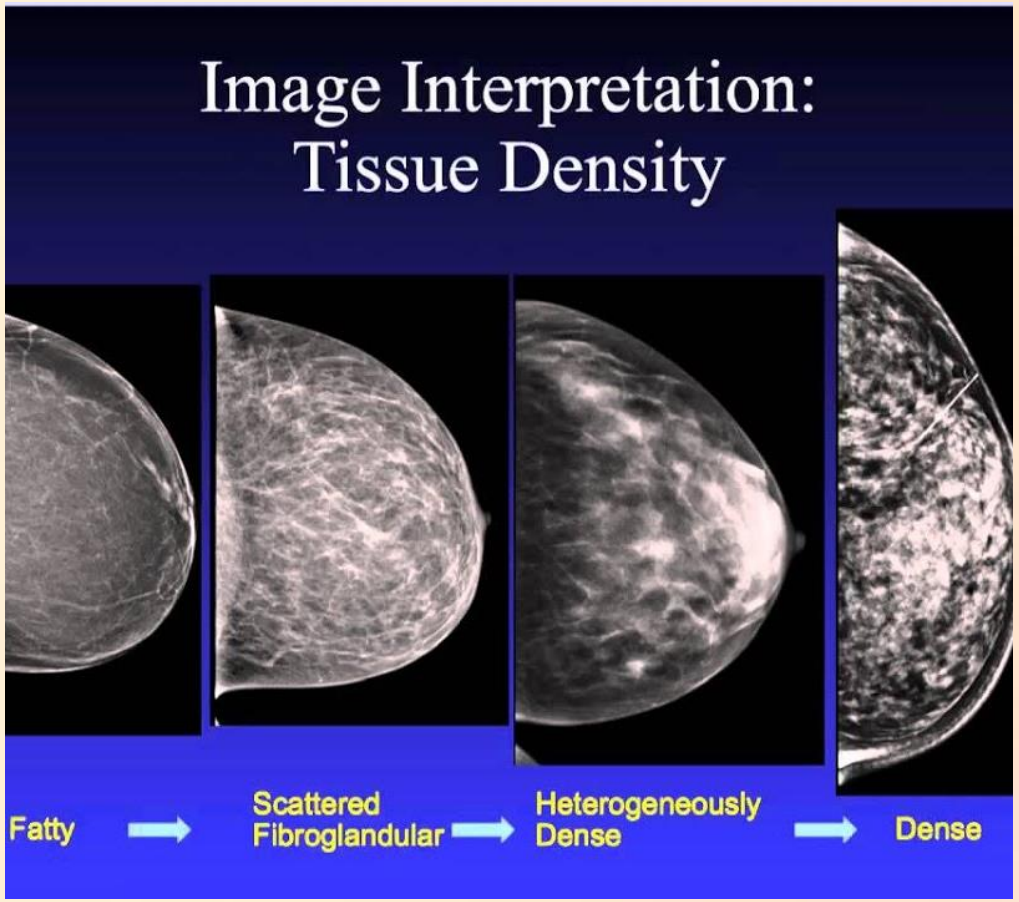
If you have triple-negative breast cancer, those locks aren't there. So the keys doctors usually use won't work. But chemotherapy is still an effective option.

Ultrasound of the Breast



Breast Density on a Mammogram

- Breast Density can contribute to more difficulty detecting cancerous masses on mammograms, and may require additional testing such as an MRI based on clinical findings
- The younger the patient the more density the breast can present with, however does not exclude any pre-menopausal female
- Post menopausal women tend to have more fatty breast tissue and less dense due to lack of hormones



U.S Breast Cancer Statistics

- About 1 in 8 U.S. women (about 13%) will develop invasive breast cancer over the course of her lifetime.
- In 2021, an estimated 281,550 new cases of invasive breast cancer are expected to be diagnosed in women in the U.S., along with 49,290 new cases of non-invasive (in situ) breast cancer.
- About 2,650 new cases of invasive breast cancer are expected to be diagnosed in men in 2021. A man's lifetime risk of breast cancer is about 1 in 833.
- Due to advancements in treatment The overall death rate from breast cancer decreased by 1% per year from 2013 to 2018
- As of January 2021, there are more than 3.8 million women with a history of breast cancer in the U.S. This includes women currently being treated and women who have finished treatment.
- Breast cancer is the most commonly diagnosed cancer among American women. In 2021, it's estimated that about 30% of newly diagnosed cancers in women will be breast cancers.
- Breast cancer became the most common cancer globally as of 2021, accounting for 12% of all new annual cancer cases worldwide, according to the World Health Organization.
- In women under 45, breast cancer is more common in Black women than white women. Overall, Black women are more likely to die of breast cancer. For Asian, Hispanic, and Native-American women, the risk of developing and dying from breast cancer is lower. Ashkenazi Jewish women have a higher risk of breast cancer because of a higher rate of *BRCA* mutations

Resources

American Cancer Society | Information and Resources about for Cancer: Breast, Colon, Lung, Prostate, Skin

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Breastcancer.org - Breast Cancer Information and Support

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Breast Cancer | CDC

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Questions?

Thank you,

Desiree Jamieson-Millan, MHE,BHS,CCMA