

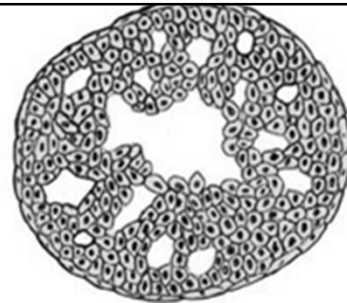
Breast Cancer

What Does the Pathology Report Say



Normal Cells

The Pathology report gives an outline on direction of treatment. It tells multiple stories to help us understand the patient's cancer.

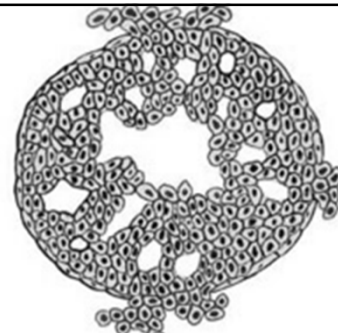


Non-Invasive Cells

Breast Cancer usually begins either in the cells of the lobules (milk producing glands) or in the ducts (passages that drain the milk from the lobules to the nipple). Non invasive cancers stay within the milk ducts or lobules. Sometimes called "carcinoma in situ"

Parts of a Pathology Report

- Personal Information
- Specimen
- Clinical History
- Clinical Diagnosis
- Gross Description
- Microscopic Description
- Special Tests or Markers
- Summary



Invasive Carcinoma

Invasive carcinomas grow into normal, healthy tissue. Most breast cancers are invasive.

Both Invasive Cancer and Non-invasive Breast Cancers

- Part of the tissue has grown into normal tissue
- Part of the tissue has stayed inside the milk ducts or lobules.
- This would be treated as an invasive cancer

Multicentric Breast Cancer

All the tumors have formed separately
Tumors are often found in different areas of the breast

Mixed Tumor

- Contains a mixture of cancerous ductal cells and lobular cells
- Called an invasive mammary breast cancer or infiltrating mammary carcinoma
- Treated as a ductal carcinoma

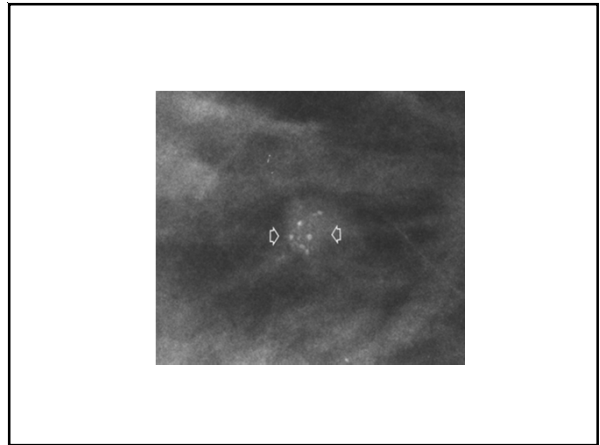
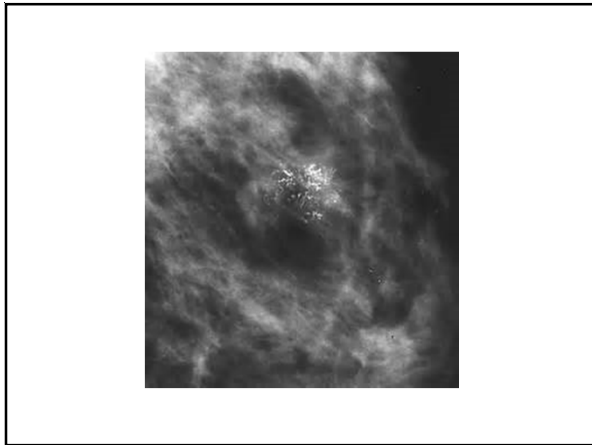
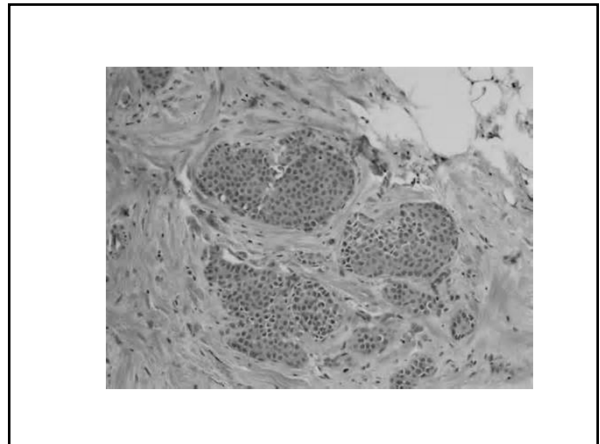
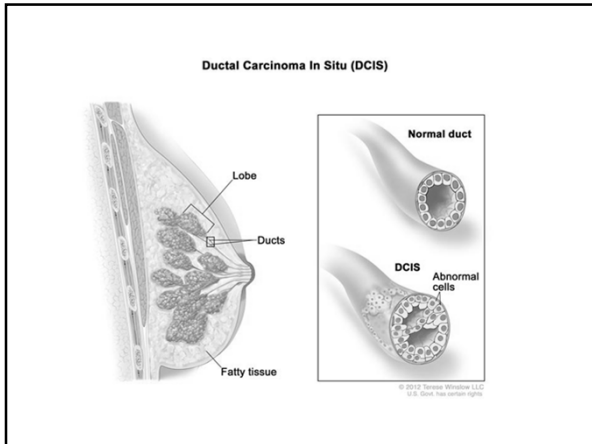
Most Common Types of Breast Cancers

Multifocal Breast Cancer

All of the tumors arise from the original tumor
Usually in same section of the breast

DCIS Ductal Carcinoma In Situ

Non-invasive carcinoma
Stays in milk duct

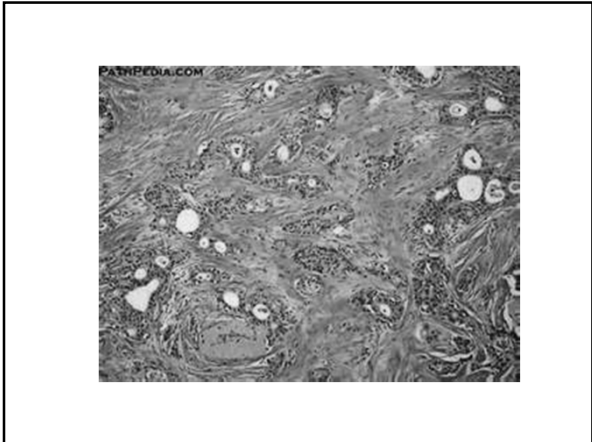


LCIS
Lobular Carcinoma In Situ

- *Overgrowth of cells that stay inside the lobule
- *It is not a true cancer
- *Warning sign of an increased risk for developing an invasive cancer in the future in either breast

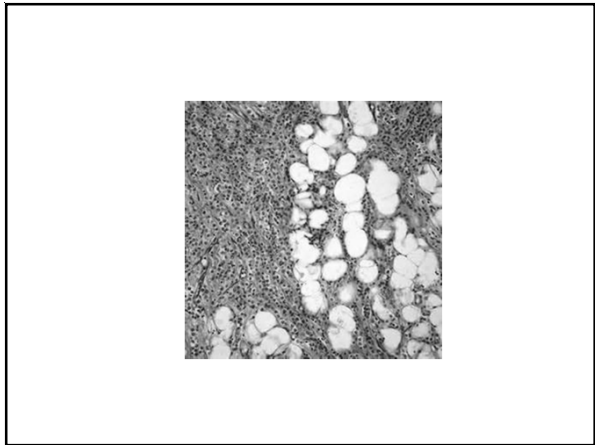
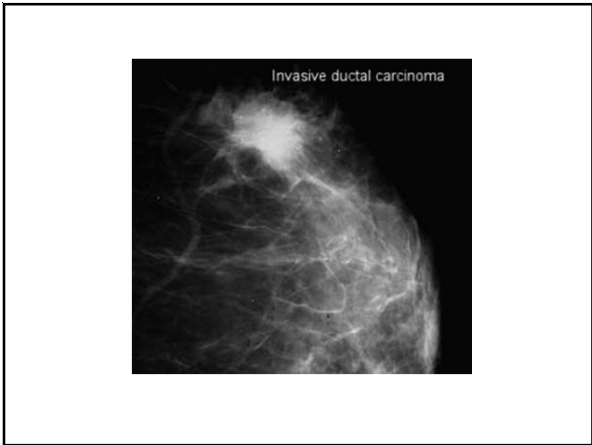
IDC
Invasive Ductal Carcinoma

Most common type of breast cancer
Begins in the milk duct
Grows into the surrounding normal tissue inside the breast

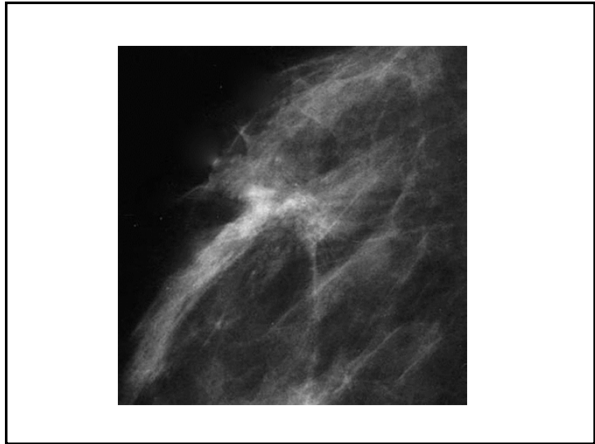


ILC
Invasive Lobular Carcinoma

Starts inside the lobule
Grows into the surrounding normal
tissue



**Less Common Subtypes of
Invasive Ductal Carcinoma**

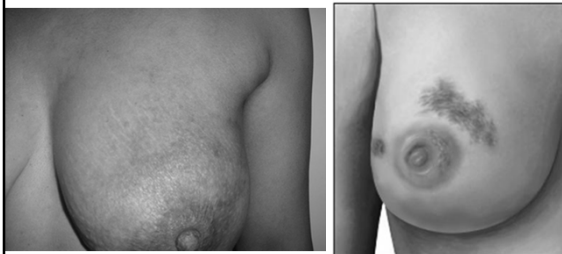


Inflammatory Breast Cancer

Fast growing
Starts with reddening and swelling
of the breast instead of a lump

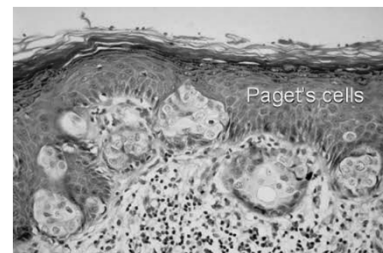


Inflammatory Breast Cancer



Paget's Disease of the Nipple

Rare form of breast cancer
Cancer cells collect in or around
the nipple



Male Breast Cancer

Almost always a ductal carcinoma



Grade 1 Low Grade

Cancer cells that look a little bit different from normal cells. They grow in slow, well organized patterns. Not that many cells are dividing to make new cancer cells.

Pathology Report Rate of Cell Growth

- Proportion of the cancer cells within the tumor are growing and dividing to form new cancer cells
- Higher percentage suggests a faster growing, more aggressive cancer

Grade 2 Intermediate/moderate Grade

- Cancer cells do not look like normal cells
- Growing and dividing a little faster than normal

Cell Grade

“Score” that tells you how different the cancer cells appearance and growth patterns appear from those of normal healthy breast cells

Grade 3 High Grade

- These cells look very different from normal cells
- They grow quickly in disorganized, irregular patterns with many dividing to make new cancer cells

Do not confuse grade with stage.

Stage is usually expressed as a number from 0 to 4 (often using Roman numerals I,II, III, IV.

Stage is based on the size of the cancer and how far it has (or hasn't) spread beyond its original location within the breast.

Surgical Margins

- During or after surgery, a pathologist examines the rim of the tissue to be sure it is clear of any cancer cells. If cancer cells are present, this will influence decisions about treatments such as additional surgery and radiation.

Size of Breast Cancer

- Indicates how large the tumor is at the widest point
- Measured in millimeters or centimeters
- 1 mm=.04 inch and 1cm=.4inch
- Size is used to help determine the stage of the breast cancer
- Size doesn't tell the entire story. All of the cancer's characteristics are important

Surgical Margins Clear, Negative or Clean

- No cancer cells are seen at the outer edge of the tissue that was removed (the tumor along with the rim of surrounding tissue.) Sometimes the pathology report also will tell you how wide the clear margin is—the distance between the edge of the surrounding tissue removed and the edge of the cancer. When margins are clear, usually no additional surgery is needed.

Marisa Weiss, MD, Breastcancer.org president and founder
Breast radiation oncologist
Philadelphia PA

Size matters when it comes to breast cancer, but size is only one of the personality features on the list. You can have a small cancer that behaves like a bully or a large cancer that is mild mannered

Surgical Margins

Positive

- Cancer cells come right out to the edge of the removed tissue. More surgery is usually needed to remove any remaining cancer cells

Close

- Cancer cells are close to the edge of the tissue, but not right at the edge. More surgery may be needed

There is not a standard definition of how wide a “clear margin” has to be.
Each hospital seems to have its own standard.

Ploidy Number of Chromosomes

- Is a measure of the number of chromosomes in a cell. They contain the genetic material known as DNA.
- Pathologist may look at whether the cancer cells contain the normal amount of DNA

Vascular or Lymphatic System Innovations

- Happens when breast cancer cells break into the blood vessels or lymph channels.
- This increases the risk of the cancer traveling outside the breast or coming back in the future. Doctors can recommend treatments to help reduce the risk

Ploidy

Diploid

Means that a proportion of cancer cells have the same number of chromosomes as normal, healthy cells (two sets of 23 each) They tend to be slower growing, less aggressive cancers.

Anueploid

Means that a proportion of cancer cells have too many or too few chromosomes. When cancer cells are rapidly dividing, mistakes in the distribution of chromosomes can happen, resulting in some cells having too many chromosomes and others too few. This cancer can be more aggressive.

Vascular or Lymphatic System Invasion

- The pathology report will say “present” if there is evidence of vascular or lymphatic system invasion.
- If there is no invasion, the path report will say “absent”
Lymphatic invasion is different from lymph node involvement. The lymph channels and lymph nodes are part of the same system, but they are looked at and reported separately.

Hormone Receptor Status

- This test will tell if there are breast cancer cells that have receptors for the hormones estrogen and progesterone
- Hormone receptors are proteins found in and on breast cells
- These cells pick up hormone signals telling the cells to grow

Hormone Receptor Status

Estrogen Receptor Positive or ER+

Suggests that the cancer cells, like normal breast cells may receive signals from estrogen that could promote their growth

Progesterone Receptor Positive or PR+

Suggests that the cancer cells may receive signals from progesterone that could promote their growth

Roughly 2 out of every 3 breast cancers test positive for hormone receptors

HER2 GENE AMPLIFICATION

- Breast cancers with HER2 gene amplification are called HER2 Positive in the pathology report.
- HER2 Positive breast cancers tend to grow faster and are more likely to spread and come back compared to HER2 Negative breast cancers.
- There is medication designed specifically for HER2 Positive breast cancers.

HER2 Gene Human Epidermal Growth Factor Receptor 2

- Plays a role in the development of breast cancer
- Makes HER2 proteins
- These proteins are receptors on breast cells

Triple Negative Breast Cancer

- Pathology report might say that the breast cancer cells tested negative for estrogen receptors (ER-), progesterone receptors (PR-), and HER2 (HER2-).
- Means that the growth of the cancer is not supported by the hormones estrogen, progesterone and HER2 receptors

HER2 Proteins

- Normally HER2 receptors help control how a healthy breast cells grow, divides and repairs itself
- In 25% of breast cancers, the HER2 gene doesn't work correctly and makes too many copies of itself
- The extra HER2 genes tell the breast cells to make too many copies of itself. This makes breast cells grow and divide in an uncontrolled way

Therefore, triple negative breast cancer does not respond to hormonal therapy, such as tamoxifen or aromatase inhibitors.

It does not respond to Herceptin that targets HER2 receptors

There are other medications that are used to treat triple negative breast cancer

About 10-20% of breast cancers are found to be triple negative. There is intense interest in finding new medications that can treat triple negative breast cancers.

Genetic testing for BRCA1 and BRCA 2 is NOT a part of the standard pathology report. This requires a special blood test.

BRCA1 AND BRCA2 Genetic Testing

- Most people who develop breast cancer have no family history of the disease
- However, if a patient does have a family history of breast cancer, ovarian cancer, or both-heredity could have played a role in the cancer's development
- Most inherited cases of breast cancer are associated with two abnormal genes
- BRCA1 and BRCA2

Lymph Node Involvement

- The pathology report will tell you how many lymph nodes were removed and how many tested positive for the presence of cancer cells.
- For example, 0/3 means that 3 nodes were removed and 0 tested positive for cancer, while 2/5 means 5 lymph glands were removed and 2 were positive.

BRCA1 and BRCA2

- Women who inherit a mutation or abnormal change in either of these genes from either their father or mother have a much higher lifetime risk of developing breast cancer and ovarian cancer
- According the NCI, women with an abnormal BRCA1 or BRCA2 gene have a 60% risk of developing breast cancer during their lifetime

Lymph Node Involvement

- The pathology report will also tell you how much cancer is in each node.
- Microscopic (or Minimal)-only a few cancer cells are in each node. A microscope is needed to find them.
- Gross (Significant or Macroscopic)-There is a lot of cancer in each node. You can see the cancer without a microscope.
- Extracapsular Extension-Cancer has spread outside the wall of the node

Stages of Breast Cancer

Stage is usually expressed as a number on a scale of 0 through IV.

Stage 0 is a noninvasive cancer that remain within their original location

Stage IV is an invasive cancer that have spread outside of the breast to other body parts.

Stage 0

- Describes non-invasive breast cancers such as DCIS
- No evidence of cancer cells invading neighboring normal tissue

Cancer Stage Based on Four Characteristics

- Size of the cancer
- Whether the cancer is invasive or non invasive
- Whether the cancer is in the lymph nodes
- Whether the cancer has spread to other parts of the body beyond the breast

Stage I

- Describes invasive breast cancer
 - *Stage IA
 - Tumor Measures up to 2 cm
 - Cancer has not spread outside the breast
 - No lymph nodes are involved
 - *Stage IB
 - There is no tumor in the breast; instead small groups of cancer cells-larger than 0.2 mm but not larger than 2 mm-are found in the lymph nodes OR
 - There is a tumor in the breast that is no larger than 2 cm and there are small groups of cancer cells-larger than 0.2 but not larger than 2 mm in the lymph nodes

Stages of Breast Cancer

More words used to describe the stage of cancer

- Local-The cancer is confined to the breast
- Regional-The lymph nodes, primarily those in the axilla are involved
- Distant-The cancer is found in other parts of the body as well

Stage I

*Microscopic invasion is possible in Stage I breast cancer.

*The cancer cells have just started to invade the tissue outside the lining of the duct or lobule, but the invading cancer cells can't measure more than 1 mm

Stage II-Invasive Breast Cancer

- Stage IIA
 - No tumor is found in the breast, but cancer cells are found in axillary lymph nodes OR
 - The tumor measures 2cm or smaller and has spread to the axillary lymph nodes OR
 - The tumor is larger than 2 cm but not larger than 5 cm and has not spread to the axillary lymph nodes

Stage III

- Stage IIIB
 - The cancer may be any size and has spread to the chest wall and/or skin of the breast AND
 - May have spread to axillary lymph nodes, which are clumped together or sticking to other structures or cancer may have spread to lymph nodes near the sternum

Stage II

- Stage IIB
 - The tumor is larger than 2 cm but not larger than 5 cm and has spread to the axillary lymph nodes OR
 - The tumor is larger than 5 cm but has not spread to the axillary lymph nodes

Stage IIIB

Inflammatory Breast Cancer is considered at least Stage IIIB.

- Reddening of a large portion of the breast skin
- The breast feels warm and may be swollen
- Cancer cells have spread to the lymph nodes and may be found in the skin

Stage III-Invasive Breast Cancer

- Stage IIIA
 - No tumor is found but cancer is found in axillary lymph, which are clumped together or sticking to other structures or cancer may have spread to lymph nodes near the sternum OR
 - The cancer is any size and has spread to axillary lymph nodes which are clumped together or sticking to other structures

Stage III

- Stage IIIC
 - There may be no sign of cancer in the breast or, if there is a tumor, it may be any size and may have spread to the chest wall and/or the skin of the breast AND
 - The cancer has spread to lymph nodes above or below the clavicle AND
 - The cancer may have spread to axillary lymph nodes or to lymph nodes near the sternum

Stage IV

- Invasive breast cancer that has spread beyond the breast and nearby lymph nodes to other organs of the body, such as lungs, skin, bones liver or brain
- Cancer may be Stage IV at first diagnosis or a recurrence of a previous breast cancer that has metastasized

The T (size) describes the primary tumor

- TX- Tumor can't be measured or found
- T0-There isn't any evidence of primary tumor
- Tis-Cancer is in situ

TNM Staging System Tumor, Node Metastasis

- Another staging system, researchers use to provide more details on how the cancer looks and behaves.
- Some clinical trials require TNM information from the participants

T1, T2, T3, T4

- Numbers are based on the size of the tumor and the extent that it has grown into neighboring tissue
- The higher the T number, the larger the tumor and/or the more it has metastasized into other areas

TNM 3 Characteristics

- Size (T stands for Tumor)
- Lymph Node Involvement (N stands for Node)
- Whether the Cancer has Metastasized (M stands for Metastasis) or moved beyond the breast to other parts of the body

N category describes whether or not the cancer has reached the nearby lymph nodes

- NX-Nearby lymph nodes can't be measured or found
- N0-Nearby lymph nodes do not contain cancer
- N1, N2, N3- These numbers are based on the number of lymph nodes involved and how much cancer is found in them

M category tells whether or there is metastasis

- MX-Metastasis can't be measured or found
- M0-There is no distant metastasis
- M1-Distant metastasis is present

Pathology Report

Now you should be able to look at the pathology reports you receive and have a better understanding of what is happening with your patients.

Once the pathologist knows your T, N, M characteristics, a stage can be assigned to the cancer



T1 N0 M0 Breast Cancer

- Primary breast tumor is less than 2 cm across (T1)
- Has not involved any lymph nodes (N0)
- Has not spread to distant parts of the body (M0)

This cancer would be grouped as a Stage 1