

How cancer can spread

Primary and secondary cancer

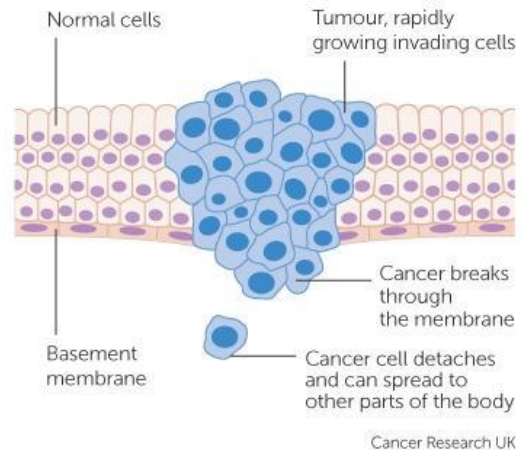
The place where a cancer starts in the body is called the primary cancer or primary site. If cancer cells spread to another part of the body the new area of cancer is called a secondary cancer or a metastasis. Some cancers may spread to more than one area of the body to form multiple secondaries or metastases (pronounced met-as-tah-seez).

How cancer can spread to other areas of the body

Cancer cells can be carried in the bloodstream or lymphatic system to other parts of the body. There they can start to grow into new tumours. The diagram shows a primary bowel cancer that has spread to the liver.

In order to spread, some cells from the primary cancer must break away, travel to another part of the body and start growing there. Cancer cells don't stick together as well as normal cells do. They may also produce substances that stimulate them to move.

The diagram shows a tumour appearing in cells lining a body structure such as the bowel wall. The tumour grows through the layer holding the cells in place (the basement membrane). Some cells can then go into small lymph vessels or blood vessels called capillaries in the area.



Spread through the blood circulation

If the cancer cells go into small blood vessels they can then get into the bloodstream. They are called circulating tumour cells.

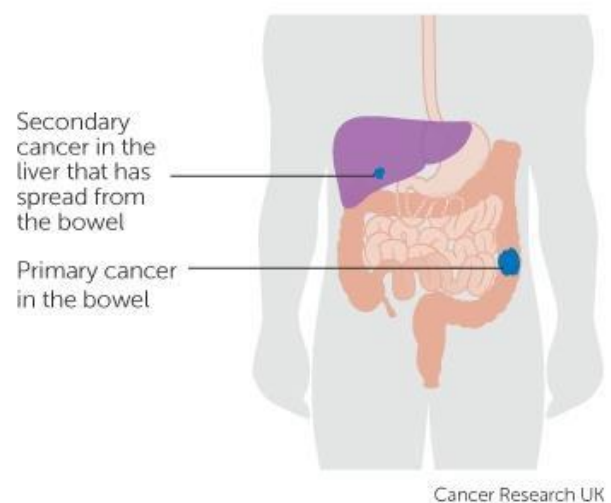
Researchers are currently looking at using blood tests to find circulating tumour cells to diagnose cancer and avoid the need for tests such as biopsies. They are also looking at whether they can test circulating cancer cells to predict which treatments will work best for each patient.

The circulating blood sweeps the cancer cells along until they get stuck somewhere. Usually they get stuck in a very small blood vessel called a capillary.

Then the cell must move through the wall of the capillary and into the tissue of the organ close by. The cell can multiply to form a new tumour if the conditions are right for it to grow and it has the nutrients that it needs.

This is quite a complicated journey and most cancer cells don't survive it. Probably, out of many thousands of cancer cells that reach the blood circulation only a few will survive to form a secondary cancer (metastasis).

Some cancer cells are probably killed off by the white blood cells in our immune system. Others cancer cells may die because they are battered around by the fast flowing blood. Cancer cells in the circulation may try to stick to platelets to form clumps to give themselves some protection. Platelets are blood cells that help the blood to clot. This may also help the cancer cells



to be filtered out in the next capillary network they come across so they can then move into the surrounding tissues.

Spread through the lymphatic system

The lymphatic system is a network of tubes and glands in the body that filters body fluid and fights infection. It also traps damaged or harmful cells such as cancer cells.

If cancer cells go into the small lymph vessels close to the primary tumour they can be carried into nearby lymph glands. The cancer cells may get stuck there. In the lymph glands they may be destroyed but some may survive and grow to form tumours in one or more lymph nodes.

Doctors call this lymph node spread.

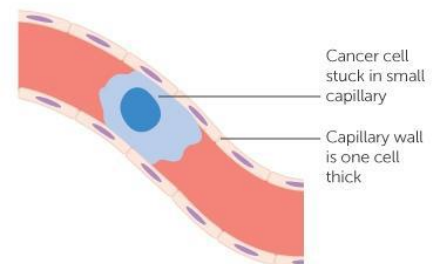
Micrometastases

Micrometastases are areas of cancer spread (metastases) that are too small to see. Some areas of cancer cells are too small to show up on any type of scan. For a few types of cancer, blood tests can detect certain proteins released by the cancer cells. These may give a sign that there are metastases in the body that are too small to show up on a scan. But for most cancers, there is no blood test that can say whether a cancer has spread or not.

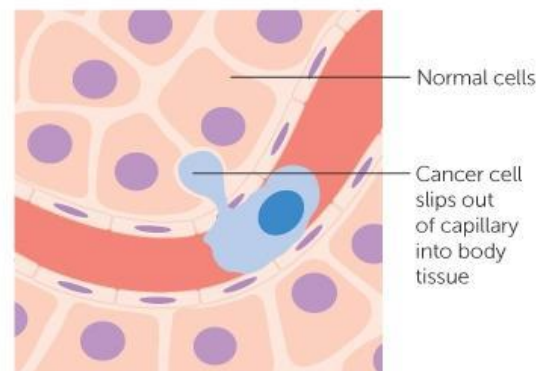
For most cancers the doctor can only say whether it is likely or not that a patient has micrometastases. This may be based on the following factors.

- Previous experience of many other patients treated in the same way. Doctors collect and publish this information to help each other
- Whether cancer cells are found in the blood vessels in the tumour removed during surgery (for example in testicular cancer). If cancer cells are found then cancer cells are more likely to have reached the bloodstream and spread to somewhere else in the body
- The grade of the cancer (how abnormal the cells are) – the higher the grade, the more quickly the cancer is growing and the more likely that cells have spread
- Whether lymph nodes removed during an operation contained cancer cells (for example in breast cancer or bowel cancer). If the lymph nodes contained cancer cells this shows that cancer cells have broken away from the original cancer. But there is no way of knowing whether the cells have spread to any other areas of the body

This information is important in treating cancer. If the doctor thinks it is likely that micrometastases are present, they may offer extra treatment, such as chemotherapy, radiotherapy, biological therapy or hormone therapy. The aim is to kill any areas of cancer cells before they grow big enough to be seen on a scan. So the extra treatments may increase the chance of curing the cancer.



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