



MELANOMA SKIN CANCER

What is cancer?

Cancer develops when cells in a part of the body begin to grow out of control. Although there are many kinds of cancer, they all start because of out-of-control growth of abnormal cells.

Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide more rapidly until the person becomes an adult. After that, cells in most parts of the body divide only to replace worn-out or dying cells and to repair injuries.

Because cancer cells continue to grow and divide, they are different from normal cells. Instead of dying, they outlive normal cells and continue to form new abnormal cells.

Cancer cells develop because of damage to DNA. This substance is in every cell and directs all its activities. Most of the time when DNA becomes damaged the body is able to repair it. In cancer cells, the damaged DNA is not repaired. People can inherit damaged DNA, which accounts for inherited cancers. Many times though, a person's DNA becomes damaged by exposure to something in the environment, like smoking.

Cancer usually forms as a tumor. Some cancers, like leukemia, do not form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Often, cancer cells travel to other parts of the body, where they begin to grow and replace normal tissue. This process is called metastasis. Regardless of where a cancer may spread, however, it is always named for the place it began. For instance, breast cancer that spreads to the liver is still called breast cancer, not liver cancer.

Not all tumors are cancerous. Benign (non-cancerous) tumors do not spread (metastasize) to other parts of the body and, with very rare exceptions, are not life threatening.

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their particular kind of cancer.

Cancer is the second leading cause of death in the United States. Nearly half of all men and a little over one third of all women in the United States will develop cancer during their lifetimes. Today, millions of people are living with cancer or have had cancer. The risk of developing most types of cancer can be reduced by changes in a person's lifestyle, for example, by quitting smoking and eating a better diet. The sooner a cancer is found and treatment begins, the better are the chances for living for many years.

What is melanoma?

Melanoma is a cancer that starts in a certain type of skin cell. To understand melanoma, it helps to know about the normal structure and function of the skin.

About normal skin

The skin is the largest organ in your body. It does several different things:

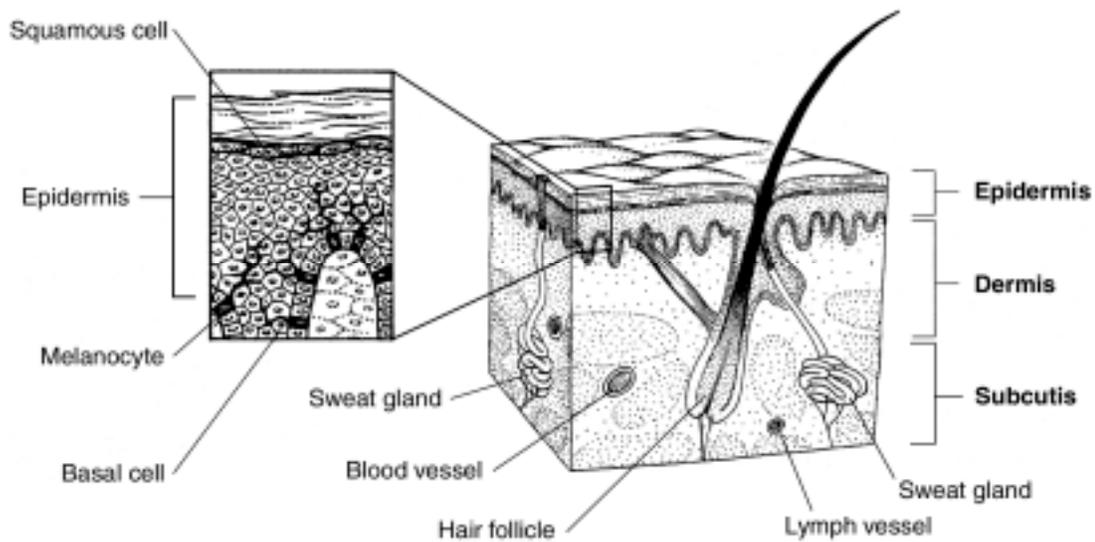
- covers the internal organs and protects them from injury
- serves as a barrier to germs such as bacteria
- prevents the loss of too much water and other fluids
- helps control body temperature

The skin has 3 layers (see picture below):

- epidermis
- dermis
- subcutis

Epidermis

The top layer of skin is the *epidermis*. The 2 main types of skin cancer, melanomas and non-melanomas, begin in the epidermis. The epidermis is very thin, averaging only 0.2 millimeters thick (about 1/100 of an inch). It protects the deeper layers of skin and the organs of the body from the environment.



Keratinocytes are the main cell type of the epidermis. These cells make an important protein called keratin. Keratin contributes to the skin's ability to protect the rest of the body.

The outermost part of the epidermis is called the *stratum corneum*, or horny layer. It is composed of keratinocytes that are no longer living. The cells in this layer are called *squamous cells* because of their flat shape. These cells are continually shed as new ones form.

Living keratinocytes are found below the stratum corneum. These cells have moved here from the lowest part of the epidermis, the basal layer. The keratinocytes of the basal layer, called *basal cells*, continually divide to form new keratinocytes. These replace the older keratinocytes that wear off the skin's surface.

Melanocytes, the cells that can become melanoma, are also present in the epidermis. These skin cells make the protective brown pigment called melanin, which makes skin tan or brown. Melanin protects the deeper layers of the skin from the harmful effects of the sun.

The epidermis is separated from the deeper layers of skin by the basement membrane. The basement membrane is an important structure because when a cancer becomes more advanced, it generally grows through this barrier.

Dermis

The middle layer of the skin is called the *dermis*. The dermis is much thicker than the epidermis. It contains hair follicles, sweat glands, blood vessels, and nerves that are held in place by a protein called collagen. Collagen, made by cells called fibroblasts, gives the skin its resilience and strength.

Subcutis

The last and deepest layer of the skin is called the *subcutis*. The subcutis and the lowest part of the dermis form a network of collagen and fat cells. The subcutis conserves heat and has a shock-absorbing effect that helps protect the body's organs from injury.

Benign skin tumors

There are many types of benign (non-cancerous) tumors that can develop from different types of skin cells.

Moles (nevi) are benign skin tumors that develop from melanocytes. Nearly all moles are harmless but having some types may raise your risk of melanoma. See the section, "What are the risk factors for melanoma skin cancer?" in this document for more information about moles.

A Spitz nevus is a kind of skin tumor that sometimes looks like melanoma. These tumors are generally benign and don't spread. But sometimes doctors have trouble telling Spitz nevi from true melanomas, even when looking at them under a microscope. Therefore, they are often removed, just to be safe.

Benign tumors that develop from other types of skin cells include:

- seborrheic keratoses: tan, brown, or black raised spots with a "waxy" texture or rough surface
- hemangiomas: benign blood vessel growths often called cherry or strawberry spots, or port wine stains
- lipomas: soft growths of benign fat cells
- warts: rough-surfaced growths caused by a virus

Most of these tumors rarely, if ever, turn into cancers. There are a lot of other kinds of benign skin tumors but most are not very common.

Melanoma skin cancers

Melanoma is a cancer that begins in the melanocytes. Other names for this cancer include malignant melanoma and cutaneous melanoma. Because most melanoma cells still produce melanin, melanoma tumors are usually brown or black. But this is not always true, as melanomas can be non-pigmented (no color). Melanoma is much less common than basal cell and squamous cell skin cancers, but it is far more dangerous.

Melanomas can occur anywhere on the skin, but are more likely to start in certain locations. The trunk is the most common site in men. The legs are the most commonly affected site in women. The neck and face are other common sites.

Having darkly pigmented skin lowers your risk, but it is not a guarantee that you will not get melanoma. Anyone can develop this cancer on the palms of the hands, soles of the feet, and under the nails. Melanomas in these areas represent about half of all melanomas in African Americans but fewer than 10% of melanomas in whites.

Melanomas can also form in other parts of your body such as the eyes, mouth, and vagina, but these are much less common than melanoma of the skin. Melanomas in these organs are discussed in separate American Cancer Society documents.

Melanoma, like basal cell and squamous cell cancers (see below), is almost always curable in its early stages. But it is much more likely than basal or squamous cell cancer to spread to other parts of the body if not caught early.

Other skin cancers

Skin cancers that are not melanoma are sometimes grouped together as *non-melanoma skin cancers* because they develop from skin cells other than melanocytes. These include basal cell and squamous cell cancers (by far the most common skin cancers, and actually more common than any other form of cancer). Because they rarely metastasize (spread elsewhere in the body), basal cell and squamous cell skin cancers are less worrisome and are treated differently than melanoma. Merkel cell carcinoma is an uncommon type of skin cancer that is sometimes harder to treat. These cancers are discussed in another American Cancer Society document called *Skin Cancer: Basal and Squamous Cell*.

Still other types of non-melanoma skin cancers are discussed in the American Cancer Society documents, *Kaposi Sarcoma* and *Lymphoma of the Skin*.

What are the key statistics about melanoma?

Cancer of the skin is the most common of cancers, probably accounting for at least half of all cancers. Melanoma accounts for less than 5% of skin cancer cases but causes a large majority of skin cancer deaths.

The American Cancer Society estimates that about 62,480 new melanomas will be diagnosed in the United States during 2008. Incidence rates for melanoma increased sharply at about 6% per year in the 1970s. During the 1980s and 1990s, the rate of increase slowed to a little less than 3% per year. Since 2000, the rate has been fairly stable.

Melanoma is more than 10 times more common in whites than in African Americans. It is slightly more common in males than in females.

Overall, the lifetime risk of getting melanoma is about 2% (1 in 50) for whites, 0.1% (1 in 1,000) for blacks, and 0.5% (1 in 200) for Hispanics. The risk for each person can be affected by a number of different factors, which are described in the section, "What are the risk factors for melanoma?"

Unlike many other common cancers, melanoma has a wide age distribution. It occurs in younger as well as older people. Rates continue to increase with age and are highest among those in their 80s, but melanoma is not uncommon even among those younger than 30. In fact, it is one of the more common cancers in adolescents and young adults.

About 8,420 people in the United States are expected to die of melanoma during 2008. The death rate has been stable since the 1990s for those older than 50, and has been dropping in those younger than 50.

For information on survival rates for melanoma, see the section, "How is melanoma staged?"

What are the risk factors for melanoma?

A *risk factor* is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. For example, smoking is a risk factor for cancers of the lung, mouth, larynx, bladder, kidney, and several other organs.

But risk factors don't tell us everything. Having a risk factor, or even several risk factors, does not mean that you will get the disease. And many people who get the disease may not have had any known risk factors. Even if a person with melanoma has a risk factor, it is often very hard to know how much that risk factor may have contributed to the cancer.

Scientists have found several risk factors that may make you more likely to develop melanoma.

Ultraviolet (UV) light exposure

Ultraviolet (UV) radiation is thought to be a major risk factor for most melanomas. Sunlight is the main source of UV radiation, which can damage the genes in your skin cells. Tanning lamps and booths are also sources of UV radiation. People with excessive exposure to light from these sources are at greater risk for skin cancer, including melanoma.

The amount of UV exposure depends on the intensity of the radiation, length of time the skin was exposed, and whether the skin was protected with clothing and sunscreen.

The nature of the UV exposure may play a role in melanoma development. Many studies have linked the development of melanoma in the trunk, legs, and arms to frequent sunburns (especially in childhood). The fact that these areas are not constantly exposed to UV light may also be important. Some experts think that melanomas in these areas are different from those on the face and neck, where the sun exposure is more constant. And different from either of these are melanomas that develop on the palms, soles, nails or internal surfaces such as the mouth and vagina, where there has been little or no sun exposure.

Moles

A *nevus* (the medical name for a mole) is a benign (non-cancerous) melanocytic tumor. Moles are not usually present at birth but begin to appear in children and teenagers. Most moles will never cause any problems, but a person who has many moles is more likely to develop melanoma.

A *dysplastic nevus*, or atypical mole, is a type of mole that particularly increases a person's risk of melanoma. Dysplastic nevi (nevi is the plural of nevus) often look a little like normal moles but also look a little like melanoma. (Refer to the section, "Can melanoma skin cancer be found early?" for descriptions of the appearance of moles and melanomas.) They can appear in areas that are exposed to the sun as well as those areas that are usually covered, such as the buttocks and scalp. They are often larger than other moles.

A small number of dysplastic nevi may develop into melanomas. But most dysplastic nevi never become cancerous, and many melanomas seem to arise without a pre-existing dysplastic nevus.

Dysplastic nevi often run in families. If you have family members with many dysplastic nevi you have about a 50% chance of developing these nevi. Someone with 1 or more dysplastic nevi and with at least 2 close relatives with melanoma has a 50% or greater risk of developing melanoma.

Lifetime melanoma risk is estimated to be between 6% and 10% for those with many dysplastic nevi (sometimes referred to as dysplastic nevus syndrome). People with this condition should have very thorough periodic skin exams by a dermatologist (a doctor who specializes in skin problems). In some cases, full body photographs are taken at regular intervals to help the doctor recognize which moles are changing and growing. Many doctors recommend that patients be taught to do monthly skin self-exams and be counseled about sun protection.

Moles present at birth are called *congenital melanocytic nevi*. The lifetime risk of getting melanoma for people with congenital melanocytic nevi has been estimated to be between 0 and 10%, depending on the size of the nevus. People with very large congenital nevi have a greater risk, while the risk is smaller for those with small nevi. Congenital nevi are sometimes removed by surgery so that they do not have a chance to become cancerous. Whether or not doctors advise removing a congenital nevus is influenced by several factors including its size, location, color, and texture. Many doctors recommend that congenital nevi that are not removed should be examined at regular intervals by a dermatologist and that the patient should be taught how to do monthly skin self-exams.

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 more than 10 times higher for whites than for African Americans. This is because skin pigment has a protective effect. Whites with red or blond hair or fair skin that freckles or burns easily are at increased risk. Red-haired people have the highest risk.

Family history of melanoma

Your risk of melanoma is greater if 1 or more of your first-degree relatives (mother, father, brother, sister, child) has been diagnosed with melanoma. Around 10% of all people with melanoma have a family history of melanoma.

The increased risk may be due to a shared family lifestyle of frequent sun exposure, a family tendency to have fair skin, or a combination of both factors. It may also be due to inherited gene changes (mutations) in a family. Gene mutations have been found in anywhere from about 10% to 40% of families with a high rate of melanoma. Most experts do not recommend genetic testing in these families at this time. Rather, they advise that people with a strong family history of melanoma do the following:

- have regular skin exams by a dermatologist
- do thorough skin self-exams once a month
- be particularly careful about sun protection

Personal history of melanoma

A person who has already had melanoma has an increased risk of getting melanoma again. About 5% to 10% of people with melanoma will develop a second one at some point.

Immune suppression

People who have been treated with medicines that suppress the immune system, such as organ transplant patients, have an increased risk of developing melanoma.

Age

Although melanoma is less related to aging than most other cancers, it is still more likely to occur in older people. But this is one of the few cancers that is also found in younger people. In fact, melanoma is one of the most common cancers in people younger than 30. Melanoma that runs in families may occur at a younger age.

Gender

Men have a higher rate of melanoma than women.

Xeroderma pigmentosum

Xeroderma pigmentosum (XP) is a rare, inherited condition resulting from a defect in an enzyme that normally repairs damage to DNA. People with XP have a high risk for developing both melanoma and basal cell and squamous cell skin cancers at a young age. Because people with XP are less able to repair DNA damage caused by sunlight, they can develop many cancers on sun-exposed areas of their skin.

Do we know what causes melanoma?

DNA is the genetic material in each of our cells. It passes along genetic information to the next generation, making children look like their parents, for example. Along with information about hair color, facial features, and other aspects of how we look, DNA also contains information that tells the cells of our body how to grow and how to perform the activities needed for life.

Ultraviolet (UV) radiation can damage DNA. Sometimes this damage affects certain genes (segments of DNA with a specific function) that control how and when cells grow and divide. If these genes do not function properly, the affected cells may form a cancer.

Most UV radiation comes from sunlight, but some may come from man-made sources such as tanning booths. Usually it's not clear exactly when UV exposure causes DNA damage that might eventually lead to cancer. Some of the damage may take place in the few years before the start of the cancer. But much of it may be due to exposures that happened many years earlier. Children and young adults often get a lot of intense UV sun exposure that may not result in an actual cancer for many years or even decades.

Scientists have found that the DNA of certain genes is often damaged in melanoma cells. Most of these DNA changes are not inherited; they are more likely the result of damage caused by sunlight. But there is evidence that some people can repair their damaged DNA better than others and are less likely to develop melanoma. In the future, better understanding of the way these DNA changes lead to melanoma might be used to help treat or even prevent this disease.

A mutation in the BRAF gene is found in many melanomas. This change is not inherited; it seems to occur during the development of the melanoma. Blocking the activity of this gene may someday help treat some people with advanced melanoma.

In some families with inherited melanomas, gene mutations that greatly increase the risk of melanoma are passed from one generation to the next. Familial (inherited) melanomas most often have changes in genes such as CDKN2A (also known as p16) and CDK4 that prevent them from doing their normal job of controlling the growth of the cell. Scientists reason that this leads to overgrowth and eventually cancer.

Although most moles never turn into a melanoma, some do. Researchers have found some DNA changes that transform benign nevus (mole) cells into melanoma cells. But it is still not known exactly why some moles become cancerous or why having many moles or atypical (dysplastic) moles increases your risk of developing melanoma.

Can melanoma be prevented?

Not all melanomas can be prevented, but there are ways to reduce your risk of getting melanoma.

Limit ultraviolet (UV) exposure

The most important way to lower your risk of melanoma is to protect yourself from exposure to ultraviolet radiation. Practice sun safety when you are outdoors. "Slip! Slop! Slap! ... and Wrap" is a catch phrase that reminds people of the 4 key methods they can use to protect themselves from UV radiation. Slip on a shirt, slop on sunscreen, slap on a hat, and wrap on sunglasses to protect the eyes and sensitive skin around them from ultraviolet light.

Protect your skin with clothing

Clothes provide different levels of protection, depending on many factors. Long-sleeved shirts, long pants, or long skirts are the most protective. Dark colors generally provide more protection than light colors. A tightly woven fabric protects better than loosely woven clothing. Dry fabric is generally more protective than wet fabric.

Be aware that covering up doesn't block out all UV rays. A typical light T-shirt worn in the summer usually provides less protection than a sunscreen with a sun protection factor (SPF) of 15 or higher.

A few companies in the United States now make clothing that is lightweight, comfortable, and protects against UV exposure even when wet. Some sun-protective clothes have a label listing the ultraviolet protection factor (UPF) value -- the level of protection the garment provides from the sun's UV rays (on a scale from 15 to 50+). The higher the UPF, the higher the protection from UV rays.

Newer products are also available to increase the UPF value of clothes you already own. Used like laundry detergents, they add a layer of UV protection to your clothes without changing the color or texture.

Wear a hat

A hat with at least a 2- to 3-inch brim all around is ideal because it protects areas often exposed to the sun, such as the neck, ears, eyes, forehead, nose, and scalp. A shade cap (which looks like a baseball cap with about 7 inches of fabric draping down the sides and back) is also good. These are often sold in sports and outdoor supply stores.

A baseball cap can protect the front and top of the head but not the back of the neck or the ears, where skin cancers commonly develop. Straw hats are not recommended unless they are tightly woven.

Use sunscreen

The American Cancer Society recommends using sunscreen as part of a sun protection program.

Use sunscreens and lip balms with an SPF factor of 15 or more on areas of skin exposed to the sun, especially when the sunlight is strong (for example, in hot or high-altitude locations or between the hours of 10 am and 4 pm). Use sunscreen even on hazy days or days with light or broken cloud cover because the UV light still comes through.

Always follow directions when applying sunscreen. For it to work best, sunscreen should be applied about 20 to 30 minutes before you go outside. A 1-ounce application (a palmful of sunscreen) is recommended to cover the arms, legs, neck and face of the average adult. Protection is greatest when sunscreen is used thickly on all sun-exposed skin. To ensure continued protection, many sunscreens should be reapplied at least every 2 hours. Many sunscreens wash off when you sweat or swim and must be reapplied for maximum effectiveness. And don't forget your lips; lip balm with sunscreen is also available.

Some people use sunscreens in order to stay out in the sun longer without getting sunburned. Sunscreen should not be used to gain extra time in the sun, as you will still end up with damage to your skin.

It is important to remember that although sunscreens may help reduce your exposure to UV light, they will not prevent melanoma if you get too much exposure, particularly if you have other risk factors.

If you want a tan, try using a "sunless" tanning lotion. These can provide the look, without the danger. Sunless tanning lotions contain a substance called dihydroxyacetone (DHA). DHA works by interacting with proteins on the surface of the skin to produce color. You do not have to go out in the sun for these to work. The color tends to wear off after a few days.

Wear sunglasses

Wrap-around sunglasses with at least 99% UV absorption provide the best protection for the eyes and the skin area around the eyes. Look for sunglasses labeled as blocking UVA and UVB light. Labels that say "UV absorption up to 400 nm" or "Meets ANSI UV

Requirements" mean the glasses block at least 99% of UV rays. If there is no label, don't assume the sunglasses provide any protection.

Seek shade

Another way to limit exposure to UV light is to avoid being outdoors in sunlight too long. This is particularly important in the middle of the day between the hours of 10 am and 4 pm, when UV light is strongest. If you are unsure about the sun's intensity, take the shadow test: If your shadow is shorter than you, the sun's rays are the strongest. Plan activities out of the sun during these times. If you must be outdoors, protect your skin. Keep in mind that sunlight (and UV rays) can come through clouds, can reflect off water, sand, concrete, and snow, and can reach below the water's surface.

The UV index: The amount of UV light reaching the ground in any given place depends on a number of factors, including the time of day, time of year, elevation, and cloud cover. To help people better understand the intensity of UV light in their area on a given day, the National Weather Service and the US Environmental Protection Agency have developed the UV Index. It gives people an idea of how strong the UV light is in their area, on a scale from 1 to 11+. A higher number means a higher chance of sunburn, skin damage and ultimately skin cancers of all kinds. Your local UV Index should be available daily in your local newspaper, on TV weather reports, and online (www.epa.gov/sunwise/uvindex.html).

Protect children from the sun

Children require 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 measures described above. Older children need to be cautioned about sun exposure as they become more independent. It is important, particularly in parts of the world where it is sunnier, to cover your children as fully as is reasonable. You should develop the habit of using sunscreen on exposed skin for yourself and your children whenever you go outdoors and may be exposed to large amounts of sunlight.

Avoid other sources of UV light

Using tanning beds and sun lamps is hazardous because the UV radiation they deliver can be damaging to the skin. There is growing evidence that they may increase your risk of developing melanoma. This is an area of active research.

Researchers are finding that the rate of skin cancer in young people is increasing. One factor may be the use of indoor tanning facilities. Most skin doctors highly recommend not using tanning beds and sun lamps.

Sun exposure and vitamin D

Doctors are learning that vitamin D has many health benefits. It may even help to lower the risk for some cancers. Vitamin D is made naturally by your skin when you are in the sun. How much vitamin D is made depends on many things, including how old you are, how dark your skin is, and how intensely the sun shines where you live. At this time, doctors aren't sure what the optimal level of vitamin D is, or how best to balance the possible benefits of getting vitamin D from sunlight versus the possible risks of skin cancer. This is an area of very active research. For those with darker skin or who live in areas with little daily sunlight, an approach recommended by many experts is to take vitamin D by mouth, such as in supplements or certain foods. For example, most milk has vitamin D added.

For more information on how to protect yourself and your family from UV exposure, see the separate American Cancer Society document, *Skin Cancer Prevention and Early Detection*.

Identifying abnormal moles and having them removed

Certain types of moles have an increased risk of developing into a melanoma (see the section, "What are the risk factors for melanoma?"). Depending on the appearance of these moles, your doctor may want to watch them closely by regular exams or may remove them if they have certain features that suggest they may be changing into a melanoma.

Routine removal of many moles is not generally recommended as a way to prevent melanoma. Some melanomas may develop from moles, but most do not. If you have many moles, a careful, routine exam by your doctor or a dermatologist, along with monthly skin self-exams may be recommended.

If you find an unusual or changing mole, it should be checked by a doctor experienced in recognizing skin cancers. See the section, "Can melanoma be found early?" to learn how to recognize suspicious moles and melanoma.

Genetic counseling and testing

If several members of one side of your family have had melanoma, if you have had multiple melanomas, if you have had melanoma at a young age, or if you have dysplastic nevi, you may have a gene mutation that increases your risk of melanoma.

Genes such as CDKN2A (also known as p16) have been found to be mutated (changed) in some families with high rates of melanoma. Tests for these gene changes are now available, although they are not widely used by doctors at this time. People interested in learning whether they carry genes linked to melanoma may want to think about taking part in genetic research that will advance progress in this field.

Before getting any type of genetic testing, it's important to know ahead of time what the results may or may not tell you about your risk. Genetic testing is not perfect, and in some cases the tests may not be able to provide solid answers. This is why meeting with a genetic counselor before testing is crucial in deciding whether or not testing should be done.

Because it's not clear how useful the test results might be, most melanoma experts do not recommend genetic testing for people with a family history of melanoma at this time. Still, some people make the personal choice 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, and being particularly careful about sun safety.

Learning more about skin cancer prevention

Many organizations conduct skin cancer prevention activities in schools and recreational areas. Others develop brochures and public service announcements. For more information, refer to the section, "Additional resources."

Can melanoma be found early?

Melanoma can often be found early. Everyone can play an important role in finding skin cancer early, when it is curable.

Self-exam

It's important to check your own skin, preferably once a month. You should know the pattern of moles, blemishes, freckles, and other marks on your skin so that you'll notice any new moles or changes in moles already present. Self-exam is best done in a well-lit room in front of a full-length mirror. A hand-held mirror should be used for areas that are hard to see, such as the backs of your thighs.

All areas should be examined, including your palms and soles, scalp, ears, nails, and your back. (For a more thorough description of a skin self-exam, see the American Cancer Society documents, *Skin Cancer Prevention and Early Detection* and *Why You Should Know About Melanoma*.) Friends and family members can also help you with these exams, especially for those hard-to-see areas, such as your back. Be sure to show your doctor any area that concerns you and ask your doctor to look at areas that may be hard for you to see. In men, about 1 of every 3 melanomas occurs on the back.

Spots on the skin that are new or changing in size, shape, feel, or color should be evaluated promptly. Any unusual sore, lump, blemish, marking, or change in the way an area of the skin looks or feels may be a sign of skin cancer or a warning that it might occur. The skin might become scaly or crusty or begin oozing or bleeding. It may feel itchy, tender, or painful. Redness and swelling may develop.

Since moles may develop into melanoma or indicate an increased risk for melanoma, it is important to know the difference between melanoma and an ordinary mole. Sometimes this may be hard to tell, so show your doctor any mole that you are unsure of.

Exam by a health care professional

Part of a routine cancer-related checkup should include a skin exam by a health care professional qualified to diagnose skin cancer. Your doctor should be willing to discuss any concerns you might have about this exam.

Any suspicious lesions or unusual moles should be seen by your primary doctor or by a dermatologist, a doctor who specializes in skin problems. Many dermatologists use a technique called *dermatoscopy* or *epiluminescence microscopy (ELM)* to look at spots on the skin more clearly. (See the section, "How is melanoma diagnosed?" for more information.)

What to look for

Normal moles

A normal mole is usually an evenly colored brown, tan, or black spot on the skin. It can be either flat or raised. It can be round or oval. Moles are generally less than 6 millimeters (about ¼ inch) across (about the width of a pencil eraser). A mole can be present at birth, or it can appear during childhood or young adulthood. Several moles can appear at the same time, especially on areas of the skin exposed to the sun.

Once a mole has developed, it will usually stay the same size, shape, and color for many years. Moles may eventually fade away in older people.

Most people have moles, and almost all moles are harmless. But it is important to recognize changes in a mole that can suggest a melanoma may be developing.

Possible signs and symptoms of melanoma

The *ABCD rule* can help distinguish a normal mole from an abnormal mole or a melanoma. Moles that have any of these traits should be checked by your doctor.

Asymmetry: One half of the mole does not match the other half.

Border irregularity: The edges of the mole are irregular, ragged, blurred, or notched.

Color: The color of the mole is not the same all over. There may be differing shades of tan, brown, or black, and sometimes patches of pink, red, blue, or white.

Diameter: The mole is larger than 6 millimeters across (about ¼ inch or about the size of a pencil eraser), although melanomas can sometimes be smaller than this.

Another very important warning of melanoma is that a mole has been growing or changing its shape or color. Some melanomas do not fit the ABCD rule described above, so it is important to report changes in skin lesions, new skin lesions, any growths that look different from the rest of your moles, and any sores that don't heal.

How is melanoma diagnosed?

If an abnormal area of skin raises the possibility of skin cancer, certain medical exams and tests may be used to find out if it is melanoma, non-melanoma skin cancer, or some other skin condition. If melanoma is found, other tests may be done to determine if it has spread to other areas of the body.

Medical history and physical exam

Usually the first step is for your doctor to take your medical history. The doctor probably will ask your age, when the mark on the skin first appeared, and whether it has changed in size or appearance. You may also be asked about past exposures to known causes of skin cancer and whether anyone in your family has had skin cancer.

During the physical exam, your doctor will note the size, shape, color, and texture of the area(s) in question, and whether there is bleeding or scaling. The rest of your body will be checked for spots and moles that may be related to skin cancer.

The doctor may also feel the lymph nodes (small, bean shaped collections of immune cells) under the skin in the groin, underarm, or neck near the abnormal area. Enlarged lymph nodes might suggest that any melanoma present may have spread.

If you are being seen by your primary doctor and melanoma is suspected, you may be referred to a dermatologist, who will look at the area more closely.

Along with a standard physical exam, many dermatologists use a technique called *dermatoscopy* (also called epiluminescence microscopy [ELM] or surface microscopy) to see spots on the skin more clearly. This involves the use of a dermatoscope, which is a special magnifying lens and light source held near the skin. Sometimes a thin layer of oil is used with this instrument. A digital or photographic image of the spot may be taken. The use of these tests by experienced dermatologists can improve accuracy in finding melanomas early. It can also often reassure you that a lesion is benign (non-cancerous) without the need for a biopsy.

Skin biopsy

If the doctor thinks a melanoma might be present, he or she will take a sample of skin from the suspicious area for exam under a microscope. This is called a *skin biopsy*. Different methods can be used for a skin biopsy. The choice depends on the size of the affected area and its location on your body.

Skin biopsies are done using a local anesthetic (numbing medicine), which is injected into the area with a very small needle. You will likely feel a small prick and a little stinging as the medicine is injected, but should not feel any pain during it or during the biopsy.

Any biopsy is likely to leave a scar. Since different methods produce different types of scars, you should ask the doctor about biopsies and scarring before the procedure is done.

Incisional and excisional biopsies

If the doctor has to examine a tumor that may have grown into the deeper layers of the skin, he or she will perform an incisional or excisional biopsy. An incisional biopsy removes only a portion of the tumor. An excisional biopsy removes the entire tumor, and is usually the preferred method of biopsy for suspected melanomas. After numbing the area with a local

anesthetic, a surgical knife is used to cut through the full thickness of skin. A wedge or sliver of skin is removed for further examination, and the edges of the wound are sewn together.

Shave biopsy

For this type of biopsy, the doctor first numbs the area with a local anesthetic. The doctor then "shaves" off the top layers of the skin (the epidermis and the outer part of the dermis) with a surgical blade. A shave biopsy is useful in diagnosing many types of skin diseases and in sampling moles when the risk of melanoma is very low. But it is not generally recommended if a melanoma is suspected because a shave biopsy sample may not be thick enough to measure how deeply the melanoma has invaded the skin.

Punch biopsy

A punch biopsy removes a deeper sample of skin but is more limited in the diameter of the sample that can be taken. The doctor uses a tool that looks like a tiny round cookie cutter. Once the skin is numbed with a local anesthetic (numbing medicine), the doctor rotates the punch biopsy tool on the surface of the skin until it cuts through all the layers of the skin, including the dermis, epidermis, and the upper parts of the subcutis.

Examining the biopsy samples

All skin biopsy samples are looked at under a microscope. The skin sample is sent to a *pathologist*, a doctor who has been specially trained in the microscopic examination and diagnosis of tissue samples. Often, the sample is sent to a dermatopathologist, a doctor who has special training in making diagnoses from skin samples.

Biopsies of melanoma that has spread

Biopsies of areas other than the skin may be needed in some cases. For example, if melanoma has already been diagnosed in a skin lesion, biopsies of nearby lymph nodes may be done to see if the cancer has spread that far (or potentially farther).

In rare cases, biopsies may be needed to figure out what type of cancer someone has. Some melanomas may spread so quickly that they reach the lymph nodes, lungs, brain, or other areas while the original skin melanoma is still small. Sometimes these tumors are found before the skin lesion is discovered. In other cases they may be found long after a skin

melanoma has been removed, so it's not clear that it might be the same cancer. In still other cases, metastatic melanoma may be found without ever finding a skin lesion. This may be because some skin lesions go away on their own (without any treatment) after some of their cells have spread to other parts of the body. Melanoma can also start in internal organs, although this is quite rare, and if melanoma has spread extensively throughout the body, it may not be possible to tell which tumor was the first one.

When such spread has occurred, the metastatic melanoma in certain organs might be confused with a cancer starting in that organ. For example, melanoma that has spread to the lung might be confused with a primary lung cancer (cancer that starts in the lung).

Special tests can be done on the biopsy samples that can tell whether it is a melanoma or some other kind of cancer. This is important because different cancers are often given different treatments.

These types of biopsies may be more involved than those used to sample the skin.

Fine needle aspiration biopsy

A fine needle aspiration (FNA) biopsy is not used for diagnosis of a suspicious mole, but it may be used to biopsy large lymph nodes near a melanoma to find out if the melanoma has spread to them. This type of biopsy uses a syringe with a thin needle to remove very small tissue fragments from a tumor. The needle is smaller than the needle used for a blood test. A local anesthetic is sometimes used to numb the area first. This test rarely causes much discomfort and does not leave a scar.

Sometimes a computed tomography (CT) scan (a special type of x-ray; see below) is used to guide a needle into a suspicious lymph node deeper in the body or a tumor in an internal organ, such as the lung or liver. This test, called a CT-guided needle biopsy, can be used if the doctor suspects the melanoma has spread to these areas.

Surgical (excisional) lymph node biopsy

This procedure can be used to remove an enlarged lymph node through a small skin incision. Local anesthetic is generally used. This is often done if a lymph node's size suggests spread of melanoma but an FNA biopsy of the node did not find any melanoma cells.

Sentinel lymph node mapping and biopsy

This has become a common procedure to determine if melanoma has spread to the lymph nodes. This procedure can find the lymph nodes that drain lymph fluid from the area of the skin where the melanoma started. If the melanoma has spread, these lymph nodes are usually the first place it will go. That is why these lymph nodes are called sentinel nodes (they stand sentinel, or watch, over the tumor, so to speak).

To map the sentinel lymph node (or nodes), some time before surgery the doctor injects a small amount of radioactive material and usually a blue dye into the area of the melanoma. By checking various lymph node areas with a radioactivity detector (which works like a Geiger counter), the doctor can see what group of lymph nodes the melanoma is most likely to travel to. The surgeon makes a small incision in the identified lymph node area. The lymph nodes are then checked to find which one(s) turned blue or became radioactive. When the sentinel node has been found, it is removed and looked at under a microscope. If the sentinel node does not contain melanoma cells, no more lymph node surgery is needed because it is very unlikely the melanoma would have spread beyond this point. If melanoma cells are found in the sentinel node, the remaining lymph nodes in this area are removed and looked at as well. This is known as a lymph node dissection.

If a lymph node near a melanoma is abnormally large, the sentinel node procedure may not be needed. The enlarged node is simply biopsied.

Imaging tests

Imaging tests use x-rays, magnetic fields, or radioactive substances to create pictures of the inside of the body. They are used mainly to look for the possible spread of melanoma to lymph nodes or other organs in the body. They are not needed in people with very early-stage melanoma, which is very unlikely to have spread.

Chest x-ray

This test may be done to help determine whether melanoma has spread to the lungs.

Computed tomography (CT)

The CT scan is a type of x-ray test that produces detailed, cross-sectional images of your body. Unlike a regular x-ray, CT scans can show the detail in soft tissues (such as internal organs). This test can help tell if any lymph nodes or organs such as the liver are enlarged, which might be due to the spread of melanoma. It can also better identify spread to the lung than the standard chest x-ray.

Instead of taking one picture, as does a regular x-ray, a CT scanner takes many pictures as it rotates around you. A computer then combines these pictures into detailed images of the part of your body that is being studied.

You may receive an intravenous (IV) injection of a dye, or radiocontrast agent, which helps better outline structures in your body. You may also be asked to drink 1 to 2 pints of a solution of contrast material. This helps outline the intestine so that it is not mistaken for tumors if your doctor is looking for abnormal areas in your abdomen.

The IV injection of contrast dye can cause some flushing (a feeling of warmth, especially in the face). Some people are allergic and get hives or, rarely, more serious reactions like trouble breathing and low blood pressure. Be sure to tell the doctor if you have ever had a reaction to any contrast material used for x-rays.

CT scans take longer than regular x-rays. You need to lie still on a table while they are being done. During the test, the table moves in and out of the scanner, a ring-shaped machine that completely surrounds the table. You might feel a bit confined by the ring you have to lie in when the pictures are being taken.

In recent years, *spiral CT* (also known as helical CT) has become available in many medical centers. This type of CT scan uses a faster machine. The scanner part of the machine rotates around the body continuously, allowing doctors to collect the images much more quickly than with standard CT. This lowers the chance of "blurred" images occurring as a result of breathing motion. It also lowers the dose of radiation received during the test. The biggest advantage may be that the "slices" it images are thinner, which yields more detailed pictures and allows doctors to look at suspicious areas from different angles.

CT-guided needle biopsy: CT scans can also be used to guide a biopsy needle precisely into a suspected metastasis. For this procedure, the patient remains on the CT scanning table while a radiologist moves a biopsy needle through the skin and toward the location of the mass. CT scans are repeated until the needle is within the mass. A fine needle biopsy sample (tiny fragment of tissue) or a core needle biopsy sample (a thin cylinder of tissue about ½-inch long and less than 1/8-inch in diameter) is then removed to be looked at under a microscope.

Magnetic resonance imaging (MRI)

MRI scans use radio waves and strong magnets instead of x-rays. The energy from the radio waves is absorbed by the body and then released in a pattern formed by the type of body tissue and by certain diseases. A computer translates the pattern into a very detailed image of parts of the body. A contrast material might be injected, just as with CT scans, but is used less often.

MRI scans are very helpful in looking at the brain and spinal cord.

MRI scans take longer than CT scans -- often up to an hour. You may have to lie inside a narrow tube, which is confining and can upset people with a fear of enclosed spaces. Newer, "open" MRI machines can help with this if needed. The MRI machine makes loud buzzing noises that you may find disturbing. Some places provide headphones to block this out.

Positron emission tomography (PET)

PET scans involve injecting glucose (a form of sugar) that contains a radioactive atom into the blood. Because cancer cells in the body are growing rapidly, they absorb large amounts of the radioactive sugar. A special camera can then create a picture of areas of radioactivity in the body.

The picture is not finely detailed like a CT or MRI scan, but it provides helpful information. This test can be useful to see if the cancer has spread to lymph nodes. PET scans are also useful when your doctor thinks the cancer has spread but doesn't know to where. Doctors find it most useful in people with advanced stages of melanoma. It is not very helpful in people with early stage melanoma.

Some newer machines are able to perform both a PET and CT scan at the same time (PET/CT scan). This allows the radiologist to compare areas of higher radioactivity on the PET with the appearance of that area on the CT.

Bone scan

A bone scan is used to look for spread of cancer to the bones, but it is rarely used in melanoma. It is only done when other test results or symptoms suggest that the cancer may have spread to the bones.

For this test, the radiologist injects a slightly radioactive chemical into the bloodstream, which collects in the bones at sites of cancer or other areas where there is metabolic activity. You then lie on a table for about 30 minutes while a special camera detects the radioactivity and creates a picture of your skeleton. The images from these scans are seen as "hot spots" in the body, but they don't provide much detail. If an area lights up on the scan, x-rays of the affected area can be done to get a more detailed look. If melanoma is a possibility, a biopsy of the area may be needed to confirm this.

How is melanoma staged?

Staging is a process of finding out how widespread a cancer is. This includes describing its size as well as whether it has spread to the lymph nodes or any other organs. The tests described in the section, "How is melanoma diagnosed?" are the ones used to help determine the stage of the melanoma.

A staging system is a standard way of summarizing how far a cancer has spread. This helps members of the cancer care team to plan appropriate treatment and determine a patient's *prognosis* (outlook).

The American Joint Committee on Cancer (AJCC) TNM System

The system most often used to stage melanoma is the American Joint Commission on Cancer (AJCC) TNM system. Several tests and procedures are used to assign T, N, and M categories and a grouped stage. The TNM system for staging contains 3 key pieces of information:

- **T** stands for **tumor** (its size and how far it has spread within the skin). The T category is assigned a number (from 0 to 4) based on the tumor's thickness (how far down it has grown). It is also assigned a small letter "a" if it is not ulcerated or a "b" if it is ulcerated. Ulceration means the layer of skin covering the melanoma is absent. This is seen under a microscope after a biopsy.
- **N** stands for spread to nearby **lymph nodes** (small bean-shaped collections of immune system cells that help the body fight infections and cancers). The N category is assigned a number (from 0 to 3) based on whether the melanoma cells have spread to lymph nodes or are found in the lymphatic channels connecting the lymph nodes. It is also assigned a small letter: "a" if melanoma cells can only be seen with the microscope or "b" if they can be seen with the naked eye. A letter "c" is assigned if there are very small areas of melanoma in the nearby skin or if the melanoma is in skin lymphatic channels around the tumor (but not in the nodes themselves).
- The **M** category is based on whether the melanoma has **metastasized** (spread) to distant organs, which organs it has reached, and sometimes on blood levels of a substance called LDH.

There are actually 2 types of staging for melanoma:

- *Clinical staging* is done based on what is found on physical exam, biopsy of the melanoma, and any imaging tests that are done.

- *Pathologic staging* uses all of this information, plus what is found during biopsies of lymph nodes or other organs. Therefore, the clinical stage (determined before the node biopsy) may actually be lower than the pathologic stage (determined after the node biopsy).

T categories

The T category is based on the thickness of the melanoma seen in the skin biopsy. This is an important part of determining a patient's prognosis.

The pathologist looking at the skin biopsy measures the thickness of the melanoma under the microscope with a device called a micrometer, which is like a small ruler. This technique is called the *Breslow measurement*. The thinner the melanoma, the better the prognosis. In general, melanomas less than 1 millimeter (mm) in depth (about 1/25 of an inch or the diameter of a period or a comma) have a very small chance of spreading. As the melanoma becomes thicker, it has a greater chance of spreading.

Another system, called the *Clark level*, describes how far a melanoma has penetrated into the skin instead of actually measuring it. The Clark level of a melanoma uses a scale of I to V (with higher numbers indicating a deeper melanoma) to describe whether:

- the cancer stays in the epidermis (Clark level I)
- the cancer has begun to invade the upper dermis (Clark level II)
- the cancer involves most of the upper dermis (Clark level III)
- the cancer has reached the lower dermis (Clark level IV)
- the cancer has invaded to the subcutis (Clark level V)

The Breslow measurement of thickness is generally thought to be more useful than the Clark level of penetration in determining a patient's outlook. The thickness is easier to measure and depends less on the pathologist's judgment. But sometimes the Clark level shows that a melanoma is more advanced than doctors may think it is from the Breslow measurement. The Clark level is used to stage thin melanomas (T1; see below).

In either system, the melanoma tends to have a worse prognosis if the pathologist says it is *ulcerated* (outermost covering layer of skin is absent).

Using these systems, the possible values for T are:

TX: Primary tumor cannot be assessed.

T0: No evidence of primary tumor.

Tis: Melanoma in situ (Clark level I - it remains in the epidermis).

T1a: The melanoma is less than or equal to 1.0 mm thick (1.0 mm = 1/25 of an inch), without ulceration and Clark level II or III.

T1b: The melanoma is less than or equal to 1.0 mm thick, Clark level IV or V, or with ulceration.

T2a: The melanoma is between 1.01 and 2.0 mm thick without ulceration.

T2b: The melanoma is between 1.01 and 2.0 mm thick with ulceration.

T3a: The melanoma is between 2.01 and 4.0 mm thick without ulceration.

T3b: The melanoma is between 2.01 and 4.0 mm thick with ulceration.

T4a: The melanoma is thicker than 4.0 mm without ulceration.

T4b: The melanoma is thicker than 4.0 mm with ulceration.

N categories

The possible values for N depend on whether or not a sentinel lymph node biopsy was done.

The *clinical staging* of the lymph nodes is listed below; it is done without the sentinel node biopsy.

NX: Nearby (regional) lymph nodes cannot be assessed.

N0: No spread to nearby lymph nodes.

N1: Spread to 1 nearby lymph node.

N2: Spread to 2 or 3 nearby lymph nodes, OR spread of melanoma to nearby skin or toward a nearby lymph node area (without reaching the lymph nodes).

N3: Spread to 4 or more lymph nodes, OR spread to lymph nodes that are clumped together, OR spread of melanoma to nearby skin or toward a lymph node area and into the lymph node(s).

Following a lymph node biopsy, the *pathologic stage* can be determined. The involvement of any lymph nodes can be subdivided as follows:

- Any Na (N1a, N2a, etc.) means that the melanoma in the lymph node is only seen under the microscope.
- Any Nb (N1b, N2b, etc.) means that the melanoma in the lymph node is visible to the naked eye.
- N2c means the melanoma has spread to very small areas of nearby skin (satellite tumors) or has spread to skin lymphatic channels around the tumor (without reaching the lymph nodes).

M Categories

The M values are:

MX: Presence of distant metastasis cannot be assessed.

M0: No distant metastasis.

M1a: Distant metastases to skin or subcutaneous (below the skin) tissue or distant lymph nodes.

M1b: Metastases to lung.

M1c: Metastases to other organs, OR distant spread to any site along with an elevated blood LDH level.

Stage grouping

Using the TNM system, a doctor will use each letter (T, N, and M) and a corresponding number. For example, a melanoma could be staged as T2, N0, M0.

To make this information somewhat clearer, several of these TNM descriptions can be grouped together into a simpler set of stages, labeled stage 0 through stage IV. This process is called *stage grouping*. The stage is described using 0 and Roman numerals from I to IV, and is sometimes subdivided using capital letters. In general, patients with lower stage cancers have a better outlook for a cure or long-term survival.

Stage 0

Tis, N0, M0: The melanoma is in situ, meaning that it involves the epidermis but has not spread to the dermis (lower layer). This is also called Clark level I.

Stage IA

T1a, N0, M0: The melanoma is less than 1.0 mm in thickness and Clark level II or III. It is not ulcerated, appears to be localized in the skin, and has not been found in lymph nodes or distant organs.

Stage IB

T1b or T2a, N0, M0: The melanoma is less than 1.0 mm in thickness and is ulcerated or Clark level IV or V, or it is between 1.01 and 2.0 mm and is not ulcerated. It appears to be localized in the skin and has not been found in lymph nodes or distant organs.

Stage IIA

T2b or T3a, N0, M0: The melanoma is between 1.01 mm and 2.0 mm in thickness and is ulcerated, or it is between 2.01 and 4.0 mm and is not ulcerated. It appears to be localized in the skin and has not been found in lymph nodes or distant organs.

Stage IIB

T3b or T4a, N0, M0: The melanoma is between 2.01 mm and 4.0 mm in thickness and is ulcerated, or it is thicker than 4.0 mm and is not ulcerated. It appears to be localized in the skin and has not been found in lymph nodes or distant organs.

Stage IIC

T4b, N0, M0: The melanoma is thicker than 4.0 mm and is ulcerated. It appears to be localized in the skin and has not been found in lymph nodes or distant organs.

Stage IIIA

T1a-4a, N1a or N2a, M0: The melanoma is not ulcerated. It has spread to 1-3 lymph nodes near the affected skin area, but the nodes are not enlarged and the melanoma is found only when they are viewed under the microscope. There is no distant spread. The thickness of the melanoma is not a factor, although it is usually thick in people with stage III melanoma.

Stage IIIB

T1b-4b, N1a or N2a, M0: The melanoma is ulcerated. It has spread to 1-3 lymph nodes near the affected skin area, but the nodes are not enlarged and the melanoma is found only when they are viewed under the microscope. There is no distant spread.

T1a-4a, N1b or N2b, M0: The melanoma is not ulcerated. It has spread to 1-3 lymph nodes near the affected skin area. The nodes are enlarged because of the melanoma. There is no distant spread.

T1a/b-4a/b, N2c, M0: The melanoma can be ulcerated or not. It has spread to small areas of nearby skin or lymphatic channels around the original tumor, but the nodes do not contain melanoma. There is no distant spread.

Stage IIIC

T1b-4b, N1b or N2b, M0: The melanoma is ulcerated. It has spread to 1 to 3 lymph nodes near the affected skin area. The nodes are enlarged because of the melanoma. There is no distant spread.

Any T, N3, M0: The melanoma can be ulcerated or not. It has spread to 4 or more nearby lymph nodes, OR to nearby lymph nodes that are clumped together, OR it has spread to

nearby skin or lymphatic channels around the original tumor and to nearby lymph nodes. The nodes are enlarged because of the melanoma. There is no distant spread.

Stage IV

Any T, Any N, M1: The melanoma has spread beyond the original area of skin and nearby lymph nodes to other organs such as the lung, liver, or brain, or to distant areas of the skin or lymph nodes. Neither the lymph node status nor thickness is considered, but typically the melanoma is thick and has also spread to lymph nodes.

Survival rates by stage

The stage of the melanoma has a major effect on a person's outlook for survival. The following survival rates are based on a study of more than 40,000 patients who were diagnosed between 1988 and 2001.

There are some important points to note about these numbers:

- The *5-year and 10-year survival rates* refer to the percentage of patients who live *at least 5 or 10 years* after being diagnosed. Many of these patients live much longer than this.
- While these numbers are among the most current we have available, they represent people who were first diagnosed and treated many years ago. Improvements in treatment since then mean the survival rates for people now being diagnosed may be higher.
- There are ranges of survival rates within some of the stages because they include different T and N categories. Even within a stage, those with less advanced disease are likely to have a better prognosis.
- While survival statistics can sometimes be useful as a general guide, they may not accurately represent any one person's prognosis. A number of other factors, including other tumor characteristics and a person's age and general health, can also affect outlook. Your doctor is likely to be a good source as to whether these numbers may apply to you, as he or she is familiar with the aspects of your particular situation.

Stage IA: The 5-year survival rate is around 99%. The 10-year survival is around 97%.

Stage IB: The 5-year survival rate is around 92%. The 10-year survival is around 86%.

Stage IIA: The 5-year survival rate is around 78%. The 10-year survival is around 66%.

Stage IIB: The 5-year survival rate is around 68%. The 10-year survival is around 59%

Stage IIC: The 5-year survival rate is around 56%. The 10-year survival is around 48%

Stage IIIA: This was a new stage when the study was done, so 5- and 10-year survival rates were not available for this group. The rates would most likely fall in between the stages above and below.

Stage IIIB: The 5-year survival rate ranges from around 50% to around 68%. The 10-year survival ranges from around 44% to around 60%.

Stage IIIC: The 5-year survival rate ranges from around 27% to around 52%. The 10-year survival ranges from around 22% to around 37%.

Stage IV: The 5-year survival rate for stage IV melanoma is about 18%. The 10-year survival is 14%. It is higher if the spread is to skin or distant lymph nodes rather than to other organs.

Other factors affecting survival

Other factors aside from stage may also affect survival. For example, stage for stage, older people generally have shorter survivals. The biggest drop begins at age 70. Recent reports also show that when melanoma occurs in African Americans, although uncommon, survival is shorter than when it occurs in whites. Some studies have shown that melanoma is more serious if it occurs on a foot, palm, or nail bed. People with HIV infection and melanoma also are at greater risk of dying of their melanoma.

How is melanoma treated?

This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.

The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor.

Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

This section starts with general comments about the types of treatments used for melanoma of the skin. This is followed by a discussion of the typical treatment options based on the stage of the melanoma.

Once melanoma has been diagnosed and staged, your cancer care team will recommend one or more treatment options. It is important to consider the options carefully. If there is anything you do not understand, ask to have it explained. The treatment options depend largely on the thickness of the primary tumor and the stage of the disease.

Surgery

Surgery is the main treatment option for most cases of melanoma, and is usually curative for early stage melanomas.

Simple excision

Thin melanomas can be completely cured by a fairly minor surgery called simple excision. The tumor is cut out, along with a small amount of normal non-cancerous skin at the edges. The normal, healthy skin around the edges of the cancer is referred to as the *margin*.

Simple excision differs from an excisional biopsy. The margins are wider because the diagnosis is already known. The margins should be anywhere from 0.5 centimeters (cm) (about ¼ inch) to nearly an inch depending on the thickness of the tumor. Thicker tumors call for larger margins.

Tumor thickness	Recommended margins
In situ	0.5 cm
Less than 1 mm	1 cm
1 to 2 mm	1 to 2 cm
2 to 4 mm	2 cm
Over 4 mm	At least 2 cm

Local anesthesia is injected into the area to numb it before the excision. The wound is carefully stitched back together afterwards. This will leave a scar.

Re-excision (wide excision)

When a diagnosis of melanoma is made by biopsy, the site will likely need to be excised again. More skin will be cut away from the melanoma site, and the sample will be viewed

under a microscope to make sure that no cancer cells remain in the skin. The size of the margin depends on the thickness of the tumor (see the table above).

If the melanoma is on the face, the margins may be smaller to avoid disfigurement. In some cases, the surgeon may use Mohs surgery (although not all doctors agree on its use for melanoma). In this procedure, the skin (including the melanoma) is removed layer by layer. Each layer is viewed under a microscope for signs of cancer. The operation continues until a layer shows no signs of cancer. In theory, this allows the surgeon to remove as much of the cancer as possible while conserving the surrounding skin tissue.

Amputation

If the melanoma is on a finger or toe, the treatment may mean amputation of all or part of that digit. At one time, some melanomas of the arms and legs were also treated by amputation, but this is no longer done. Studies have shown that wide excision of arm and leg melanomas is as effective as amputation.

Lymph node dissection

A lymph node dissection surgically removes the lymph nodes in the region most likely to contain any spreading melanoma cells. (For example, if a skin melanoma is found on a leg, lymph node dissection would remove the nodes in the groin region on that side of the body, which is where melanoma cells would most likely travel to.) The nodes are then viewed under a microscope to see how many of them contain cancer.

Once the diagnosis of melanoma is made from the skin biopsy, the doctor will examine the lymph nodes nearest the melanoma. Depending on the thickness of the melanoma, this may be done by physical exam and/or by imaging tests to look at nodes that are not near the surface.

If the nearby lymph nodes feel abnormally hard or large, and a fine needle aspiration biopsy finds melanoma in a node or nodes, a lymph node dissection is usually done.

If the lymph nodes are not enlarged, then a sentinel lymph node biopsy may be done, particularly if the melanoma is thicker than 1 mm. (See the section, "How is melanoma diagnosed?" for a description of this procedure.) If the sentinel lymph node does not show cancer, then it is unlikely the melanoma has spread to the lymph nodes and there is no need for a lymph node dissection. If the sentinel lymph node is positive for cancer, removal of the remaining lymph nodes in that area is usually advised.

Although clinical trials are in progress, doctors do not know whether finding and removing lymph nodes that may have cancer cells is life-saving. Still, some doctors feel it may prolong a patient's survival and at least avoid the pain that may be caused by cancer growing in these lymph nodes. Its main benefit at this point is to help determine a patient's outlook.

A full lymph node dissection can cause some upsetting long-term side effects. One of the most troublesome is called lymphedema. Lymph nodes in the groin or under the arm normally help drain fluid from the limbs. If they are removed, fluid may build up, leading to limb swelling, which may or may not go away over time. Elastic stockings or compression sleeves can help some people with this condition. Sometimes special devices that squeeze the limbs are used and may be helpful. For more information, see the separate American Cancer Society document, *Understanding Lymphedema (For Cancers Other Than Breast Cancer)*.

Lymphedema, along with the pain from the surgery itself, is why lymph node dissection is not done unless the doctor thinks it is necessary. Sentinel lymph node biopsy, however, is unlikely to have this effect. It is important to discuss the possible risks of side effects with your doctor before having these procedures done.

Surgery for metastatic melanoma

Once melanoma has spread from the skin to distant organs such as the lungs or brain, the cancer is very unlikely to be curable by surgery. Even when only 1 or 2 metastases are found by imaging tests such as CT or MRI scans, other areas of metastasis are likely to be present that are too small to be found by these scans. Surgery is sometimes done in these circumstances, although the goal is usually to try to control the cancer rather than to cure it. If 1 or even a few metastases are present and can be completely removed, this surgery may help some patients to live longer. Removing metastases in some areas, such as the brain, might also relieve symptoms and help improve the patient's quality of life.

Chemotherapy

Chemotherapy uses drugs that kill cancer cells. Systemic chemotherapy uses anti-cancer drugs that are usually injected into a vein or given by mouth. These medicines travel through the bloodstream to all parts of the body (the reason it is called systemic) and attack cancer cells that have already spread beyond the skin to involve lymph nodes and other organs.

Chemotherapy drugs work by attacking cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow, the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemotherapy, which can lead to side effects.

The side effects of chemotherapy depend on the type and dose of drugs given and the length of time they are taken. These side effects may include:

- hair loss
- mouth sores
- loss of appetite
- nausea and vomiting
- lowered resistance to infection (due to low white blood cell counts)
- easy bruising or bleeding (due to low blood platelets)
- fatigue (due to low red blood cells)

These side effects are usually short-term and go away once treatment is finished.

Be sure to talk with your cancer care team about any side effects you have because there are often ways to lessen them. For example, drugs can be given to help prevent or reduce nausea and vomiting.

Several types of systemic chemotherapy can be used to treat advanced melanoma. Although chemotherapy is usually not as effective in melanoma as in some other types of cancer, it may relieve symptoms or extend survival for some patients.

Several chemotherapy drugs may be used to treat melanoma:

- Dacarbazine (also called DTIC), may be used either alone or in combination with other chemotherapy drugs such as carmustine (also known as BCNU) and cisplatin. The combination of these 3 drugs, together with tamoxifen (a hormonal therapy drug) is called the "Dartmouth regimen."
- Cisplatin, vinblastine, and DTIC is another chemotherapy combination for treating melanoma. This is known as the "CVD regimen."
- Temozolomide (Temodar) is a drug that works similar to DTIC, but it can be given in the form of a pill. It may be given by itself, although some studies have shown the drug to be more effective when combined with interferon.
- Paclitaxel is a drug sometimes used to treat melanoma, either alone or combined with drugs such as cisplatin or carboplatin.

It is not clear if using combinations of chemotherapy drugs is much better than using a single drug. Some studies have found that combining chemotherapy drugs with 1 or more immunotherapy drugs (interferon-alpha and/or interleukin-2) may be more effective than a single chemotherapy drug alone, although it's not clear if this helps people live longer. This type of treatment is also called *biochemotherapy* or *chemoimmunotherapy*.

Isolated limb perfusion is a type of chemotherapy sometimes used to treat advanced melanomas confined to an arm or leg. It is done during a surgical procedure. Instead of giving chemotherapy into a vein and letting it go throughout the body, this method temporarily separates the blood flow of the involved limb from the rest of the body and injects high doses of chemotherapy into the artery feeding the limb. This allows high doses to be given to the area of the tumor without exposing internal organs to these doses, which would otherwise cause severe side effects. Usually the chemotherapy fluid is warmed before being given, which may help make it work better. Melphalan is the chemotherapy drug most often used in this procedure.

Immunotherapy

Immunotherapy enhances and encourages a patient's own immune system to recognize and destroy cancer cells more effectively. Several types of immunotherapy can be used in treating patients with advanced melanoma.

Cytokines for advanced melanoma

Cytokines are proteins that boost the immune system in a general way. Two man-made versions of natural cytokines, interferon-alpha and interleukin-2 (IL-2), are sometimes used in patients with melanoma. They are given as intravenous (IV) infusions, at least at first. Some patients or caregivers may be able to learn how to give injections under the skin at home. Both drugs can help shrink advanced (stage III and IV) melanomas in about 10% to 20% of patients when used alone. These drugs may also be given as part of a biochemotherapy regimen for stage IV melanoma.

Side effects of cytokine therapy may include fever, chills, aches, severe tiredness, drowsiness, and low blood cell counts. Interleukin-2, particularly in high doses, can cause fluid to build up in the body so that the person swells up and can feel quite sick. Some patients may need to be hospitalized because of this problem.

Interferon-alpha as adjuvant therapy

Patients with deeper melanomas often have cancer cells that travel to other parts of the body. Even after all apparent cancer has been removed by surgery, some of these cells may remain. Interferon-alpha can be used as an *adjuvant* (added) therapy after surgery to try to prevent these cells from spreading and growing. This may delay the recurrence of melanoma. It is not yet clear if adjuvant interferon improves survival.

In order for the interferon to be effective, high doses must be used. But many patients cannot tolerate the side effects of high-dose therapy. These can include fever, chills, aches, depression, severe tiredness, and effects on the heart and liver. Patients getting this drug should be followed by an oncologist who is experienced with this treatment.

Decisions about adjuvant therapy by patients and their doctors should take into account the potential benefits and side effects of this treatment.

Melanoma vaccines

Vaccines directed at melanoma are experimental therapies that do not yet have proven benefit. They are, in some ways, similar to the vaccines used to prevent diseases such as polio, measles, and mumps that are caused by viruses. Such vaccines usually contain weakened viruses or parts of a virus that cannot cause the disease. The vaccine stimulates the body's immune system to destroy the more harmful type of virus.

In the same way, killed melanoma cells or parts of cells (called antigens) can be injected into a patient as a vaccine in an attempt to stimulate the body's immune system to destroy other melanoma cells in the body. Usually, the cells or antigens are mixed with other substances that help stimulate the body's immune system as a whole. But unlike vaccines that are meant to prevent infections, these vaccines are meant to treat an existing disease.

Making a vaccine against a tumor such as melanoma has proven to be harder than making a vaccine to fight a virus. Clinical trials are in progress to test the value of treating advanced melanoma patients with vaccines, sometimes combined with cytokine therapy as well. The results of these studies have been mixed so far, but newer vaccines may hold more promise.

Bacille Calmette-Guerin (BCG) vaccine

BCG is a bacterium that is related to the germ that causes tuberculosis. Unlike its bacterial "cousin," BCG does not cause serious disease in humans, but it does activate the immune system. The BCG vaccine works more like a cytokine, enhancing the entire immune system, rather than the melanoma vaccines described above that are directed specifically at melanoma cells. It is sometimes used to help treat stage III melanomas by injecting it directly into tumors.

Imiquimod cream

Imiquimod is a drug that, when applied as a cream, stimulates a local immune response against skin cancer cells. For very early (stage 0) melanomas in sensitive areas on the face, some doctors may use imiquimod if surgery might be disfiguring. Still, not all doctors agree on whether it should be used for melanoma.

The cream is applied anywhere from once a day to 2 times a week for around 3 months. Some people may have serious skin reactions to this drug. Imiquimod is not used for more advanced melanomas.

Radiation therapy

Radiation therapy uses high-energy rays or particles to kill cancer cells. External beam radiation therapy focuses radiation from outside the body on the skin tumor. This type of radiation therapy is used for treating some patients with melanoma.

Radiation therapy is not often used to treat the original melanoma that started on the skin. In some cases, it may be given as an adjuvant to surgery in the area where lymph nodes were removed, especially if many of the nodes were found to contain cancer. It may also be used to treat melanoma that has come back, either in the skin or lymph nodes, after surgery. Radiation therapy may also be used to treat distant spread.

Perhaps the main role of radiation therapy for melanoma is palliation (relief of symptoms) of metastases to the brain or bone. Palliative radiation therapy is not expected to cure the cancer, but it may help shrink it for a time to control some of the symptoms.

Clinical trials

You have had to make a lot of decisions since you've been told you have cancer. One of the most important decisions you will make is deciding which treatment is best for you. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you. Clinical trials are one way to get state-of-the-art cancer care. Still, they are not right for everyone.

Here we will give you a brief review of clinical trials. Talking to your health care team, your family, and your friends can help you make the best treatment choice for you.

What are clinical trials?

Clinical trials are carefully controlled research studies that are done with patients. These studies test whether a new treatment is safe and how well it works in patients, or they may test new ways to diagnose or prevent a disease. Clinical trials have led to many advances in cancer prevention, diagnosis, and treatment.

The purpose of clinical trials

Clinical trials are done to get a closer look at promising new treatments or procedures in patients. A clinical trial is only done when there is good reason to believe that the treatment, test, or procedure being studied may be better than the one used now. Treatments used in clinical trials are often found to have real benefits and may go on to become tomorrow's standard treatment.

Clinical trials can focus on many things, such as:

- new uses of drugs that are already approved by the US Food and Drug Administration (FDA)
- new drugs that have not yet been approved by the FDA
- non-drug treatments (such as radiation therapy)
- medical procedures (such as types of surgery)
- herbs and vitamins
- tools to improve the ways medicines or diagnostic tests are used
- medicines or procedures to relieve symptoms or improve comfort
- combinations of treatments and procedures

Researchers conduct studies of new treatments to try to answer the following questions:

- Is the treatment helpful?
- What's the best way to give it?
- Does it work better than other treatments already available?
- What side effects does the treatment cause?
- Are there more or fewer side effects than the standard treatment used now?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

Phases of clinical trials

There are 4 phases of clinical trials, which are numbered I, II, III, and IV. We will use the example of testing a new cancer treatment drug to look at what each phase is like.

Phase I clinical trials: The purpose of a phase I study is to find the best way to give a new treatment safely to patients. The cancer care team closely watches patients for any harmful side effects.

For phase I studies, the drug has already been tested in lab and animal studies, but the side effects in patients are not fully known. Doctors start by giving very low doses of the drug to the first patients and increase the doses for later groups of patients until side effects appear or the desired effect is seen. Doctors are hoping to help patients, but the main purpose of a phase I trial is to test the safety of the drug.

Phase I clinical trials are often done in small groups of people with different cancers that have not responded to standard treatment, or that keep coming back (recurring) after treatment. If a drug is found to be reasonably safe in phase I studies, it can be tested in a phase II clinical trial.

Phase II clinical trials: These studies are designed to see if the drug works. Patients are given the best dose as determined from phase I studies. They are closely watched for an effect on the cancer. The cancer care team also looks for side effects.

Phase II trials are often done in larger groups of patients with a specific cancer type that has not responded to standard treatment. If a drug is found to be effective in phase II studies, it can be tested in a phase III clinical trial.

Phase III clinical trials: Phase III studies involve large numbers of patients -- most often those who have just been diagnosed with a specific type of cancer. Phase III clinical trials may enroll thousands of patients.

Often, these studies are randomized. This means that patients are randomly put in one of two (or more) groups. One group (called the control group) gets the standard, most accepted treatment. Another group (or more than one group) gets the new treatment being studied. All patients in phase III studies are closely watched. The study will be stopped early if the side effects of the new treatment are too severe or if one group has much better results than the others.

Phase III clinical trials are usually needed before the FDA will approve a treatment for use by the general public.

Phase IV clinical trials: Once a drug has been approved by the FDA and is available for all patients, it is still studied in other clinical trials (sometimes referred to as phase IV studies). This way more can be learned about short-term and long-term side effects and safety as the drug is used in larger numbers of patients with many types of diseases. Doctors can also learn more about how well the drug works, and if it might be helpful when used in other ways (such as in combination with other treatments).

What it will be like to be in a clinical trial

If you are in a clinical trial, you will have a team of experts taking care of you and watching your progress very carefully. Depending on the phase of the clinical trial, you may receive more attention (such as having more doctor visits and lab tests) than you would if you were treated outside of a clinical trial. Clinical trials are specially designed to pay close attention to you.

However, there are some risks. No one involved in the study knows in advance whether the treatment will work or exactly what side effects will occur. That is what the study is designed to find out. While most side effects go away in time, some may be long-lasting or even life threatening. Keep in mind, though, that even standard treatments have side effects. Depending on many factors, you may decide to enter (enroll in) a clinical trial.

Deciding to enter a clinical trial

If you would like to take part in a clinical trial, you should begin by asking your doctor if your clinic or hospital conducts clinical trials. There are requirements you must meet to take part in any clinical trial. But whether or not you enter (enroll in) a clinical trial is completely up to you.

Your doctors and nurses will explain the study to you in detail. They will go over the possible risks and benefits and give you a form to read and sign. The form says that you understand the clinical trial and want to take part in it. This process is known as giving your informed consent. Even after reading and signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason. Taking part in a clinical trial does not keep you from getting any other medical care you may need.

To find out more about clinical trials, talk to your cancer care team. Here are some questions you might ask:

- Is there a clinical trial that I could take part in?
- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do? Has it been used before?
- Will I know which treatment I receive?
- What is likely to happen in my case with, or without, this new treatment?
- What are my other choices and their pros and cons?
- How could the study affect my daily life?
- What side effects can I expect from the study? Can the side effects be controlled?
- Will I have to stay in the hospital? If so, how often and for how long?
- Will the study cost me anything? Will any of the treatment be free?

- If I am harmed as a result of the research, what treatment would I be entitled to?
- What type of long-term follow-up care is part of the study?
- Has the treatment been used to treat other types of cancers?

How can I find out more about clinical trials that might be right for me?

The American Cancer Society offers a clinical trials matching service for patients, their family, and friends. You can reach this service at 1-800-303-5691 or on our Web site at <http://clinicaltrials.cancer.org>.

Based on the information you give about your cancer type, stage, and previous treatments, this service can put together a list of clinical trials that match your medical needs. The service will also ask where you live and whether you are willing to travel so that it can look for a treatment center that you can get to.

You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials Web site at www.cancer.gov/clinicaltrials.

For even more information on clinical trials, the American Cancer Society has a document called *Clinical Trials: What You Need to Know*. You can read this on the Web site, www.cancer.org, or have it sent to you by calling 1-800-ACS-2345.

Complementary and alternative therapies

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that are different from mainstream (standard) medical treatment. These methods can include vitamins, herbs, and special diets, or methods such as acupuncture or massage -- among many others. You may have a lot of questions about these treatments. Here are some you may have thought of already:

- How do I know if a non-standard treatment is safe?
- How do I know if it works?
- Should I try one or more of these treatments?
- What does my doctor know/think about these methods? Should I tell the doctor that I'm thinking about trying them?
- Will these treatments cause a problem with my standard medical treatment?
- What is the difference between "complementary" and "alternative" methods?
- Where can I find out more about these treatments?

The terms can be confusing

Not everyone uses these terms the same way, so it can be confusing. The American Cancer Society uses *complementary* to refer to medicines or methods that are used *along with* your regular medical care. *Alternative* medicine is a treatment used *instead of* standard medical treatment.

Complementary methods: Complementary treatment methods, for the most part, are not presented as cures for cancer. Most often they are used to help you feel better. Some methods that can be used in a complementary way are meditation to reduce stress, acupuncture to relieve pain or peppermint tea to relieve nausea. There are many others. Some of these methods are known to help, while others have not been tested. Some have been proven not to be helpful. A few have even been found harmful. However, some of these methods may add to your comfort and well-being.

There are many complementary methods that you can safely use right along with your medical treatment to help relieve symptoms or side effects, to ease pain, and to help you enjoy life more. For example, some people find methods such as aromatherapy, massage therapy, meditation, or yoga to be useful.

Alternative treatments: Alternative treatments are those that are used instead of standard medical care. These treatments have not been proven safe and effective in clinical trials. Some of these methods may even be dangerous and some have life-threatening side effects. The biggest danger in most cases is that you may lose the chance to benefit from standard treatment. Delays or interruptions in your standard medical treatment may give the cancer more time to grow.

Deciding what to do

It is easy to see why people with cancer may consider alternative methods. You want to do all you can to fight the cancer. Sometimes mainstream treatments such as chemotherapy can be hard to take, or they may no longer be working.

Sometimes people suggest that their method can cure your cancer without having serious side effects, and it's normal to want to believe them. But the truth is that most non-standard methods of treatment have not been tested and proven to be effective for treating cancer.

As you consider your options, here are 3 important steps you can take:

- Talk to your doctor or nurse about any method you are thinking about using.
- Check the list of "red flags" below.

- Contact the American Cancer Society at 1-800-ACS-2345 to learn more about complementary and alternative methods in general and to learn more about the specific methods you are thinking about.

Red flags

You can use the questions below to spot treatments or methods to avoid. A "yes" answer to any one of these questions should raise a "red flag."

- Does the treatment promise a cure for all or most cancers?
- Are you told not to use standard medical treatment?
- Is the treatment or drug a "secret" that only certain people can give?
- Does the treatment require you to travel to another country?
- Do the promoters attack the medical or scientific community?

The decision is yours

Decisions about how to treat or manage your cancer are always yours to make. If you are thinking about using a complementary or alternative method, be sure to learn about the method and talk to your doctor about it. With reliable information and the support of your health care team, you may be able to safely use the methods that can help you while avoiding those that could be harmful.

Treatment of melanoma by stage

The type of treatment(s) your doctor recommends will depend on the stage of the melanoma and on your overall health. This section lists the options usually considered for each stage of melanoma.

Stage 0

Stage 0 melanomas have not grown deeper than the epidermis. They are usually treated by surgically removing the melanoma and a margin of about 1/2 cm (about 1/5 inch) of normal skin. For melanomas in sensitive areas on the face, some doctors may use a cream containing the drug imiquimod (Aldara) if surgery might be disfiguring, although not all doctors agree with this use.

Stage I

Stage I melanoma is treated by surgically removing the melanoma as well as a margin of normal skin. The amount of normal skin removed depends on the thickness of the melanoma. When the thickness is less than 1 mm, wide excision with 1 cm (2/5 inch) margins is recommended. For stage I melanomas between 1 mm and 2 mm thick, the tumor and 1 cm to 2 cm (4/5 inch) of surrounding skin are removed. No more than 2 cm of normal skin needs to be removed from all sides of the melanoma in stage I. Wider margins make healing more difficult and have not been found to help people live longer.

Some doctors may recommend a sentinel lymph node biopsy, especially if the melanoma is stage IB or has other characteristics that makes spread to the lymph nodes more likely. This is an option that you and your doctor should discuss. Routine lymph node dissection (removal of lymph nodes near the cancer) has not been shown to improve survival in patients with stage I melanoma.

Stage II

Wide excision is the standard treatment for stage II melanoma. If the melanoma is between 1 mm and 2 mm thick, a margin 1 to 2 cm of normal skin will be removed as well. If it is thicker than 2 mm, about 2 cm of normal skin will be removed from around the tumor site.

Because the melanoma may have spread to lymph nodes near the melanoma, many doctors recommend a sentinel lymph node biopsy as well. This is an option that you and your doctor should discuss. If the sentinel node(s) is found, then it will be biopsied along with removing the melanoma. If the sentinel node contains cancer, then a lymph node dissection (where all the lymph nodes in that area are surgically removed) will be done at a later date.

In certain cases (such as if the tumor is found to be more than 4 mm thick or if lymph nodes contain cancer), some doctors may advise *adjuvant therapy* (additional treatment after surgery) with interferon. Other drugs or perhaps vaccines may also be recommended as part of a clinical trial to try to reduce the chance the melanoma will come back.

Stage III

Surgical treatment for stage III melanoma usually requires lymph node dissection, along with wide excision of the primary tumor as in stage II. Adjuvant therapy with interferon may help some patients with stage III melanomas fight off recurrence longer.

If several melanomas are present, they should all be removed. If this is not possible, injections of bacille Calmette-Guerin (BCG) vaccine or interleukin-2 directly into the melanoma is a treatment option. For melanomas on an arm or leg, another possible option is to infuse the limb with a heated solution of the chemotherapy drug melphalan. In some cases, radiation therapy may be given as an adjuvant to surgery in the area where lymph nodes were removed, especially if many of the nodes were found to contain cancer. Other possible treatments include chemotherapy, immunotherapy with cytokines, or both combined (biochemotherapy).

Newer treatments being tested in clinical trials may benefit some patients. Many patients will not be cured with current treatments for stage III melanoma, so they may want to think about being in a clinical trial.

Stage IV

Stage IV melanomas are very hard to treat, as they have already spread to distant lymph nodes or other areas of the body. Skin tumors or lymph node metastases causing symptoms can often be removed by surgery. Metastases to internal organs are sometimes removed, depending on how many are present, where they are located, and how likely they are to cause symptoms. Metastases that cause symptoms but cannot be removed surgically may be treated with radiation or chemotherapy.

The chemotherapy drugs in use at this time are of limited value in most people with stage IV melanoma. Dacarbazine (DTIC) and temozolomide (Temodar) are the ones most often used, either by themselves or combined with other drugs. Even when chemotherapy can shrink these cancers, the effect is often only temporary, with an average time of 3 to 6 months before the cancer starts growing again. In rare cases they are effective for longer periods of time, however.

Immunotherapy using interferon or interleukin-2 can help a small number of patients with stage IV melanoma live longer. Higher doses of these drugs seem to be more effective, but they also have more severe side effects.

Many doctors recommend biochemotherapy -- a combination of chemotherapy and either interleukin-2, interferon, or both. For example, some doctors are combining interferon with temozolomide. The 2 drugs combined cause more tumor shrinkage, which may make patients feel better, although the combination has not been shown to help patients live longer. Another drug combination uses low doses of interferon, interleukin and temozolomide. Each seems to benefit some patients. Patients should carefully consider the possible benefits and side effects of any recommended treatment before starting.

Because stage IV melanoma is very hard to treat with current therapies, patients may want to think about taking part in a clinical trial. Clinical trials of new chemotherapy drugs, new

methods of immunotherapy or vaccine therapy, and combinations of different types of treatments may benefit some patients.

Even though the outlook for patients with stage IV melanoma tends to be poor overall, a small number of patients have responded extraordinarily well to treatment or have survived for many years after diagnosis.

Recurrent melanoma

Treatment of melanoma that comes back after initial treatment depends on the stage of the original melanoma, the prior treatment, and the site of recurrence.

Melanoma may come back in the skin near the site of the original tumor. In general, these local (skin) recurrences are treated with surgery similar to that recommended for a primary melanoma. This may include a sentinel lymph node biopsy. Depending on the thickness and location of the tumor, other treatments may be considered, such as isolated limb perfusion chemotherapy, radiation therapy, or tumor injection with BCG vaccine or interleukin-2.

If nearby lymph nodes weren't removed during the initial treatment, the melanoma may come back in a nearby area of lymph nodes. This would appear as a swelling or tumor mass. Lymph node recurrence is treated by lymph node dissection, and may include adjuvant therapy such as interferon or radiation therapy.

The cancer can also come back in distant sites. Almost any organ can be affected. Most often, the melanoma will come back in the lung, bone, liver, or brain. Treatment for recurrences is generally the same as for stage IV melanoma (see above). Melanomas that recur on an arm or leg may be treated with isolated limb perfusion chemotherapy. Melanoma that comes back in the brain can be hard to treat. Single sites of recurrence can sometimes be removed by surgery. Most chemotherapy drugs aren't able to reach the brain, although temozolomide may be useful. Radiation therapy to the brain may help as well.

As with other stages of melanoma, patients with recurrent melanoma may want to think about taking part in a clinical trial.

More treatment information

For more details on treatment options -- including some that may not be addressed in this document -- the National Comprehensive Cancer Network (NCCN) and the National Cancer Institute (NCI) are good sources of information.

The NCCN, made up of experts from many of the nation's leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. Those are available on the NCCN Web site (www.nccn.org).

The American Cancer Society collaborates with the NCCN to produce a version of some of these treatment guidelines written specifically for patients and their families. The melanoma treatment guideline is one of these. This less-technical version is available on both the NCCN Web site (www.nccn.org) and the ACS Web site (www.cancer.org). A print version can also be requested from the ACS at 1-800-ACS-2345.

The NCI provides treatment guidelines via its telephone information center (1-800-4-CANCER) and its Web site (www.cancer.gov). Detailed guidelines intended for use by cancer care professionals are also available on www.cancer.gov.

What should you ask your doctor about melanoma?

It is important to have honest, open discussions with your cancer care team. They want to answer all of your questions, no matter how minor you might think they are. Some questions to consider:

- What type of skin cancer do I have?
- How far has my melanoma spread within or beneath the skin? How thick is my melanoma?
- What are my treatment options? What are the possible risks and benefits of each?
- Which treatment do you recommend? Why?
- What is my expected prognosis (outlook), based on my cancer as you view it?
- Will a scar remain after treatment?
- What should I do to be ready for treatment?
- What are the chances of my cancer recurring (coming back) with the treatment options we have discussed? What would we do if this happens?
- Should I take special precautions to avoid sun exposure?
- Do I need follow-up appointments to check for recurrence or formation of a new cancer?
- Should I arrange to have my family members screened?

Along with these sample questions, be sure to write down your own questions. For instance, you might want more information about recovery times so you can plan your work schedule. Or you may want to ask about getting a second opinion or about clinical trials for which you may qualify.

What happens after treatment for melanoma?

Completing treatment can be both stressful and exciting. You will be relieved to finish treatment, yet it is hard not to worry about cancer coming back. (When cancer returns, it is called recurrence.) This is a very common concern among those who have had cancer.

It may take a while before your confidence in your own recovery begins to feel real and your fears are somewhat relieved. Even with no recurrences, people who have had cancer learn to live with uncertainty.

Follow-up care

After your treatment is over, it is very important to keep all follow-up appointments. Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments. This is the time for you to ask your health care team any questions you need answered and to discuss any concerns you might have.

Your follow-up should include regular skin and lymph node exams by yourself and by your doctor. How often you need follow-up visits depends on the stage of your melanoma when you were diagnosed. In addition to the exams, blood and imaging tests may be recommended for some patients.

A typical follow-up schedule for melanomas thinner than 1 mm generally calls for physical exams every 3 to 12 months for several years. If these exams are normal, you can return for a checkup once a year. Your doctor may recommend more frequent exams if you have many moles or a few atypical moles.

For thicker melanomas, a typical schedule might include physical exams every 3 to 6 months for 2 years, then every 3 to 12 months for the next 2 years. After that, exams are done at least once a year. Some doctors also recommend chest x-rays (to look for lung metastases) and certain blood tests (to detect liver or bone metastases) every 3 to 12 months. Other tests such as CT scans may be considered as well, especially for people who had more advanced stage disease.

It is also important for melanoma skin cancer survivors to do regular self-exams. You should see your doctor if you find any new lump or change in your skin. You should also report any new symptoms (for example, pain, cough, fatigue, loss of appetite) that do not go away. Melanoma can come back as many as 10 or (rarely) more years after it was first treated.

Patients with stage IV melanoma whose cancer has been completely removed or disappeared after treatment usually have the same follow-up schedule as for those with thicker melanomas (see above). Patients with persistent stage IV melanoma have a follow-up schedule that is based on their specific situation.

A person who has had one melanoma may still be at risk for developing another melanoma or a non-melanoma type of skin cancer. People cured of one melanoma should continue to examine their skin every month for new skin cancers, and should avoid overexposure to the sun.

Seeing a new doctor

At some point after your cancer diagnosis and treatment, you may find yourself in the office of a new doctor. Your original doctor may have moved or retired, or you may have moved or changed doctors for some reason. It is important that you be able to give your new doctor the exact details of your diagnosis and treatment. Make sure you have the following information handy:

- a copy of your pathology report from any biopsies or surgeries
- if you had surgery, a copy of your operative report
- if you were hospitalized, a copy of the discharge summary that doctors must prepare when patients are sent home
- if you had radiation therapy, a summary of the type and dose of radiation and when and where it was given
- if you had chemotherapy, a list of your drugs, drug doses, and when you took them

It is also important to keep medical insurance. Even though no one wants to think of their cancer coming back, it is always a possibility. If it happens, the last thing you want is to have to worry about paying for treatment.

Lifestyle changes to consider during and after treatment

Having cancer and dealing with treatment can be time-consuming and emotionally draining, but it can also be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even begin this process during cancer treatment.

Make healthier choices

Think about your life before you learned you had cancer. Were there things you did that might have made you less healthy? Maybe you drank too much alcohol, or ate more than you needed, or smoked, or didn't exercise very often. Emotionally, maybe you kept your feelings bottled up, or maybe you let stressful situations go on too long.

Now is not the time to feel guilty or to blame yourself. However, you can start making changes *today* that can have positive effects for the rest of your life. Not only will you feel better but you will also be healthier. What better time than *now* to take advantage of the motivation you have as a result of going through a life-changing experience like having cancer?

You can start by working on those things that you feel most concerned about. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call the American Cancer Society's Quitline[®] tobacco cessation program at 1-800-ACS-2345.

Diet and nutrition

Eating right can be a challenge for anyone, but it can get even tougher during and after cancer treatment. For instance, treatment often may change your sense of taste. Nausea can be a problem. You may lose your appetite for a while and lose weight when you don't want to. On the other hand, some people gain weight even without eating more. This can be frustrating, too.

If you are losing weight or have taste problems during treatment, do the best you can with eating and remember that these problems usually improve over time. You may want to ask your cancer team for a referral to a dietitian, an expert in nutrition who can give you ideas on how to fight some of the side effects of your treatment. You may also find it helps to eat small portions every 2 to 3 hours until you feel better and can go back to a more normal schedule.

One of the best things you can do after treatment is to put healthy eating habits into place. You will be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Try to eat 5 or more servings of vegetables and fruits each day. Choose whole grain foods instead of white flour and sugars. Try to limit meats that are high in fat. Cut back on processed meats like hot dogs, bologna, and bacon. Get rid of them altogether if you can. If you drink alcohol, limit yourself to 1 or 2 drinks a day at the most. And don't forget to get some type of regular exercise. The combination of a good diet and regular exercise will help you maintain a healthy weight and keep you feeling more energetic.

Rest, fatigue, work, and exercise

Fatigue is a very common symptom in people being treated for cancer. This is often not an ordinary type of tiredness but a "bone-weary" exhaustion that doesn't get better with rest. For

some, this fatigue lasts a long time after treatment, and can discourage them from physical activity.

However, exercise can actually help you reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel physically and emotionally improved and can cope better.

If you are ill and need to be on bed rest during treatment, it is normal to expect your fitness, endurance, and muscle strength to decline some. Physical therapy can help you maintain strength and range of motion in your muscles, which can help fight fatigue and the sense of depression that sometimes comes with feeling so tired.

Any program of physical activity should fit your own situation. An older person who has never exercised will not be able to take on the same amount of exercise as a 20-year-old who plays tennis 3 times a week. If you haven't exercised in a few years but can still get around, you may want to think about taking short walks.

Talk with your health care team before starting, and get their opinion about your exercise plans. Then, try to get an exercise buddy so that you're not doing it alone. Having family or friends involved when starting a new exercise program can give you that extra boost of support to keep you going when the push just isn't there.

If you are very tired, though, you will need to balance activity with rest. It is okay to rest when you need to. It is really hard for some people to allow themselves to do that when they are used to working all day or taking care of a household. (For more information about fatigue, please see the publication, *Cancer-Related Fatigue and Anemia Treatment Guidelines for Patients*.)

Exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- It strengthens your muscles.
- It reduces fatigue.
- It lowers anxiety and depression.
- It makes you feel generally happier.
- It helps you feel better about yourself.

And long term, we know that exercise plays a role in preventing some cancers. The American Cancer Society, in its guidelines on physical activity for cancer prevention, recommends that adults take part in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on 5 or more days of the week; 45 to 60 minutes of intentional physical activity are preferable. Children and teens are encouraged to try for at least 60 minutes a day of energetic physical activity on at least 5 days a week.

How about your emotional health?

Once your treatment ends, you may find yourself overwhelmed by emotions. This happens to a lot of people. You may have been going through so much during treatment that you could only focus on getting through your treatment.

Now you may find that you think about the potential of your own death, or the effect of your cancer on your family, friends, and career. You may also begin to re-evaluate your relationship with your spouse or partner. Unexpected issues may also cause concern -- for instance, as you become healthier and have fewer doctor visits, you will see your health care team less often. That can be a source of anxiety for some.

This is an ideal time to seek out emotional and social support. You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, online support communities, or individual counselors.

Almost everyone who has been through cancer can benefit from getting some type of support. What's best for you depends on your situation and personality. Some people feel safe in peer-support groups or education groups. Others would rather talk in an informal setting, such as church. Others may feel more at ease talking one-on-one with a trusted friend or counselor. Whatever your source of strength or comfort, make sure you have a place to go with your concerns.

The cancer journey can feel very lonely. It is not necessary or realistic to go it all by yourself. And your friends and family may feel shut out if you decide not to include them. Let them in -- and let in anyone else who you feel may help. If you aren't sure who can help, call your American Cancer Society at 1-800-ACS-2345 and we can put you in touch with an appropriate group or resource.

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life -- making healthy choices and feeling as well as possible, physically and emotionally.

What happens if treatment is no longer working?

If cancer continues to grow after one kind of treatment, or if it returns, it is often possible to try another treatment plan that might still cure the cancer, or at least shrink the tumors enough to help you live longer and feel better. On the other hand, when a person has received several different medical treatments and the cancer has not been cured, over time the cancer tends to become resistant to all treatment. At this time it's important to weigh the possible limited benefit of a new treatment against the possible downsides, including continued doctor visits and treatment side effects.

Everyone has his or her own way of looking at this. Some people may want to focus on remaining comfortable during their limited time left.

This is likely to be the most difficult time in your battle with cancer -- when you have tried everything medically within reason and it's just not working anymore. Although your doctor may offer you new treatment, you need to consider that at some point, continuing treatment is not likely to improve your health or change your prognosis or survival.

If you want to continue treatment to fight your cancer as long as you can, you still need to consider the odds of more treatment having any benefit. In many cases, your doctor can estimate the response rate for the treatment you are considering. Some people are tempted to try more chemotherapy or radiation, for example, even when their doctors say that the odds of benefit are less than 1%. In this situation, you need to think about and understand your reasons for choosing this plan.

No matter what you decide to do, it is important that you be as comfortable as possible. Make sure you are asking for and getting treatment for any symptoms you might have, such as pain. This type of treatment is called "palliative" treatment.

Palliative treatment helps relieve these symptoms, but is not expected to cure the disease; its main purpose is to improve your quality of life. Sometimes, the treatments you get to control your symptoms are similar to the treatments used to treat cancer. For example, radiation therapy might be given to help relieve bone pain from bone metastasis. Or chemotherapy might be given to help shrink a tumor and keep it from causing a bowel obstruction. But this is not the same as receiving treatment to try to cure the cancer.

At some point, you may benefit from hospice care. Most of the time, this can be given at home. Your cancer may be causing symptoms or problems that need attention, and hospice focuses on your comfort. You should know that receiving hospice care doesn't mean you can't have treatment for the problems caused by your cancer or other health conditions. It just means that the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult stage of your cancer.

Remember also that maintaining hope is important. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends -- times that are filled with happiness and meaning. In a way, pausing at this time in your cancer treatment is an opportunity to refocus on the most important things in your life. This is the time to do some things you've always wanted to do and to stop doing the things you no longer want to do.

What's new in research and treatment of melanoma?

Research into the causes, prevention, and treatment of melanoma is under way in many medical centers throughout the world.

Causes and prevention

Sunlight and UV radiation

Recent studies suggest there may be 2 general ways that UV exposure is linked to melanoma, although there is likely some overlap.

The first link is to sun exposure to as a child and teenager. People with melanoma often have an early history of sunburns, although this isn't necessary. This early sun exposure starts a change in skin cells (melanocytes) that may eventually turn into melanoma. Some doctors think this might help explain melanomas that occur on the legs and trunk -- areas that generally aren't exposed to the sun as much in adulthood.

The second link is to melanomas that occur on the arms, neck, and face. These areas are chronically exposed to sun, particularly in men. Tanning booths may also encourage these kinds of melanomas to develop.

Public education

Most skin cancer is preventable. The greatest reduction in the number of skin cancer cases and a reduction in the pain and loss of life from this disease will come from prevention and early detection strategies. This involves educating the public, especially parents, about skin cancer risk factors. It is important for health care professionals and skin cancer survivors to remind everyone about the dangers of excessive sun exposure and about how easy it can be to protect your skin against too much UV radiation.

Melanoma should be detected early, when it is most likely to be completely cured. Monthly skin self-exams and awareness of the warning signs of melanomas may be helpful in detecting melanoma at an early, curable stage.

The American Academy of Dermatology (AAD) sponsors annual free skin cancer screenings throughout the country. The American Cancer Society works closely with the AAD to provide volunteers for registration, coordination, and education efforts related to these free screenings. Look for information locally about these screenings or call the American Academy of Dermatology for more information. Their telephone number and Web site are listed in the "Additional resources" section.

A slogan popularized in Australia is now used as the American Cancer Society's skin cancer prevention message in the United States. "Slip! Slop! Slap! ... and Wrap" is a catchy way of remembering to slip on a shirt, slop on sunscreen, slap on a hat, and wrap on sunglasses when outdoors to protect your eyes and the sensitive skin around them.

Melanoma DNA research

Scientists have made a great deal of progress during the past few years in understanding how UV light damages DNA and how changes in DNA cause normal skin cells to become cancerous.

They have also found that DNA damage affecting certain genes is important in causing melanocytes to change into a melanoma. Often this damage is due to sun exposure.

On the other hand, some people may inherit mutated (damaged) genes from their parents. For example, changes in the CDKN2A (p16) gene cause some melanomas to run in certain families. People who have a strong family history of melanoma should speak with a cancer genetic counselor or a doctor experienced in cancer genetics to discuss the benefits, limitations, and potential disadvantages of testing for changes in this gene.

Molecular staging

Advances in melanoma DNA research are also being applied to molecular staging. In ordinary staging, a lymph node removed from a patient is looked at under a microscope to see if melanoma cells have spread to the lymph node.

In molecular staging, ribonucleic acid, or RNA (a chemical related to DNA), is extracted from cells in the lymph node. Certain types of RNA are made by melanoma cells but not by normal lymph node cells. A sensitive and sophisticated test called reverse transcription polymerase chain reaction (RT-PCR) is used to detect these types of RNA.

Early studies have found that RT-PCR is more sensitive than routine microscopic testing in detecting the spread of melanoma to lymph nodes. This test may eventually help identify some patients who might benefit from additional treatment such as immunotherapy after surgery. However, some doctors are concerned that this test may lead to false positive results (where the test is positive even though there is no cancer in the sample), which might lead them to advise unnecessary treatment for some patients. That's why this test is not currently recommended. Research studies are now in progress to learn more about how results should influence choice of treatment.

Treatment

Immune therapy

This approach to melanoma treatment includes several strategies for helping the body's immune system attack melanoma cells more effectively. Some forms of immune therapy, such as cytokines (interferon-alpha and interleukin-2) and the BCG vaccine are already used to treat some melanomas. They work by boosting the immune system in a general way.

Experimental melanoma vaccines help "train" a person's immune system to fight melanoma in a more specific way. As researchers learn more about how the immune system works, these immune treatments should become more effective. This is a major area of current research, although melanoma vaccines are only available in clinical trials at this time.

Other forms of immunotherapy are also being studied. A recent small study showed that treating patients with tumor-infiltrating lymphocytes (TILs), immune system cells found in tumors, could shrink melanoma tumors and possibly prolong life as well. Another study found that T cells (a type of white blood cell) that had their genes altered in the lab could cause tumors to shrink in a small fraction of patients. Further studies of these new treatments are now under way.

Molecular targeting

As doctors have discovered some of the gene abnormalities in melanoma cells, they have begun to develop drugs to attack these abnormalities.

An example is a gene called BRAF, which is abnormal in most melanoma cells. Several drugs that target the activity of this gene are being developed and studied.

Another target is CTLA-4, a protein that normally suppresses the T-cell immune response, which might help melanoma cells to survive. Drugs that counteract CTLA-4, such as ipilimumab, are now in late stage clinical trials. They may prove to be most effective when combined with other treatments such as immunotherapy or chemotherapy.

About one third of certain types of melanomas have changes in a gene called c-kit. This often includes melanomas that start in certain areas:

- on the palms of the hands, soles of the feet, or under fingernails
- inside the mouth or in other mucosal areas
- in areas that get chronic sun exposure

Some drugs that are already used to treat other cancers, such as imatinib (Gleevec), are known to target cells with changes in c-kit. Clinical trials are now under way to see if imatinib and similar drugs might help people with these types of melanoma.

Several drugs that target other abnormal genes or proteins are now being studied in clinical trials as well.

Gene therapy

A promising new approach to treating melanoma adds certain genes to the cancer cells. Gene therapy can be used to try to replace some of the damaged genes in melanoma cells, to add a gene that can block to melanoma cells' ability to make certain proteins, or to help boost the immune response against them. Many researchers feel that progress in this third strategy is the farthest along. Clinical trials testing these gene therapy approaches are currently in progress.

Additional resources

More information from your American Cancer Society

The following related information may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-ACS-2345.

A Parent's Guide to Skin Protection (also available in Spanish)

After Diagnosis: A Guide for Patients and Families (also available in Spanish)

Immunotherapy

Melanoma: Treatment Guidelines for Patients -- Version IV, January 2008 (also available in Spanish)

Skin Cancer Prevention and Early Detection

Sun Basics: Skin Protection Made Simple (information for children)

Why You Should Know About Melanoma (also available in Spanish)

National organizations and Web sites*

In addition to the American Cancer Society, other sources of patient information and support include:

American Academy of Dermatology
Toll free number: 1-888-462-3376 (1-888-462-DERM)
Web site: www.aad.org

Environmental Protection Agency
Web site: www.epa.gov/eftpages/humasunprotection.html

Melanoma Patients' Information Page
Web site: www.mpip.org

National Cancer Institute
Toll free number: 1-800-422-6274 (1-800-4-CANCER)
Web site: www.cancer.gov

Skin Cancer Foundation
Toll free number: 1-800-754-6490 (1-800-SKIN-490)
Web site: www.skincancer.org

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at **1-800-ACS-2345** or visit www.cancer.org.

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Last Medical Review: 6/5/2008

Last Revised: 6/5/2008

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For additional assistance please contact your American Cancer Society
1 - 800 - ACS-2345 or www.cancer.org