

# Genetic testing and targeted therapy

When you have been diagnosed with lung cancer your doctor will do a variety of diagnostic tests to understand the biology of your tumour and to guide your treatment. One of these tests is genetic testing that looks at the genes that are causing your cancer. Genetic testing provides a more comprehensive picture of your lung cancer and helps your oncologist develop and guide the most appropriate treatment plan for you.

## What is genetic testing?

Genetic testing can have many names, including mutation testing, genomic testing, genetic panel testing, biomarker testing or molecular testing. Essentially, all these terms refer to the same process. Cells from a biopsy of your lung cancer are examined under a microscope and have a range of tests carried out upon them. These tests determine if there is a mutation present by the way the cells look, behave and react to the tests.

## Why is genetic testing important?

A high percentage of lung cancers carry some form of mutation. A mutation can possibly occur in cancer due to multiple factors which may be environmental or genetic, or the exact cause may not be known.

The process of genetic testing can take a number of weeks to fully complete. Taking the time to get the results is important. Testing for mutations can help your oncologist to better understand the type of cancer you have, and to identify which treatment may be most effective and appropriate for you. Biomarkers, such as PD-L1 will also be determined through testing, which can also help to determine treatment.

Common mutations associated with lung cancer include:

- EGFR - epidermal growth factor receptor
- ALK - anaplastic lymphoma kinase
- ROS1 - Reactive Oxygen Species 1
- KRAS - Kirsten rat sarcoma viral oncogene homolog

Research is continually being undertaken in lung cancer to learn more about the role mutations play. Check with your oncologist if your biopsy sample has had genetic testing and ask for the results to be explained to you.

## What happens if a mutation is found?

The presence of a mutation gives your oncologist information about your cancer, and possibly how it will behave. Depending on what type of mutation is found, there may be a specific treatment, called targeted therapy suitable for you.

## What is targeted therapy?

As it sounds, targeted therapy is a treatment which precisely targets a particular type of cancer cell or mutation.

## How does targeted therapy work?

Targeted therapy is able to attack cancer cells, while minimising harm to healthy cells. It is only active, or effective, on the cell or genetic material that it has been designed to treat. Targeted therapy may affect the cancer cells it targets through different methods such as:

- blocking or turning off signals that tell cancer cells to grow and divide
- preventing the cells from living longer than normal
- destroying cancer cells.

In lung cancer, targeted therapy may come in the form of a tablet or capsule. Some may be taken daily for many months or years while they are effective in treating your lung cancer.

However, targeted therapies do have some limitations. It is possible that the targeted cancer cell may mutate again or become resistant to treatment – meaning it may work as expected when you first start on the treatment, but then may stop working. It is also possible that side effects from the treatment are not able to be tolerated. If this happens another type of targeted therapy may be tried or another treatment option explored, for example, immunotherapy or chemotherapy. Many factors determine which treatment is the best for you, at the time. Your oncologist will discuss the risks and benefits involved in all of your options.

### Are there side effects with targeted therapy?

Whilst specifically targeting cancer cells, targeted therapies do have the potential to cause side effects, which can vary in severity. Common side effects can include skin reactions, changes in the way your bowel works, fatigue, joint aches and pains. They are usually able to be better managed when you report them early to your treating healthcare team. Ask your treating healthcare team about what possible side effects you should be on the lookout for and what to do in the event you experience them.

## What if there is no genetic mutation or no targeted therapy?

It is possible that your lung cancer will not carry a mutation or it may have one for which there is no specific targeted therapy currently available. If this is the case and drug treatment is required, your oncologist may offer chemotherapy, immunotherapy or a combination of these two treatments together. At all times, your oncologist will consider your entire health picture and recommend what is the most appropriate treatment for you.

## Looking ahead

Greater understanding of mutations in cancer cells has changed the way cancer is treated, resulting in the development of many therapies that target specific cancer cells and mutations. Some mutations found in lung cancer are also identified in other types of cancers. This has helped in the ongoing improvement and development of treatments and outcomes through broader cancer research.

It is possible that new targeted treatment options may become available in the future, after your initial diagnosis and treatment. Speak with your oncologist about all of your options for treatment.



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### Lung Foundation Australia Services

- Information and Support Team
- Lung disease information resources
- Education webinars
- Lung Cancer and Respiratory Support Nurses
- Support groups
- Peer-to-peer connections
- Referral to pulmonary rehabilitation and Lungs in Action exercise programs
- E-newsletter

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