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What is Cancer?

This leaflet gives a short account about what cancer is, what tumours are, and how cancers develop and spread. There are separate leaflets on the individual types of cancer such as breast cancer, prostate cancer, lung cancer, skin cancer, etc.

What is cancer?

Cancer is a disease of the cells in the body. There are many different types of cell in the body, and many different types of cancer which arise from different types of cell. What all types of cancer have in common is that the cancer cells are abnormal and multiply out of control. However, there are often great differences between different types of cancer. For example:

- Some grow and spread more quickly than others.
- Some are more easy to treat than others, particularly if diagnosed at an early stage.
- Some respond much better than others to chemotherapy, radiotherapy, or other treatments.
- Some have a better outlook (prognosis) than others. For some types of cancer there is a very good chance of being cured. For some types of cancer, the outlook is poor.

So, cancer is not just one condition. In each case it is important to know exactly what type of cancer has developed, how large it has become, whether it has spread, and how well the particular type of cancer responds to various treatments. This will enable you to get reliable information on treatment options and outlook.

What are cells?

Normal body cells

The body is made up from millions of tiny cells. Different parts of the body, such as organs, bones, muscles, skin, and blood, are made up from different specialised cells. All cells have a centre called a nucleus. The nucleus in each cell contains thousands of genes which are made up from a chemical called DNA.

The genes are like codes which control the functions of the cell. For example, different genes control how the cell makes proteins, or how and when to make hormones or other chemicals. Certain genes control when the cell should divide and multiply, and certain genes even control when the cell should die.

Most types of cell in the body divide and multiply from time to time. As old cells wear out or become damaged, new cells are formed to replace them. Some cells normally multiply quickly. For example, you make millions of red blood cells each day as old ones become worn out and are broken down. Some cells do not multiply at all once they are mature - for example, brain cells.

Normally, your body only makes the right number of cells that are needed.

Abnormal cells

Sometimes a cell becomes abnormal. This occurs because one or more of the genes in the cell has become damaged or altered. The abnormal cell may then divide into two, then four, then eight, and so on. Lots of abnormal cells may then develop from the original abnormal cell. These cells do not know when to stop multiplying. A group of abnormal cells may then form. If this group of cells gets bigger, it becomes a large clump of abnormal cells called a tumour.

What are tumours?

A tumour is a lump or growth of tissue made up from abnormal cells. Tumours are divided into two types - benign and malignant.

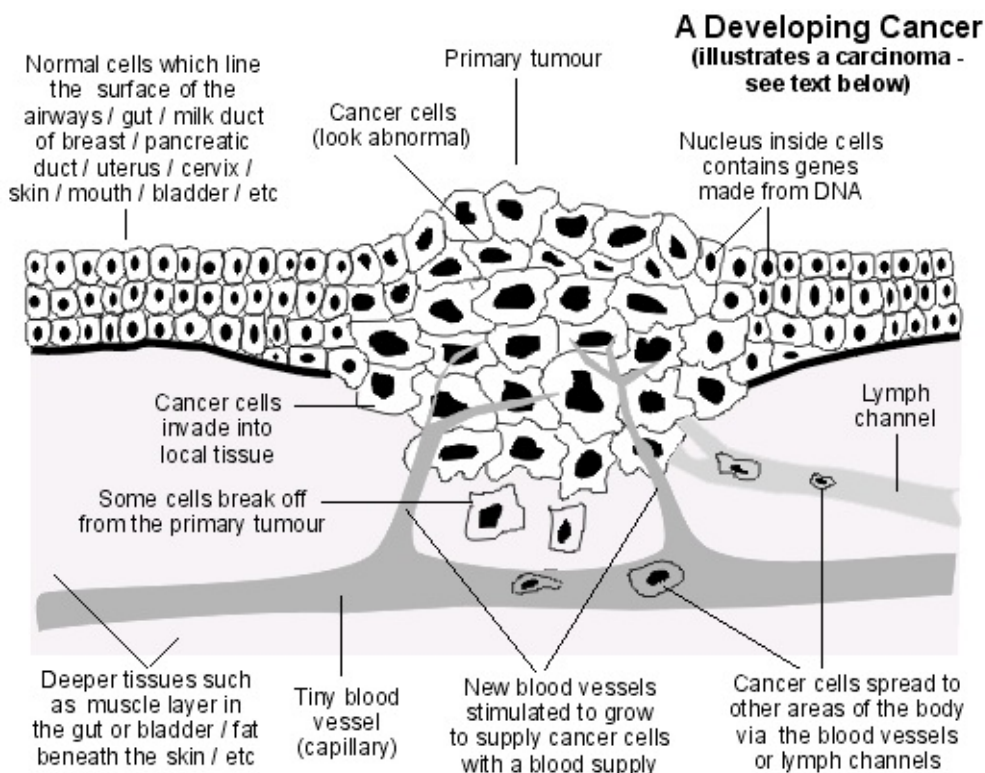
Non-cancerous (benign) tumours

These may form in various parts of the body. Benign tumours grow slowly, and do not spread or invade other tissues. They are not cancerous and are not usually life-threatening. They often do no harm if they are left alone. However, some benign tumours can cause problems. For example, some grow quite large and may cause local pressure symptoms, or look unsightly. Also, some benign tumours that arise from cells in hormone glands can make too much hormone which can cause unwanted effects.

Cancerous (malignant) tumours

Malignant tumours tend to grow quite quickly, and invade into nearby tissues and organs, which can cause damage. The original site where a tumour first develops is called a primary tumour. Malignant tumours may also spread to other parts of the body to form secondary tumours (metastases). These secondary tumours may then grow, invade and damage nearby tissues, and spread again. **Note:** not all cancers form solid tumours. For example, in **cancer of the blood cells (leukaemia)** many abnormal blood cells are made in the bone marrow and circulate in the bloodstream.

How do cancerous (malignant) tumours grow and spread?



Local growth and damage to nearby tissues

Malignant cells multiply quickly. However, to get larger, a tumour has to develop a blood supply to obtain oxygen and nourishment for the new and dividing cells. In fact, a tumour would not grow bigger than the size of a pinhead if it did not also develop a blood supply. Cancer cells make chemicals that stimulate tiny blood vessels to grow around them which branch off from the existing blood vessels. This ability for cancer cells to stimulate blood vessels to grow is called angiogenesis. Malignant cells have the ability to push through or between normal cells. So, as they divide and multiply, malignant cells invade and damage the local surrounding tissue.

Spread to lymph channels and lymph nodes

Some malignant cells may get into local lymph channels. (The body contains a network of lymph channels which drains the fluid called lymph which bathes and surrounds the body's cells.) The lymph channels drain lymph into lymph glands (called lymph nodes). There are many lymph nodes all over the body. A malignant cell may be carried to a lymph node and there it may become trapped. However, it may multiply and develop into a tumour. This is why lymph nodes that are near to a tumour may enlarge and contain cancerous cells.

Spread to other areas of the body

Some malignant cells may get into a local small blood vessel (capillary). They may then get carried in the bloodstream to other parts of the body. The cells may then multiply to form secondary tumours (metastases) in one or more parts of the body. These secondary tumours may then grow, invade and damage nearby tissues, and spread again.

Why do non-cancerous (benign) tumours not spread to other areas?

Cells that make up benign tumours are different to cancerous (malignant) cells. Cells in benign tumours tend to be quite similar to normal cells. They do not invade local tissues. A benign tumour often grows slowly within a capsule or within normal cells which surround the tumour. A benign tumour tends to look and feel smooth and regular and have a well-defined edge. This is unlike a malignant tumour which may look craggy and irregular, and its edges tend to be mixed up with the nearby normal cells and tissue.

Types of cancer

There are more than 100 different types of cancer. Each type is classified by the type of cell the cancer originates from - for example, a breast cell, a lung cell, etc. Each type of cancer generally falls into one of three categories:

- Carcinomas are cancers that arise from cells which line a body surface, or the lining of a gland - for example, the skin, or the lining of the gut, mouth, cervix, airways, etc.
- Sarcomas are cancers that arise from cells which make up the connective tissues such as bones or muscles. For example, an osteosarcoma is a cancer of bone tissue.
- Leukaemias and lymphomas are cancers of cells in bone marrow and lymph glands (lymph nodes). For example, leukaemia is a cancer of cells that make white blood cells.

The five most common cancers in the UK are breast, lung, prostate, bowel and skin cancer. See separate leaflets called [Breast Cancer](#), [Lung Cancer](#), [Prostate Cancer](#), [Colorectal \(Bowel\) Cancer](#) and [Skin Cancer - An Overview](#) for more details. There are also separate leaflets giving details about other types of cancer.

What is carcinoma in situ?

A carcinoma in situ is the very early stage of a cancer when the abnormal cancer cells are confined to their original site. At this stage no tumour has grown and no cancer cells have spread. It may be that many cancers remain at this dormant stage for months, or even years, before they start to grow and spread into a proper cancer. This may be because the cells of the carcinoma in situ do not have the ability to stimulate new blood vessels (see above under 'Local growth and damage to nearby tissues' - angiogenesis). If they cannot stimulate new blood vessels to grow then the cancer itself cannot grow or spread.

It is thought that one or more of the cells in a carcinoma in situ may then mutate after some time (some genes may be altered). This then gives them the ability to make chemicals to stimulate new blood vessels. The cancer then grows and spreads as described above.

A carcinoma in situ contains only a small number of cells and is usually too small to be detected by scans or X-rays. However, some screening tests may detect a carcinoma in situ. For example, some cells from an abnormal cervical screening test, looked at under the microscope, may show carcinoma in situ. These cells can then be destroyed by treatment which prevents cancer from developing. Sometimes a small sample (a biopsy) taken from a part of the body may show a carcinoma in situ.

Further help & information

Cancer Research UK

Angel Building, 407 St John Street, London, EC1V 4AD

Tel: (Nurse team) 0808 800 4040, (Switchboard) 020 7242 0200

Web: www.cancerresearchuk.org

Macmillan Cancer Support

89 Albert Embankment, London, SE1 7UQ

Tel: (Support Line) 0808 808 00 00

Web: www.macmillan.org.uk

Further reading & references

- [What is Cancer?](#); National Cancer Institute

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