

# NOT ALL LUNG CANCERS ARE THE SAME

Your guide to lung  
cancer biomarker  
testing and finding  
the care that fits you



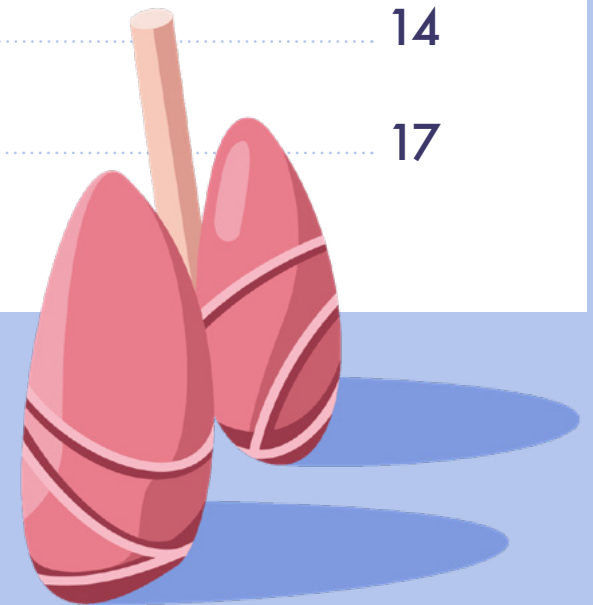
This guide was co-created by Takeda and ALK Positive Europe,  
fully funded by Takeda.



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Check out the glossary for definitions of the key terms in **pink** throughout



The background of the page is a light blue color with a repeating pattern of stylized human lungs. Each lung is depicted in a reddish-pink color with a yellowish-brown bronchus. The lungs are scattered across the page, some appearing as a pair and others as a single lung. The pattern is consistent throughout the document.

# INTRODUCTION

If you've recently been diagnosed with **lung cancer**, it's completely natural to feel overwhelmed by the news and the amount of information you may be receiving. Whether diagnosis has come as a complete shock, or if lung cancer is something that runs in your family, it's understandable if the news feels difficult to process.

**Lung cancer is not the same for everyone.** Each diagnosis is unique and often needs an individualised approach to treatment and care. This guide was created to provide clear information about lung cancer types and **biomarker** testing, helping you better understand your diagnosis.

This guide has been co-created with **ALK Positive Europe** and **Takeda** as part of the '**Not All Lung Cancers Are The Same**' campaign. It has been developed with input from patient advocates and healthcare professionals across Europe to offer information on different types of lung cancer, outline some treatment approaches, and point you towards places where you can find further support. The content has been reviewed to reflect widely accepted medical understanding and patient perspectives, offering reliable support for the diverse range of people impacted by this disease.

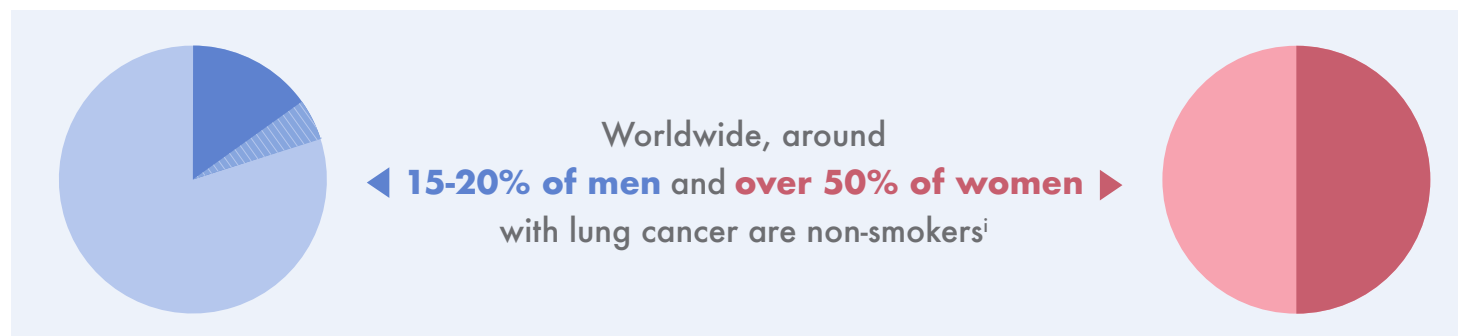
# UNDERSTANDING DIFFERENT TYPES OF LUNG CANCER

Lung **cancer** begins in the lungs when certain cells change and start to grow in an unusual way, forming a **tumour**. It is not a single disease – there are different types, and understanding the type you have, along with its specific characteristics, is an important first step in helping your healthcare team plan the treatment approach that's most appropriate for you.

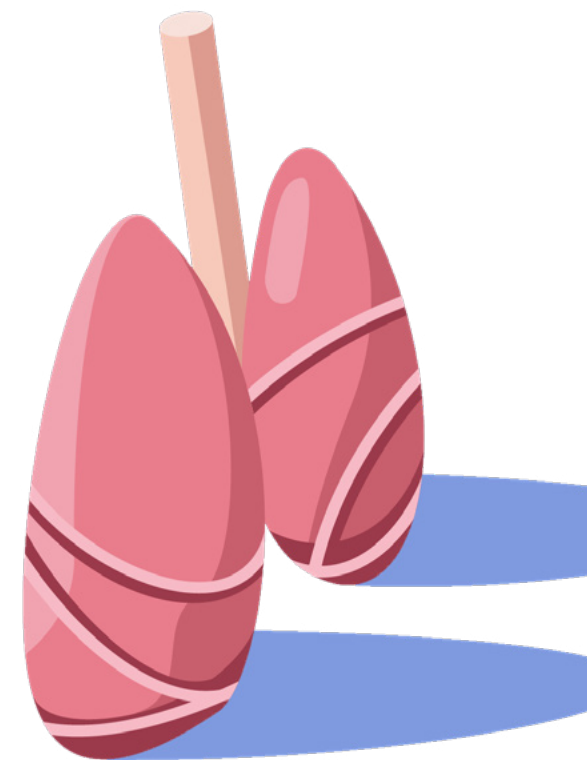
## Who can get lung cancer?

Lung cancer is often surrounded by an unfair stigma, based on the assumption that it only affects people who smoke. **This isn't true.**

While smoking is a major risk factor, anyone with lungs can develop lung cancer. There are many different risk factors that may contribute.

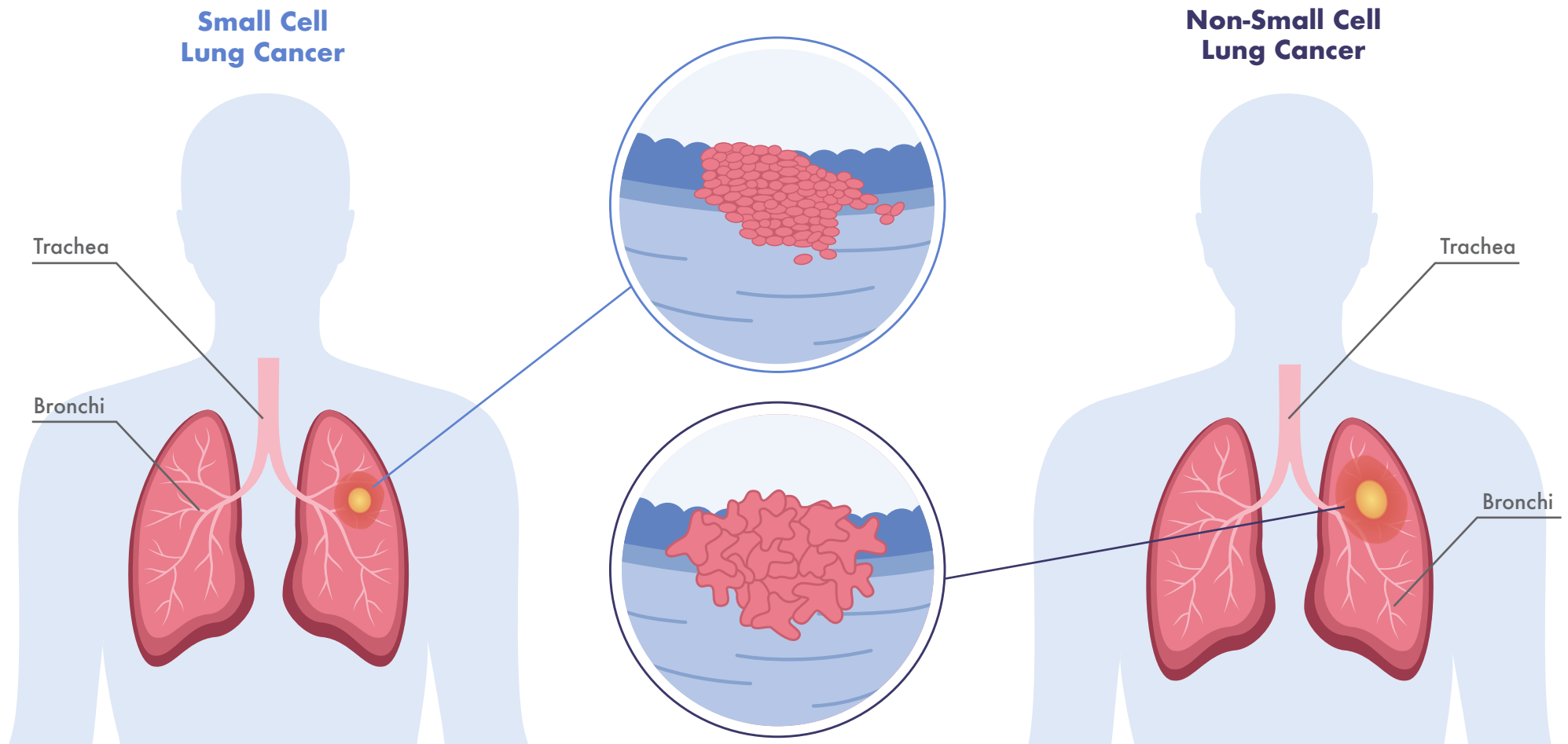


It's important to remember that no one deserves lung cancer, and everyone diagnosed deserves empathy, support and access to the best care available.



## Types of lung cancer

Lung **cancer** is usually divided into two main types: **small cell lung cancer (SCLC)** and **non-small cell lung cancer (NSCLC)**. Within these types, doctors may find specific changes in the cancer's **genes** (sometimes called mutations). These changes can affect how the cancer grows, spreads, or responds to certain treatments.



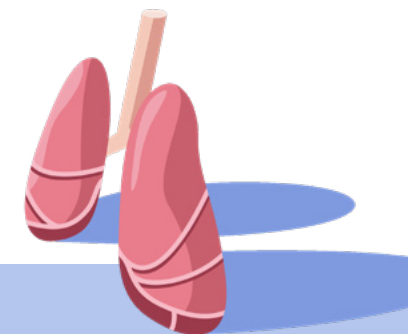
Small cell lung cancer (SCLC): <sup>ii</sup>	Non-small cell lung cancer (NSCLC): <sup>iii</sup>
Makes up about 15% of lung cancer cases	Makes up about 85% of lung cancer cases
Cancer cells are smaller and tend to grow and spread more quickly than NSCLC	Cancer cells are larger and usually grow and spread more slowly than SCLC
Can spread to other parts of the body at an early stage	Can spread to other parts of the body, often at a slower pace than SCLC
<b>Two main subtypes:</b> <ul style="list-style-type: none"> <li>• <b>Small cell carcinoma</b></li> <li>• <b>Combined small cell carcinoma</b></li> </ul>	<b>Three main subtypes:</b> <ul style="list-style-type: none"> <li>• <b>Adenocarcinoma</b></li> <li>• <b>Squamous cell carcinoma</b></li> <li>• <b>Large cell carcinoma</b></li> </ul>

## Stages of lung cancer

When doctors talk about the stage of lung cancer, they are describing how big the **tumour** is, where it is located, and whether it has spread to other parts of the body. Lung cancer is usually grouped into stages 1 to 4, with stage 1 being the earliest stage, and stage 4 the most advanced. Each stage can sometimes be divided into smaller sub-stages, which your healthcare team can explain in more detail.

The stage is usually determined after a series of tests, which may include chest x-rays, CT or MRI scans, PET scans, blood tests,

**tissue biopsies**, or ultrasound scans. Your healthcare team can help to explain which tests you may need, what they look for and what makes them different. Understanding the stage of your cancer helps your healthcare team discuss the treatment options that may work best for you, along with other important factors such as your overall health.



## Oncogene-driven lung cancer

Advances in science have shown that some cases of NSCLC are linked to changes in certain **genes**.

Normally, our cells contain healthy genes, called **proto-oncogenes**, that help control how cells grow and divide. Sometimes, these genes change or become damaged. When this happens, they can turn into **oncogenes**, which tell cells to grow and divide uncontrollably. This uncontrolled growth can lead to **cancer**.

Cancers that develop in this way are often called **oncogene-driven cancers**. If your healthcare team suspects your cancer may be oncogene-driven, they can use specific tests to look for these gene changes. Understanding these results can help guide your treatment options.

There are different types of oncogene-driven cancers. In lung cancer, some of the gene changes that can act as oncogenes and drive cancer growth include, but are not limited to, the following:

<b>KRAS</b>	<b>MET</b>
<b>EGFR</b>	<b>ALK</b>
<b>HER2</b>	<b>ROS1</b>
<b>BRAF</b>	<b>RET</b>



This kind of change is called a **genetic mutation**, and it can happen for different reasons.

Many mutations develop from **random changes** in cells over time. These changes can sometimes be linked to things that increase cancer risk, such as tobacco smoking, exposure to certain toxins, or radiation.<sup>iii</sup>

Some genetic mutations are **inherited** as part of the genes passed down from your parents. These inherited mutations can increase the risk of developing certain types of cancer, even if no one in your family has ever had cancer. If this applies to you, your healthcare team can help explain what it might mean for you and your family.

In oncogene-driven cancers, the mutations are almost always acquired, never inherited.



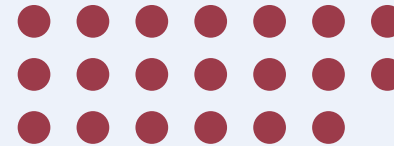
## Identifying oncogene-driven lung cancer

All **oncogenes** are a type of **biomarker**. A biomarker is any measurable change in the body – such as a **genetic mutation** – that may help guide diagnosis and treatment.

Biomarkers are usually found through laboratory tests, using samples such as blood, **tumour tissue**, or other bodily fluids.

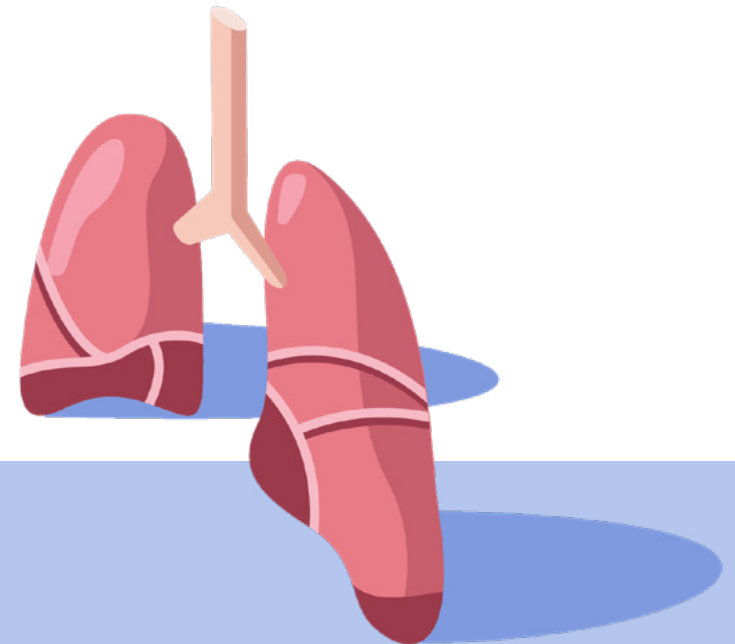


Around **9** biomarkers have been identified in SCLC<sup>iv</sup>



Around **20** biomarkers have been identified in NSCLC<sup>v</sup>

Research into lung **cancer** biomarkers is ongoing, and scientists continue to study and identify new ones over time. Sometimes, more than one biomarker can be present in the same cancer, meaning several genetic changes may be driving how the cancer grows.



# IS MY CANCER ONCOGENE-DRIVEN?

When you're diagnosed with lung **cancer**, learning more about its specific type and characteristics can feel overwhelming, but this information could make a real difference to your care. A more detailed understanding of your cancer can help your healthcare team tailor a treatment plan that's right for you.

## Healthcare professionals may use a combination of tests

To find out whether your cancer is **oncogene-driven**, your healthcare team may recommend a combination of tests, such as **tissue biopsies** or **liquid biopsies** (a type of blood test). These tests help gather important information about your cancer type and any genetic changes that may be influencing how it grows.



- ▶ To help you feel confident in discussing your testing and care options with your healthcare team, download **Your conversation guide to lung cancer biomarker testing and treatment** – a support resource on the ALK Positive Europe website.

## Understanding the process of biomarker testing



**Biomarker** testing (sometimes called molecular or genetic testing) is a laboratory test that looks for specific genetic changes in your **cancer** cells. These changes may be linked to certain **oncogenes**, such as **HER2, ALK, KRAS**, or others.

Usually, biomarker testing starts with a **tissue biopsy**, where a small sample of your **tumour** is collected. In some cases, a **liquid biopsy**, which is a type of blood test, may also be used. Once the sample is taken, it's sent to a laboratory for detailed analysis. One type of analysis that is sometimes available is called **Next Generation Sequencing (NGS)**. NGS is an advanced testing method that can check for multiple biomarkers at once, which can help build a clearer picture of your cancer's genetic profile.

Test results usually take 1–3 weeks, though this may vary.<sup>vi</sup> When your results are ready, your oncologist will go through them with you and explain what they mean. It's possible that your results may show that your cancer is driven by an oncogene, which may help guide your treatment plan. However, not all lung cancers are **oncogene-driven**, and not all biomarkers are currently known. Research in this area is ongoing, and new findings help inform future treatment options. Even so, biomarker testing is still an important step to help understand what treatment options may be available to you.

If your cancer returns or progresses, your healthcare team may recommend another round of biomarker testing to check for additional or new genetic changes.

## How to talk to your doctor about testing



If your healthcare team hasn't mentioned biomarker testing yet, it's important to bring it up.

**Below are some questions to start the conversation:**

- I want biomarker testing - am I eligible?
- Does my lung cancer have any biomarkers or **genetic mutations**?
- If I want a biomarker test but I am not eligible, why is that?
- How could biomarker testing influence my treatment plan?



# UNDERSTANDING TREATMENT OPTIONS

After learning more about your specific lung **cancer** diagnosis, your doctor will talk with you about the treatment options available. These may depend on the type and stage of your lung cancer, whether it's **oncogene-driven**, and any **biomarkers** that have been identified through testing.

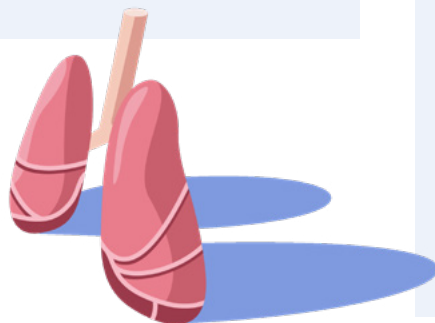
## Targeted therapies for oncogene-driven lung cancers

Some **oncogene-driven lung cancers** can be treated with **targeted therapies** (sometimes called **precision therapies**). These treatments are designed to block the effects of specific genetic changes that help cancer cells grow. While therapies are not yet available for all biomarkers, ongoing research continues to expand treatment options.



### How do targeted therapies work?

Targeted therapies work by interfering with the abnormal signals caused by genetic changes in cancer cells. By blocking these signals, they can help slow or stop **tumour** growth. These treatments are often taken as oral tablets.<sup>vii</sup>



### Types of targeted therapies for common mutations

Targeted therapies are grouped into different types based on how they block the signals produced by oncogenes that help cancer cells grow.

One common type of targeted therapy used in lung cancer is **tyrosine kinase inhibitors (TKIs)**, which are designed to block the effects of certain oncogenes, that drive cancer **cell growth**.<sup>viii</sup> Another type, called **antibody-drug conjugates (ADCs)**, attaches to specific markers (like tiny flags) on the surface of cancer cells and delivers treatment directly to them.<sup>ix</sup> **Monoclonal antibodies** are another form of targeted therapy that block certain **proteins** that help cancer grow, and in some cases, help the immune system recognise and attack these cells.<sup>x</sup>

The type of targeted therapy you may receive depends on the results of your biomarker testing.

New targeted treatments continue to emerge as more oncogenes are discovered. This is one of the key reasons that biomarker testing is important; it helps match the right treatment to the unique characteristics of your cancer.

If your **cancer** isn't linked to a known oncogene, or if targeted therapy isn't suitable, other treatment options may be recommended. These could include **immunotherapy**, **radiotherapy**, **chemotherapy**, surgery, or a combination of these treatments.



## Immunotherapy

**Immunotherapy** works by helping your body's own immune system recognise and fight cancer more effectively. It's usually given through a drip into a vein (called an **intravenous infusion**) at regular intervals.<sup>xi</sup> Your healthcare team will guide you on how often you may need this treatment and what to expect.



## Radiotherapy

**Radiotherapy** uses high-energy radiation (such as X-rays) to target and damage cancer cells in a specific area of the body. It works by breaking the **DNA** inside cancer cells. Once their DNA is damaged, the cells can't grow or divide properly, and over time they die.<sup>xiii</sup>

There are several types of radiotherapy, and the type used may depend on factors like where the cancer is in the body, its size, and its type.



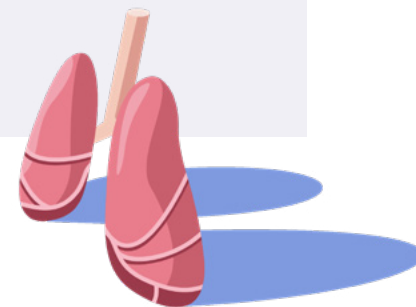
## Chemotherapy

**Chemotherapy** uses medicines that attack fast-growing cells, including cancer cells. It may be used on its own or in combination with other treatments, depending on your diagnosis and overall health. Chemotherapy can be used to shrink **tumours**, slow down cancer growth, or manage symptoms to help you feel more comfortable.<sup>xii</sup>



## Surgery

In some cases, surgery may be an option, particularly if your lung cancer is found early and is confined to one area. Surgery involves removing the part of the lung affected by cancer, and sometimes nearby lymph nodes as well. If this is suitable for you, your healthcare team will explain what the procedure involves and how it may help as part of your overall treatment plan.



Understanding your treatment options, and how they relate to the specific characteristics of your type of lung **cancer**, can help you feel more informed and supported when discussing your next steps. If you have questions, your healthcare team is there to guide and reassure you throughout the process.

## Side effects

Lung cancer treatments can cause side effects, which vary from person to person. Your healthcare team may offer additional support, treatments or advice to help manage side effects. It's important to speak up about how you're feeling – even if changes seem small – so you can receive the care you need.

## The evolving treatment landscape

Lung cancer treatment is continually advancing, offering new hope and potential options for many people.

Researchers are working hard to find new and better ways to treat lung cancer. Promising progress is being made in areas such as cancer vaccines and clinical trials, which are helping to expand the range of available treatments. These newer approaches may not be right for everyone, but they may offer opportunities for some people.

If you're interested in learning more about emerging therapies or clinical trials, speak with your healthcare team. They can help you understand whether any of these options might be appropriate for your individual situation and guide you through what's involved.

## Shared decision-making

Your healthcare team will guide you through treatment options based on your medical needs. It's also important that your care reflects what matters most to you. Shared decision-making is about working together – combining clinical expertise with your personal priorities. By sharing your goals and concerns, you can help shape a treatment plan that truly supports your needs.



# NEXT STEPS

Being diagnosed with lung **cancer** can feel overwhelming. You may be facing new medical information, important decisions, and a lot of uncertainty. It is completely normal to feel anxious, confused, or unsure about what comes next. But you are not alone. Support is available to help you manage both the practical and emotional challenges of this journey.

## Your well-being

Lung cancer care isn't just about the treatment itself – it's also about how you feel from day to day. Supportive care focuses on helping you maintain the best possible quality of life, whatever your diagnosis or stage.

### This may include:



Managing symptoms and side effects such as fatigue, breathlessness, or nausea



Emotional support and counselling to help with anxiety or low mood



Practical guidance on adjusting to life at home, at work, or in your relationships



Resources for carers and loved ones, including advice on how best to support someone with lung cancer

Talk to your healthcare team about the supportive care services available to you. These services are often available alongside your main treatment to help you feel as well as possible throughout your care.

## What should I do next?

Taking small steps can sometimes make a big difference in helping you feel more prepared and supported. Here are a few things you might find helpful:

### 1 PREPARE FOR YOUR APPOINTMENTS

If you can, consider bringing someone along with you to your appointments, both for emotional support and as a second pair of ears. Writing down questions or notes before, during, and after your appointments can also help you feel more in control.

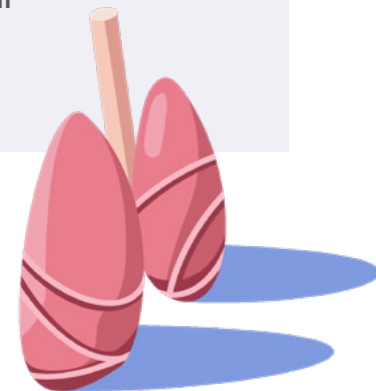
To help you feel more confident during discussions with your healthcare team, consider reading **'Your conversation guide to lung cancer biomarker testing and treatment'** – a resource you can download from the ALK Positive Europe website.

### 2 TALK TO YOUR FRIENDS AND FAMILY

In a way that feels most comfortable for you, talk to your loved ones about what you're going through. If you have a known family history of lung cancer or similar conditions, speaking with relatives about their experiences may give you valuable context and emotional support.

### 3 WIDEN YOUR SUPPORT NETWORK

Connecting with others who have faced similar challenges, whether in person or through online communities, can offer comfort, practical tips, and a sense of understanding that only those with shared experiences can provide.



## Where can I go to get more support?

There are many organisations that offer reliable support and information for people living with or affected by lung **cancer**.



### ALK Positive Europe

[www.alkpositiveeurope.org](http://www.alkpositiveeurope.org)

A patient-led association supporting people with ALK-positive lung cancer.

For more information on '**Not All Lung Cancers Are The Same**' – visit the ALK Positive Europe Resources page:  
<https://alkpositiveeurope.org/resources/>



### Lung Cancer Europe (LuCE)

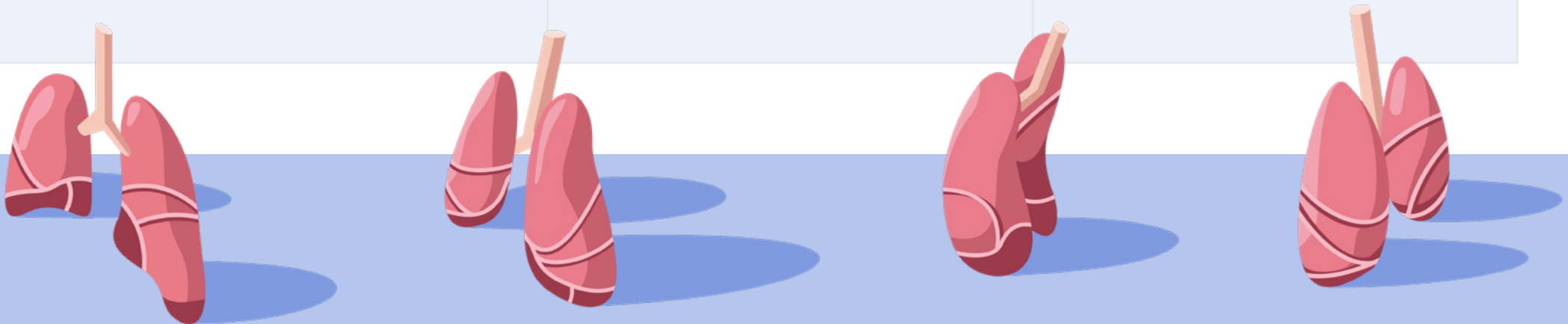
<https://www.lungcancereurope.eu>

LuCE provides a European platform for lung cancer patient advocacy associations and networks and supports the establishment of national lung cancer patient groups in those European countries where such groups do not yet exist.



### Local support organisations

Many countries have national cancer societies or lung cancer-specific groups available to provide support.



# GLOSSARY

**Adenocarcinoma:** A type of cancer that forms in the parts of the body that make mucus, often in the lungs.<sup>xiv</sup>

**ALK (Anaplastic Lymphoma Kinase):** A gene that can lead to unusual proteins that help cancer grow.<sup>xv</sup>

**Antibody:** A protein made by the immune system that protects the body by finding and attaching to harmful germs like viruses.<sup>xvi</sup>

**Antibody-Drug Conjugate (ADC):** A targeted cancer treatment that links an antibody to a drug, delivering it directly to cancer cells while reducing effects on healthy cells.<sup>ix</sup>

**Biomarker:** A biological molecule that indicates the presence or progression of a disease, or the effects of treatment.<sup>xvii</sup>

**Cancer:** A group of diseases where abnormal cells grow uncontrollably and can spread to nearby tissues or other parts of the body.<sup>xviii</sup>

**Carcinogen:** A substance that may increase one's risk of developing cancer.<sup>xix</sup>

**Carcinoma:** A type of cancer that starts in the skin or in the lining of organs inside the body.<sup>xx</sup>

**Cell Division:** The process by which a single cell splits into two new cells. In cancer, this process may happen too quickly or uncontrollably.<sup>xxi</sup>

**Cell Growth:** The process by which cells increase in size and mass. In cancer, this process can become uncontrolled.<sup>xxii</sup>

**Chemotherapy:** A treatment that uses drugs to kill or slow the growth of cancer cells.<sup>xii</sup>

**Combined Small Cell Carcinoma:** A rare form of lung cancer that has features of both small cell and non-small cell cancer types.<sup>ii</sup>

**DNA (Deoxyribonucleic Acid):** The molecule that carries the genetic instructions for the development, functioning, and reproduction of all living things.<sup>xxiii</sup>

**DNA Replication:** The process by which DNA is copied in cells; errors can lead to mutations and cancer.<sup>xxiv</sup>

**Epidermal Growth Factor Receptor (EGFR):** A protein that, when mutated, can lead to cancer growth.<sup>xxv</sup>

**Gene:** A part of DNA that gives the body instructions to make a certain protein or perform a specific function in the body.<sup>xxvi</sup>

**Genetic Mutation:** A change in DNA that can lead to uncontrolled cell growth and cancer.<sup>xxvii</sup>

**Human Epidermal Growth Factor Receptor 2 (HER2):** A gene that can promote the growth of cancer cells. Mutations in this gene are targetable in some cancers.<sup>xxviii</sup>

**Immunotherapy:** A type of treatment that helps the immune system recognise and attack cancer cells.<sup>xi</sup>

**Intravenous (Infusion):** The administration of medication or fluids directly into a vein.<sup>xxix</sup>

**Kirsten Rat Sarcoma (KRAS):** A gene that helps cells send signals; mutations in this gene are common in several cancers, including lung cancer.<sup>xxx</sup>

**Large Cell Carcinoma:** A type of non-small cell lung cancer characterised by large, abnormal-looking cells.<sup>xxxi</sup>

**Liquid Biopsy:** A test done on a blood sample to look for cancer cells or DNA from tumours.<sup>xxxii</sup>

**Monoclonal Antibody:** A laboratory-made protein that works like a natural antibody, finding and attaching to cancer cells. Some monoclonal antibodies help the immune system fight the cancer, while others block the signals cancer cells need to grow.<sup>x</sup>

**MET:** A gene that controls cell growth and repair and is sometimes changed in cancer.<sup>xxxiii</sup>

**Next Generation Sequencing (NGS):** Advanced diagnostic test used to detect mutations in cancer.<sup>xxxiv</sup>

**Non-Small Cell Lung Cancer (NSCLC):** The most common type of lung cancer, includes subtypes like adenocarcinoma and squamous cell carcinoma.<sup>iii</sup>

**Oncogene:** A gene that has the potential to cause cancer.<sup>xxxv</sup>

**Oncogene-Driven Lung Cancer:** A type of lung cancer that is primarily caused by specific genetic mutations (oncogenes) that drive cancer growth.<sup>xxxvi</sup>

**Palliative Care:** Special care for patients, focused on relieving symptoms and improving quality of life.<sup>xxxvii</sup>

**Protein:** A building block of the body that helps it work properly. Proteins do many jobs, like building muscles, carrying messages, and fighting infections.<sup>xxxviii</sup>

**Proto-Oncogene:** A normal gene that helps cells grow but, if changed or damaged, could become a cancer-causing gene (see oncogene).<sup>xxxv</sup>

**Radiotherapy:** A type of treatment using high-energy radiation to kill cancer cells.<sup>xiii</sup>

**RET:** A gene that makes a protein that plays an important role in cell growth and development of nerve cells in the body. Mutations in the RET gene may cause the protein made by this gene to become overactive, which may cause abnormal cells, including cancer cells, to grow.<sup>xxxix</sup>

**ROS1:** A gene that makes a protein that is involved in sending signals in cells and in cell growth. Mutated forms of the ROS1 gene and protein have been found in some types of cancer, including non-small cell lung cancer (NSCLC).<sup>xl</sup>

**Small Cell Carcinoma:** A type of cancer, often found in the lungs, made up of small round cells that multiply quickly and are aggressive in nature.<sup>ii</sup>

**Small Cell Lung Cancer (SCLC):** A fast-growing type of lung cancer that tends to spread quickly.<sup>ii</sup>

**Squamous Cell Carcinoma:** A type of lung cancer that starts in the cells lining the airways.<sup>xli</sup>

**Targeted/Precision Therapies:** Treatments that target specific genetic mutations or proteins in cancer cells.<sup>xlii</sup>

**Tissue:** A group of cells that work together to do a specific job in the body.<sup>xliii</sup>

**Tissue Biopsy:** The removal of a small amount of tissue for examination under a microscope to diagnose disease.<sup>xliv</sup>

**Tyrosine Kinase Inhibitor (TKI):** A targeted therapy drug that blocks signals from certain oncogenes, like EGFR or ALK, to slow or stop cancer cell growth.<sup>viii</sup>

**Tumour:** An abnormal mass of tissue. Some are not harmful, but others can turn into cancer.<sup>xlv</sup>

**v-raf Murine Sarcoma Viral Oncogene Homolog B1 (BRAF):** A gene involved in cell growth; mutations in this gene are found in various cancers, including lung cancer.<sup>xlvi</sup>

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