

Health Reference Series

Sixth Edition

Cancer

SOURCEBOOK

Basic Consumer Health Information about Major Forms and Stages of Cancer, Featuring Facts about Head and Neck Cancers, Lung Cancers, Gastrointestinal Cancers, Genitourinary Cancers, Lymphomas, Blood Cell Cancers, Endocrine Cancers, Skin Cancers, Bone Cancers, Metastatic Cancers, and More

Along with Facts about Cancer Treatments, Cancer Risks and Prevention, a Glossary of Related Terms, Statistical Data, and a Directory of Resources for Additional Information

*Edited by
Karen Bellenir*

OmniGraphics

P.O. Box 31-1640, Detroit, MI 48231

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Section 45.1

Hodgkin Lymphoma

Excerpted from “What You Need to Know about Hodgkin Lymphoma,”
National Cancer Institute (www.cancer.gov), February 5, 2008.

Basic Facts about Hodgkin Lymphoma

Hodgkin lymphoma is a cancer that begins in cells of the immune system. The immune system fights infections and other diseases. The lymphatic system is part of the immune system. The lymphatic system includes the following:

- **Lymph vessels:** The lymphatic system has a network of lymph vessels. Lymph vessels branch into all the tissues of the body.
- **Lymph:** The lymph vessels carry clear fluid called lymph. Lymph contains white blood cells, especially lymphocytes such as B cells and T cells.
- **Lymph nodes:** Lymph vessels are connected to small, round masses of tissue called lymph nodes. Groups of lymph nodes are found in the neck, underarms, chest, abdomen, and groin. Lymph nodes store white blood cells. They trap and remove bacteria or other harmful substances that may be in the lymph.
- **Other parts of the lymphatic system:** Other parts of the lymphatic system include the tonsils, thymus, and spleen. Lymphatic tissue is also found in other parts of the body including the stomach, skin, and small intestine.

Because lymphatic tissue is in many parts of the body, Hodgkin lymphoma can start almost anywhere. Usually, it's first found in a lymph node above the diaphragm, the thin muscle that separates the chest from the abdomen. But Hodgkin lymphoma also may be found in a group of lymph nodes. Sometimes it starts in other parts of the lymphatic system.

Lymphoma

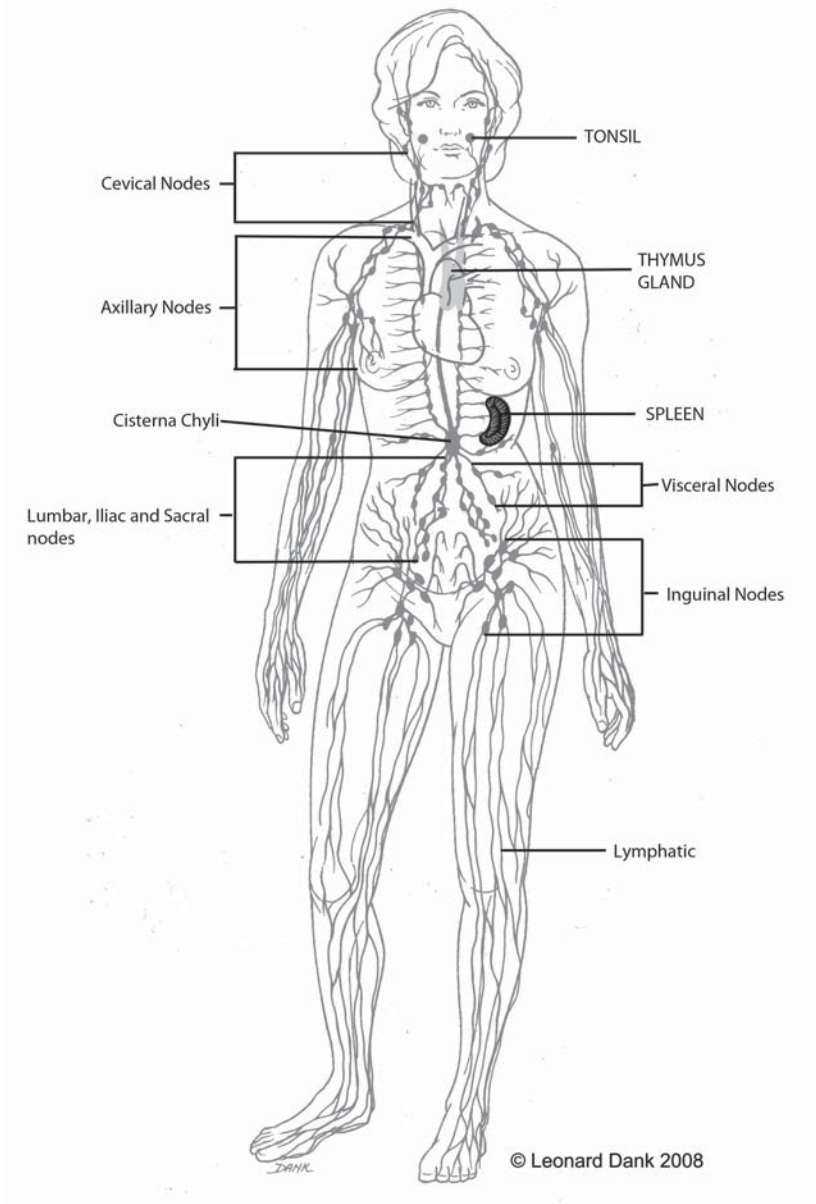


Figure 45.1. Components of the Lymphatic System (image by Leonard Dank)

Hodgkin Lymphoma Cells

Hodgkin lymphoma begins when a lymphocyte (usually a B cell) becomes abnormal. The abnormal cell is called a Reed-Sternberg cell. Reed-Sternberg cells are much larger than normal cells and they divide to make copies of themselves. The new cells divide again and again, making more and more abnormal cells. The abnormal cells don't die when they should. They don't protect the body from infections or other diseases. The buildup of extra cells often forms a mass of tissue called a growth or tumor.

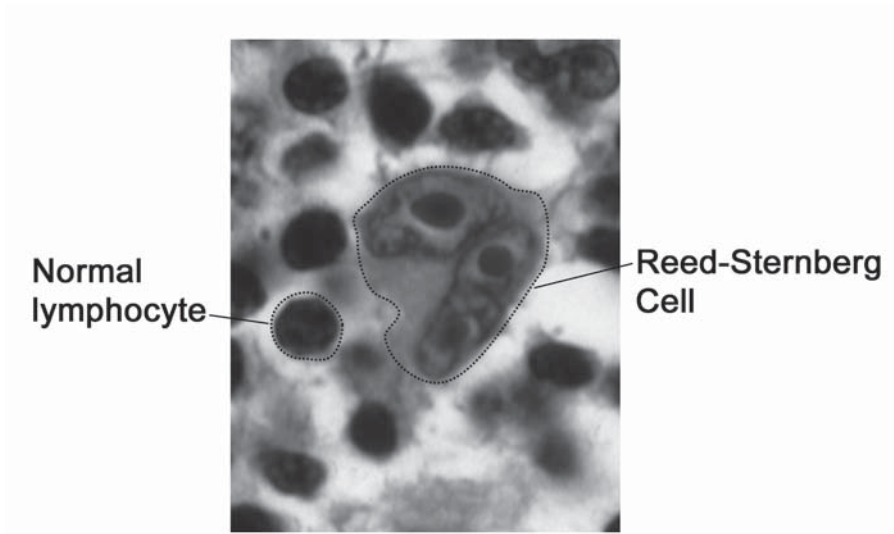


Figure 45.2. *Reed-Sternberg Cell (National Cancer Institute, AV No. CDR576466)*

Risk Factors

Doctors seldom know why one person develops Hodgkin lymphoma and another does not. But research shows that certain risk factors increase the chance that a person will develop this disease. The risk factors for Hodgkin lymphoma include the following:

- **Certain viruses:** Having an infection with the Epstein-Barr virus (EBV) or the human immunodeficiency virus (HIV) may increase the risk of developing Hodgkin lymphoma. However, lymphoma is not contagious. You can't catch lymphoma from another person.

Lymphoma

- **Weakened immune system:** The risk of developing Hodgkin lymphoma may be increased by having a weakened immune system (such as from an inherited condition or certain drugs used after an organ transplant).
- **Age:** Hodgkin lymphoma is most common among teens and adults aged 15 to 35 years and adults aged 55 years and older.
- **Family history:** Family members, especially brothers and sisters, of a person with Hodgkin lymphoma or other lymphomas may have an increased chance of developing this disease.

Having one or more risk factors does not mean that a person will develop Hodgkin lymphoma. Most people who have risk factors never develop cancer.

Symptoms

Hodgkin lymphoma can cause many symptoms:

- Swollen lymph nodes (that do not hurt) in the neck, underarms, or groin
- Becoming more sensitive to the effects of alcohol or having painful lymph nodes after drinking alcohol
- Weight loss for no known reason
- Fever that does not go away
- Soaking night sweats
- Itchy skin
- Coughing, trouble breathing, or chest pain
- Weakness and tiredness that don't go away

Most often, these symptoms are not due to cancer. Infections or other health problems may also cause these symptoms. Anyone with symptoms that last more than two weeks should see a doctor so that problems can be diagnosed and treated.

Diagnosis

If you have swollen lymph nodes or another symptom that suggests Hodgkin lymphoma, your doctor will try to find out what's causing the problem. Your doctor may ask about your personal and family medical history. You may have some of the following exams and tests:

- **Physical exam:** Your doctor checks for swollen lymph nodes in your neck, underarms, and groin. Your doctor also checks for a swollen spleen or liver.
- **Blood tests:** The lab does a complete blood count to check the number of white blood cells and other cells and substances.
- **Chest x-rays:** X-ray pictures may show swollen lymph nodes or other signs of disease in your chest.
- **Biopsy:** A biopsy is the only sure way to diagnose Hodgkin lymphoma. Your doctor may remove an entire lymph node (excisional biopsy) or only part of a lymph node (incisional biopsy). A thin needle (fine needle aspiration) usually cannot remove a large enough sample for the pathologist to diagnose Hodgkin lymphoma. Removing an entire lymph node is best. The pathologist uses a microscope to check the tissue for Hodgkin lymphoma cells. A person with Hodgkin lymphoma usually has large, abnormal cells known as Reed-Sternberg cells. They are not found in people with non-Hodgkin lymphoma.

Types of Hodgkin Lymphoma

When Hodgkin lymphoma is found, the pathologist reports the type. There are two major types of Hodgkin lymphoma:

- **Classical Hodgkin lymphoma:** Most people with Hodgkin lymphoma have the classical type.
- **Nodular lymphocyte-predominant Hodgkin lymphoma:** This is a rare type of Hodgkin lymphoma. The abnormal cell is called a popcorn cell. It may be treated differently from the classical type.

Staging Hodgkin Lymphoma

Your doctor needs to know the extent (stage) of Hodgkin lymphoma to plan the best treatment. Staging is a careful attempt to find out what parts of the body are affected by the disease.

Hodgkin lymphoma tends to spread from one group of lymph nodes to the next group. For example, Hodgkin lymphoma that starts in the lymph nodes in the neck may spread first to the lymph nodes above the collarbones, and then to the lymph nodes under the arms and within the chest.

Lymphoma

In time, the Hodgkin lymphoma cells can invade blood vessels and spread to almost any other part of the body. For example, it can spread to the liver, lungs, bone, and bone marrow.

Staging may involve one or more of the following tests:

- **CT scan:** An x-ray machine linked to a computer takes a series of detailed pictures of your chest, abdomen, and pelvis. You may receive an injection of contrast material. Also, you may be asked to drink another type of contrast material. The contrast material makes it easier for the doctor to see swollen lymph nodes and other abnormal areas on the x-ray.
- **MRI:** A powerful magnet linked to a computer is used to make detailed pictures of your bones, brain, or other tissues. Your doctor can view these pictures on a monitor and can print them on film.
- **PET scan:** You receive an injection of a small amount of radioactive sugar. A machine makes computerized pictures of the sugar being used by cells in your body. Lymphoma cells use sugar faster than normal cells, and areas with lymphoma look brighter on the pictures.
- **Bone marrow biopsy:** The doctor uses a thick needle to remove a small sample of bone and bone marrow from your hipbone or another large bone. Local anesthesia can help control pain. A pathologist looks for Hodgkin lymphoma cells in the sample.

Other staging procedures may include biopsies of other lymph nodes, the liver, or other tissue.

The doctor considers the following to determine the stage of Hodgkin lymphoma:

- The number of lymph nodes that have Hodgkin lymphoma cells
- Whether these lymph nodes are on one or both sides of the diaphragm
- Whether the disease has spread to the bone marrow, spleen, liver, or lung.

The stages of Hodgkin lymphoma are as follows:

- **Stage I:** The lymphoma cells are in one lymph node group (such as in the neck or underarm). Or, if the lymphoma cells are not in the lymph nodes, they are in only one part of a tissue or an organ (such as the lung).

- **Stage II:** The lymphoma cells are in at least two lymph node groups on the same side of (either above or below) the diaphragm. Or, the lymphoma cells are in one part of a tissue or an organ and the lymph nodes near that organ (on the same side of the diaphragm). There may be lymphoma cells in other lymph node groups on the same side of the diaphragm.
- **Stage III:** The lymphoma cells are in lymph nodes above and below the diaphragm. Lymphoma also may be found in one part of a tissue or an organ (such as the liver, lung, or bone) near these lymph node groups. It may also be found in the spleen.
- **Stage IV:** Lymphoma cells are found in several parts of one or more organs or tissues. Or, the lymphoma is in an organ (such as the liver, lung, or bone) and in distant lymph nodes.
- **Recurrent:** The disease returns after treatment.

In addition to these stage numbers, your doctor may also describe the stage as A or B:

- **A:** You have not had weight loss, drenching night sweats, or fevers.
- **B:** You have had weight loss, drenching night sweats, or fevers.

Treatment Options

Your doctor can describe your treatment choices and the expected results. You and your doctor can work together to develop a treatment plan that meets your needs.

Your doctor may refer you to a specialist, or you may ask for a referral. Specialists who treat Hodgkin lymphoma include hematologists, medical oncologists, and radiation oncologists. Your doctor may suggest that you choose an oncologist who specializes in the treatment of Hodgkin lymphoma. Often, such doctors are associated with major academic centers. Your health care team may also include an oncology nurse and a registered dietitian.

The choice of treatment depends mainly on the following the type of your Hodgkin lymphoma (most people have classical Hodgkin lymphoma), its stage (where the lymphoma is found), whether you have a tumor that is more than four inches (10 centimeters) wide, your age, and whether you've had weight loss, drenching night sweats, or fevers. People with Hodgkin lymphoma may be treated with chemotherapy, radiation therapy, or both.

Lymphoma

If Hodgkin lymphoma comes back after treatment, doctors call this a relapse or recurrence. People with Hodgkin lymphoma that comes back after treatment may receive high doses of chemotherapy, radiation therapy, or both, followed by stem cell transplantation.

You may want to know about side effects and how treatment may change your normal activities. Because chemotherapy and radiation therapy often damage healthy cells and tissues, side effects are common. Side effects may not be the same for each person, and they may change from one treatment session to the next. Before treatment starts, your health care team will explain possible side effects and suggest ways to help you manage them. The younger a person is, the easier it may be to cope with treatment and its side effects.

At any stage of the disease, you can have supportive care. Supportive care is treatment to prevent or fight infections, to control pain and other symptoms, to relieve the side effects of therapy, and to help you cope with the feelings that a diagnosis of cancer can bring. You may want to talk to your doctor about taking part in a clinical trial, a research study of new treatment methods.

Chemotherapy

Chemotherapy for Hodgkin lymphoma uses drugs to kill lymphoma cells. It is called systemic therapy because the drugs travel through the bloodstream. The drugs can reach lymphoma cells in almost all parts of the body.

Usually, more than one drug is given. Most drugs for Hodgkin lymphoma are given through a vein (intravenous), but some are taken by mouth.

Chemotherapy is given in cycles. You have a treatment period followed by a rest period. The length of the rest period and the number of treatment cycles depend on the stage of your disease and on the anticancer drugs used.

You may have your treatment in a clinic, at the doctor's office, or at home. Some people may need to stay in the hospital for treatment.

The side effects depend mainly on which drugs are given and how much. The drugs can harm normal cells that divide rapidly:

Blood cells: When chemotherapy lowers the levels of healthy blood cells, you are more likely to get infections, bruise or bleed easily, and feel very weak and tired. Your health care team gives you blood tests to check for low levels of blood cells. If levels are low, there are medicines that can help your body make new blood cells.

- **Cells in hair roots:** Chemotherapy may cause hair loss. If you lose your hair, it will grow back, but it 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. Ask your health care team about medicines and other ways to help you cope with these problems.
- **Some types of chemotherapy can cause infertility:** In men, chemotherapy may damage sperm cells. Because these changes to sperm may be permanent, some men have their sperm frozen and stored before treatment (sperm banking). In women, chemotherapy may damage the ovaries. Women who may want to get pregnant in the future should ask their health care team about ways to preserve their eggs before treatment starts.

Some of the drugs used for Hodgkin lymphoma may cause heart disease or cancer later on.

Radiation Therapy

Radiation therapy (also called radiotherapy) for Hodgkin lymphoma uses high-energy rays to kill lymphoma cells. It can shrink tumors and help control pain.

A large machine aims the rays at the lymph node areas affected by lymphoma. This is local therapy because it affects cells in the treated area only. Most people go to a hospital or clinic for treatment five days a week for several weeks.

The side effects of radiation therapy depend mainly on the dose of radiation and the part of the body that is treated. For example, radiation to your abdomen can cause nausea, vomiting, and diarrhea. When your chest and neck are treated, you may have a dry, sore throat and some trouble swallowing.

In addition, your skin in the area being treated may become red, dry, and tender. You also may lose your hair in the treated area.

Many people become very tired during radiation therapy, especially in the later weeks of treatment. Resting is important, but doctors usually advise people to try to stay as active as they can.

Although the side effects of radiation therapy can be distressing, they can usually be treated or controlled. You can talk with your doctor about ways to ease these problems.

It may also help to know that, in most cases, the side effects are not permanent. However, you may want to discuss with your doctor the

possible long-term effects of radiation treatment. After treatment is over, you may have an increased chance of developing a second cancer. Also, radiation therapy aimed at the chest may cause heart disease or lung damage.

Radiation therapy aimed at the pelvis can cause infertility. Loss of fertility may be temporary or permanent, depending on your age. In men, if radiation therapy is aimed at the pelvic area, the testes may be harmed. Sperm banking before treatment may be a choice. In women radiation aimed at the pelvic area can harm the ovaries. Menstrual periods may stop, and women may have hot flashes and vaginal dryness. Menstrual periods are more likely to return for younger women. Women who may want to get pregnant after radiation therapy should ask their health care team about ways to preserve their eggs before treatment starts.

Stem Cell Transplantation

If Hodgkin lymphoma returns after treatment, you may receive stem cell transplantation. A transplant of your own blood-forming stem cells (autologous stem cell transplantation) allows you to receive high doses of chemotherapy, radiation therapy, or both. The high doses destroy both Hodgkin lymphoma cells and healthy blood cells in the bone marrow.

Stem cell transplants take place in the hospital. Before you receive high-dose treatment, your stem cells are removed and may be treated to kill lymphoma cells that may be present. Your stem cells are frozen and stored. After you receive high-dose treatment to kill Hodgkin lymphoma cells, your stored stem cells are thawed and given back to you through a flexible tube placed in a large vein in your neck or chest area. New blood cells develop from the transplanted stem cells.

Second Opinion

Before starting treatment, you might want a second opinion about your diagnosis and your treatment plan. Many insurance companies cover a second opinion if you or your doctor requests it.

It may take some time and effort to gather your medical records and see another doctor. In most cases, a brief delay in starting treatment will not make treatment less effective. To make sure, you should discuss this delay with your doctor. Sometimes people with Hodgkin lymphoma need treatment right away.

There are many ways to find a doctor for a second opinion. You can ask your doctor, a local or state medical society, a nearby hospital, or

a medical school for names of specialists. Nonprofit groups with an interest in lymphoma may be of help. Some such groups are listed in the resources at the end of this book.

Follow-Up Care

You'll need regular checkups after treatment for Hodgkin lymphoma. Even when there are no longer any signs of cancer, the disease sometimes returns because undetected lymphoma cells may remain somewhere in your body after treatment.

Also, checkups help detect health problems that can result from cancer treatment. People treated for Hodgkin lymphoma have an increased chance of developing heart disease; leukemia; melanoma; non-Hodgkin lymphoma; and cancers of the bone, breast, lung, stomach, and thyroid. Checkups help ensure that any changes in your health are noted and treated if needed. Checkups may include a physical exam, blood tests, chest x-rays, CT scans, and other tests.

After treatment, people with Hodgkin lymphoma may receive the flu vaccine and other vaccines. You may want to talk with your health care team about when to get certain vaccines.

If you have any health problems between checkups, you should contact your doctor.

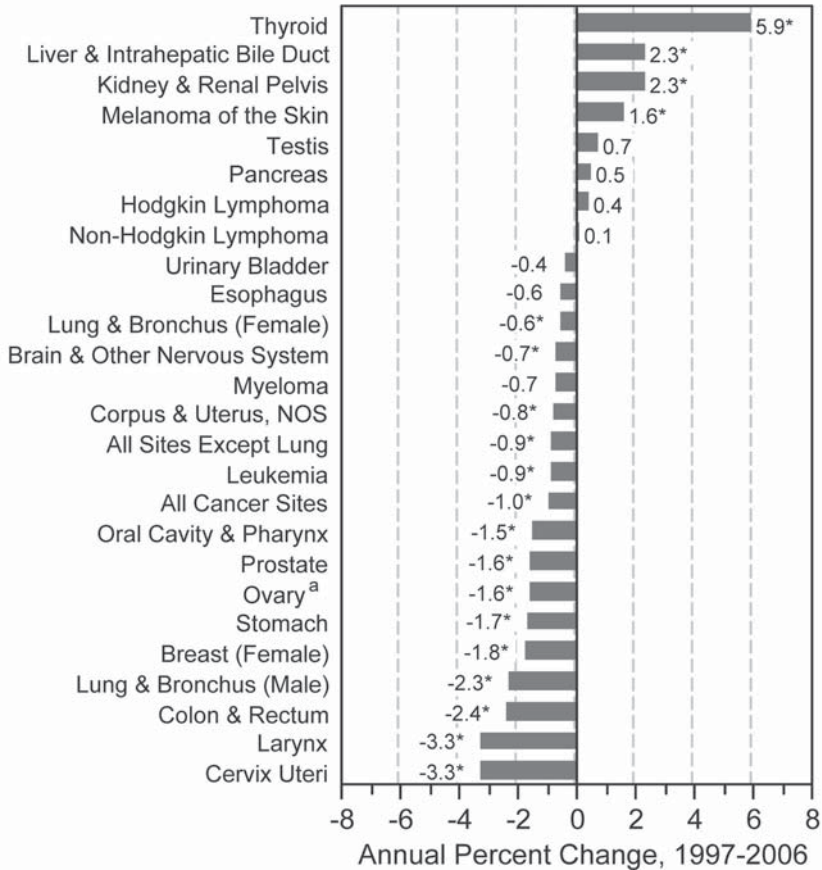


Figure 2.1. Trends in Seer incidence Rates (Source: SEER 13 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia) and US Mortality Files, National Center for Health Statistics, Centers for Disease Control and Prevention).

For sex-specific cancer sites, the population was limited to the population of the appropriate sex. Underlying rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1103). *The Annual Percent Change is significantly different from zero ($p < .05$). ^aOvary excludes borderline cases or histologies 8442, 8451, 8462, 8472, and 8473.)

Bone Cancer

It is estimated that 2,570 men and women (1,430 men and 1,140 women) will be diagnosed with and 1,470 men and women will die of cancer of the bones and joints in 2009.

Cancer Vaccines

Table 71.1. Microbes Associated with Cancer

Infectious Agents	Type of Organism	Associated Cancer(s)
hepatitis B virus (HBV)	virus	hepatocellular carcinoma (a type of liver cancer)
hepatitis C virus (HCV)	virus	hepatocellular carcinoma (a type of liver cancer)
human papillomavirus (HPV) types 16 and 18, as well as other HPV types	virus	cervical cancer; vaginal cancer; vulvar cancer; oropharyngeal cancer (cancers of the base of the tongue, tonsils, or upper throat); anal cancer; penile cancer
Epstein-Barr virus	virus	Burkitt lymphoma; non-Hodgkin lymphoma; Hodgkin lymphoma; nasopharyngeal carcinoma (cancer of the upper part of the throat behind the nose)
human T-cell lymphotropic virus 1 (HTLV1)	virus	acute T-cell leukemia
<i>Helicobacter pylori</i>	bacterium	stomach cancer
schistosomes (<i>Schistosoma hematobium</i>)	parasite	bladder cancer
liver flukes (<i>Opisthorchis viverrini</i>)	parasite	cholangiocarcinoma (a type of liver cancer)

How do cancer treatment vaccines work?

Cancer treatment vaccines are designed to treat cancers that have already occurred. They are intended to delay or stop cancer cell growth; cause tumor shrinkage; prevent cancer from coming back; or eliminate cancer cells that are not killed by other forms of treatment, such as surgery, radiation therapy, or chemotherapy.

Developing effective cancer treatment vaccines requires a detailed understanding of how immune system cells and cancer cells interact. The immune system often does not “see” cancer cells as dangerous or

Brain Tumors

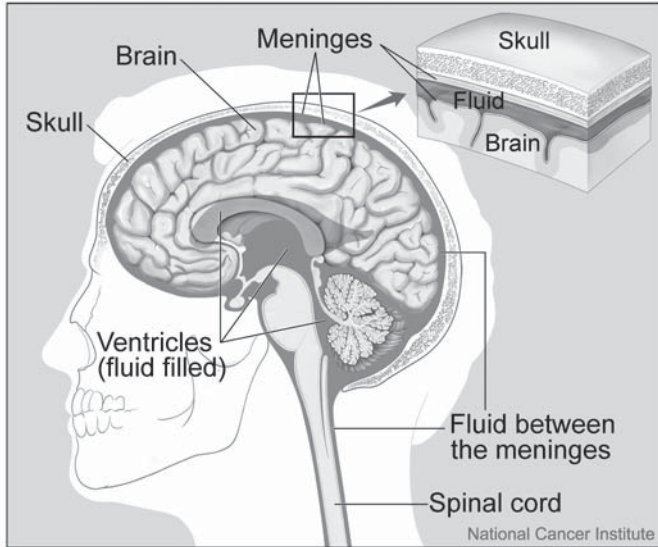


Figure 10.1. *The Brain and Nearby Structures (image by Alan Hoofring, National Cancer Institute).*

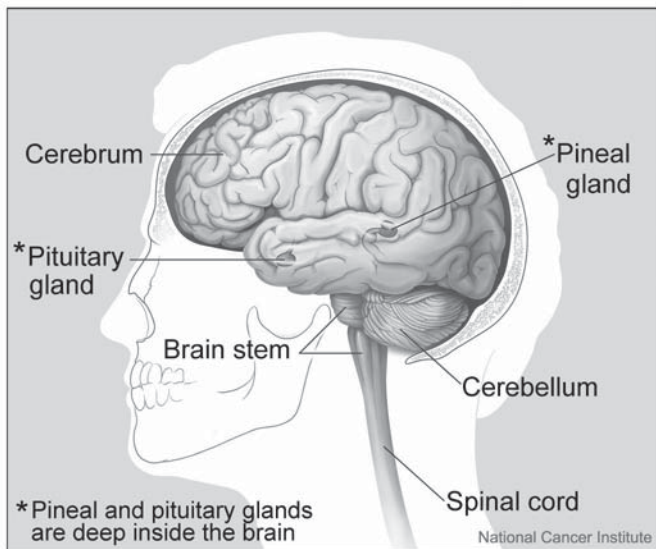


Figure 10.2. *Major Parts of the Brain (image by Alan Hoofring, National Cancer Institute).*

Chapter 75

A Glossary of Cancer-Related Terms

ABCD rating: A staging system for prostate cancer that uses ABCD. “A” and “B” refer to cancer that is confined to the prostate. “C” refers to cancer that has grown out of the prostate but has not spread to lymph nodes or other places in the body. “D” refers to cancer that has spread to lymph nodes or to other places in the body. Also called Jewett staging system and Whitmore-Jewett staging system.

abdominal ultrasound: A procedure used to examine the organs in the abdomen. An ultrasound transducer (probe) is pressed firmly against the skin of the abdomen. High-energy sound waves from the transducer bounce off tissues and create echoes. The echoes are sent to a computer, which makes a picture called a sonogram. Also called transabdominal ultrasound.

abdominoperineal resection: Surgery to remove the anus, the rectum, and part of the sigmoid colon through an incision made in the abdomen. The end of the intestine is attached to an opening in the surface of the abdomen and body waste is collected in a disposable bag outside of the body. This opening is called a colostomy. Lymph nodes that contain cancer may also be removed during this operation.

ablation: In medicine, the removal or destruction of a body part or tissue or its function. Ablation may be performed by surgery, hormones, drugs, radiofrequency, heat, or other methods.

Excerpted from “Dictionary of Cancer Terms,” National Cancer Institute (www.cancer.gov), undated; accessed December 2010.

Chapter 76

National Organizations Offering Cancer-Related Services

General Cancer Information and Cancer Survivorship

American Academy of Family Physicians

11400 Tomahawk Creek
Parkway
Leawood, KS 66211-2672
Toll-Free: 800-274-2237
Phone: 913-906-6000
Website: <http://www.aafp.org>
E-mail: fp@aafp.org

American Cancer Fund

3401 Quebec St. Suite 3200
Denver, CO 80207
Toll-Free: 800-321-1557
Website: <http://www.amc.org>
E-mail: contactus@amc.org

American Cancer Society

250 Williams Street NW, Suite 600
Atlanta, GA 30303-1002
Toll-Free: 800-227-2345
Phone: 404-320-3333
Website: <http://www.cancer.org>

American Childhood Cancer Organization

P.O. Box 498
Kensington, MD 20895
Toll-Free: 800-366-2223
Phone: 301-962-3520
Website: <http://www.americanchildhoodcancer.org>
E-mail: staff@americanchildhoodcancer.org

Information in this chapter was compiled from “National Organizations That Offer Cancer-Related Services,” National Cancer Institute (www.cancer.gov), 2010, and other sources deemed reliable. Inclusion does not constitute endorsement and there is no implication associated with omission. All contact information was updated and verified in October 2010.

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