

The grade of the cancer: Using a formalized set of objective criteria, pathologists determine whether the cancer is low-grade (looks like normal breast tissue and is slow growing), intermediate grade or high grade (does not look like breast tissue and is fast growing).

The subtype of cancer: Different subtypes of cancer require different treatment.

If the surgery successfully removed enough tissue: By performing surgery, your surgeon has attempted to get a clean margin of tissue around your specimen. Your pathologist determines whether the margin is positive for cancer (you may need more surgery), negative with a wide margin of normal tissue (no further surgery) or negative but without a wide margin of normal tissue (further surgery being dependent on other factors).

An accurate estimation of the number of lymph nodes removed by the surgeon and the number that are involved by cancer: In general, patients with no tumor in lymph nodes require a different treatment than those with positive lymph nodes.

Estrogen Receptor (ER) and Progesterone Receptor (PR) Readings: When a cancer shows few if any estrogen receptors (when it is "ER-negative"), anti-estrogen therapy is not as effective. But anti-estrogen therapy may also be useful in cases where progesterone receptors are present ("PR-positive"). Women whose cancers are PR-positive but ER-negative may still respond to anti-estrogen therapy such as Tamoxifen or Aromatase Inhibitors.

A high percentage of tumours with estrogen receptors may regress after hormonal manipulation whereas only a small number of those that are negative respond.

Involvement of lymph or blood vessels: This may be seen in patients with no positive lymph nodes; however, this suggests that the cancer may be spreading outside the breast.

Her2/neu status: This will predict response to therapy with Herceptin, the humanized anti-Her2/neu antibody.

Conclusion:

Like all of your doctors, your pathologist is working for you. The information provided by your pathology report is essential in deciding your treatment and prognosis. Be sure to ask for a copy of your report and make sure you understand all aspects of the process. Do not hesitate to ask to discuss the findings with your pathologist if you feel uncertain about anything reported.

If you would like your pathology report explained, desire a second opinion on your pathology diagnosis, or would like to speak to a pathologist, notify your primary caregiver.



**THE
PATH
TO DIAGNOSIS**

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WHERE DO I GO FROM HERE?

If your doctor is concerned that you may have breast cancer, a biopsy is usually performed and the tissue is sent to the Pathology Lab for testing.

What the pathologist discovers about your tissue forms the cornerstone of your treatment and prognosis. Obtaining the best pathological examination of your tissue and understanding your pathology report are important steps in your journey.

What happens to your breast biopsy / lumpectomy / mastectomy specimen after it arrives in the lab?

As soon as your breast tissue arrives, your specimen is assigned a number so it can be tracked.

Examination is done within a few hours. A pathologist examines your tissue by measuring its size, describing its color and texture, and determining if any other masses are present (these results are considered *gross findings*). If a mass is found, its size and distance to the specimen's edge (the margin where the surgeon cut) will be recorded. The pathologist then sections the specimen into thin slices with a scalpel for further examination. Pieces of the tissue and its mass are then put into small containers called *cassettes*.

In order to make microscopic slides, the tissue in the *cassettes* must be treated in *formalin* (a fixative that hardens the tissue and prevents the cellular proteins from breaking down). It usually takes 24 hours for the tissue to harden; it is then placed in a *Tissue Processing Machine*. The processed tissue is placed in hot wax to form a tissue block and once dry, a thin section of tissue is cut from each block using a *microtome* (a cutting instrument), and stained with special dyes. The slides are then ready to be examined under the microscope.

Your tissue blocks are filed and saved for an extended amount of time in the pathology department. Keeping your specimen on file allows for slide duplication if you need to have your pathology re-evaluated, or retested if a new test or technological discovery comes along that would affect your breast cancer treatment in the future.

Pathologist's Diagnosis:

The pathologist receives all of the slides that he/she made the day before along with a typed note of his/her *gross findings*. The pathologist reviews the slides, correlates the microscopic findings with the gross findings, and makes a pathology report. Prognostic factors of breast cancer, such as size of tumor, margin status, grade of tumor (how aggressive it looks), subtype of tumor (in-situ vs. invasive) and lymph node status (whether or not the tumor has spread to the lymph glands in your armpit) are decided by the pathologist and will be included in the report. These factors are used by your oncologist to determine the likelihood of cancer and cancer recurrence.

The pathologist also determines predictive factors, which help determine if you are likely to respond to certain drugs such as Tamoxifen or Herceptin. The pathologist will test a tissue block for breast cancer markers such as Estrogen Receptor (ER), Progesterone Receptors (PR) and Her/2 neu (cancer gene).

It can take up to one week for your pathologist to complete a report. Always ask for a copy of your pathology report. Review it yourself and then review it with your primary oncologist. Remember not to focus on only one aspect of the report, all of the information provided is important and it all acts together to create your unique profile.

If you would like your pathology report explained or have questions, please talk to your Oncologist.

Your report should include the following:

Confirmation if cancer is present: Many non-cancerous conditions can look like cancer on a mammogram or breast exam.

Whether the cancer remains inside the duct system (In-situ) or has spread outside (Invasive carcinoma): In general, *in-situ* cancer is treated differently than *invasive*.

The size of the cancer: An accurate measurement gives the oncologist important information about the stage of cancer. In general, the smaller the size the better the prognosis, but remember not to focus on only aspect of the report – some small tumors can be high grade and aggressive.