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# Melanoma Skin Cancer Causes, Risk Factors, and Prevention

## Risk Factors

A risk factor is anything that raises your chances of getting a disease such as cancer. Learn more about the risk factors for melanoma skin cancer.

- [Risk Factors for Melanoma Skin Cancer](#)
- [What Causes Melanoma Skin Cancer?](#)
- [Genetic Counseling and Testing for People at High Risk of Melanoma](#)

## Prevention

There is no sure way to prevent melanoma skin cancer. But there are things you can do that might lower your risk. Learn more.

- [Can Melanoma Skin Cancer Be Prevented?](#)

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# Risk Factors for Melanoma Skin Cancer

A risk factor is anything that raises your risk of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking and excess sun exposure, can be changed. Others, like your age or family history, can't be changed.

Having a risk factor, or even many risk factors, does not mean that you will get melanoma. Many people with risk factors never get melanoma. And some people who get it may have few or no known risk factors.

Still, it's important to know about the risk factors for melanoma because there may be [things you can do to lower your risk](#) of getting it. If you are at higher risk because of certain factors, there are also [things you can do that might help find it early](#)<sup>1</sup>, when it's likely to be easier to treat.

Several risk factors can make a person more likely to develop melanoma.

## Ultraviolet (UV) light exposure

Exposure to ultraviolet (UV) rays is a major risk factor for most melanomas. Sunlight is the main source of UV rays. Tanning beds and sun lamps are also sources of UV rays.

While UV rays make up only a very small portion of the sun's rays, they are the main cause of the damaging effects of the sun on the skin. UV rays damage the DNA (genes) inside skin cells. Skin cancers can begin when this damage affects the DNA of genes that control skin cell growth.

The pattern and timing of the UV exposure may play a role in melanoma development. For example, melanoma on the trunk (chest and back) and legs has been linked to frequent sunburns (especially in childhood). This might also have something to do with the fact that these areas aren't constantly exposed to UV light. Some evidence suggests that melanomas that start in these areas are different from those that start on the face, neck, and arms, where the sun exposure is more constant. And different from either of these are melanomas on the palms of the hands, soles of the feet, or under the nails (known as **acral lentiginous melanomas**), or on internal surfaces such as the mouth and vagina (**mucosal melanomas**), where there has been little or no sun exposure.

To learn more about the effects of UV rays on the skin and what you can do to protect yourself and your loved ones, see [Ultraviolet \(UV\) Radiation](#)<sup>2</sup> and [How Do I Protect Myself from Ultraviolet \(UV\) Rays?](#)<sup>3</sup>

## Moles

A mole (also known as a *nevus*) is a benign (non-cancerous) pigmented tumor. Babies are not usually born with moles; they often begin to appear in children and young adults.

**Having many moles:** Most moles will never cause any problems, but someone who

has many moles is more likely to develop melanoma.

**Atypical moles (dysplastic nevi):** These moles look a little like normal moles but also have some features of melanoma. They are often larger than other moles and have an abnormal shape or color. (See [Signs and Symptoms of Melanoma Skin Cancer](#)<sup>4</sup> for descriptions of how moles and melanomas look.) They can appear on skin that is exposed to the sun as well as skin that is usually covered, such as on the buttocks or scalp.

Dysplastic nevi often run in families. A small percentage of dysplastic nevi may develop into melanomas. But most dysplastic nevi never become cancer, and many melanomas seem to arise without a pre-existing dysplastic nevus.

**Dysplastic nevus syndrome (atypical mole syndrome):** People with this inherited condition have many dysplastic nevi. If at least one close relative has had melanoma, this condition is referred to as **familial atypical multiple mole and melanoma syndrome, or FAMMM**.

People with this condition have a very high lifetime risk of melanoma, so they need to have very thorough, regular skin exams by a dermatologist (a doctor who specializes in skin problems). Sometimes full body photos are taken to help the doctor recognize if moles are changing and growing. Many doctors recommend that these patients be taught to do monthly [skin self-exams](#)<sup>5</sup> as well.

**Congenital melanocytic nevi:** Moles present at birth are called *congenital melanocytic nevi*. The lifetime risk of melanoma developing in congenital melanocytic nevi is estimated to be between 0 and 5%, depending on the size of the nevus. People with very large congenital nevi have a higher risk, while the risk is lower for those with small nevi. For example, the risk for melanoma is very low in congenital nevi smaller than the palm of the hand, while those that cover large portions of back and buttocks (“bathing trunk nevi”) have significantly higher risks.

Congenital nevi are sometimes removed by surgery so that they don’t have a chance to become cancer. Whether doctors advise removing a congenital nevus depends on several factors including its size, location, and color. Many doctors recommend that congenital nevi that are not removed should be examined regularly by a dermatologist and that the patient should be taught how to do monthly skin self-exams.

Again, the chance of any single mole turning into cancer is very low. However, anyone with lots of irregular or large moles has an increased risk for melanoma.

## Fair skin, freckling, and light hair

The risk of melanoma is much higher for whites than for African Americans. Whites with red or blond hair, blue or green eyes, or fair skin that freckles or burns easily are at increased risk.

## Family history of melanoma

Your risk of melanoma is higher if one or more of your first-degree relatives (parents, brothers, sisters, or children) has had melanoma. Around 10% of all people with melanoma have a family history of the disease.

The increased risk might be because of a shared family lifestyle of frequent sun exposure, a family tendency to have fair skin, certain gene changes (mutations) that run in a family, or a combination of these factors.

Most experts don't recommend that people with a family history of melanoma have [genetic testing](#) to look for mutations that might increase risk, as it's not yet clear how helpful this is. Rather, experts advise that they do the following:

- Have regular skin exams by a dermatologist
- Thoroughly examine their own skin once a month
- Be particularly careful about sun protection and avoiding manmade UV rays (such as those from tanning beds)

## Personal history of melanoma or other skin cancers

A person who has already had melanoma has a higher risk of getting melanoma again. People who have had basal or squamous cell skin cancers are also at increased risk of getting melanoma.

## Having a weakened immune system

A person's immune system helps fight cancers of the skin and other organs. People with weakened immune systems (from certain diseases or medical treatments) are more likely to develop many types of skin cancer, including melanoma.

For example, people who get organ transplants are usually given medicines that

weaken their immune system to help prevent them from rejecting the new organ. This increases their risk of melanoma.

People infected with [HIV](#)<sup>6</sup>, the virus that causes AIDS, often have weakened immune systems and are also at increased risk for melanoma.

## Being older

Melanoma is more likely to occur in older people, but it is also found in younger people. In fact, melanoma is one of the most common cancers in people younger than 30 (especially younger women). Melanoma that runs in families may occur at a younger age.

## Being male

In the United States, men have a higher rate of melanoma than women, although this varies by age. Before age 50, the risk is higher for women; after age 50 the risk is higher in men.

## Xeroderma pigmentosum

Xeroderma pigmentosum (XP) is a rare, inherited condition that affects skin cells' ability to repair damage to their DNA. People with XP have a high risk of developing melanoma and other skin cancers when they are young, especially on sun-exposed areas of their skin.

## Hyperlinks

1. [www.cancer.org/cancer/melanoma-skin-cancer/detection-diagnosis-staging/detection.html](http://www.cancer.org/cancer/melanoma-skin-cancer/detection-diagnosis-staging/detection.html)
2. [www.cancer.org/cancer/cancer-causes/radiation-exposure/uv-radiation.html](http://www.cancer.org/cancer/cancer-causes/radiation-exposure/uv-radiation.html)
3. [www.cancer.org/healthy/be-safe-in-sun/uv-protection.html](http://www.cancer.org/healthy/be-safe-in-sun/uv-protection.html)
4. [www.cancer.org/cancer/melanoma-skin-cancer/detection-diagnosis-staging/signs-and-symptoms.html](http://www.cancer.org/cancer/melanoma-skin-cancer/detection-diagnosis-staging/signs-and-symptoms.html)
5. [www.cancer.org/healthy/be-safe-in-sun/skin-exams.html](http://www.cancer.org/healthy/be-safe-in-sun/skin-exams.html)
6. [www.cancer.org/cancer/cancer-causes/infectious-agents/hiv-infection-aids.html](http://www.cancer.org/cancer/cancer-causes/infectious-agents/hiv-infection-aids.html)

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## What Causes Melanoma Skin Cancer?

Many [risk factors for melanoma](#) have been found, but it's not always clear exactly how they might cause cancer.

For example, while most moles never turn into a melanoma, some do. Researchers have found some gene changes inside mole cells that may cause them to become melanoma cells. But it's still not known exactly why some moles become cancerous

while most don't.

DNA is the chemical in each of our cells that makes up our **genes**, which control how our cells function. We usually look like our parents because they are the source of our DNA. But DNA affects more than just how we look.

Some genes control when our cells grow, divide into new cells, and die:

- Genes that help cells grow, divide, and stay alive are called **oncogenes**.
- Genes that keep cell growth in check, repair mistakes in DNA, or cause cells to die at the right time are called **tumor suppressor genes**.

Cancers can be caused by DNA mutations (or other types of changes) that keep oncogenes turned on, or that turn off tumor suppressor genes. These types of gene changes can lead to cells growing out of control. Changes in several different genes are usually needed for a cell to become a cancer cell.

## Acquired gene mutations

Most often, gene changes related to melanoma are acquired during a person's lifetime and are not passed on to a person's children (inherited). In some cases, these **acquired mutations** seem to happen randomly within a cell, without having a clear cause. In other cases, they likely happen as the result of exposure to an outside cause.

For example, [ultraviolet \(UV\) rays](#)<sup>1</sup> are clearly a major cause of melanoma. UV rays can damage the DNA in skin cells. Sometimes this damage affects certain genes that control how the cells grow and divide. If these genes no longer work properly, the affected cells may become cancer cells.

Most UV rays come from sunlight, but some can come from man-made sources such as tanning beds. Some DNA damage from UV exposure might happen in the few years before the cancer appears, but much of it could be from exposures that happened many years earlier. Children and young adults often get a lot of intense sun exposure that might not result in cancer until many years or even decades later.

The most common change in melanoma cells is a mutation in the *BRAF* oncogene, which is found in about half of all melanomas. Other genes that can be affected in melanoma include *NRAS*, *CDKN2A*, and *NF1*. (Usually only one of these genes is affected.)

Some melanomas occur in parts of the body that are rarely exposed to sunlight. These

melanomas often have different gene changes than those in melanomas that develop in sun-exposed areas, such as changes in the *C-KIT* (or just *KIT*) gene.

## Inherited gene mutations

Less often, people inherit gene changes from a parent that clearly raise their risk of melanoma.

Familial (inherited) melanomas most often have changes in tumor suppressor genes such as *CDKN2A* (also known as *p16*) or *CDK4* that prevent them from doing their normal job of controlling cell growth. This could eventually lead to cancer.

Some people, such as those with xeroderma pigmentosum (XP), inherit a change in one of the *XP (ERCC)* genes, which normally help to repair damaged DNA inside the cell. Changes in one of these genes can lead to skin cells that have trouble repairing DNA damaged by UV rays, so these people are more likely to develop melanoma, especially on sun-exposed parts of the body.

## Gene mutations can sometimes affect treatment

Some of the gene changes found in melanoma cells have proven to be good targets for drugs to help treat this disease. For example, several drugs that specifically target cells with changes in the *BRAF* gene are now used to treat advanced melanomas with these changes (see [Targeted Therapy for Melanoma Skin Cancer<sup>2</sup>](#)).

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/radiation-exposure/uv-radiation.html](http://www.cancer.org/cancer/cancer-causes/radiation-exposure/uv-radiation.html)
2. [www.cancer.org/cancer/melanoma-skin-cancer/treating/targeted-therapy.html](http://www.cancer.org/cancer/melanoma-skin-cancer/treating/targeted-therapy.html)

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# Can Melanoma Skin Cancer Be Prevented?

There is no sure way to prevent melanoma. Some [risk factors](#) such as your age, race, and family history can't be controlled. But there are things you can do that could lower your risk of getting melanoma and other skin cancers.

## Limit your exposure to ultraviolet (UV) rays

The most important way to lower your risk of melanoma is to protect yourself from exposure to [UV rays](#)<sup>1</sup>. Practice sun safety when you are outdoors.

### Seek shade

Simply staying in the shade is one of the best ways to limit your UV exposure.

### “Slip! Slop! Slap!® ... and Wrap”

If you are going to be in the sun, this catchphrase can help you remember some of the key steps you can take to protect yourself from UV rays:

- Slip on a shirt.
- Slop on sunscreen.
- Slap on a hat.
- Wrap on sunglasses to protect the eyes and sensitive skin around them.

### **Avoid using tanning beds and sunlamps**

Many people believe the UV rays of tanning beds are harmless. This is not true. Tanning lamps give off UV rays, which can cause long-term skin damage and can contribute to skin cancer. Tanning bed use has been linked with an increased risk of melanoma, especially if it is started before a person is 30. Most dermatologists (skin doctors) and health organizations recommend not using tanning beds and sun lamps.

### **Protect children from the sun**

Children need special attention, since they tend to spend more time outdoors and can burn more easily. Parents and other caregivers should protect children from excess sun exposure by using the steps above. Children need to be taught about the dangers of too much sun exposure as they become more independent.

### **To learn more about sun safety**

For more on how to protect yourself and your family from UV exposure, see [How Do I Protect Myself from UV Rays?](#)<sup>2</sup>

### **Watch for abnormal moles**

Checking your skin regularly may help you spot any new or abnormal moles or other growths and show them to your doctor before they even have a chance to turn into skin cancer.

Certain types of moles are more likely to develop into melanoma (see [Melanoma Skin Cancer Risk Factors](#)). If you have moles, depending on how they look, your doctor may want to watch them closely with regular exams or may remove some of them if they have features that suggest they might change into a melanoma.

Routine removal of many moles is not usually recommended as a way to prevent melanoma. Some melanomas develop from moles, but most do not. If you have many moles, getting careful, routine exams by a dermatologist, along with doing monthly [skin](#)

[self-exams](#)<sup>3</sup> are, might be recommended.

If you find a new, unusual, or changing mole, you should have it checked by a doctor experienced in recognizing skin cancers. See [Signs and Symptoms of Melanoma Skin Cancer](#)<sup>4</sup> for descriptions of what to look for.

## **Avoid weakening your immune system (when possible)**

Having a weakened immune system increases your risk of getting melanoma and other types of skin cancer.

Infection with HIV, the virus that causes AIDS, can weaken the immune system. Avoiding known risk factors for HIV infection, such as intravenous (IV) drug use and having unprotected sex with many partners, might lower your risk of skin cancer and many other types of cancer. (For more information, see [HIV Infection, AIDS, and Cancer](#)<sup>5</sup>.)

Some people need to take medicines to suppress their immune system. This includes people who have had organ transplants and some people with autoimmune diseases. People with cancer also sometimes need to take medicines such as chemotherapy that can lower their immune function. For these people, the benefit from taking these medicines will likely far outweigh the small increased risk of getting skin cancer.

## **Hyperlinks**

1. [www.cancer.org/cancer/cancer-causes/radiation-exposure/uv-radiation.html](http://www.cancer.org/cancer/cancer-causes/radiation-exposure/uv-radiation.html)
2. [www.cancer.org/healthy/be-safe-in-sun/uv-protection.html](http://www.cancer.org/healthy/be-safe-in-sun/uv-protection.html)
3. [www.cancer.org/healthy/be-safe-in-sun/skin-exams.html](http://www.cancer.org/healthy/be-safe-in-sun/skin-exams.html)
4. [www.cancer.org/cancer/melanoma-skin-cancer/detection-diagnosis-staging/signs-and-symptoms.html](http://www.cancer.org/cancer/melanoma-skin-cancer/detection-diagnosis-staging/signs-and-symptoms.html)
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## Genetic Counseling and Testing for People at High Risk of Melanoma

Gene mutations (changes) that increase melanoma risk can be [passed down through families \(inherited\)](#), but these account for only a small portion of melanomas. You might have inherited a gene mutation that increases your risk of melanoma if any of the following apply:

- Several members on one side of your family have had melanoma
- A family member has had more than one melanoma

- A family member has had both melanoma and pancreatic cancer
- You have had 3 or more melanomas, especially if the first one appeared before age 45
- You have had 2 or more unusual looking moles called [Spitz nevi](#)<sup>1</sup>

Some families with high rates of melanoma have mutations in genes such as *CDKN2A* (also known as *p16*). Tests for some of these gene changes are now available, although doctors aren't sure how useful they are at this time. In part, this is because people with any of the factors above are already known to have a higher risk of melanoma regardless of whether they carry a mutated gene, so it's not always clear how helpful the genetic testing results would be.

Still, people interested in learning whether they carry gene changes linked to melanoma may want to ask their doctor about whether genetic counseling (and possibly testing) might be right for them. They could also consider taking part in genetic research that will advance progress in this field.

If you're considering genetic testing, it's very important to meet first with a genetic counselor or other health professional with knowledge of genetic testing. They can describe the tests to you and explain what the results may or may not tell you about your risk. Genetic testing is not perfect, and sometimes the tests might not provide clear answers. To learn more about genetic testing in general, see [Genetics and Cancer](#)<sup>2</sup>.

At this time, because it's not clear how useful the test results might be, most melanoma experts don't recommend genetic testing for all people with a personal or family history of melanoma. Still, some people may choose to get tested. In any event, people with a family history of melanoma should ask their doctor about getting regular skin exams, learning to do [skin self-exams](#)<sup>3</sup>, and being particularly careful about [sun safety](#)<sup>4</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/melanoma-skin-cancer/about/what-is-melanoma.html](http://www.cancer.org/cancer/melanoma-skin-cancer/about/what-is-melanoma.html)
2. [www.cancer.org/cancer/cancer-causes/genetics.html](http://www.cancer.org/cancer/cancer-causes/genetics.html)
3. [www.cancer.org/healthy/be-safe-in-sun/skin-exams.html](http://www.cancer.org/healthy/be-safe-in-sun/skin-exams.html)
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