

# Advances in Nano Drug Delivery Systems

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**Abstract:** Systems of chemotherapeutic agents such as nanoformulations, liposomes, hydrogels, exosomes, dendrimers, microspheres, microbubbles, phytosomes, micelles, etc. Nanomedicine and nano delivery systems are a relatively Breast Cancer is a carcinoma of breast tissue, in women with less than 40 year of age approximately 7% diagnosed as suffering from breast cancer & in women with less than 35 years of a age, it was less 4%. Emerging novel delivery systems may result in promising approach for its early recognition and efficient treatment. Breast cancer is improving by using various novel delivery new but rapidly developing science where materials in the nanoscale range are employed to serve as means of diagnostic tools or to deliver therapeutic agents to specific targeted sites in a controlled manner. Nanotechnology offers multiple benefits in treating chronic human diseases by site-specific, and target-oriented delivery of precise medicines.

**Keywords:** microparticles, gene therapy, oral delivery, nanoparticles etc

## I. INTRODUCTION

The drug delivery system is highly integrated and requires various disciplines, such as chemist, biologist, and engineers to join forces to optimize this system. Breast cancer treatment using various novel delivery system of chemotherapeutic agents such as nano formulations liposomes, hydrogels, exosomes, dendrimers, microspheres, microtubules, phytosomes, micelles, etc. It has been demonstrated that 5% to 10% of breast cancers can be attributed to genetic mutations and family history, and 20% to 30% of breast cancers can be attributed to factors that may be modifiable. Breast cells are where breast cancer first develops. A collection of cancer cells known as a cancerous tumor is capable of spreading into and destroying nearby tissue. As well as spreading throughout the body, it can. Breast cells occasionally undergo changes that prevent them from growing or behaving normally. Non-cancerous breast conditions atypical hyperplasia and cysts may result from these changes. Additionally, they may result in benign tumors like intraductal papillomas.

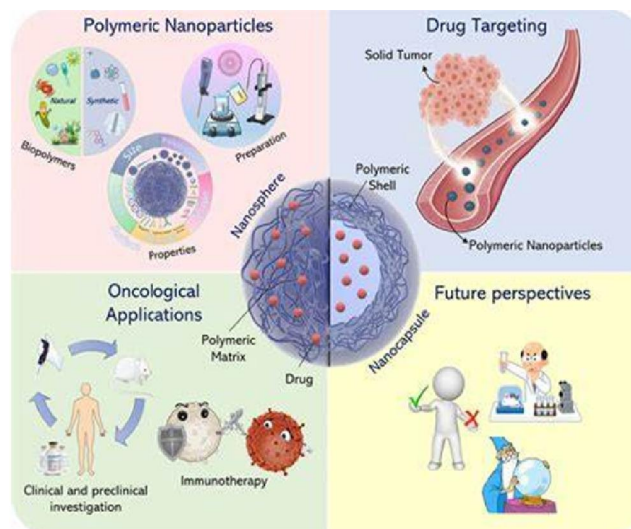


Fig: Nano particles used in treatment of BC.



**OBJECTIVE:**

- Increase awareness are known and potential risk factor of breast cancer.
- Understand appropriate dietary and lifestyle changes that may promote healthy breast cells.
- Increase knowledge of available diagnostic screening methods that may promotes earlier detection.

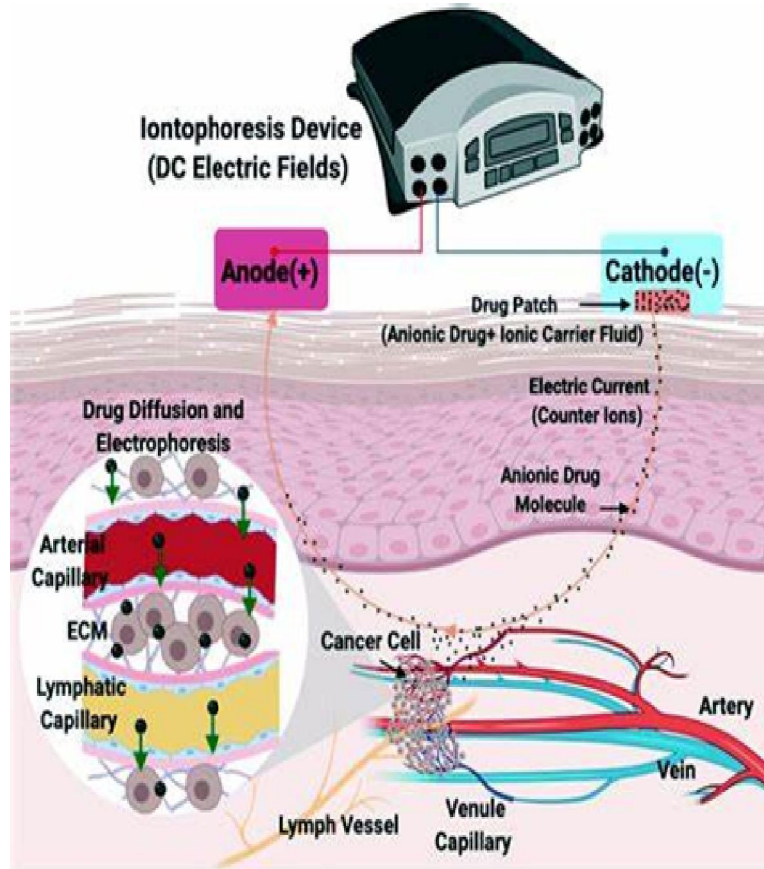


Fig: Mechanism of nano particles in the treatment of breast cancer.

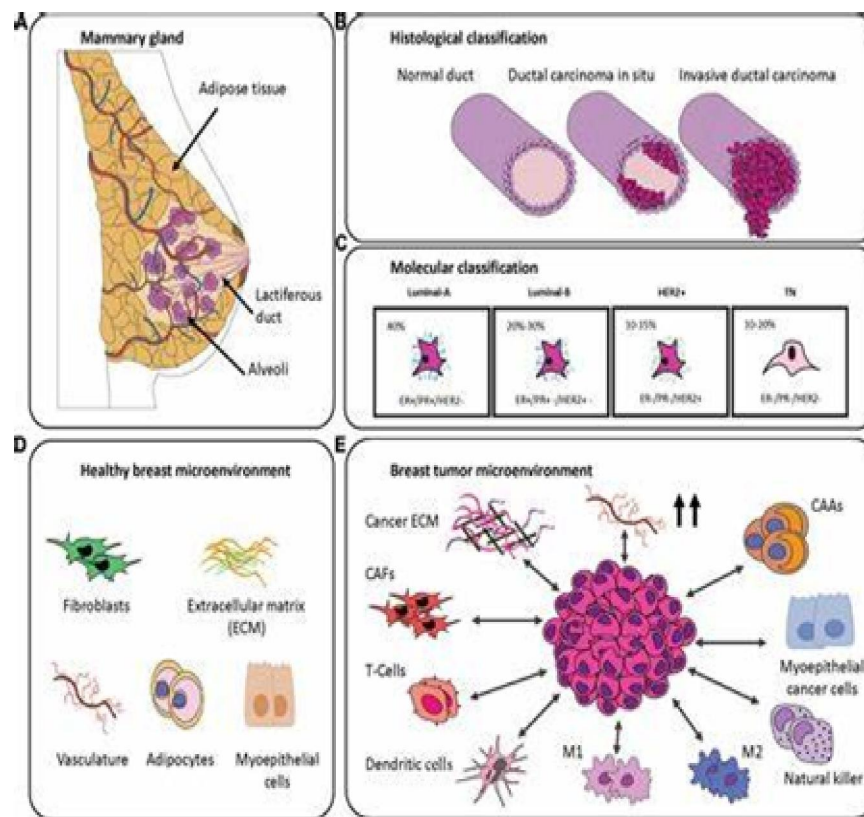
**Modifiable and non-modifiable risk factors of breast cancer.**

Non-Modifiable Factors	Modifiable Factors
Female sex	Hormonal replacement therapy
Older age	Diethylstilbestrol
Family history (of breast or ovarian cancer)	Physical activity
Genetic mutations	Overweight/obesity
Race/ethnicity	Alcohol intake
Pregnancy and breastfeeding	Smoking
Menstrual period and menopause	Insufficient vitamin supplementation



Non-Modifiable Factors	Modifiable Factors
Density of breast tissue	Excessive exposure to artificial light
Previous history of breast cancer	Intake of processed food
Non-cancerous breast diseases	Exposure to chemicals
Previous radiation therapy	Other drugs

**CLASSIFICATION OF BREAST CANCER:**



**Type of breast cancer:-**

1. ANGIOSARCOMA
2. DUCTAL CARCINOMA IN SITU (DCIS)
3. Inflammatory breast cancer
4. Invasive lobular carcinoma
5. Lobular carcinoma in situ
6. Male breast cancer
7. Paget's disease of the breast
8. Recurrent breast cancer



### 1. Angiosarcoma

It is a rare type of cancer that forms in the lining of the blood vessels and lymph vessels. The lymph vessels are part of the immune system. The lymph vessels collect bacteria, viruses and waste products from the body and dispose of them. This type of cancer can occur any place in the body. But it most often occurs in the skin on the head and neck. Rarely, it may form in the skin on other parts of the body, such as the breast. Or it may form in deeper tissue, such as the liver and the heart. It can occur in areas that were treated with radiation therapy in the past.



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#### Symptoms:-

- A raised area of skin that looks like a bruise
- A bruise-like lesion that grows larger over time
- A lesion that may bleed when scratched or bumped
- Swelling in the skin around the lesion

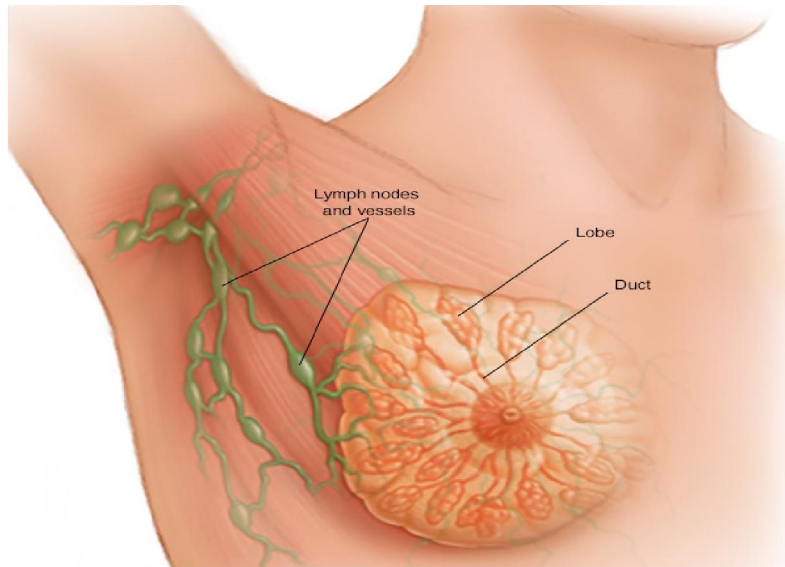
#### Risk Factor :-

- **Radiation therapy.** Treatment with radiation for cancer or other conditions may increase the risk of angiosarcoma. Angiosarcoma is a rare side effect of radiation therapy.
- **Swelling caused by lymph vessel damage.** Swelling caused by a backup of lymph fluid is called lymphedema. It happens when the lymphatic system gets blocked or damaged. Lymphedema can happen when lymph nodes are removed during surgery. This is often done during surgery to treat cancer. Lymphedema can also happen when there is an infection or other conditions.
- **Chemicals.** Liver angiosarcoma is linked to exposure to several chemicals. Examples of these chemicals include vinyl chloride and arsenic.
- **Genetic syndromes.** Certain gene changes that people can be born with can raise the risk of having angiosarcoma. Examples include the gene changes that cause neurofibromatosis, Maffucci syndrome, or Klippel-Trenaunay syndrome, and the *BRCA1* and *BRCA2* genes.

### 2. Ductal carcinoma in situ

It is a very early form of breast cancer. In this type the cancer cells are confined inside a milk duct in the breast. The cancer cells haven't spread into the breast tissue. Ductal carcinoma in situ is often shortened to DCIS. It's sometimes called noninvasive, preinvasive or stage 0 breast cancer.





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**Symptoms :-**

- A breast lump
- Bloody nipple discharge

**Risk Factor:-**

- **A family history of breast cancer.** If a parent, sibling or child had breast cancer, your risk of breast cancer is increased. The risk is higher if your family has a history of getting breast cancer at a young age. The risk also is higher if you have multiple family members with breast cancer. Still, most people diagnosed with breast cancer don't have a family history of the disease.
- **A personal history of breast cancer.** If you've had cancer in one breast, you have an increased risk of getting cancer in the other breast.
- **A personal history of breast conditions.** Certain breast conditions are a sign of a higher risk of breast cancer. These conditions include lobular carcinoma in situ, also called LCIS, and atypical hyperplasia of the breast. If you've had a breast biopsy that found one of these conditions, you have an increased risk of breast cancer.
- **Beginning your period at a younger age.** Beginning your period before age 12 increases the risk of breast cancer.
- **Beginning menopause at an older age.** Beginning menopause after age 55 increases the risk of breast cancer.
- **Being female.** Women are much more likely than men are to get breast cancer. Everyone is born with some breast tissue, so anyone can get breast cancer.
- **Dense breast tissue.** Breast tissue is made up of fatty tissue and dense tissue. Dense tissue is made of milk glands, milk ducts and fibrous tissue. If you have dense breasts, you have more dense tissue than fatty tissue in your breasts. Having dense breasts can make it harder to detect breast cancer on a mammogram. If a mammogram showed that you have dense breasts, your risk of breast cancer is increased. Talk with your healthcare team about other tests you might have in addition to mammograms to look for breast cancer.
- **Drinking alcohol.** Drinking alcohol increases the risk of breast cancer.
- **Having your first child at an older age.** Giving birth to your first child after age 30 may increase the risk of breast cancer.
- **Having never been pregnant.** Having been pregnant one or more times lowers the risk of breast cancer. Never having been pregnant increases the risk.



- **Increasing age.** The risk of breast cancer goes up as you get older.
- **Inherited DNA changes that increase cancer risk.** Certain DNA changes that increase the risk of breast cancer can be passed from parents to children. The most well-known changes are called BRCA1 and BRCA2. These changes can greatly increase your risk of breast cancer and other cancers, but not everyone with these DNA changes gets cancer.
- **Menopausal hormone therapy.** Taking certain hormone therapy medicines to control the symptoms of menopause may increase the risk of breast cancer. The risk is linked to hormone therapy medicines that combine estrogen and progesterone. The risk goes down when you stop taking these medicines.
- **Obesity.** People with obesity have an increased risk of breast cancer.
- **Radiation exposure.** If you received radiation treatments to your chest as a child or young adult, your risk of breast cancer is higher.

#### **Prevention :-**

Making changes in your daily life may help lower your risk of ductal carcinoma in situ. This early form of breast cancer also is called DCIS. To lower your risk of breast cancer, try to:

##### **Ask about breast cancer screening**

Talk with your doctor or other healthcare professional about when to begin breast cancer screening. Ask about the benefits and risks of screening. Together, you can decide what breast cancer screening tests are right for you.

##### **Become familiar with your breasts through breast self-exam for breast awareness**

You may choose to become familiar with your breasts by occasionally inspecting them during a breast self-exam for breast awareness. If you find a new change, lumps or other unusual signs in your breasts, tell a healthcare professional right away.

Breast awareness can't prevent breast cancer. But it may help you to better understand the look and feel of your breasts. This might make it more likely that you'll notice if something changes.

##### **Drink alcohol in moderation, if at all**

If you choose to drink alcohol, limit the amount you drink to no more than one drink a day. For breast cancer prevention, there is no safe amount of alcohol. So if you're very concerned about your breast cancer risk, you may choose to not drink alcohol.

##### **Exercise most days of the week**

Aim for at least 30 minutes of exercise on most days of the week. If you haven't been active lately, ask your healthcare professional whether exercising is OK and start slowly.

##### **Limit hormone therapy during menopause**

Combination hormone therapy may increase the risk of breast cancer. Talk with a healthcare professional about the benefits and risks of hormone therapy.

Some people have symptoms during menopause that cause discomfort. These people may decide that the risks of hormone therapy are acceptable to get relief. To reduce the risk of breast cancer, use the lowest dose of hormone therapy possible for the shortest amount of time.

##### **Maintain a healthy weight**

If your weight is healthy, work to maintain that weight. If you need to lose weight, ask a healthcare professional about healthy ways to lower your weight. Eat fewer calories and slowly increase the amount you exercise.

### **3. Inflammatory breast cancer :-**

It is a form of breast cancer that causes breast swelling and skin changes.

Inflammatory breast cancer happens when a growth of cells forms in the breast tissue. The cells break away from where they started to grow and travel to the lymphatic vessels in the skin. The cells can block the vessels and cause the skin on the breast to look swollen. This skin on the breast might look red or purple.





**Symptoms :-**

- Fast change in the appearance of one breast, over the course of several weeks.
- Thickness, heaviness or swelling of one breast.
- Changes in skin color, giving the breast a red, purple, pink or bruised appearance.
- Unusual warmth of the affected breast.
- Dimpling or ridges on the skin of the affected breast, similar to an orange peel.
- Tenderness, pain or aching.
- Enlarged lymph nodes under the arm, above the collarbone or below the collarbone.
- Flattened nipple or nipple that turns inward on the affected breast.

**Risk factor:-**

**Being female**

Women are much more likely than men to get breast cancer, including inflammatory breast cancer. Everyone is born with some breast tissue, so anyone can get breast cancer.

**Being younger**

Inflammatory breast cancer is more frequently diagnosed in people in their 40s and 50s.

**Being Black**

Black people have a higher risk of inflammatory breast cancer than do white people.

**Being obese**

People who are obese have a greater risk of inflammatory breast cancer.

**Prevention :-**

Making changes in your daily life may help lower your risk of breast cancer. Try to:

**Ask about breast cancer screening**

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**Limit hormone therapy during menopause**

Combination hormone therapy may increase the risk of breast cancer. Talk with a healthcare professional about the benefits and risks of hormone therapy.

Some people have symptoms during menopause that cause discomfort. These people may decide that the risks of hormone therapy are acceptable to get relief. To reduce the risk of breast cancer, use the lowest dose of hormone therapy possible for the shortest amount of time.

**Maintain a healthy weight**

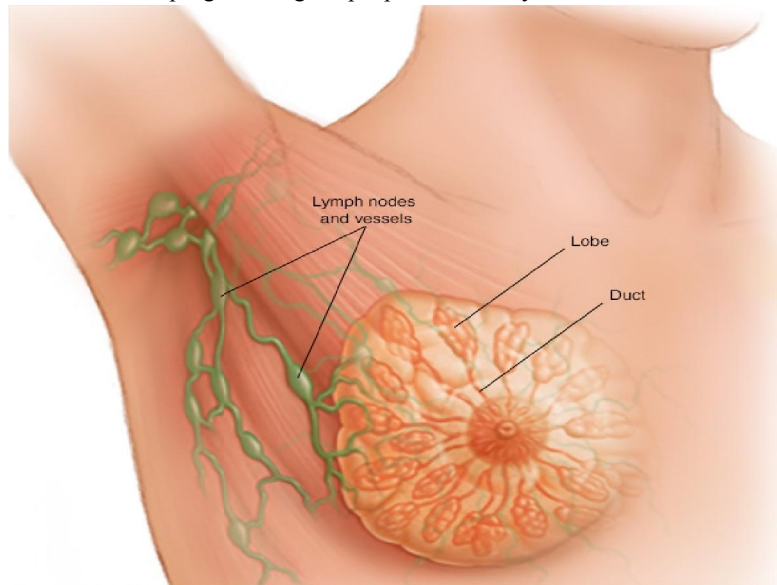
If your weight is healthy, work to maintain that weight. If you need to lose weight, ask a healthcare professional about healthy ways to lower your weight. Eat fewer calories and slowly increase the amount you exercise.

**Invasive lobular carcinoma**

Invasive lobular carcinoma (ILC) is breast cancer that starts in the lobules, the glands in the breast that produce milk. Invasive means the cancer has spread into surrounding breast tissues. Carcinoma refers to any cancer that begins in the skin or other tissues that cover internal organs, such as breast tissue.

This information is provided by [Breastcancer.org](http://Breastcancer.org).

[Donate](#) to support free resources and programming for people affected by breast cancer.



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**Symptoms:-**

- A change in the texture or appearance of the skin over the breast, such as dimpling or thickening.
- A new area of fullness or swelling in the breast.
- A newly inverted nipple.
- An area of thickening in part of the breast.

**Risk Factors**

- Family history of breast cancer
- A personal history of breast cancer
- A personal history of breast condition
- Beginning your period at young age

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Beginning menopause at an older age  
Being family  
Dense breast tissue  
Drinking alcohol  
Having your first child at an older age  
Older age  
Obesity  
Radiation exposure

### **Prevention**

#### **Ask about breast cancer screening**

Talk with your doctor or other healthcare professional about when to begin breast cancer screening. Ask about the benefits and risks of screening. Together, you can decide what breast cancer screening tests are right for you.

#### **Become familiar with your breasts through breast self-exam**

You may choose to become familiar with your breasts by occasionally inspecting them during a breast self-exam for breast awareness. If there is a new change, a lump or something not typical in your breasts, report it to a healthcare professional right away.

Breast awareness can't prevent breast cancer. But it may help you to better understand the look and feel of your breasts. This might make it more likely that you'll notice if something changes.

#### **Drink alcohol in moderation, if at all**

If you choose to drink alcohol, limit the amount you drink to no more than one drink a day. For breast cancer prevention, there is no safe amount of alcohol. So if you're very concerned about your breast cancer risk, you may choose to not drink alcohol.

#### **Exercise most days of the week**

Aim for at least 30 minutes of exercise on most days of the week. If you haven't been active lately, ask a healthcare professional whether it's OK and start slowly.

#### **Limit menopausal hormone therapy**

Combination hormone therapy may increase the risk of breast cancer. Talk with a healthcare professional about the benefits and risks of hormone therapy.

Some people have symptoms during menopause that cause discomfort. These people may decide that the risks of hormone therapy are acceptable in order to get relief. To reduce the risk of breast cancer, use the lowest dose of hormone therapy possible for the shortest amount of time.

#### **Maintain a healthy weight**

If your weight is healthy, work to maintain that weight. If you need to lose weight, ask a healthcare professional about healthy ways to lower your weight. Eat fewer calories and slowly increase the amount of exercise.

#### **Talk with a healthcare professional about your cancer risk**

If you have a family history of breast cancer or feel that you may have an increased risk of breast cancer, talk about it with your healthcare professional. Preventive medicines, surgery and more-frequent screening may be options for people with a high risk of breast cancer.

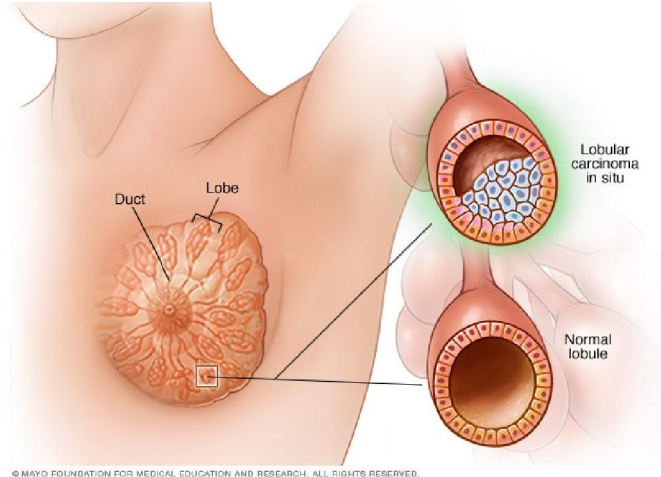
### **Lobular carcinoma in Situ**

It is an uncommon condition in which abnormal cells form in the milk glands (lobules) in the breast. Lobular carcinoma in situ (LCIS) isn't cancer. But being diagnosed with LCIS indicates that you have an increased risk of developing breast cancer.

LCIS usually doesn't show up on mammograms. The condition is most often discovered as a result of a breast biopsy done for another reason, such as a suspicious breast lump or an abnormal mammogram.



Women with LCIS have an increased risk of developing invasive breast cancer in either breast. If you're diagnosed with LCIS, your doctor may recommend increased breast cancer screening and may ask you to consider medical treatments to reduce your risk of developing invasive breast cancer.



### Symptoms

Lobular carcinoma in situ doesn't cause signs or symptoms. Rather, your doctor might discover incidentally that you have LCIS — for instance, after a biopsy to assess a breast lump or an abnormal area found on a mammogram.

### Male Breast Cancer

Male breast cancer is a rare cancer that begins as a growth of cells in the breast tissue of men.

Breast cancer is typically thought of as a condition that happens in women. But everyone is born with some breast tissue. So anyone can get breast cancer.

Male breast cancer is rare. It happens most often in older men, though it can occur at any age.

### Symptoms

- A painless lump or thickening of the skin on the chest.
- Changes to the skin covering the chest, such as dimpling, puckering, scaling or changes in the color of the skin.
- Changes to the nipple, such as changes in the skin color or scaling, or a nipple that begins to turn inward.
- Discharge or bleeding from the nipple.

### Types of male breast cancer include:

**Cancer that begins in the milk ducts, called ductal carcinoma.** This type of breast cancer starts in the tubes that connect to the nipple. These tubes are called ducts. Ductal carcinoma is the most common type of male breast cancer.

**Cancer that begins in the milk-producing glands, called lobular carcinoma.** This type of cancer begins in the glands that have the potential to make breast milk. These glands are called lobules. Lobular carcinoma is less common in people assigned male at birth because they usually have fewer lobular cells.

**Other types of cancer.** Other, rarer types of male breast cancer include Paget's disease of the nipple and inflammatory breast cancer.

### Risk factor:-

Factors that increase the risk of male breast cancer include:

- **Older age.** The risk of breast cancer increases with age. Male breast cancer is most often diagnosed in men in their 60s.



- **Hormone therapy for prostate cancer or medicines containing estrogen.** If you take estrogen-related medicines, such as those used for hormone therapy for prostate cancer, your risk of breast cancer rises.
- **Family history of breast cancer.** If you have a blood relative with breast cancer, you have a greater chance of getting the disease.
- **Inherited DNA changes that increase breast cancer risk.** Some of the DNA changes that can lead to breast cancer are passed down from parents to children. People born with these DNA changes have a greater risk of breast cancer. For example, the DNA changes BRCA1 and BRCA2 increase the risk of male breast cancer.
- **Klinefelter syndrome.** This genetic syndrome occurs when males are born with more than one copy of the X chromosome. Klinefelter syndrome affects the development of the testicles. It causes changes in the balance of hormones in the body, which can increase the risk of male breast cancer.
- **Liver disease.** Certain conditions, such as cirrhosis of the liver, can change the balance of hormones in the body. This raises the risk of male breast cancer.
- **Obesity.** Obesity is linked with higher levels of estrogen in the body. This increases the risk of male breast cancer.
- **Testicle disease or surgery.** Having inflamed testicles, called orchitis, or surgery to remove a testicle, called orchiectomy, can increase the risk of male breast cancer.

#### **Prevention:-**

**If breast cancer runs in your family.** Certain DNA changes are linked to breast cancer. If these DNA changes run in your family, you might have an increased risk of breast cancer. DNA changes that increase the risk of male breast cancer include BRCA1 and BRCA2.

If you know that a blood relative carries DNA changes linked to breast cancer, tell your doctor or other health care professional. Together you can decide whether you should have genetic testing to see if you also carry the DNA changes.

If you carry a DNA change that increases your risk, you might need breast cancer screening. Usually this involves becoming familiar with the skin and tissue on your chest. Tell your health professional if you notice any changes. You also might have an annual exam of your chest.

**If you're a transgender man.** If you haven't had gender-affirming surgery on your chest, talk with your doctor or other health care professional about breast cancer screening. In general, follow the screening guidelines for people assigned female at birth.

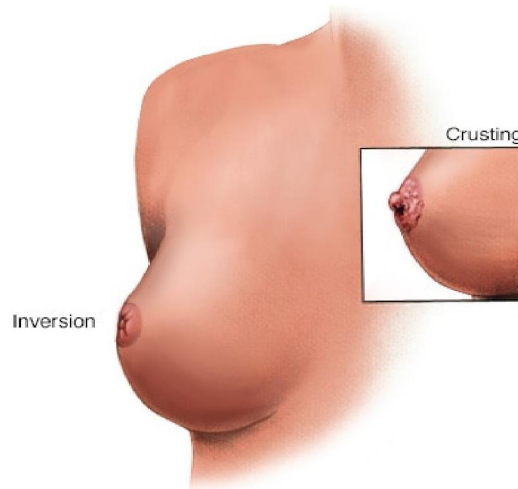
If you've had gender-affirming surgery to your chest, breast cancer is still possible, though it's rare. Often a small amount of breast tissue remains after surgery. Get to know the look and feel of the skin on your chest. Report any changes to your health care team right away.

#### **Paget's disease of the Breast**

Paget's (PAJ-its) disease of the breast is a rare form of breast cancer. Paget's disease of the breast starts on the nipple and extends to the dark circle of skin (areola) around the nipple. Paget's disease of the breast isn't related to Paget's disease of the bone, a metabolic bone disease.

Paget's disease of the breast occurs most often after age 50. Most people with this diagnosis also have underlying ductal breast cancer, either in situ — meaning in its original place — or, less commonly, invasive breast cancer. Only rarely is Paget's disease of the breast confined to the nipple itself.





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#### Symptoms :-

- Flaky or scaly skin on your nipple
- Crusty, oozing or hardened skin resembling eczema on the nipple, areola or both
- Itching
- Redness
- A tingling or burning sensation
- Straw-colored or bloody nipple discharge
- A flattened or turned-in (inverted) nipple
- A lump in the breast
- Thickening skin on the breast

#### Risk factor :-

- **Increasing age.** Your risk of breast cancer increases as you age.
- **A personal history of breast conditions.** If you've had a breast biopsy that found lobular carcinoma in situ (LCIS) or atypical hyperplasia of the breast, you have an increased risk of breast cancer.
- **A personal history of breast cancer.** If you've had breast cancer in one breast, you have an increased risk of developing cancer in the other breast.
- **A family history of breast cancer.** If your parent, sibling or child was diagnosed with breast cancer, particularly at a young age, your risk of breast cancer is increased. Still, the majority of people diagnosed with breast cancer have no family history of the disease.
- **Inherited genes that increase cancer risk.** Certain gene mutations that increase the risk of breast cancer can be passed from parents to children. The most well-known gene mutations are referred to as BRCA1 and BRCA2. These genes can greatly increase your risk of breast cancer and other cancers, but they don't make cancer inevitable.
- **Radiation exposure.** If you received radiation treatments to your chest as a child or young adult, your risk of breast cancer is increased.
- **Obesity.** Being obese increases your risk of breast cancer.
- **Beginning your period at a younger age.** Beginning your period before age 12 increases your risk of breast cancer.



- **Beginning menopause at an older age.** If you began menopause at an older age, you're more likely to develop breast cancer.
- **Having your first child at an older age.** If you give birth to your first child after age 30, you may have an increased risk of breast cancer.
- **Having never been pregnant.** If you've never been pregnant, your risk of breast cancer may be increased.
- **Postmenopausal hormone therapy.** Hormone therapy medications that combine estrogen and progesterone to treat the signs and symptoms of menopause may increase the risk of breast cancer. The risk decreases when you stop taking these medications.
- **Drinking alcohol.** Drinking alcohol increases the risk of breast cancer.

### Prevention

- **Ask your doctor about breast cancer screening.** Discuss with your doctor when to begin breast cancer screening exams and tests, such as clinical breast exams and mammograms.
- Talk to your doctor about the benefits and risks of screening. Together, you can decide what breast cancer screening strategies are right for you.
- **Become familiar with your breasts through breast self-exam for breast awareness.** You may choose to become familiar with your breasts by occasionally inspecting your breasts during a breast self-exam for breast awareness. If there is a new change, lumps or other unusual signs in your breast, talk to your doctor promptly.
- Breast awareness can't prevent breast cancer, but it may help you to better understand the normal changes that your breasts undergo and identify any unusual signs and symptoms.
- **Drink alcohol in moderation, if at all.** If you choose to drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.
- **Exercise most days of the week.** Aim for at least 30 minutes of exercise on most days of the week. If you haven't been active lately, ask your doctor whether it's OK and start slowly.
- **Limit postmenopausal hormone therapy.** Combination hormone therapy may increase the risk of breast cancer. Talk with your doctor about the benefits and risks of hormone therapy.
- You may experience bothersome signs and symptoms during menopause and, for you, the increased risk of breast cancer may be acceptable in order to relieve menopause signs and symptoms.
- To reduce the risk of breast cancer, use the lowest dose of hormone therapy possible for the shortest amount of time.
- **Maintain a healthy weight.** If your weight is healthy, work to maintain that weight. If you need to lose weight, ask your doctor about healthy strategies to accomplish this. Reduce the number of calories you eat each day and slowly increase the amount of exercise.
- **Choose a healthy diet.** Eating a Mediterranean diet supplemented with extra-virgin olive oil and mixed nuts may reduce your risk of breast cancer. The Mediterranean diet focuses mostly on plant-based foods, such as fruits and vegetables, whole grains, legumes, and nuts. People who follow the Mediterranean diet choose healthy fats, such as olive oil, over butter and fish instead of red meat.

### Recurrent Breast Cancer

Recurrent breast cancer is breast cancer that comes back after initial treatment. Although the initial treatment is aimed at eliminating all cancer cells, a few may have evaded treatment and survived. These undetected cancer cells multiply, becoming recurrent breast cancer.

### Symptoms:-

Signs and symptoms of local recurrence within the same breast may include:

- A new lump in your breast or irregular area of firmness.
- Changes to the skin of your breast.



- Skin inflammation or area of redness.
- Nipple discharge.

Signs and symptoms of local recurrence on the chest wall after a mastectomy may include:

- One or more painless nodules on or under the skin of your chest wall.
- A new area of thickening along or near the mastectomy scar

#### **Risk Factor**

- **Lymph node involvement.** Finding cancer in nearby lymph nodes at the time of your original diagnosis increases your risk of the cancer coming back.
- **Larger tumor size.** People with larger tumors have a greater risk of recurrent breast cancer.
- **Positive or close tumor margins.** During breast cancer surgery, the surgeon tries to remove the cancer along with a small amount of the normal tissue that surrounds it. A pathologist examines the edges of the tissue to look for cancer cells.

If the borders are free of cancer when examined under a microscope, that's considered a negative margin. If any part of the border has cancer cells (positive margin), or the margin between the tumor and normal tissue is close, the risk of breast cancer recurrence is increased.

**Lack of radiation treatment following a lumpectomy.** Most people who choose a lumpectomy (wide local excision) for breast cancer undergo breast radiation therapy to reduce the risk of recurrence. Those who don't undergo the radiation therapy have an increased risk of local breast cancer recurrence.

**Younger age.** Younger people, particularly those under age 35 at the time of their original breast cancer diagnosis, face a higher risk of recurrent breast cancer.

**Inflammatory breast cancer.** People with inflammatory breast cancer have a higher risk of local recurrence.

**Lack of endocrine therapy for hormone receptor-positive breast cancer.** In people who have a certain type of breast cancer, not receiving endocrine therapy can raise their risk of recurrence.

**Cancer cells with certain characteristics.** If you had triple negative breast cancer, you may have an increased risk of breast cancer recurrence. Triple negative breast cancer cells don't have receptors for estrogen or progesterone, and they don't make too much of a protein called HER2.

**Obesity.** Having a higher body mass index increases your risk of recurrence.

#### **Prevention**

- **Hormone therapy.** Taking hormone therapy after your initial treatment may reduce the risk of recurrence if you have hormone receptor positive breast cancer. Hormone therapy may continue for at least five years.
- **Chemotherapy.** For people with breast cancer who have an increased risk of cancer recurrence, chemotherapy has been shown to decrease the chance that cancer will recur, and those who receive chemotherapy live longer.
- **Radiation therapy.** People who've had a breast-sparing operation to treat their breast cancer and those who had a large tumor or inflammatory breast cancer have a lower chance of the cancer recurring if they're treated with radiation therapy.
- **Targeted therapy.** If your cancer makes extra HER2 protein, drugs that target that protein can help decrease the chance of the cancer recurring.
- **Bone-building drugs.** Taking bone-building drugs reduces the risk of cancer recurring in the bones (bone metastasis) in people with an increased risk for breast cancer recurrence.
- **Maintaining a healthy weight.** Maintaining a healthy weight may help decrease the risk of recurrent breast cancer.
- **Exercising.** Regular exercise may reduce your risk of breast cancer recurrence.
- **Choosing a healthy diet.** Focus on including lots of vegetables, fruits and whole grains in your diet. If you choose to drink alcohol, limit yourself to one drink a day.



## II. CONCLUSION

Novel delivery system such as radiation therapy, hormonal therapy, gene therapy, immunological therapy, are secure precious and relatively effective and could lead to a new tract for layer addiction of breast cancer.

## REFERENCES

- [1]. <https://www.cancer.org/cancer/types/breast-cancer/about/>
- [2]. <https://www.cancer.org/cancer/types/breast-cancer/abo>
- [3]. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11124876>
- [4]. <https://jnanobiotechnology.biomedcentral.com/articles/10.1186/s12951-018-0392-8>
- [5]. <https://www.mayoclinic.org/diseases-conditions/breast-cancer/symptoms-causes/syc-20352470>
- [6]. <https://my.clevelandclinic.org/health/diseases/3986-breast-cancer>
- [7]. <https://www.cancer.gov/types/breast>
- [8]. Hotel-Management-System/SOURCE.CPP at master · idaljeetsingh/Hotel-Management-System · GitHub

