

ANTICANCER DRUGS

Cancer is a general term that covers a wide range of disorders, ranging from the leukaemias (blood cancers) to solid tumours of the lung, breast, and other organs. In all cancers, a group of cells escape from the normal controls on cell growth and multiplication. As a result, the malignant (cancerous) cells begin to crowd out the normal cells and a tumour develops. Cancerous cells are frequently unable to perform their usual functions, and this may lead to progressively impaired function of the organ or area concerned. Cancers may develop from cells of the blood, skin, muscle, or any other tissue.

Malignant tumours spread into nearby structures, blocking blood vessels and compressing nerves and other structures. Fragments of the tumour may become detached and carried in the bloodstream to other parts of the body, where they form secondary growths (metastases).

Many different factors, or a combination of them, can provoke cancerous changes in cells. These include an individual's genetic background, immune system failure, and exposure to cancer-causing agents (carcinogens). Known carcinogens

include strong sunlight, tobacco smoke, radiation, certain chemicals, viruses, and dietary factors.

Treating cancer is a complicated process that depends on the type of cancer, its stage of development, and the patient's condition and wishes. Any of the following treatments may be used alone or in combination with the others: surgery, radiation treatment, and drug therapy.

Until recently, drug treatment of cancer relied heavily on hormonal drugs and cytotoxic agents (usually referred to as chemotherapy). Hormone treatments are suitable for only a few types of cancer and cytotoxic drugs, although valuable, can have severe side effects because of the damage that they do to normal tissues. In recent years, as understanding of cancer biology has increased, new drugs have been developed. These include cytokines, such as interferon and interleukin-2, that stimulate the immune system to attack certain cancers, and monoclonal antibodies and growth factor inhibitors that attack the cancer cells much more selectively.

Why they are used

Cytotoxic drugs can cure rapidly growing cancers and are the treatment of choice for leukaemias, lymphomas, and certain cancers of the testis. They are less effective against slow-growing solid tumours, such as those of the breast and bowel, but they can relieve symptoms and prolong life when given as palliative chemotherapy (treatment that relieves symptoms but does not cure the disease). Adjuvant chemotherapy is increasingly being used after surgery, especially for breast and bowel tumours, to prevent regrowth of the cancer from cells left behind after surgery. Neoadjuvant or primary chemotherapy is sometimes used before surgery to reduce the size of the tumour. Hormone treatment is offered in cases of hormone-sensitive cancer, such as breast, uterine, and prostatic cancers, where they can be used to relieve disease symptoms or provide palliative treatment in advanced disease. Cytokines, monoclonal antibodies, and growth factor inhibitors are increasingly used alongside or instead of conventional chemotherapy. Sometimes these can be curative but often they produce or prolong disease remission.

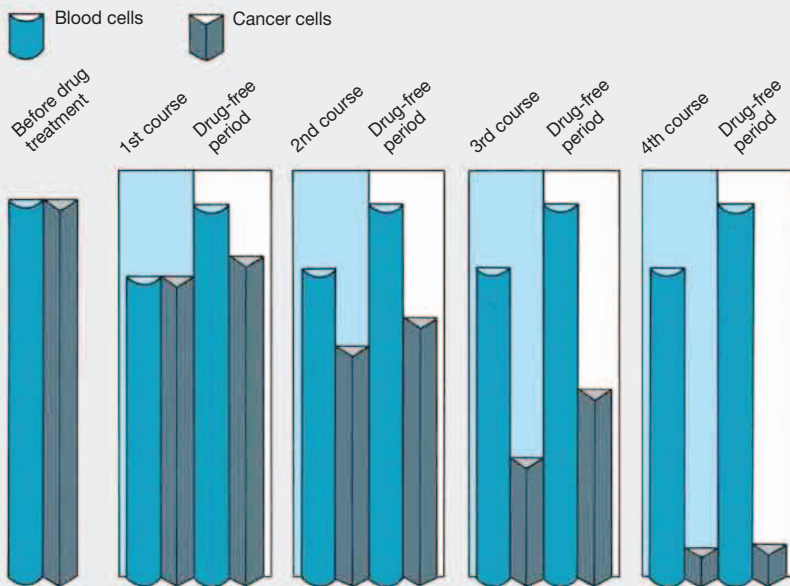
SUCCESSFUL CHEMOTHERAPY

Not all cancers respond to treatment with anticancer drugs. Some cancers can be cured by drug treatment. In others, drug treatment can slow or temporarily halt the progress of the disease. The table (right) summarizes the main cancers that fall into each of these two groups. In certain individual cases, drug treatment has no beneficial effect, but in some

of these, other treatments, such as surgery, often produce significant benefits.

Successful drug treatment of cancer usually requires repeated courses of anticancer drugs because the treatment needs to be halted periodically to allow the blood-producing cells in the bone marrow to recover. The diagram below shows the number of cancer cells and

normal blood cells before and after each course of treatment with cytotoxic anticancer drugs during successful chemotherapy. Both cancer cells and blood cells are reduced, but the blood cells recover quickly between courses of drug treatment. When treatment is effective, the number of cancer cells is reduced, so they no longer cause symptoms.



Response to chemotherapy

Cancers that can be cured by drugs

- Some cancers of the lymphatic system (including Hodgkin's disease)
- Acute leukaemias (forms of blood cancer)
- Choriocarcinoma (cancer of the placenta)
- Germ cell tumours (cancers affecting sperm and egg cells)
- Wilms' tumour (a rare form of kidney cancer that affects children)
- Cancer of the testis

Cancers in which drugs produce worthwhile benefits

- Breast cancer
- Ovarian cancer
- Some leukaemias
- Multiple myeloma (a bone marrow cancer)
- Many types of lung cancer
- Head and neck cancers
- Cancer of the stomach
- Cancer of the prostate
- Some cancers of the lymphatic system
- Bladder cancer
- Endometrial cancer (cancer affecting the lining of the uterus)
- Cancer of the large intestine
- Cancer of the oesophagus
- Cancer of the pancreas
- Cancer of the cervix