Understanding Your Pathology Report: Melanoma

What is a pathology report?

A pathologist is a doctor who specializes in diagnosing diseases by examining tissue from the body. You will probably never meet the pathologist, but samples of your melanoma tissue, removed during surgery or biopsy, will be sent to them for review. The pathology report is a result of their findings. This report contains important information about the tumor which is used to make treatment decisions. You should request a copy of this report and keep it in your personal medical files.

What will you find on a pathology report?

The report is broken down into a few sections, including some information about the patient, diagnosis (if known), procedure, a description of what the specimen looks like to the naked eye (called gross description), a description of what was seen under the microscope (microscopic description), where the tissue was taken from and a diagnosis. The pathologist will describe the type of melanoma and some characteristics or features of it that are important for determining prognosis and treatment. To help you read your report, let’s go through each of the characteristics you may find in your report.

Type of Melanoma

Also called the histologic type or cellular type of melanoma. There are four major subtypes, with a few rare subtypes:

- Superficial Spreading Melanoma: most common of the melanomas.
- Nodular Melanoma: are always vertical growth phase present (see below) melanomas. Most commonly found on the chest, back, head or neck.
- Acral Lentiginous: most common type in dark skinned and Asian populations. More frequently occur on soles of feet, palms of hands or under nails.
- Lentigo Maligna Melanoma: tends to occur on sun-exposed areas in older people. Often found on the face or neck.
- Rare subtypes: mucosal melanoma, desmoplastic melanoma, nevoid melanoma

Breslow Depth:
The Breslow's depth of invasion is a measurement of the thickness of a melanoma, at its thickest point, in millimeters. This measurement is an important factor in prognosis; for example, a thicker melanoma has a poorer prognosis. Breslow thickness is more important than the tumor’s Clark's Level (more below) in determining prognosis.

Breslow Depth Classification

- Melanoma in situ or thin invasive tumors: ≤1.0mm in depth
- Intermediate risk melanoma: 1.01-2mm and 2.01-4.0mm in depth
- High risk melanoma: ≥4.0mm in depth

Clark's Level:
Clark’s Level (also called anatomic level) is also a measure of depth of invasion. However, it reports what layer of the skin the melanoma extends into (penetration of), as opposed to a measurement in millimeters. The higher the Clark's Level number, the deeper into the tissue it extends. Depending where on the body the melanoma is, the millimeters deep for each Clark level can vary widely, so one person’s Clark’s III may be 1mm, while another’s is 2mms. Clark’s Level is not used to determine staging anymore, as it is not a good predictor of prognosis. Some pathology reports may still include Clark’s level, but others will not. This number should not be mistaken for the stage. The breakdown of Clark’s Level is as follows:

- Clark's Level I: lesion involves the dermis.
- Clark's Level II: lesion involves the papillary dermis.
- Clark’s Level III: lesion invades and fills the papillary dermis.
- Clark’s Level IV: lesion invades reticular dermis.
- Clark’s Level V: lesion invades sub-cutaneous tissue.

**Radial Growth Phase (RGP):** The melanoma lesion is described as having RGP present or absent. If present, RGP indicates that the melanoma is growing horizontally or radially within a single plane of skin layer, meaning it is growing outward (horizontally), across the skin. In general, RGP melanomas are thin and typically cured with surgical removal.

**Vertical Growth Phase (VGP):** The melanoma is described as having VGP present or absent. If present, it is an indication that the melanoma is growing vertically or deeper into the tissues. VGP melanomas are invasive and have a potential to metastasize (spread to other areas).

**Tumor-Infiltrating Lymphocytes (TILs):** TILs describe the patient’s immune response to the melanoma. When the pathologist examines the melanoma under the microscope, he/she looks for the number of lymphocytes (white blood cells) within the lesion. This response, or TILs, is usually described as "brisk", "non-brisk", or "absent", although occasionally as "mild" or "moderate". TILs indicate the immune system's ability to recognize the melanoma cells as abnormal.

**Ulceration:** Ulceration is the sloughing of dead tissue. This can sometimes occur in the center of a melanoma lesion. The presence of ulceration is incorporated into the staging classification of a melanoma. Ulceration is thought to reflect rapid tumor growth, which leads to the death of cells in the center of the melanoma.

**Regression:** Regression is described as being present or absent. If it is present, the extent of regression is identified. Regression describes an area where it appears there had been melanoma cells, but these have been destroyed by the immune system and replaced with inflammation or scar tissue. When regression is present, the total size of the melanoma is hard to characterize because it is difficult to tell how extensive it was before the regression occurred.

**Mitotic Rate:** This term describes the frequency of cell division within the melanoma. Higher mitotic rates are associated with more rapidly dividing cells and therefore larger lesions, with greater potential for metastasis and poorer prognosis. Mitotic rate is thought to be the second most important factor (behind Breslow thickness) in determining prognosis, with a higher rate being predictive of a poorer prognosis. This value is used to stage very thin melanomas (<1mm).

To measure the mitotic rate, the pathologist identifies the area of the tumor sample with the most mitoses (referred to as the hot spot) and counts the number of mitoses in a square millimeter surrounding this area. It is reported as a value per mm2 or may be given as a range (i.e. 1-4/mm2).

**Satellites:** Satellite lesions (also called micro satellites) are areas of tumor/melanoma located more than 0.05 mm, but less than 2cm, from the primary lesion. Satellites are described as being present or absent. These are also reflected in the staging.

**In-Transit Metastases:** Similar to satellite lesions, however these areas are more than 2cm from the primary lesion without being beyond local lymph drainage (called the lymph node basin). These are also reflected in the staging.

**Blood Vessel/Lymphatic Invasion:** Blood vessel or angio invasion as well as lymphatic invasion is described as being present or absent. If present, it means that the melanoma cells have invaded the blood or lymph system.

**Margins:** The report will describe the location of the tumor to the margins, or edges of the biopsy or tissue sample. “Negative margins” mean a small amount of normal tissue around the entire tumor was also removed and is free of cancer cells—this ensures the entire melanoma is removed. “Positive margins,” on the other hand, indicate that melanoma extends all the way to the edge of the tissue removed, and that it is possible some melanoma may not have been removed. The report may also state how close the tumor cells were to the margins (edges) of the sample. Positive or close margins may require further surgery to achieve clean or negative margins.

**Lactate Dehydrogenase (LDH):** A blood test for the LDH enzyme that is normally found in the body in low levels. A high LDH can be an indicator of metastasis and is used in staging melanoma.

**BRAF Mutation Analysis:** BRAF is a protein kinase that plays a role in regulating genes that are responsible for cell replication and survival. It is estimated that 50% of melanomas contain an abnormal form of BRAF (also called a mutation), which appears
to promote overgrowth of these cancer cells and is the target of several new medications. Testing for a BRAF mutation is typically done in patients with advanced or aggressive melanoma to determine if these BRAF Inhibitor therapies are an appropriate treatment option.

**Types of Biopsies** (may be listed under the procedure section):

- Shave Biopsy: a superficial area of the lesion is taken off, often with a razor-type blade.
- Punch Biopsy: the removal of a circular area of skin with an instrument known as a punch, which comes in various sizes—sort of like a miniature round cookie cutter.
- Incisional Biopsy: the removal of a portion of the affected tissue, for examination, using a knife.
- Excisional Biopsy: the removal of the entire affected area and often some healthy tissue for examination using a knife.

**Staging**: "Staging" is used to describe and group cancers based on the size and extent of the tumor. Different staging systems are used for each type of cancer. The staging system most commonly used for melanoma is the American Joint Committee on Cancer (AJCC) staging system. This system utilizes the extent of the primary tumor, the absence or presence of cancer in the lymph nodes, and the existence of metastasis to assign a TNM rating, which corresponds to a stage. See the article [All About Melanoma](#) for complete staging information. In melanoma, staging is used to determine the aggressiveness of the cancer and what treatment is needed.

**Putting it all together**

Some pieces of the report are used to determine the stage of the cancer and other pieces play a role in deciding what treatment is needed. By understanding the basics of the report, you will be better able to discuss your treatment options with your healthcare team.

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