

Melanoma - Diagnosis [1]

This section has been reviewed and approved by the [Cancer.Net Editorial Board](#) [2], 06/2014

ON THIS PAGE: You will find a list of the common tests, procedures, and scans that doctors can use to find out whether a suspicious mole or other skin growth is cancerous. To see other pages, use the menu on the side of your screen.

Doctors use many tests to diagnose cancer and find out if it has spread to another part of the body, called metastasis. For melanoma, a biopsy of the suspicious skin area, called a lesion, is the only way to make a definitive diagnosis. The doctor may suggest other tests that will help make a diagnosis and determine the overall stage of the melanoma. Imaging tests may be used to find out whether the cancer has spread. This list describes options for diagnosing this type of cancer, but not all of the tests listed will be used for every person.

A biopsy and pathologic examination of a skin lesion for melanoma

A biopsy is the removal of a small amount of tissue for examination under a microscope. During this procedure, the suspected skin lesion is removed, usually after a local anesthetic has been used to numb the area, using techniques to preserve the entire lesion so that the thickness of the potential cancer and its margin (healthy tissue around the lesion) can be carefully examined. Other tests can suggest that cancer is present, but only a biopsy can make a definite diagnosis.

The sample removed during the biopsy is analyzed by a pathologist who determines if it is a melanoma. A pathologist is a doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease.

The pathologist will write a report, called a [pathology report](#) [3], that should include at least the following information:

- Type/subtype of melanoma
- Thickness of melanoma
- Presence or absence of ulceration (loss of the surface of the skin)
- Mitotic rate (how rapidly the cells are dividing)
- Presence of immune cells (tumor infiltrating lymphocytes)
- Margin status (whether melanoma cells can be seen at the edges of the biopsy specimen)

Each of these items is described in detail below.

Types of skin melanoma

There are four types of skin or cutaneous melanoma:

Superficial spreading melanoma. This is the most common type, accounting for 70% of melanomas. It usually develops from an existing mole.

Lentigo maligna melanoma. This type tends to occur in older people. It most commonly begins on the face, ears, and arms on skin that is chronically exposed to the sun.

Nodular melanoma. This type accounts for about 15% of melanomas, and it often appears rapidly as a bump on skin. It is usually black, but it may also be pink or red.

Acral lentiginous melanoma. This type develops on the palms of the hands, soles of the feet, or under the nail bed. It sometimes occurs on people with darker skin. Acral lentiginous melanoma is not related to sun exposure.

Subtypes of melanoma

Recent information has shown that melanoma can also be classified into molecular (genetic) subtypes based upon distinct genetic changes in the melanoma rather than histologic types, which are based on how the tissue appears under a microscope. The most common genetic change in melanoma is found in the *BRAF* (V600E) gene, which is mutated in about 50% of cutaneous melanomas. Another gene, *NRAS*, is mutated in the tumors of approximately 20% of patients with melanoma. *KIT* mutations occur more commonly in melanomas that develop from the mucosal lining, acral lentiginous melanoma, or melanoma that occur in chronically sun damaged skin, such as lentigo maligna melanoma, and may influence a patient's treatment options. It is likely that additional molecular subtypes of melanoma will be described in the near future.

The classification of melanoma into different subtypes based upon genetic alterations can have a major effect on treatment options, since targeting specific mutated genes is an important new way of treating advanced melanoma. Learn more about this approach, called targeted therapy, in the [Treatment Options](#) [4] and [Latest Research](#) [5] sections.

Thickness of melanoma

The pathologist will measure the "thickness" of the melanoma in millimeters (or fraction of a millimeter) from the top of the skin down to the underlying skin because it is the most reliable characteristic that reflects the risk of spread. A melanoma tumor that is less than 1 mm thick is characterized as "thin" and is associated with low risk of spread to regional lymph nodes or to distant sites. An intermediate-thickness melanoma is between 1 mm and 4 mm. A thicker melanoma, greater than 4 mm thick, is associated with a greater chance of recurrence, which is the chance the cancer will return following initial treatment, presumably because the cancer has already spread to other parts of the body at the time of diagnosis.

Mitotic rate and ulceration

Another pathologic feature of melanoma is the mitotic rate, which is an estimate of the speed at which tumor cells are dividing. It is measured as the number of mitoses per millimeter squared (mm^2). In combination with the thickness and the presence of ulceration, the mitotic rate is used to help determine the stage, treatment approach, and prognosis of melanoma (see below).

Finally, the presence or absence of ulceration of the primary melanoma is defined in the pathology report. If there is ulceration, research has shown it significantly increases the risk of spread and recurrence.

Additional patient evaluation after a diagnosis of melanoma

After the initial diagnosis of melanoma, you will be referred to a specialist. The doctor will take a complete medical history, noting any symptoms or signs [6], and perform a complete physical examination, including a total skin examination. This could also include a sentinel lymph node biopsy (see the Treatment Options [4] section). The focus of these examinations is to identify risk factors and signs or symptoms that may indicate melanoma has spread beyond the original site.

The extent of the initial evaluation is based upon the risk of recurrence associated with the primary (original) melanoma. In general, for most low-risk melanomas, such as those less than 1 mm thick, no further search for metastases or spread is necessary. In patients with higher-risk melanoma, more extensive testing, such as lymph node assessment and the other tests described below, may be considered. Therefore, the extent of the initial evaluation for a patient with newly diagnosed melanoma depends upon on the stage [7] of melanoma and discussions with the team of doctors.

Depending on the results of the evaluation, including the pathology report of the primary melanoma tumor, further testing for high-risk or later-stage melanoma may include the following:

Ultrasound [8]. An ultrasound uses sound waves to create a picture of the internal organs, including collections of lymph nodes, called lymph node basins, and soft tissue.

Computed tomography (CT or CAT) scan [9]. A CT scan creates a three-dimensional picture of the inside of the body with an x-ray machine. A computer then combines these images into a detailed, cross-sectional view that shows any abnormalities or tumors. If melanoma has spread, a CT scan can also be used to measure the tumor's size. Sometimes, a special dye called a contrast medium is given before the scan to provide better detail on the image. This dye can be injected into a patient's vein or given as a pill to swallow.

Magnetic resonance imaging (MRI) [10]. An MRI uses magnetic fields, not x-rays, to produce detailed images of the body. MRI can also be used to measure the tumor's size. A special dye called a contrast medium is given before the scan to create a clearer picture. This dye can be injected into a patient's vein or given as a pill to swallow.

Positron emission tomography (PET) scan [11]. A PET scan is a way to create pictures of organs and tissues inside the body. A small amount of a radioactive sugar substance is injected

into the patient's body. This sugar substance is taken up by cells that use the most energy. Because cancer tends to use energy actively, it absorbs more of the radioactive substance. A scanner then detects this substance to produce images of the inside of the body.

There are advantages and disadvantages to each of these tests. Depending on your situation, your doctor may feel that one is more appropriate for you than others. Your doctor may also feel you don't need any of these tests. Talk with your doctor about which test(s) will provide the most useful information about your condition.

After diagnostic tests are done, your doctor will review all of the results with you. If the diagnosis is cancer, these results also help the doctor describe the cancer; this is called staging.

The next section helps explain the different stages for this type of cancer. Use the menu on the side of your screen to select Stages, or you can select another section, to continue reading this guide.

Links:

- [1] <http://www.cancer.net/cancer-types/melanoma/diagnosis>
- [2] <http://www.cancer.net/about-us>
- [3] <http://www.cancer.net/node/24715>
- [4] <http://www.cancer.net/node/19258>
- [5] <http://www.cancer.net/node/19263>
- [6] <http://www.cancer.net/node/19255>
- [7] <http://www.cancer.net/node/19257>
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