



Pathology Reports

What is a pathology report?

A pathology report is a document that contains the diagnosis determined by examining cells and tissues under a microscope. The report may also contain information about the size, shape, and appearance of a specimen as it looks to the naked eye. This information is known as the gross description.

A pathologist is a doctor who does this examination and writes the pathology report. Pathology reports play an important role in cancer diagnosis and staging (describing the extent of cancer within the body, especially whether it has spread), which helps determine treatment options.

How is tissue obtained for examination by the pathologist?

In most cases, a doctor needs to do a biopsy or surgery to remove cells or tissues for examination under a microscope.

Some common ways a biopsy can be done are as follows:

- A needle is used to withdraw tissue or fluid.
- An endoscope (a thin, lighted tube) is used to look at areas inside the body and remove cells or tissues.

• Surgery is used to remove part of the tumor or the entire tumor. If the entire tumor is removed, typically some normal tissue around the tumor is also removed. Tissue removed during a biopsy is sent to a pathology laboratory, where it is sliced into thin sections for viewing under a microscope. This is known as histologic (tissue) examination and is usually the best way to tell if cancer is present. The pathologist may also examine cytologic (cell) material. Cytologic material is present in urine, cerebrospinal fluid (the fluid around the brain and spinal cord), sputum (mucus from the lungs), peritoneal (abdominal cavity) fluid, pleural (chest cavity) fluid, cervical/vaginal smears, and in fluid removed during a biopsy.

How is tissue processed after a biopsy or surgery? What is a frozen section?

The tissue removed during a biopsy or surgery must be cut into thin sections, placed on slides, and stained with dyes before it can be examined under a microscope. Two methods are used to make the tissue firm enough to cut into thin sections: frozen sections and paraffin-embedded (permanent

sections. All tissue samples are prepared as permanent sections, but sometimes frozen sections are also prepared.

Permanent sections are prepared by placing the tissue in fixative (usually formalin) to preserve the tissue, processing it through additional solutions, and then placing it in paraffin wax. After the wax has hardened, the tissue is cut into very thin slices, which are placed on slides and stained. The process normally takes several days. A permanent section provides the best quality for examination by the pathologist and produces more accurate results than a frozen section (1).

Frozen sections are prepared by freezing and slicing the tissue sample. They can be done in about 15 to 20 minutes while the patient is in the operating room (1). Frozen sections are done when an immediate answer is needed; for example, to determine whether the tissue is cancerous so as to guide the surgeon during the course of an operation.

What information does a pathology report usually include?

The pathology report may include the following information (1):



Patient information: Name, birth date, biopsy date

- Gross description: Color, weight, and size of tissue as seen by the naked eye
- Microscopic description: How the sample looks under the microscope and how it compares with normal cells
- Diagnosis: Type of tumor/cancer and grade (how abnormal the cells look under the microscope and how quickly the tumor is likely to grow and spread)
- Tumor size: Measured in centimeters
- Tumor margins: There are three possible findings when the biopsy sample is the entire tumor:
 - Positive margins mean that cancer cells are found at the edge of the material removed
 - Negative, not involved, clear, or free margins mean that no cancer cells are found at the outer edge
 - Close margins are neither negative nor positive
- Other information: Usually notes about samples that have been sent for other tests or a second opinion
- Pathologist's signature and name and address of the laboratory.

What might the pathology report say about the physical and chemical characteristics of the tissue?

After identifying the tissue as cancerous, the pathologist may perform additional tests to get more information about the tumor that cannot be determined by looking at the tissue with routine stains, such as hematoxylin and eosin (also known as H&E), under a microscope (2). The pathology report will include the results of these tests. For example, the pathology report may include information obtained from immunochemical stains (IHC). IHC uses antibodies to identify specific antigens on the surface of cancer cells. IHC can often be used to:

- Determine where the cancer started
- Distinguish among different cancer types, such as carcinoma, melanoma, and lymphoma
- Help diagnose and classify leukemias and lymphomas (3)

The pathology report may also include the results of flow cytometry. Flow cytometry is a method of measuring properties of cells in a sample, including the number of cells, percentage of live cells, cell size and shape, and presence of tumor markers on the cell

surface. Tumor markers are substances produced by tumor cells or by other cells in the body in response to cancer or certain noncancerous conditions.) Flow cytometry can be used in the diagnosis, classification, and management of cancers such as acute leukemia, chronic lymphoproliferative disorders, and non-Hodgkin lymphoma (2).

Finally, the pathology report may include the results of molecular diagnostic and cytogenetic studies. Such studies investigate the presence or absence of malignant cells, and genetic or molecular abnormalities in specimens.

Selected References

1. Morra M, Potts E. Choices. 4th ed. New York: HarperResource, 2003.
2. Borowitz M, Westra W, Cooley LD, et al. Pathology and laboratory medicine. In: Abeloff MD, Armitage JO, Niederhuber JE, Kastan MB, McKenna WG, editors. Clinical Oncology. 3rd ed. London: Churchill Livingstone, 2004.
3. Connolly JL, Schnitt SJ, Wang HH, et al. Principles of cancer pathology. In: Bast RC Jr., Kufe DW, Pollock RE, et al., editors. Cancer Medicine. 6th ed. Hamilton, Ontario, Canada: BC Decker Inc., 2003

Source: National Cancer Institute. ■

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