



Cancer Treatment Factsheet: Biological Therapy

Biological therapy helps the immune system fight cancer. The immune system is the body's natural defense against disease. Part of the immune system's response to disease is the production of antibodies; proteins which bind to foreign substances. Monoclonal antibodies are substances produced in the laboratory which immitate natural antibodies. Monoclonal antibodies are designed to locate and bind to cancer cells wherever they are in the body. They can be used in cancer detection or therapy as each one recognizes and binds to a different protein. Monoclonal antibodies can also be used to deliver drugs, toxins, or radioactive material directly to a tumor.

Trastuzumab ("tras-TU-zoo-mab") or Herceptin® is a monoclonal antibody which targets cancer cells that overexpress a specific protein called HER-2/neu. HER-2/neu is a protein involved in normal cell growth, and it is overexpressed in some fast-growing cancers. By binding to HER-2/neu positive cells, trastuzumab can slow or stop the growth of the cancer cells. Trastuzumab can be used in the treatment of HER-2/neu positive breast cancer patients whose cancer has metastasized.

Trastuzumab is given intravenously. It may be given alone or with chemotherapy. Trastuzumab is a form of systemic therapy because it travels through the bloodstream to reach cells all over the body.

The first time a patient receives Trastuzumab, the most common side effects are fever and chills. Some patients also have pain, weakness, nausea, vomiting, diarrhea, headaches, difficulty breathing or rashes. Side effects usually become milder after the first treatment.

Trastuzumab may also cause heart damage. This may lead to heart failure. Trastuzumab can also affect the lungs. It can cause breathing problems that require a doctor at once. Before a patient receives Trastuzumab, their doctor will check for the heart and lungs. During treatment, the doctor will watch for signs of lung problems.

Sources: U.S. Department of Health and Senior Services, National Institutes of Health, National Cancer Institute. What You Need To Know About™ Breast Cancer and "Herceptin (Trastuzumab): Questions and Answers."



Cancer Treatment Factsheet: Chemotherapy

Chemotherapy uses powerful drugs to attack rapidly dividing cancer cells. Chemotherapy is a form of systemic treatment because the drugs travel in the bloodstream and target cells throughout the body. Chemotherapy for breast cancer is usually a combination of drugs. The drugs may be given as a pill or by injection into a vein. Once in the bloodstream, the drugs circulate through the body attacking the original tumor as well as cancer cells that may have spread to other parts of the body.

Patients with breast cancer can have chemotherapy in an outpatient part of the hospital, at the doctor's office or at home. Some patients need to stay in the hospital during treatment.

Side effects depend mainly on the specific drugs and the dose. Since chemotherapy drugs target all rapidly dividing cells in the body, not just cancer cells, the following cell types may be affected:

- **Blood cells:** These cells fight infection, help blood to clot, and carry oxygen to all parts of the body. When drugs affect blood cells, patients are more likely to get infections, bruise or bleed easily, and feel very weak and tired. Years after chemotherapy, some patients can develop leukemia (cancer of the blood cells).
- **Cells in hair roots:** Chemotherapy can cause hair loss. Their hair will grow back, but it may be somewhat different in color and texture.
- **Cells that line the digestive tract:** These are also rapidly dividing cells affected by chemotherapy drugs. Therefore, chemotherapy can cause poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores.

Doctors can suggest ways to control many of these side effects.

Some drugs used for breast cancer can cause tingling or numbness in the hands or feet. This problem usually goes away after treatment is over. Other problems may not go away. In some patients, the drugs used for breast cancer may weaken the heart.

Some anticancer drugs can damage the ovaries. The ovaries may stop making hormones. Some women may have symptoms of menopause. The symptoms include hot flashes and vaginal dryness. Menstrual periods may no longer be regular or may stop altogether. Some women become infertile (unable to become pregnant). For women over the age of 35, infertility is likely to be permanent.

Source: U.S. Department of Health and Senior Services, National Institutes of Health, National Cancer Institute. What You Need To Know About™ Breast Cancer



Cancer Treatment Factsheet: Hormone Therapy

Some breast tumors need hormones to grow. Hormone therapy is a systemic treatment that keeps cancer cells throughout the body from getting or using the natural hormones they need. Lab tests can determine whether a tumor is hormone sensitive; has receptors for the hormones estrogen or progesterone. If someone has this kind of tumor, they may receive hormone therapy.

This treatment uses drugs or surgery:

- **Drugs:** The doctor may suggest a drug that can block the natural hormone from reaching the tumor. One such drug is Tamoxifen, which blocks estrogen. Another type of drug prevents the body from producing hormones. An aromatase inhibitor is a drug that prevents the formation of estradiol, a female hormone, by interfering with an aromatase enzyme. If the patient has not gone through menopause, their doctor may give them a drug that stops the ovaries from making estrogen.
- **Surgery:** If the patient has not gone through menopause, they may have surgery to remove the ovaries. The ovaries are the main source of the body's estrogen. A woman who has gone through menopause does not need surgery. (The ovaries produce less estrogen after menopause.)

The side effects of hormone therapy depend largely on the specific drug or type of treatment. Tamoxifen is the most common hormone treatment. In general, the side effects of Tamoxifen are similar to some of the symptoms of menopause. The most common are hot flashes and vaginal discharge. Other side effects are irregular menstrual periods, headaches, fatigue, nausea, vomiting, vaginal dryness or itching, irritation of the skin around the vagina, and skin rash. Not all women who take Tamoxifen have side effects.

It is possible to become pregnant when taking Tamoxifen, however this drug may harm the unborn baby. If the patient is still menstruating, they should discuss birth control methods with their doctor. Serious side effects of Tamoxifen are rare. However, it can cause blood clots in the veins. Blood clots form most often in the legs and in the lungs. Women may also have a slight increase in their risk of stroke. Tamoxifen can cause cancer of the uterus. Patients should get regular pelvic exams from their doctor. Patients should tell their doctor about any unusual vaginal bleeding between exams. When the ovaries are removed, menopause occurs at once. The side effects are often more severe than those caused by natural menopause. Health care providers can suggest ways to cope with these side effects.

Source: U.S. Department of Health and Senior Services, National Institutes of Health, National Cancer Institute. What You Need To Know About™ Breast Cancer



Cancer Treatment Factsheet: Radiation Therapy

Radiation therapy is a local therapy using high-energy rays to kill cancer cells in the breast and surrounding lymph node area. Most patients receive radiation therapy after breast-sparing surgery (removes the cancer but not the breast). Some patients receive radiation therapy after a mastectomy. Studies have found equal survival rates for breast-sparing surgery (with radiation therapy) and mastectomy for Stage I and Stage II breast cancer. Treatment depends on the size of the tumor and other factors. The radiation destroys breast cancer cells that may remain in the area after surgery.

Some patients have radiation therapy before surgery to destroy cancer cells and shrink the tumor. Doctors use this approach when the tumor is large or may be hard to remove. Some patients also have chemotherapy or hormone therapy before surgery.

Doctors use two types of radiation therapy to treat breast cancer. Some women receive both types:

- **External radiation:** The radiation comes from a large machine outside the body. Most patients go to a hospital or clinic for treatment. Treatments are usually five days a week for several weeks.
- **Internal radiation:** Thin plastic tubes that hold a radioactive substance are put directly in the breast. The implants stay in place for several days. A patient stays in the hospital while they have implants. Doctors remove the implants before going home.

Side effects depend mainly on the dose and type of radiation and the part of the body treated. It is common for the skin in the treated area to become red, dry, tender and itchy. The breast may feel heavy and tight. These problems will go away over time. Toward the end of treatment, the skin may become moist and “weepy.” Exposing this area to air as much as possible can help the skin heal. Bras and some other types of clothing may rub the skin and cause soreness. Patients may want to wear loose-fitting cotton clothes during this time. Gentle skin care is also important. Patients should check with their doctor before using any deodorants, lotions or creams on the treated area. These effects of radiation therapy on the skin will go away and the area gradually heals once treatment is over. However, there may be a lasting change in skin color. Although the side effects of radiation therapy can be distressing, doctors can usually relieve them.

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

Source: U.S. Department of Health and Senior Services, National Institutes of Health, National Cancer Institute. What You Need To Know About™ Breast Cancer



Cancer Treatment Factsheet: Surgery

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Surgery is the most common treatment for breast cancer. It is a form of local therapy, because it targets the cancer in the breast tumor. There are several types of surgery. Your doctor can explain each type, discuss and compare the benefits and risks, and describe how each will change the way a patient looks:

- **Breast-sparing surgery:** (Remove the cancer but not the breast.) Also called breast-conserving surgery, lumpectomy, segmental mastectomy, and partial mastectomy. Sometimes an excisional biopsy serves as a lumpectomy because the surgeon removes the whole lump. After breast-sparing surgery, most women receive radiation therapy to the breast. This treatment destroys cancer cells that may remain in the breast.
- **Mastectomy:** Remove the breast, or as much of the breast tissue as possible. Some women have radiation therapy after surgery.
- **Lymph Node Biopsy:** When a patient undergoes surgery to remove a breast tumor, a sentinel lymph node biopsy or an axillary lymph node dissection is often performed. During a sentinel lymph node biopsy, the surgeon removes a few of the lymph nodes closest to the tumor in order to determine if the cancer has spread there. If the doctor finds cancer cells in the sentinel lymph nodes, more nodes may be removed. In an axillary lymph node dissection, the surgeon removes the underarm lymph nodes.
- **Breast reconstruction:** Plastic surgery to rebuild the shape of the breast following a mastectomy. This may be done at the same time as a mastectomy or later.

Studies have found equal survival rates for breast-sparing surgery (with radiation therapy) and mastectomy for Stage I and Stage II breast cancer.

The time it takes to heal after surgery is different for everyone. Surgery causes pain and tenderness. Medicine can help control the pain. Before surgery, patients should discuss the plan for pain relief with their doctor or nurse. After surgery, doctors can adjust the plan if more relief is needed. Any kind of surgery also carries a risk of infection, bleeding or other problems. Patients should tell their health care provider right away if they develop any problems.

Patients may feel off balance if they've had one or both breasts removed, especially if they have large breasts. This imbalance can cause discomfort in the neck and back. Also, the skin where the breast was removed may feel tight. Arm and shoulder muscles may feel stiff and weak. These problems usually go away. The doctor, nurse, or physical therapist can suggest exercises to help regain movement and strength. Exercise can also reduce stiffness and pain. Some patients may be able to begin gentle exercises within days of surgery.



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Because nerves may be injured or cut during surgery, patients may have numbness and tingling in their chest, underarm, shoulder, and upper arm. These feelings usually go away within a few weeks or months, but for some patients, numbness does not go away.

Removing the lymph nodes under the arm slows the flow of lymph fluid. The fluid may build up in the arm and/or hand and cause swelling. This swelling is called lymphedema. Lymphedema can develop right after surgery or months to years later.

Patients will need to protect their arm and hand on the side that was treated for the rest of their life:

- Avoid wearing tight clothing or jewelry on the affected arm
- Carry a purse or luggage with the other arm
- Use an electric razor to avoid cuts when shaving underarms
- Have shots, blood tests, and blood pressure measurements on the other arm
- Wear gloves to protect the hands when gardening and when using strong detergents
- Have careful manicures and avoid cutting the cuticles
- Avoid burns or sunburns to the affected arm and hand

Patients should ask their doctor how to handle any cuts, insect bites, sunburn, or other injuries to their arm or hand. Also, patients should contact their doctor if their arm or hand is injured, swells, or becomes red and warm.

If lymphedema occurs, the doctor may suggest a patient raise their arm above their heart whenever they can. The doctor may show patients hand and arm exercises. Some women with lymphedema wear an elastic sleeve to improve lymph circulation. Medication, manual lymph drainage (massage), or use of a machine that gently compresses the arm may also help. Patients with lymphedema may be referred to a physical therapist or another specialist.

Source: U.S. Department of Health and Senior Services, National Institutes of Health, National Cancer Institute. What You Need To Know About™ Breast Cancer and “Sentinal Lymph Node Biopsy: Questions and Answers”