

Oncologist-approved cancer information from the American Society of Clinical Oncology

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Understanding Chemotherapy

This is the first article in a three-part series on chemotherapy. This article provides an overview of the basics of chemotherapy. Other articles in this series include [chemotherapy—your personal experience](#) and [side effects of chemotherapy](#).

Description of chemotherapy

Chemotherapy is the use of drugs to kill cancer cells. Chemotherapy is different from other types of cancer treatments in that it is a systemic treatment, meaning it circulates throughout the entire body, killing original cancer cells and those that may have spread to other locations (metastasis). Chemotherapy destroys reproducing cells but cannot differentiate between normal cells and cancerous cells. Side effects occur when normal cells become damaged.

Goals of chemotherapy

The primary goal of chemotherapy is to successfully treat the cancer and keep it from recurring (returning). If eliminating the cancer completely is not possible with chemotherapy, controlling the disease and preventing it from spreading becomes the priority. If the cancer is advanced and chemotherapy is not effective in controlling cancer spread, chemotherapy may still be effective at decreasing the size of the tumor and reducing the symptoms caused by the cancer, an approach called palliation, or palliative therapy.

Chemotherapy may also be given as a neoadjuvant treatment, which means that it is used to shrink a larger tumor before surgery or radiation therapy. Often, chemotherapy is used as an adjuvant therapy to destroy cancer cells that have been left behind after radiation therapy or surgery.

How a patient receives chemotherapy

Chemotherapy is given in different ways. The drugs may be swallowed, injected into a vein, smoothed onto the skin, or infused into a certain area of the body. How the chemotherapy is given depends on the patient's cancer type, the physical location of the cancer, and the properties

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of the drug.

A patient may receive chemotherapy as an inpatient or outpatient of a hospital, in a doctor's office, or at home/work depending upon how the drugs are administered (given).

How chemotherapy is used to treat cancer

More than 100 drugs are available to treat cancer. Often, oncologists (doctors who specialize in the care and treatment of people with cancer) will combine drugs to more effectively treat a patient's cancer.

The selection of cancer treatment depends on many factors, such as the characteristics of the disease, including type and stage (describes the size and location of the tumor and whether it has spread), as well as the patient's overall health, age, presence of other medical conditions, and previous cancer treatments.

Chemotherapy is given in cycles of medication and recovery to allow the noncancerous cells to heal. A course of chemotherapy consists of several cycles. Recently, researchers have been studying the effect of giving drugs more often with less of a recovery time in what is known as a dose-dense schedule. This schedule appears to have some benefit over the standard treatment schedule, but the differences have not been dramatic. Patients may consider discussing this schedule with their doctors.

Chemotherapy as a systemic treatment

The term chemotherapy has been used loosely to describe other systemic treatments that target properties of cancer cells other than uncontrolled growth. These newer therapies often have fewer side effects and are usually used in combination with conventional chemotherapy.

There are four main types of systemic therapy other than conventional chemotherapy:

- **Hormonal therapy:** Hormones or hormone-like drugs block the effect of the body's natural hormones. This therapy can control or reverse growth of breast, prostate, and uterine cancers. Examples include the anti-estrogen tamoxifen (Nolvadex); aromatase inhibitors letrozole (Femara), anastrozole (Arimidex), exemestane (Aromasin); progestin megestrol acetate (Megace); and the anti-androgen flutamide (Drogenil).
- **Targeted therapy:** Cancer researchers have developed new drugs that specifically recognize unique characteristics of cancer cells, such as proteins that allow cancer cells to grow and spread. Examples include imatinib (Gleevec), trastuzumab (Herceptin), rituximab (Rituxan), erlotinib (Tarceva), bevacizumab (Avastin), cetuximab (Erbix), and sorafenib (Nexavar). Read more about [understanding targeted treatments](#).

- **Immunotherapy:** Immunotherapy (also called biologic therapy) stimulates or mimics the immune system to fight cancer. Currently available immunotherapies include interferon, a protein that helps strengthen the immune system; interleukin-2 (IL-2) (aldesleukin [Proleukin]); and cancer vaccines, which aim to stimulate the body's own defenses to destroy cancer cells. Read more about [immunotherapy](#).
- **Anti-angiogenesis agents:** Rather than targeting the cancer cells directly, anti-angiogenic agents prevent new blood vessels from providing nutrients to cancer cells, essentially starving the tumor. Bevacizumab (Avastin) is an example of this type of treatment and is currently used to treat advanced colorectal cancer. Similar drugs are being tested in clinical trials (studies designed to evaluate whether a new development is safe, effective, and better than the current standard of care). Read more about [angiogenesis and angiogenesis inhibitors to treat cancer](#).

Chemotherapy and clinical trials

The treatment team of doctors and nurses use their experience and knowledge to develop an appropriate treatment plan. They may also alert the patient to relevant clinical trials that are being conducted to test new cancer treatments. For more information, view www.cancer.gov/clinicaltrials and www.cancertrialshelp.org/. Also, the American Cancer Society (ACS) offers a [clinical trials matching service](#). For general information about clinical trials, read Cancer.Net's [clinical trials](#) section.

More Information

[JCO Cancer Advances: New Drug Helps to Reduce Chemotherapy-Related Nausea and Vomiting](#)

[Cancer Advances: News From the 2006 ASCO Annual Meeting](#)

[Types of Treatment](#)

Additional Resources

National Cancer Institute (NCI): [Chemotherapy and You: A guide to Self-Help During Cancer Treatment](#)

NCI: [Helping Yourself During Chemotherapy](#)

Breastcancer.org: [Chemotherapy](#)

Breastcancer.org: [Systemic Therapy: The Whole Body](#)

Breastcancer.org: [Weighing Treatment Pros and Cons](#)

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