What You Need To Know About™

Melanoma

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

This booklet is about melanoma. The Cancer Information Service can help you learn more about this disease. The staff can talk with you in English or Spanish.

The number is 1–800–4–CANCER (1–800–422–6237). The number for deaf and hard of hearing callers with TTY equipment is 1–800–332–8615. The call is free.

Este folleto es acerca del melanoma. Llame al Servicio de Información sobre el Cáncer para saber más sobre esta enfermedad. Este servicio tiene personal que habla español.

El número a llamar es el 1–800–4–CANCER (1–800–422–6237). Personas con problemas de audición y que cuentan con equipo TTY pueden llamar al 1–800–332–8615. La llamada es gratis.

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U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES
Public Health Service
National Institutes of Health

What You Need To Know About™ Melanoma

*Melanoma** is the most serious type of cancer of the skin. Each year in the United States, more than 53,600 people learn they have melanoma.

In some parts of the world, especially among Western countries, melanoma is becoming more common every year. In the United States, for example, the percentage of people who develop melanoma has more than doubled in the past 30 years.

The National Cancer Institute (NCI) has written this booklet to help people with melanoma and their families and friends better understand this disease. We hope others will read it as well to learn more about melanoma. This booklet discusses risks and prevention, symptoms, diagnosis, treatment, and followup care. It also has information about resources and sources of support to help patients cope with melanoma.

This booklet is about melanoma of the skin. Melanomas arising in areas other than the skin (such as intraocular melanoma, which is melanoma arising in the eye) are not discussed here. Also, two more common and less serious types of skin cancer (squamous cell and basal cell cancer) are discussed in another NCI booklet, *What You Need To Know About™ Skin Cancer.* For other sources of information on intraocular melanoma and skin cancer, see the "National Cancer Institute Information Resources" on page 46.

*Words that may be new to readers appear in *italics*. The "Dictionary" section gives definitions of these terms. Some words in the "Dictionary" have a "sounds-like" spelling to show how to pronounce them.

Research continues to teach us more about melanoma. Scientists are learning more about its causes. They are exploring new ways to prevent, find, and treat this disease. Because of research, people with melanoma can look forward to a better quality of life and less chance of dying from this disease.

Information specialists at the NCI's Cancer Information Service at 1–800–4–CANCER can answer questions about melanoma, and they can send NCI materials. Many NCI publications and fact sheets can be viewed on the Internet at **http://cancer.gov/publications**. People in the United States and its territories may use this Web site to order publications. This Web site also explains how people outside the United States can mail or fax their requests for NCI publications.

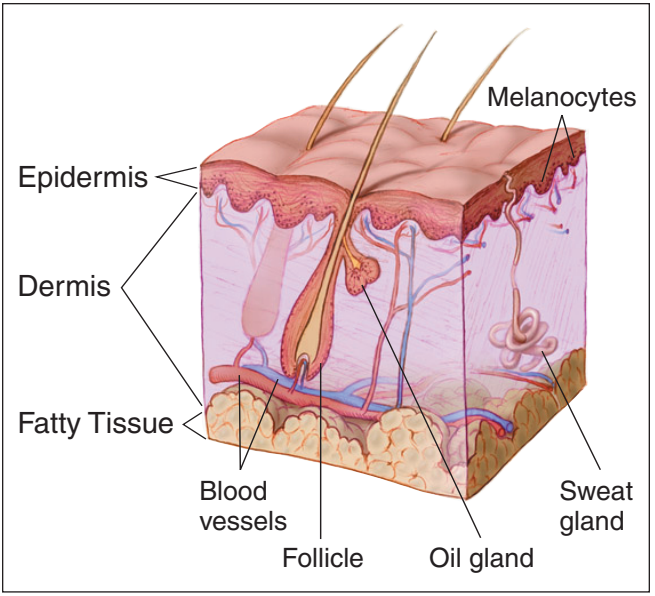
What Is Melanoma?

Melanoma is a type of skin cancer. It begins in *cells* in the skin called *melanocytes*. To understand melanoma, it is helpful to know about the skin and about melanocytes—what they do, how they grow, and what happens when they become cancerous.

The Skin

The skin is the body's largest *organ*. It protects against heat, sunlight, injury, and infection. It helps regulate body temperature, stores water and fat, and produces vitamin D.

The skin has two main layers: the outer *epidermis* and the inner *dermis*.



- The epidermis is mostly made up of flat, scalelike cells called *squamous cells*. Round cells called *basal cells* lie under the squamous cells in the epidermis. The lower part of the epidermis also contains melanocytes.
- The dermis contains blood vessels, *lymph vessels*, hair *follicles*, and *glands*. Some of these glands produce sweat, which helps regulate body temperature. Other glands produce *sebum*, an oily substance that helps keep the skin from drying out. Sweat and sebum reach the skin's surface through tiny openings called pores.

Melanocytes and Moles

Melanocytes produce *melanin*, the pigment that gives skin its natural color. When skin is exposed to the sun, melanocytes produce more pigment, causing the skin to tan, or darken.

Sometimes, clusters of melanocytes and surrounding *tissue* form noncancerous growths called *moles*. (Doctors also call a mole a *nevus*; the plural is nevi.) Moles are very common. Most people have between 10 and 40 moles. Moles may be pink, tan, brown, or a color that is very close to the person's normal skin tone. People who have dark skin tend to have dark moles. Moles can be flat or raised. They are usually round or oval and smaller than a pencil eraser. They may be present at birth or may appear later on—usually before age 40. They tend to fade away in older people. When moles are surgically removed, they normally do not return.

Understanding Cancer

Cancer begins in cells, the building blocks that make up tissues. Tissues make up the organs of the body. Normally, cells grow and divide to form new cells as the body needs them. When cells grow old, they die, and new cells take their place.

Sometimes this orderly process goes wrong. New cells form when the body does not need them, and old cells do not die when they should. These extra cells can form a mass of tissue called a growth or *tumor*. Not all tumors are cancer.

Tumors can be *benign* or *malignant*:

- **Benign tumors** are not cancer:
  - They are rarely life threatening.
  - Usually, benign tumors can be removed, and they seldom grow back.
  - Cells from benign tumors do not spread to tissues around them or to other parts of the body.
- **Malignant tumors** are cancer:
  - They are generally more serious and may be life threatening.
  - Malignant tumors usually can be removed, but they can grow back.
  - Cells from malignant tumors can invade and damage nearby tissues and organs. Also, cancer cells can break away from a malignant tumor and enter the bloodstream or *lymphatic system*. That is how cancer cells spread from the original cancer (the *primary tumor*) to form new tumors in other organs. The spread of cancer is called *metastasis*. Different types of cancer tend to spread to different parts of the body.

Melanoma

Melanoma occurs when melanocytes (pigment cells) become malignant. Most pigment cells are in the skin; when melanoma starts in the skin, the disease is called *cutaneous* melanoma. Melanoma may also occur in the eye (*ocular melanoma* or *intraocular melanoma*). Rarely, melanoma may arise in the *meninges*, the *digestive tract*, *lymph nodes*, or other areas where melanocytes are found. Melanomas that begin in areas other than the skin are not discussed in this booklet. The Cancer Information Service (1–800–4–CANCER) can provide information about these types of melanoma.

Melanoma is one of the most common cancers. The chance of developing it increases with age, but this disease affects people of all ages. It can occur on any skin surface. In men, melanoma is often found on the trunk (the area between the shoulders and the hips) or the head and neck. In women, it often develops on the lower legs. Melanoma is rare in black people and others with dark skin. When it does develop in dark-skinned people, it tends to occur under the fingernails or toenails, or on the palms or soles.

When melanoma spreads, cancer cells may show up in nearby lymph nodes. Groups of lymph nodes are found throughout the body. Lymph nodes trap *bacteria*, cancer cells, or other harmful substances that may be in the lymphatic system. If the cancer has reached the lymph nodes, it may mean that cancer cells have spread to other parts of the body such as the liver, lungs, or brain. In such cases, the cancer cells in the new tumor are still melanoma cells, and the disease is called metastatic melanoma, not liver, lung, or brain cancer.

Melanoma: Who's at Risk?

No one knows the exact causes of melanoma. Doctors can seldom explain why one person gets melanoma and another does not.

However, research has shown that people with certain *risk factors* are more likely than others to develop melanoma. A risk factor is anything that increases a person's chance of developing a disease. Still, many who do get this disease have no known risk factors.

Studies have found the following risk factors for melanoma:

- ***Dysplastic nevi***: Dysplastic nevi are more likely than ordinary moles to become cancerous. Dysplastic nevi are common, and many people have a few of these abnormal moles. The risk of melanoma is greatest for people who have a large number of dysplastic nevi. The risk is especially high for people with a family history of both dysplastic nevi and melanoma.
- **Many (more than 50) ordinary moles**: Having many moles increases the risk of developing melanoma.
- **Fair skin**: Melanoma occurs more frequently in people who have fair skin that burns or freckles easily (these people also usually have red or blond hair and blue eyes) than in people with dark skin. White people get melanoma far more often than do black people, probably because light skin is more easily damaged by the sun.
- **Personal history of melanoma or skin cancer**: People who have been treated for melanoma have a high risk of a second melanoma. Some people develop more than two melanomas. People who had one or more of the common skin cancers (*basal cell carcinoma* or *squamous cell carcinoma*) are at increased risk of melanoma.
- **Family history of melanoma**: Melanoma sometimes runs in families. Having two or more close relatives who have had this disease is a risk factor. About 10 percent of all patients with melanoma have a family member with this disease. When melanoma runs in a family, all family members should be checked regularly by a doctor.

- **Weakened *immune system***: People whose immune system is weakened by certain cancers, by drugs given following organ *transplantation*, or by *HIV* are at increased risk of developing melanoma.
- **Severe, blistering sunburns**: People who have had at least one severe, blistering sunburn as a child or teenager are at increased risk of melanoma. Because of this, doctors advise that parents protect children's skin from the sun. Such protection may reduce the risk of melanoma later in life. Sunburns in adulthood are also a risk factor for melanoma.
- ***Ultraviolet (UV) radiation***: Experts believe that much of the worldwide increase in melanoma is related to an increase in the amount of time people spend in the sun. This disease is also more common in people who live in areas that get large amounts of UV radiation from the sun. In the United States, for example, melanoma is more common in Texas than in Minnesota, where the sun is not as strong. UV radiation from the sun causes premature aging of the skin and skin damage that can lead to melanoma. Artificial sources of UV radiation, such as sunlamps and tanning booths, also can cause skin damage and increase the risk of melanoma. Doctors encourage people to limit their exposure to natural UV radiation and to avoid artificial sources.

People who are concerned about developing melanoma should talk with their doctor about the disease, the symptoms to watch for, and an appropriate schedule for checkups. The doctor's advice will be based on the person's personal and family history, medical history, and other risk factors.

Doctors recommend that people take steps to help prevent and reduce the risk of melanoma caused by UV radiation:

- Avoid exposure to the midday sun (from 10 a.m. to 4 p.m.) whenever possible. When your shadow is shorter than you are, remember to protect yourself from the sun.
- If you must be outside, wear long sleeves, long pants, and a hat with a wide brim.
- Protect yourself from UV radiation that can penetrate light clothing, windshields, and windows.
- Protect yourself from UV radiation reflected by sand, water, snow, and ice.
- Help protect your skin by using a lotion, cream, or gel that contains *sunscreen*. Many doctors believe sunscreens may help prevent melanoma, especially sunscreens that reflect, absorb, and/or scatter both types of ultraviolet radiation. These sunscreen products will be labeled with "broad-spectrum coverage." Sunscreens are rated in strength according to a sun protection factor (SPF). The higher the SPF, the more sunburn protection is provided. Sunscreens with an SPF value of 2 to 11 provide minimal protection against sunburns. Sunscreens with an SPF of 12 to 29 provide moderate protection. Those with an SPF of 30 or higher provide the most protection against sunburn.
- Wear sunglasses that have UV-absorbing lenses. The label should specify that the lenses block at least 99 percent of *UVA* and *UVB radiation*. Sunglasses can protect both the eyes and the skin around the eyes.

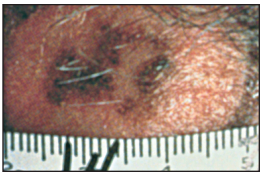
Signs and Symptoms

Often, the first sign of melanoma is a change in the size, shape, color, or feel of an existing mole. Most melanomas have a black or blue-black area. Melanoma also may appear as a new mole. It may be black, abnormal, or "ugly looking."

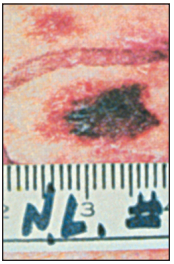
If you have a question or concern about something on your skin, see your doctor. Do not use the following pictures to try to diagnose it yourself. Pictures are useful examples, but they cannot take the place of a doctor's examination.

Thinking of "ABCD" can help you remember what to watch for:

A *symmetry*—The shape of one half does not match the other.

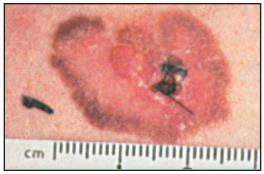


Border—The edges are often ragged, notched, blurrred, or irregular in outline; the pigment may spread into the surrounding skin.

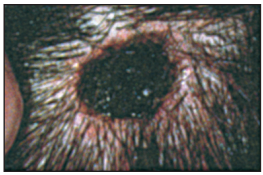


Color—The color is uneven. Shades of black, brown, and tan may be present. Areas of white, grey, red, pink, or blue also may be seen.

Diameter—There is a change in size, usually an increase. Melanomas are usually larger than the eraser of a pencil (1/4 inch or 5 millimeters).



Melanomas can vary greatly in how they look. Many show all of the ABCD features. However, some may show changes or abnormalities in only one or two of the ABCD features.



Melanomas in an early *stage* may be found when an existing mole changes slightly; for example, when a new black area forms. Newly formed fine scales and itching in a mole also are common symptoms of early melanoma. In more advanced melanoma, the texture of the mole may change. For example, it may become hard or lumpy. Melanomas may feel different from regular moles. More advanced tumors may itch, ooze, or bleed. But melanomas usually do not cause pain.

A skin examination is often part of a routine checkup by a health care provider. People also can check their own skin for new growths or other changes. (The "How To Do a Skin Self-Exam" section on page 32 has a simple guide on how to do this skin self-exam.) Changes in the skin, such as a change in a mole, should be reported to the health care provider right away. The person may be referred to a *dermatologist*, a doctor who specializes in diseases of the skin.

Melanoma can be cured if it is diagnosed and treated when the tumor is thin and has not deeply invaded the skin. However, if a melanoma is not removed at its early stages, cancer cells may grow downward from the skin surface and invade healthy tissue. When a melanoma becomes thick and deep, the disease often spreads to other parts of the body and is difficult to control.

People who have had melanoma have a high risk of developing a new melanoma. People at risk for any reason should check their skin regularly and have regular skin exams by a health care provider.

Dysplastic Nevi

Some people have certain abnormal-looking moles (called dysplastic nevi or atypical moles) that are more likely than normal moles to develop into melanoma. Most people with dysplastic nevi have just a few of these abnormal moles; some people have many. People

with dysplastic nevi and their health care provider should examine these moles regularly to watch for changes. (Additional information about moles and dysplastic nevi and melanoma risk is available in the NCI booklet *What You Need To Know About™ Moles and Dysplastic Nevi*.)

Dysplastic nevi often look very much like melanoma. Doctors with special training in skin diseases are in the best position to decide whether an abnormal-looking mole should be closely watched or removed and checked for cancer.

In some families, many members have a large number of dysplastic nevi, and some have had melanoma. Members of these families have a very high risk of melanoma. Doctors often recommend that they have frequent checkups (every 3 to 6 months) so that any problems can be detected early. The doctor may take pictures of a person's skin to help show when changes occur.

Diagnosis

If the doctor suspects that a spot on the skin is melanoma, the patient will need to have a *biopsy*. A biopsy is the only way to make a definite diagnosis. In this procedure, the doctor tries to remove all of the suspicious-looking growth. This is an *excisional biopsy*. If the growth is too large to be removed entirely, the doctor removes a sample of the tissue. The doctor will never "shave off" or *cauterize* a growth that might be melanoma.

A biopsy can usually be done in the doctor's office using *local anesthesia*. A *pathologist* then examines the tissue under a microscope to check for cancer cells. Sometimes it is helpful for more than one pathologist to check the tissue for cancer cells.

A person who needs a biopsy may want to ask the doctor some of the following questions:

- Why do I need a biopsy?
- How long will it take? Will it hurt?
- Will the entire tumor be removed?
- What side effects can I expect?
- How soon will I know the results?
- If I do have cancer, who will talk to me about treatment? When?

Staging

If the diagnosis is melanoma, the doctor needs to learn the extent, or stage, of the disease before planning treatment. *Staging* is a careful attempt to learn how thick the tumor is, how deeply the melanoma has invaded the skin, and whether melanoma cells have spread to nearby lymph nodes or other parts of the body. The doctor may remove nearby lymph nodes to check for cancer cells. (Such *surgery* may be considered part of the treatment because removing cancerous lymph nodes may help control the disease.) The doctor also does a careful physical exam and, if the tumor is thick, may order chest *x-rays*, blood tests, and scans of the liver, bones, and brain.

Stages of Melanoma

The following stages are used for melanoma:

- **Stage 0**: In stage 0, the melanoma cells are found only in the outer layer of skin cells and have not invaded deeper tissues.

- **Stage I**: Melanoma in stage I is thin:
  - The tumor is no more than 1 millimeter (1/25 inch) thick. The outer layer (epidermis) of skin may appear scraped. (This is called an *ulceration.*)
  - Or, the tumor is between 1 and 2 millimeters (1/12 inch) thick. There is no ulceration.

  The melanoma cells have not spread to nearby lymph nodes.
- **Stage II**: The tumor is at least 1 millimeter thick:
  - The tumor is between 1 and 2 millimeters thick. There is ulceration.
  - Or, the thickness of the tumor is more than 2 millimeters. There may be ulceration.

  The melanoma cells have not spread to nearby lymph nodes.
- **Stage III**: The melanoma cells have spread to nearby tissues:
  - The melanoma cells have spread to one or more nearby lymph nodes.
  - Or, the melanoma cells have spread to tissues just outside the original tumor but not to any lymph nodes.
- **Stage IV**: The melanoma cells have spread to other organs, to lymph nodes, or to skin areas far away from the original tumor.
- ***Recurrent***: Recurrent disease means that the cancer has come back (recurred) after it has been treated. It may have come back in the original site or in another part of the body.

Treatment

The doctor can describe treatment choices and discuss the results expected with each treatment option. The doctor and patient can work together to develop a treatment plan that fits the patient's needs. Treatment for melanoma depends on the extent of the disease, the patient's age and general health, and other factors.

People with melanoma are often treated by a team of specialists. The team may include a *dermatologist*, *surgeon*, *medical oncologist*, *radiation oncologist*, and *plastic surgeon*.

Getting a Second Opinion

Before starting treatment, the patient might want a second opinion about the diagnosis and the treatment plan. Some insurance companies require a second opinion; others may cover a second opinion if the patient or doctor requests it.

There are a number of ways to find a doctor for a second opinion:

- The patient's doctor may refer the patient to one or more specialists. At cancer centers, several specialists often work together as a team.
- The Cancer Information Service, at 1–800–4–CANCER, can tell callers about nearby treatment centers.
- A local or state medical society, a nearby hospital, or a medical school can usually provide the names of specialists.

- The *Official ABMS Directory of Board Certified Medical Specialists* lists doctors' names along with their specialty and their educational background. Board-certified doctors have met specific education and training requirements and have passed an examination given by a specialty board. The directory is available in most public libraries. The American Board of Medical Specialties (ABMS) also offers information about board certification by telephone and on the Internet. The toll-free telephone number is 1–866–ASK–ABMS (1–866–275–2267). The Internet address is **http://www.abms.org/newsearch.asp**.

Preparing for Treatment

People with melanoma often want to take an active part in making decisions about their medical care. They want to learn all they can about their disease and their treatment choices. However, shock and stress after a diagnosis of a melanoma can make it hard to think of everything to ask the doctor. It often helps to make a list of questions before an appointment. To help remember what the doctor says, patients may take notes or ask whether they may use a tape recorder. Some also want to have a family member or friend with them when they talk to the doctor—to take part in the discussion, to take notes, or just to listen.

These are some questions a patient may want to ask the doctor before treatment begins:

- What is my diagnosis?
- What is the stage of my disease?
- What are my treatment choices? Which do you recommend for me? Why?
- What are the benefits of each kind of treatment?
- What are the risks and possible *side effects* of each treatment?
- How will I feel after surgery?
- If I have pain, how will it be controlled?
- Will I need more treatment after surgery?
- Will there be a scar? Will I need a *skin graft* or *plastic surgery*?
- What is the treatment likely to cost?
- Will treatment affect my normal activities? If so, for how long?
- How often will I need checkups?
- Would a *clinical trial* (research study) be appropriate for me? Can you help me find one?

People do not need to ask all of their questions or understand all of the answers at one time. They will have other chances to ask the doctor to explain things that are not clear and to ask for more information.

Methods of Treatment

People with melanoma may have *surgery*, *chemotherapy*, *biological therapy*, or *radiation therapy*. Patients may have a combination of treatments.

At any stage of disease, people with melanoma may have treatment to control pain and other symptoms of the cancer, to relieve the side effects of therapy, and to ease emotional and practical problems. This kind of treatment is called *symptom management*, *supportive care*, or *palliative care*.

The doctor is the best person to describe the treatment choices and discuss the expected results.

A patient may want to talk to the doctor about taking part in a clinical trial, a research study of new treatment methods. The section on "The Promise of Cancer Research" on page 30 has more information about clinical trials.

Surgery

Surgery is the usual treatment for melanoma. The surgeon removes the tumor and some normal tissue around it. This procedure reduces the chance that cancer cells will be left in the area. The width and depth of surrounding skin that needs to be removed depends on the thickness of the melanoma and how deeply it has invaded the skin:

- The doctor may be able to completely remove a very thin melanoma during the biopsy. Further surgery may not be necessary.
- If the melanoma was not completely removed during the biopsy, the doctor takes out the remaining tumor. In most cases, additional surgery is performed to remove normal-looking tissue around the tumor (called the *margin*) to make sure all melanoma cells are removed. This is often necessary, even for thin melanomas. If the melanoma is thick, the doctor may need to remove a larger margin of tissue.

If a large area of tissue is removed, the surgeon may do a skin graft. For this procedure, the doctor uses skin

from another part of the body to replace the skin that was removed.

Lymph nodes near the tumor may be removed because cancer can spread through the lymphatic system. If the pathologist finds cancer cells in the lymph nodes, it may mean that the disease has also spread to other parts of the body. Two procedures are used to remove the lymph nodes:

- *Sentinel lymph node biopsy*—The sentinel lymph node biopsy is done after the biopsy of the melanoma but before the wider *excision* of the tumor. A radioactive substance is injected near the melanoma. The surgeon follows the movement of the substance on a computer screen. The first lymph node(s) to take up the substance is called the *sentinel lymph node*(*s*). (The imaging study is called *lymphoscintigraphy*. The procedure to identify the sentinel node(s) is called *sentinel lymph node mapping*.) The surgeon removes the sentinel node(s) to check for cancer cells.

  If a sentinel node contains cancer cells, the surgeon removes the rest of the lymph nodes in the area. However, if a sentinel node does not contain cancer cells, no additional lymph nodes are removed.

- *Lymph node dissection*—The surgeon removes all the lymph nodes in the area of the melanoma.

Therapy may be given after surgery to kill cancer cells that remain in the body. This treatment is called *adjuvant therapy*. The patient may receive biological therapy.

Surgery is generally not effective in controlling melanoma that has spread to other parts of the body. In such cases, doctors may use other methods of treatment, such as chemotherapy, biological therapy, radiation therapy, or a combination of these methods.

Chemotherapy

Chemotherapy, the use of drugs to kill cancer cells, is sometimes used to treat melanoma. The drugs are usually given in cycles: a treatment period followed by a recovery period, then another treatment period, and so on. Usually a patient has chemotherapy as an outpatient (at the hospital, at the doctor's office, or at home). However, depending on which drugs are given and the patient's general health, a short hospital stay may be needed.

People with melanoma may receive chemotherapy in one of the following ways:

- **By mouth or injection**—Either way, the drugs enter the bloodstream and travel throughout the body.
- ***Isolated limb perfusion*** (also called isolated arterial perfusion)—For melanoma on an arm or leg, chemotherapy drugs are put directly into the bloodstream of that limb. The flow of blood to and from the limb is stopped for a while. This allows most of the drug to reach the tumor directly. Most of the chemotherapy remains in that limb.

  The drugs may be heated before injection. This type of chemotherapy is called *hyperthermic perfusion*.

Biological Therapy

Biological therapy (also called immunotherapy) is a form of treatment that uses the body's immune system, either directly or indirectly, to fight cancer or to reduce side effects caused by some cancer treatments. Biological therapy for melanoma uses substances called *cytokines*. The body normally produces cytokines in small amounts in response to infections and other diseases. Using modern laboratory techniques, scientists can produce cytokines in large amounts. In some cases, biological therapy given after surgery can help prevent melanoma from recurring. For patients with metastatic melanoma or a high risk of recurrence, interferon alpha and interleukin-2 (also called IL-2 or aldesleukin) may be recommended after surgery.

Radiation Therapy

Radiation therapy (also called radiotherapy) uses high-energy rays to kill cancer cells. A large machine directs radiation at the body. The patient usually has treatment at a hospital or clinic, five days a week for several weeks. Radiation therapy may be used to help control melanoma that has spread to the brain, bones, and other parts of the body. It may shrink the tumor and relieve symptoms.

Treatment Choices by Stage

The following are brief descriptions of the treatments most often used for each stage. (Other treatments may sometimes be appropriate.)

Stage 0

People with Stage 0 melanoma may have minor surgery to remove the tumor and some of the surrounding tissue.

Stage I

People with Stage I melanoma may have surgery to remove the tumor. The surgeon may also remove as much as 2 centimeters (3/4 inch) of tissue around the tumor. To cover the wound, the patient may have skin grafting.

Stage II or Stage III

People with Stage II or Stage III melanoma may have surgery to remove the tumor. The surgeon may also remove as much as 3 centimeters (1 1/4 inches) of nearby tissue. Skin grafting may be done to cover the wound. Sometimes the surgeon removes nearby lymph nodes.

Stage IV

People with Stage IV melanoma often receive palliative care. The goal of palliative care is to help the patient feel better—physically and emotionally. This type of treatment is intended to control pain and other symptoms and to relieve the side effects of therapy (such as nausea), rather than to extend life.

The patient may have one of the following:

- Surgery to remove lymph nodes that contain cancer cells or to remove tumors that have spread to other areas of the body
- Radiation therapy, biological therapy, or chemotherapy to relieve symptoms

People with advanced melanoma can find helpful information in the National Cancer Institute booklet *Pain Control: A Guide for People with Cancer and Their Families*.

Recurrent Melanoma

Treatment for recurrent melanoma depends on where the cancer came back, which treatments the patient has already received, and other factors. As with Stage IV melanoma, treatment usually cannot cure melanoma that recurs. Palliative care is often an important part of the treatment plan. Many patients have palliative care to ease their symptoms while they are getting anticancer treatments to slow the progress of the disease. Some receive only palliative care to improve their *quality of life* by easing pain, nausea, and other symptoms.

The patient may have one of the following:

- Surgery to remove the tumor
- Radiation therapy, biological therapy, or chemotherapy to relieve symptoms
- Heated chemotherapy drugs injected directly into the tumor

Side Effects of Treatment

Because treatment may damage healthy cells and tissues, unwanted side effects sometimes occur. These side effects depend on many factors, including the location of the tumor and the type and extent of the treatment. Side effects may not be the same for each person, and they may even change from one treatment session to the next. Before treatment starts, the health care team will explain possible side effects and suggest ways to help the patient manage them.

The NCI provides helpful booklets about cancer treatments and coping with side effects, such as *Radiation Therapy and You*, *Chemotherapy and You*, and *Eating Hints for Cancer Patients*. See the sections "National Cancer Institute Information Resources" on page 46 and "National Cancer Institute Booklets" on page 47 for other sources of information about side effects.

Surgery

The side effects of surgery depend mainly on the size and location of the tumor and the extent of the operation. Although patients may have some pain during the first few days after surgery, this pain can be controlled with medicine. People should feel free to discuss pain relief with the doctor or nurse. It is also common for patients to feel tired or weak for a while. The length of time it takes to recover from an operation varies for each patient.

Scarring may also be a concern for some patients. To avoid causing large scars, doctors remove as little tissue as they can (while still protecting against recurrence). In general, the scar from surgery to remove an early stage melanoma is a small line (often 1 to 2 inches long), and it fades with time. How noticeable the scar is depends on where the melanoma was, how well the person heals, and whether the person develops raised scars called *keloids*. When a tumor is large and thick, the doctor must remove more surrounding skin and other tissue (including muscle). Although skin grafts reduce scarring caused by the removal of large growths, these scars will still be quite noticeable.

Surgery to remove the lymph nodes from the underarm or groin may damage the lymphatic system and slow the flow of *lymphatic fluid* in the arm or leg.

Lymphatic fluid may build up in a limb and cause swelling (*lymphedema*). The doctor or nurse can suggest exercises or other ways to reduce swelling if it becomes a problem. Also, it is harder for the body to fight infection in a limb after nearby lymph nodes have been removed, so the patient will need to protect the arm or leg from cuts, scratches, bruises, insect bites, or burns that may lead to infection. If an infection does develop, the patient should see the doctor right away.

Chemotherapy

The side effects of chemotherapy depend mainly on the specific drugs and the dose. In general, anticancer drugs affect cells that divide rapidly, especially:

- **Blood cells**: These cells fight infection, help the blood to clot, and carry oxygen to all parts of the body. When drugs affect blood cells, patients are more likely to get infections, may bruise or bleed easily, and may feel very weak and tired.
- **Cells in hair roots**: Chemotherapy can lead to hair loss. The hair grows back, but the new hair may be somewhat different in color and texture.
- **Cells that line the digestive tract**: Chemotherapy can cause poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores. Many of these side effects can be controlled with drugs.

Biological Therapy

The side effects of biological therapy vary with the type of treatment. These treatments may cause flu-like symptoms, such as chills, fever, muscle aches, weakness, loss of appetite, nausea, vomiting, and diarrhea. Patients may also get a skin rash. These problems can be severe, but they go away after treatment stops.

Radiation Therapy

The side effects of radiation therapy depend on the amount of radiation given and the area being treated. Side effects that may occur in the treated area include red or dry skin and hair loss. Radiation therapy also may cause fatigue. Although the side effects of radiation therapy can be unpleasant, the doctor can usually treat or control them. It also helps to know that, in most cases, side effects are not permanent.

Nutrition

People with melanoma may not feel like eating, especially if they are uncomfortable or tired. Also, the side effects of treatment, such as poor appetite, nausea, or vomiting, can be a problem. Foods may taste different. Nevertheless, patients should try to eat well during cancer therapy. They need enough calories to maintain a good weight and protein to keep up strength. Good nutrition often helps people with cancer feel better and have more energy.

The doctor, dietitian, or other health care provider can suggest ways to maintain a healthy diet. Patients and their families may want to read the National Cancer Institute booklet *Eating Hints for Cancer Patients*, which contains many useful ideas and recipes. The "National Cancer Institute Booklets" section on page 47 tells how to get this publication.

Followup Care

Melanoma patients have a high risk of developing new melanomas. Some also are at risk of a recurrence of the original melanoma in nearby skin or in other parts of the body.

To increase the chance of detecting a new or recurrent melanoma as early as possible, patients should follow their doctor's schedule for regular checkups. It is especially important for patients who have dysplastic nevi and a family history of melanoma to have frequent checkups. Patients also should examine their skin monthly (keeping in mind the "ABCD" guidelines in the "Signs and Symptoms" section on page 10, and the skin self-exam described in "How To Do a Skin Self-Exam" on page 32). They should follow their doctor's advice about how to reduce their chance of developing another melanoma. General information about reducing the risk of melanoma is described in the "Melanoma: Who's at Risk?" section on page 6.

The chance of recurrence is greater for patients whose melanoma was thick or had spread to nearby tissue than for patients with very thin melanomas. Followup care for those who have a high risk of recurrence may include x-rays, blood tests, and scans of the chest, liver, bones, and brain.

The NCI has prepared a booklet for people who have completed their treatment to help answer questions about followup care and other concerns. *Life After Cancer Treatment* provides tips for getting the most out of medical visits. It describes the kinds of help people may need.

A person who has been treated for melanoma may want to ask the doctor the following questions:

- How often should I have checkups?
- What special precautions should I take to avoid sun exposure?
- Are my family members at risk of melanoma? Should they schedule an appointment with their doctor for an examination?

Support for People with Melanoma

Living with a serious disease such as melanoma is not easy. Some people find they need help coping with the emotional and practical aspects of their disease. Support groups can help. In these groups, patients or their family members get together to share what they have learned about coping with the disease and the effects of treatment. Patients may want to talk with a member of their health care team about finding a support group. Groups may offer support in person, over the telephone, or on the Internet.

People living with melanoma may worry about caring for their families, keeping their jobs, or continuing daily activities. Concerns about treatments and managing side effects, hospital stays, and medical bills also are common. Doctors, nurses, and other members of the health care team can answer questions

about treatment, working, or other activities. Meeting with a social worker, counselor, or member of the clergy can be helpful to those who want to talk about their feelings or discuss their concerns. Often, a social worker can suggest resources for financial aid, transportation, home care, or emotional support.

The Cancer Information Service at 1–800–4–CANCER can send publications and provide information to help patients and their families locate programs and services.

The Promise of Cancer Research

Doctors all over the country are conducting many types of clinical trials. These are research studies in which people take part voluntarily. Studies include new ways to treat melanomas. Research already has led to advances, and researchers continue to search for more effective approaches.

Patients who join these studies have the first chance to benefit from treatments that have shown promise in earlier research. They also make an important contribution to medical science by helping doctors learn more about the disease. Although clinical trials may pose some risks, researchers take very careful steps to protect their patients.

Researchers are testing new anticancer drugs. They are looking at combining chemotherapy with radiation therapy. Other studies are combining chemotherapy with biological therapy. Scientists also are studying several cancer *vaccines* and a type of *gene therapy* designed to help the immune system kill cancer cells.

Patients who are interested in being part of a clinical trial should talk with their doctor. They may want to read *Taking Part in Clinical Trials: What Cancer Patients Need To Know.* The NCI also offers an easy-to-read brochure called *If You Have Cancer…What You Should Know About Clinical Trials*. These NCI publications describe how research studies are carried out and explain their possible benefits and risks. NCI's Web site includes a section on clinical trials at **http://cancer.gov/clinical_trials**. This section of the Web site provides general information about clinical trials. It also offers detailed information about ongoing studies of treatment for melanoma. The Cancer Information Service at 1–800–4–CANCER can answer questions and provide information about clinical trials.

How To Do a Skin Self-Exam

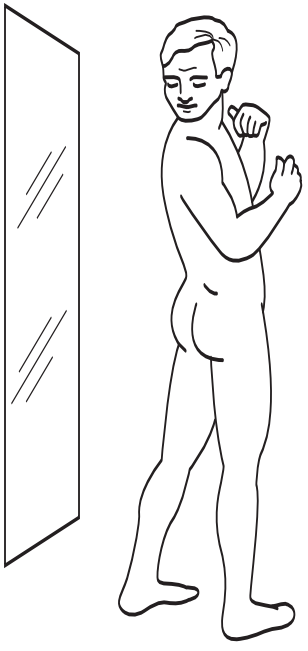
Your doctor or nurse may recommend that you do a regular skin self-exam. If your doctor has taken photos of your skin, comparing your skin to the photos can help you check for changes.

The best time to do a skin self-exam is after a shower or bath. You should check your skin in a well-lighted room using a full-length mirror and a hand-held mirror. It's best to begin by learning where your birthmarks, moles, and blemishes are and what they usually look and feel like.

Check for anything new:

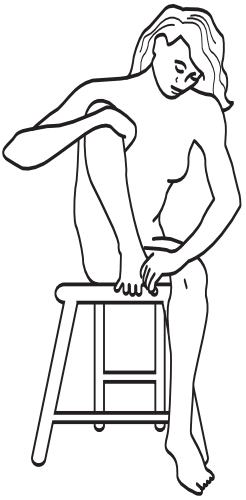
- A new mole (that looks abnormal)
- A change in the size, shape, color, or texture of a mole
- A sore that does not heal

Check yourself from head to toe. Don't forget to check all areas of the skin, including the back, the scalp, between the buttocks, and the genital area.



1 Look at your face, neck, ears, and scalp. You may want to use a comb or a blow dryer to move your hair so that you can see better. You also may want to have a relative or friend check through your hair because this is difficult to do yourself.

2 Look at the front and back of your body in the mirror, then raise your arms and look at your left and right sides.

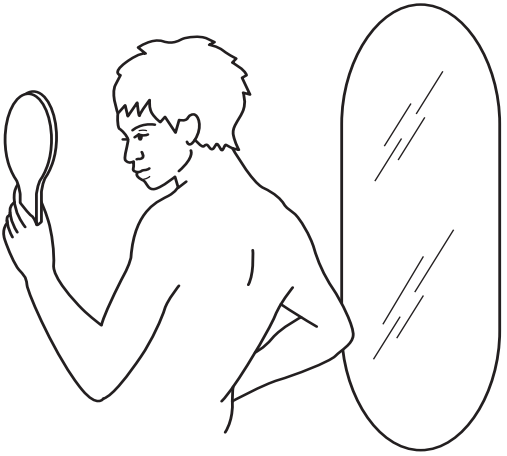


3 Bend your elbows and look carefully at your fingernails, palms, forearms (including the undersides), and upper arms.

4 Examine the back, front, and sides of your legs. Also look between your buttocks and around your genital area.

5 Sit and closely examine your feet, including the toenails, the soles, and the spaces between the toes.

By checking your skin regularly, you will become familiar with what is normal for you. It may be helpful to record the dates of your skin exams and to write notes about the way your skin looks. If you find anything unusual, see your doctor right away.



Dictionary

Adjuvant therapy (AD-joo-vant): Treatment given after the primary treatment to increase the chances of a cure. Adjuvant therapy may include chemotherapy, radiation therapy, hormone therapy, or biological therapy.

Asymmetry: Not of balanced proportions.

Bacteria: A large group of single-cell microorganisms. Some cause infections and disease in animals and humans. The singular of bacteria is bacterium.

Basal cells (BAY-sal): Small, round cells found in the lower part (or base) of the epidermis, the outer layer of the skin.

Basal cell carcinoma (BAY-sal sel kar-sin-O-ma): A type of skin cancer that arises from the basal cells, small round cells found in the lower part (or base) of the epidermis, the outer layer of the skin.

Benign (beh-NINE): Not cancerous; does not invade nearby tissue or spread to other parts of the body.

Biological therapy (by-o-LAHJ-i-kul): Treatment to stimulate or restore the ability of the immune system to fight infections and other diseases. Also used to lessen side effects that may be caused by some cancer treatments. Also known as immunotherapy, biotherapy, or biological response modifier (BRM) therapy.

Biopsy (BY-op-see): The removal of cells or tissues for examination under a microscope. When only a sample of tissue is removed, the procedure is called an incisional biopsy or core biopsy. When an entire lump or suspicious area is removed, the procedure is called an excisional biopsy. When a sample of tissue or fluid is removed with a needle, the procedure is called a needle biopsy or fine-needle aspiration.

Cauterize (KOT-uh-rize): To destroy tissue with a hot instrument, an electrical current, or a caustic substance.

Cell: The individual unit that makes up all of the tissues of the body. All living things are made up of one or more cells.

Chemotherapy (kee-mo-THER-a-pee): Treatment with anticancer drugs.

Clinical trial: A type of research study that tests how well new medical treatments or other interventions work in people. Such studies test new methods of screening, prevention, diagnosis, or treatment of a disease. The study may be carried out in a clinic or other medical facility. Also called a clinical study.

Cutaneous (kyoo-TAY-nee-us): Having to do with the skin.

Cytokines: A class of substances that are produced by cells of the immune system and can affect the immune response. Cytokines can also be produced in the laboratory by recombinant DNA technology and given to people to affect immune responses.

Dermatologist (der-ma-TAH-lo-jist): A doctor who specializes in the diagnosis and treatment of skin problems.

Dermis (DER-mis): The lower or inner layer of the two main layers of tissue that make up the skin.

Digestive tract (dye-JES-tiv): The organs through which food and liquids pass when they are swallowed and digested. These organs are the mouth, esophagus, stomach, small and large intestines, and rectum.

Dysplastic nevi (dis-PLAS-tik NEE-vye): Atypical moles; moles whose appearance is different from that of common moles. Dysplastic nevi are generally larger than ordinary moles and have irregular and indistinct borders. Their color frequently is not uniform and ranges from pink to dark brown; they usually are flat, but parts may be raised above the skin surface.

Epidermis (ep-i-DER-mis): The upper or outer layer of the two main layers of tissue that make up the skin.

Excision (ek-SIH-zhun): Removal by surgery.

Excisional biopsy (ek-SIH-zhun-al BY-op-see): A surgical procedure in which an entire lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

Follicles (FOL-i-kuls): Shafts through which hair grows.

Gene therapy: Treatment that alters a gene. In studies of gene therapy for cancer, researchers are trying to improve the body's natural ability to fight the disease or to make the cancer cells more sensitive to other kinds of therapy.

Gland: An organ that makes one or more substances, such as hormones, digestive juices, sweat, tears, saliva, or milk. Some glands (endocrine glands) release the substances into the bloodstream. Others (exocrine glands) release the substances outside the gland (sometimes outside the body) through a duct or canal.

HIV: Human immunodeficiency virus, the cause of acquired immunodeficiency syndrome (AIDS).

Hyperthermic perfusion: A procedure in which a warmed solution containing anticancer drugs is used to bathe, or is passed through the blood vessels of, the tissue or organ containing the tumor.

Immune system (im-YOON): The complex group of organs and cells that defends the body against infection or disease.

Intraocular melanoma: A rare cancer in which malignant cells are found in the pigmented (colored) part of the eye. The pigmented part of the eye contains cells called melanocytes. When melanocytes are cancerous, the disease is melanoma. Also called ocular melanoma.

Isolated limb perfusion: A technique that may be used to deliver anticancer drugs directly to an arm or leg. The flow of blood to and from the limb is temporarily stopped with a tourniquet, and anticancer drugs are put directly into the blood of the limb. This allows the person to receive a high dose of drugs in the area where the cancer occurred. Also called limb perfusion.

Keloid (KEY-loyd): A thick, irregular scar caused by excessive tissue growth at the site of an incision or wound.

Local anesthesia (an-es-THEE-zha): Drugs that cause a temporary loss of feeling in one part of the body. The patient remains awake but cannot feel the part of the body treated with the anesthetic.

Lymph node (limf node): A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph (lymphatic fluid), and they store lymphocytes (white blood cells). They are located along lymphatic vessels. Also known as a lymph gland.

Lymph node dissection (limf node dis-EK-shun): A surgical procedure in which lymph nodes are removed and examined to see whether they contain cancer. Also called lymphadenectomy.

Lymph vessels (limf): Thin tubes that carry lymph and white blood cells through the lymphatic system. Also called lymphatic vessels.

Lymphatic fluid (lim-FAT-ik): The clear fluid that travels through the lymphatic system and carries cells that help fight infections and other diseases. Also called lymph.

Lymphatic system (lim-FAT-ik SIS-tem): The tissues and organs that produce, store, and carry white blood cells that fight infections and other diseases. This system includes the bone marrow, spleen, thymus, lymph nodes, and lymphatic vessels (a network of thin tubes that carry lymph and white blood cells). These tubes branch, like blood vessels, into all the tissues of the body.

Lymphedema (LIMF-eh-DEE-ma): A condition in which excess fluid collects in tissue and causes swelling. It may occur in the arm or leg after lymph vessels or lymph nodes in the underarm or groin are removed or treated with radiation.

Lymphoscintigraphy (lim-fo-sin-TIG-ruh-fee): A method used to identify the sentinel lymph node (the first draining lymph node near a tumor). A radioactive substance that can be taken up by lymph nodes is injected at the site of the tumor, and a surgeon follows the movement of this substance on a computer screen. Once the lymph nodes that have taken up the substance are identified, they can be removed and examined to see if they contain tumor cells.

Malignant (ma-LIG-nant): Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body.

Margin: The edge or border of the tissue removed in cancer surgery. The margin is described as negative or clean when the pathologist finds no cancer cells at the edge of the tissue, suggesting that all of the cancer has been removed. The margin is described as positive or involved when the pathologist finds cancer cells at the edge of the tissue, suggesting that all of the cancer has not been removed.

Medical oncologist (MED-i-kal on-KOL-o-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, and biological therapy. A medical oncologist often is the main caretaker of someone who has cancer and coordinates treatment provided by other specialists.

Melanin (MEL-a-nin): The substance that gives color to skin and eyes.

Melanocytes (mel-AN-o-sites): Cells in the skin and eyes that produce and contain the pigment called melanin.

Melanoma: A form of skin cancer that arises in melanocytes, the cells that produce pigment. Melanoma usually begins in a mole.

Meninges (meh-NIN-jeez): The three membranes that cover and protect the brain and spinal cord.

Metastasis (meh-TAS-ta-sis): The spread of cancer from one part of the body to another. Tumors formed from cells that have spread are called "secondary tumors" and contain cells that are like those in the original (primary) tumor. The plural is metastases (meh-TAS-ta-seez).

Mole: A benign growth on the skin (usually tan, brown, or flesh-colored) that contains a cluster of melanocytes and surrounding supportive tissue.

Nevus (NEE-vus): A benign growth on the skin, such as a mole. A mole is a cluster of melanocytes and surrounding supportive tissue that usually appears as a tan, brown, or flesh-colored spot on the skin. The plural of nevus is nevi (NEE-vye).

Ocular melanoma: A rare cancer in cells called melanocytes in the pigmented (colored) part of the eye. Also called intraocular melanoma.

Organ: A part of the body that is made of cells and tissues and that performs specific functions. For example, the heart is an organ.

Palliative care (PAL-yut-iv): Care that prevents or relieves the symptoms of cancer or other diseases. Palliative care does not alter the course of a disease but can improve the quality of life. It attempts to meet the physical, emotional, spiritual, and practical needs of patients by helping to relieve pain, depression, or other problems. Also known as comfort care, supportive care, and symptom management.

Pathologist (pa-THOL-o-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

Plastic surgeon: A surgeon who specializes in reducing scarring or disfigurement that may occur as a result of accidents, birth defects, or treatment for diseases.

Plastic surgery: An operation that restores or improves the appearance of body structures.

Primary tumor: The original tumor.

Quality of life: The overall enjoyment of life. Many clinical trials measure aspects of an individual's sense of well-being and ability to perform various activities to assess the effects of cancer and its treatment on the quality of life.

Radiation oncologist (ray-dee-AY-shun on-KOL-o-jist): A doctor who specializes in using radiation to treat cancer.

Radiation therapy (ray-dee-AY-shun): The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or from materials called radioisotopes. Radioisotopes produce radiation and can be placed in or near the tumor or in the area near cancer cells. This type of radiation treatment is called internal radiation therapy, implant radiation, interstitial radiation, or brachytherapy. Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy, irradiation, and x-ray therapy.

Recurrent cancer: Cancer that has returned, at the same site as the original (primary) tumor or in another location, after the tumor had disappeared.

Risk factor: Anything that increases a person's chance of developing a disease, including a substance, agent, genetic alteration, trait, habit, or condition.

Sebum (SEE-bum): An oily substance produced by certain glands in the skin.

Sentinel lymph node: The first lymph node to which cancer is likely to spread from the primary tumor. Cancer cells may appear first in the sentinel node before spreading to other lymph nodes.

Sentinel lymph node biopsy: Removal and examination of the first lymph node(s) to which cancer cells are likely to spread from a primary tumor. To identify the sentinel lymph node(s), the surgeon injects a radioactive substance, blue dye, or both near the tumor. The first lymph node(s) into which the substance(s) flows is the sentinel lymph node(s). The surgeon uses a scanner to find the sentinel lymph node(s) containing the radioactive substance or looks for the lymph node(s) stained with dye. The surgeon then removes the sentinel node(s) to check for the presence of cancer cells.

Sentinel lymph node mapping: The use of dyes and radioactive substances to identify the first lymph node to which cancer is likely to spread from the primary tumor. Cancer cells may appear first in the sentinel node before spreading to other lymph nodes and other places in the body.

Side effects: Problems that occur when treatment affects healthy cells. Common side effects of cancer treatment are fatigue, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

Skin graft: Skin that is moved from one part of the body to another.

Squamous cell carcinoma (SKWAY-mus sel kar-sin-O-ma): Cancer that begins in squamous cells, which are thin, flat cells that look like fish scales. Squamous cells are found in the tissue that forms the surface of the skin, the lining of the hollow organs of the body, and the passages of the respiratory and digestive tracts. Also called epidermoid carcinoma.

Squamous cells (SKWAY-mus): Flat cells that look like fish scales under a microscope. These cells cover internal and external surfaces of the body.

Stage: The extent of a cancer within the body, especially whether the disease has spread from the original site to other parts of the body.

Staging (STAY-jing): Performing exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body. It is important to know the stage of the disease in order to plan the best treatment.

Sunscreen: A substance that helps protect the skin from the sun's harmful rays. Sunscreens reflect, absorb, and scatter both ultraviolet A and B radiation to provide broad-spectrum coverage. Using lotions, creams, or gels that contain sunscreens can help protect the skin from premature aging and damage that may lead to skin cancer.

Supportive care: Care given to prevent, control, or relieve complications and side effects and to improve the comfort and quality of life of people who have cancer.

Surgeon: A doctor who removes or repairs a part of the body by operating on the patient.

Surgery (SERJ-uh-ree): An operation done by a surgeon to remove or repair a part of the body. Surgery also may be done to find out whether disease is present.

Symptom management: Care given to relieve the problems associated with a disease or its treatment. Symptom management improves the comfort and quality of life of people who have cancer.

Tissue (TISH-oo): A group or layer of cells that are alike and that work together to perform a specific function.

Transplantation: The replacement of tissue with tissue from the person's own body or from another person.

Tumor (TOO-mer): An abnormal mass of tissue that results from excessive cell division. Tumors perform no useful body function. They may be benign (not cancerous) or malignant (cancerous).

Ulceration: The formation of a break on the skin or on the surface of an organ. Forms when the surface cells die and are cast off. Ulcers are caused by cancer and other diseases.

Ultraviolet radiation (ul-tra-VYE-o-let ray-dee-AY-shun): UV radiation. Invisible rays that are part of the energy that comes from the sun. UV radiation also comes from sun lamps and tanning beds. UV radiation can damage the skin and cause melanoma and other types of skin cancer. UV radiation that reaches the Earth's surface is made up of two types of rays, called UVA and UVB rays. UVB rays are more likely than UVA rays to cause sunburn, but UVA rays pass deeper into the skin. Scientists have long thought that UVB radiation can cause melanoma and other types of skin cancer. They now think that UVA radiation also may add to skin damage that can lead to skin cancer and cause premature aging. For this reason, skin specialists recommend that people use broad-spectrum sunscreens that reflect, absorb, or scatter both kinds of UV radiation.

UVA radiation: A type of ultraviolet (UV) radiation. UV rays are invisible rays that are part of the energy that comes from the sun. UVA radiation also comes from sun lamps and tanning beds. Scientists think that UVA radiation may cause skin damage that can lead to skin cancer and premature aging. For this reason, skin specialists recommend that people use sunscreens that reflect, absorb, or scatter ultraviolet radiation.

UVB radiation: A type of ultraviolet (UV) radiation. UV rays are invisible rays that are part of the energy that comes from the sun. UVB radiation causes sunburn, and scientists have long thought that it can cause melanoma and other types of skin cancer. Skin specialists recommend that people use sunscreens that reflect, absorb, or scatter ultraviolet radiation.

Vaccine: A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. A vaccine can help the body recognize and destroy cancer cells or microorganisms.

X-ray: A type of high-energy radiation. In low doses, x-rays are used to diagnose diseases by making pictures of the inside of the body. In high doses, x-rays are used to treat cancer.

National Cancer Institute Information Resources

You may want more information for yourself, your family, and your doctor. The following National Cancer Institute (NCI) services are available to help you.

Telephone

Cancer Information Service (CIS)

Provides accurate, up-to-date information on cancer to patients and their families, health professionals, and the general public. Information specialists translate the latest scientific information into understandable language and respond in English, Spanish, or on TTY equipment.

Toll-free: 1–800–4–CANCER (1–800–422–6237)

TTY: 1–800–332–8615

Internet

The NCI's Cancer.gov™ Web site provides information from numerous NCI sources. It offers current information on cancer prevention, screening, diagnosis, treatment, genetics, supportive care, and ongoing clinical trials. It also provides information about NCI's research programs and funding opportunities, cancer statistics, and the Institute itself. Cancer.gov contains CANCERLIT®, a database of citations and abstracts on cancer topics from scientific literature. Cancer.gov can be accessed at **http://cancer.gov** on the Internet.

Cancer.gov also provides live, online assistance through LiveHelp. Information specialists are available Monday through Friday from 9:00 AM to 10:00 PM Eastern Time. LiveHelp is at **http://cancer.gov** on the Internet.

National Cancer Institute Booklets

National Cancer Institute (NCI) publications can be ordered by writing to the address below, and some can be viewed and downloaded from **http://cancer.gov/publications** on the Internet.

Publications Ordering Service
National Cancer Institute
Building 31, Room 10A31
31 Center Drive, MSC 2580
Bethesda, MD 20892-2580

In addition, people in the United States and its territories may order these and other NCI booklets by calling the Cancer Information Service at 1–800–4–CANCER. They may also order many NCI publications on-line at **http://cancer.gov/publications.**

Booklets About Skin Conditions

- *What You Need To Know About™ Moles and Dysplastic Nevi*
- *What You Need To Know About™ Skin Cancer*

Booklets About Cancer Treatment

- *Radiation Therapy and You: A Guide to Self-Help During Treatment*
- *Chemotherapy and You: A Guide to Self-Help During Treatment*

- *Helping Yourself During Chemotherapy: 4 Steps for Patients*
- *Eating Hints for Cancer Patients*
- *Understanding Cancer Pain*
- *Pain Control: A Guide for People with Cancer and Their Families*
- *Get Relief From Cancer Pain*
- *Taking Part in Clinical Trials: What Cancer Patients Need To Know*
- *La quimioterapia y usted: Una guía de autoayuda durante el tratamiento del cáncer (Chemotherapy and You: A Guide to Self-Help During Treatment for Cancer)*
- *El dolor relacionado con el cáncer (Understanding Cancer Pain)*
- *La radioterapia y usted: Una guía de autoayuda durante el tratamiento del cáncer (Radiation Therapy and You: A Guide to Self-Help During Treatment)*
- *¿En qué consisten los estudios clínicos? Un folleto para los pacientes de cáncer (What Are Clinical Trials All About? A Guide for Cancer Patients)*

Booklets About Living with Cancer

- *Taking Time: Support for People With Cancer and the People Who Care About Them*
- *Facing Forward Series:*

  – Life After Cancer Treatment

  – Ways You Can Make a Difference in Cancer
- *Advanced Cancer: Living Each Day*
- *When Cancer Recurs: Meeting the Challenge*

This booklet was written and published by the National Cancer Institute (NCI), 31 Center Drive, MSC 2580, Bethesda, MD 20892–2580. Part of the National Institutes of Health, NCI oversees all Government-sponsored cancer research in the United States. NCI conducts its own cancer research in laboratories and clinics in Bethesda, Maryland, and also supports and coordinates cancer research conducted by universities, hospitals, research foundations, and private laboratories throughout the United States and abroad. NCI conducts and supports research into better ways to prevent, diagnose, and treat cancer, and is responsible for communicating its research findings to the medical community and the public.

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