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Pneumology

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Fast Facts Information Sheets for Patients

Biomarkers in Metastatic Non-Small Cell Lung Cancer

A guide for people living with the disease

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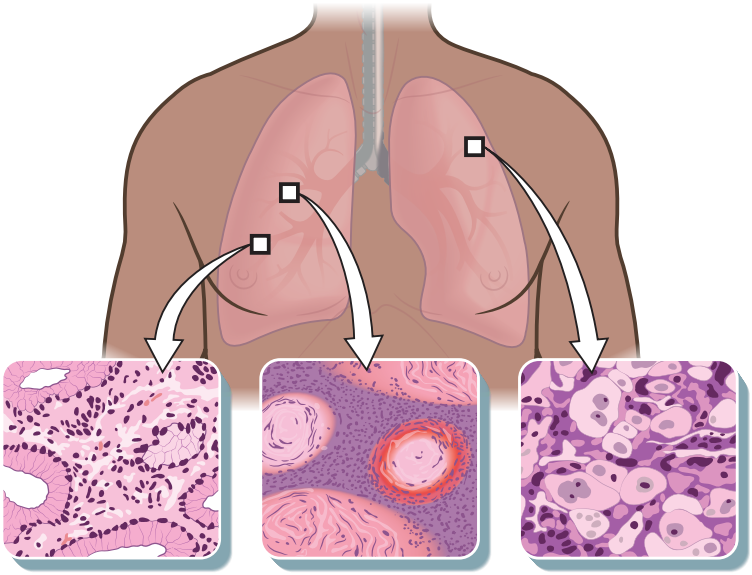
Biomarkers in metastatic non-small cell lung cancer – a guide for people living with the disease



What is non-small cell lung cancer?

Cancers are named after the type of cell that becomes cancerous. There are many different cell types in the lungs, so there is more than one type of lung cancer.

There are three main types of non-small cell lung cancer (NSCLC):

- Adenocarcinoma, which develops from gland cells inside the lungs
- Squamous cell carcinoma, which develops from cells that form the lining of the lungs
- Large cell carcinoma, which develops from large cells in the lung airways

What is metastatic cancer?

The place a cancer starts is called the **primary cancer**. But cancer cells can break away and travel to another part of the body. The places they start growing are called **secondary cancers** (or **metastatic cancers**). NSCLCs are more likely to spread to some parts of the body than others, such as the brain, bone, and liver.

Remember, wherever they are, they are lung cancer cells that may respond to treatments for lung cancer.

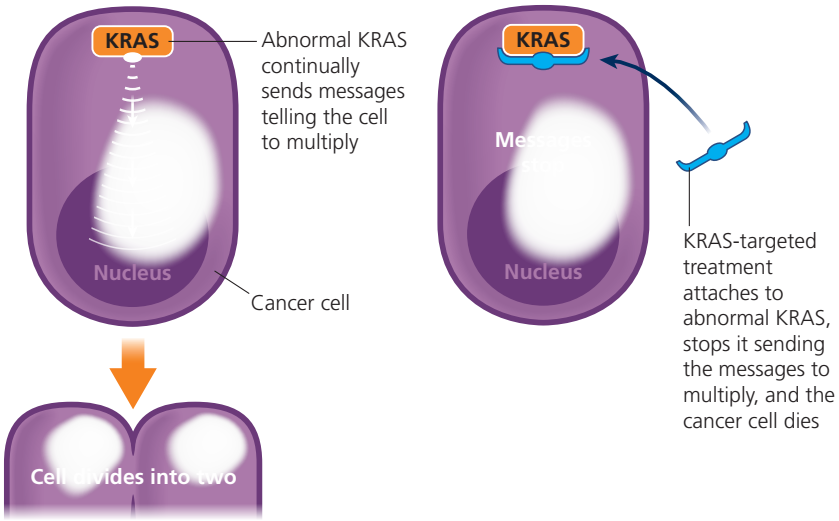
What makes cancer cells different?

Cancer cells are abnormal because they have changes – **mutations** – in their genes. Genes carry instructions for making proteins that control how body cells multiply and function.

Mutated genes in cancer cells make abnormal proteins. It's these that cause cancer cells to behave differently from normal cells – they are able to spread, grow too quickly, and don't die when they should. Some mutations are inherited from a parent, but most – like KRAS mutations in NSCLC – are only found in the cancer cells and can't be passed on to children.

A mutation that encourages cancer cells to grow uncontrollably is called a **driver mutation**.

KRAS is the most common driver mutation in NSCLC cells. When it is mutated, it constantly sends signals telling the cell to multiply.



Why are cancer gene changes important?

Abnormal proteins that result in abnormal growth of cancer cells are potential targets for treatment. If doctors can use drugs that block them, cancer growth may slow down or stop.

Abnormal proteins that are targets for drugs and that can be measured are a type of **biomarker**.

If tests show your cancer has a biomarker, then the drug that targets it may help to successfully treat your cancer. This is a way of personalizing your treatment – the treatment is specifically chosen to treat your cancer.

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Biomarkers and NSCLC

There are several important biomarkers in NSCLC, including KRAS.

There are different types of KRAS mutation. **G12C** is the most common of them – more than 4 in every 10 (40%) KRAS mutations are the G12C subtype.

Until recently, people with advanced NSCLC (including those with a KRAS G12C mutation) were unlikely to survive for a long time. But now treatments have been developed that target cancers with this biomarker and help to block cancer cell growth. Researchers are also working on drugs that target other types of KRAS mutations.

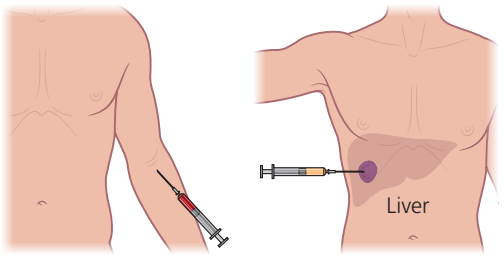
How do I get tested for biomarkers?

Ask your doctor about biomarker testing. The mutations are usually only found in cancer cells, not normal body cells. So, they will test your cancer cells to see which mutations they have.

You may have had a biopsy and biomarker tests when your cancer was first diagnosed, but they may need to be repeated. Cancers can sometimes continue to develop new gene mutations (potential biomarkers) as they grow.

There is also now a blood test for biomarkers. Your doctor may call this a liquid biopsy.

However, your doctor may want to take a biopsy of an area of cancer spread. For example, you may have a biopsy from a tumor in your liver. Your doctor will do this by putting a needle through the skin. First, you'll have some local anesthetic and then the doctor will remove some cancerous tissue. They may use an ultrasound or CT scan to see where to put the needle.



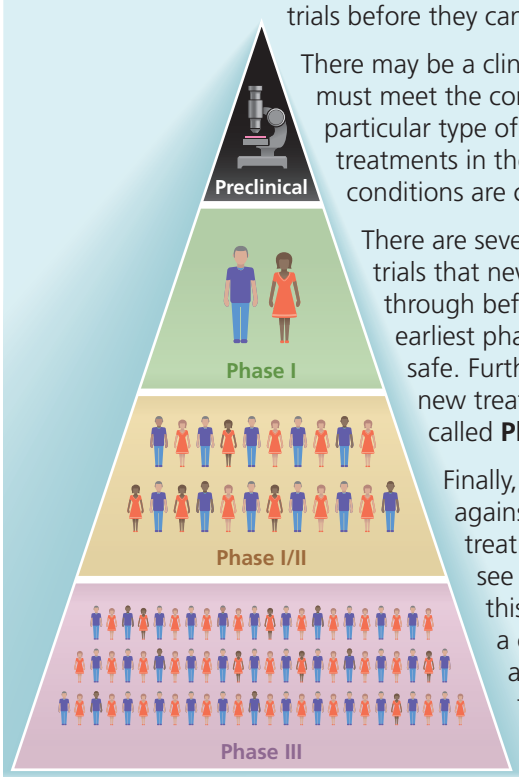
Liquid biopsy | Liver biopsy

What happens next?

Once your biopsy sample has been analyzed, your doctor will explain your test results. Your results may show your cancer has a gene mutation (biomarker). Some biomarkers can now be targeted by specific cancer drugs. If yours can, your doctor may suggest you start a new treatment. For example, you may have tablets or capsules that you take once or twice a day for as long as they help to control your lung cancer.

Clinical trials

Research is going on all the time into new treatments for cancer, including treatments that target lung cancer biomarkers. All potential treatments that show promise in early tests need to go through clinical trials before they can be considered for approval.



There may be a clinical trial of a new treatment that you can join. To enter a clinical trial, you must meet the conditions of the trial – having a particular type of cancer or having had particular treatments in the past, for example. These conditions are called the **trial eligibility**.

There are several different phases of clinical trials that new treatments must go through before they can be licensed. The earliest phases are to make sure they are safe. Further trials show how well the new treatment works. These are called **Phase I** and **Phase II** trials.

Finally, the new treatment is tested against the current best standard treatment in a **Phase III** trial, to see which helps most. If you join this type of trial, you won't have a choice of treatment. You'll be allocated randomly to either the new treatment or the current standard treatment.

Ask your doctor

- What type of lung cancer do I have?
- Where has my cancer spread to?
- What are my treatment options?
- Has a sample of my cancer been tested for biomarkers?
- Which biomarkers have you tested for and what are the results?
- Should I have the cancer spread tested too? Will this mean I need to have a biopsy?
- Are there treatments available for the biomarkers my cancer has?
- What are the options if you don't find any biomarkers?
- Are there any clinical trials that are suitable for me?

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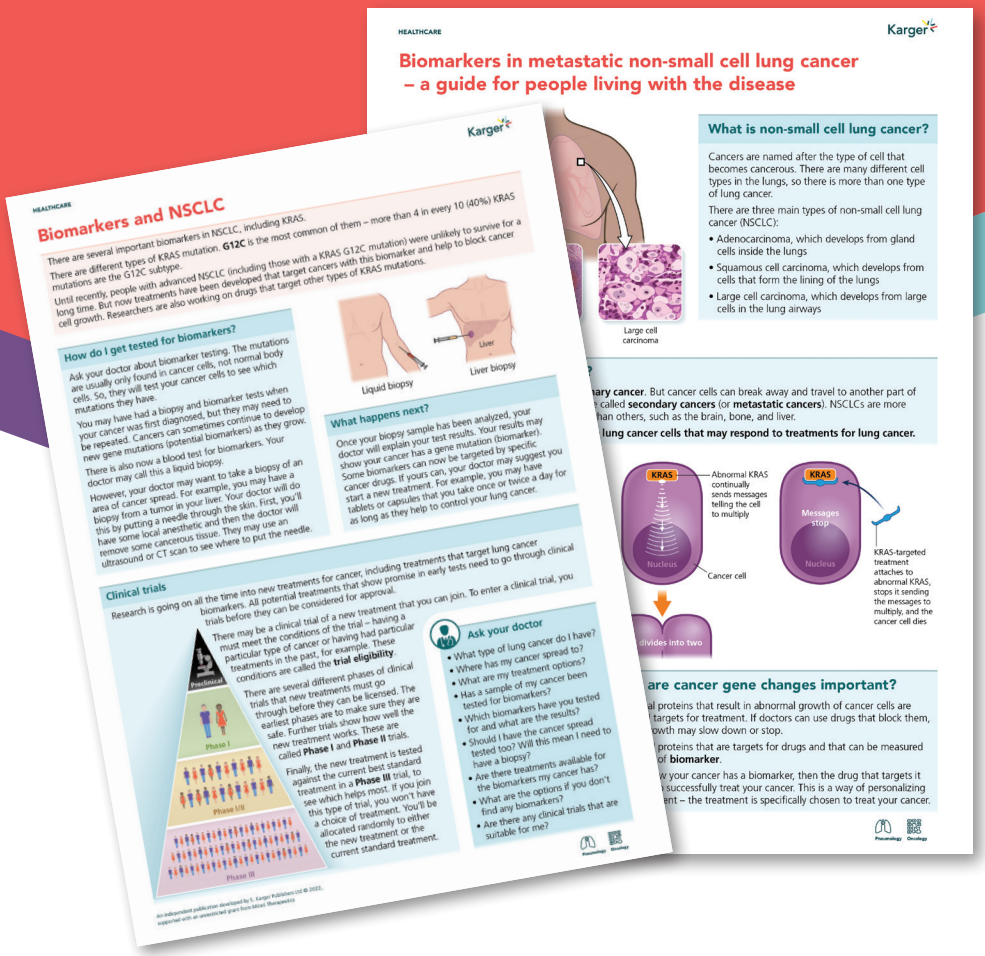

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