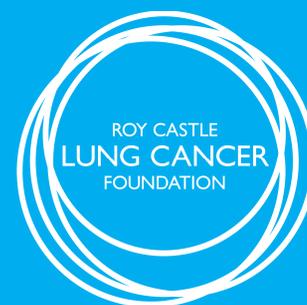


Immunotherapy and lung cancer treatment



What is immunotherapy?

Immunotherapy, also called immuno-oncology or “IO”, is a kind of treatment that helps the body’s own immune system to recognise and destroy cancer cells more effectively. It can be used to treat some forms of cancer including non-small cell lung cancer (NSCLC).

What is the immune system? How does it work?

The primary function of the immune system is to protect us from damage mainly from viruses and bacteria. When the immune system doesn’t work hard enough or is broken, this can result in infection.

The role of the immune system is to recognise and eradicate abnormal cells (such as cancer cells). The frontline of your immune system includes cells in your blood stream called white blood cells.

Different types of white blood cells recognise bacteria, viruses or cells as abnormal and neutralise them by creating an inflammation in the area to destroy the invasive cells or germs.

T-cells are a type of white blood cell that can recognise if a cell has become infected or is abnormal, such as a cancer cell. T-cells are activated and work to destroy anything they recognise as not normal.

How do cancer cells avoid the immune system?

Cancer cells can sometimes find ways to trick the immune system into thinking they are normal and should not be attacked. One way this happens is through proteins called checkpoint proteins.

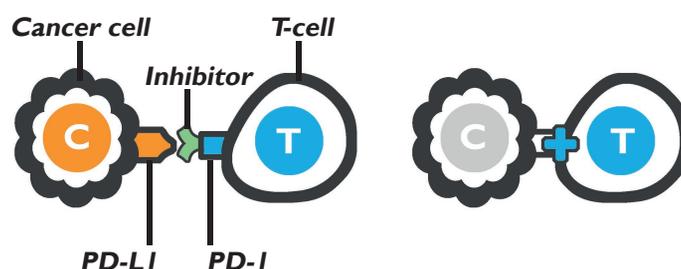
PD-L1 and PD-1 are types of checkpoint proteins. PD-L1 is found on normal tissue surface and healthy cells. PD-1 is often found on T-cells. Some cancer cells disguise themselves by making their own PD-L1, when this happens it binds to PD-1 on T-cells.

These cells are not spotted by the checkpoints which means the immune system does not destroy them. Undetected, the cancer cells can continue to grow without being slowed down or stopped.

How do the available immunotherapies work?

New cancer drugs have been developed to activate the immune system to attack cancer cells. Some checkpoint inhibitors work by binding or sticking to the PD-1 on T-cells or PD-L1 on tumour cells.

These drugs stop PD-1 from binding to the PD-L1 on cancer cells. When this happens, the cancer cells can no longer trick the immune system. This stops the cancer cells from making themselves invisible.



What treatments are currently available?

At present, there are three immunotherapies licensed and approved for use in the UK to treat patients diagnosed with advanced non-small cell lung cancer (NSCLC) either squamous or non-squamous:

- Nivolumab.
- Pembrolizumab.
- Atezolizumab.

New treatments are rapidly and continually being developed, such as Durvalumab.

Once the immune cells are switched on after checkpoint inhibitors are used in a patient whose cancer expresses PD-L1, the body’s own immune system can begin to destroy the cancer.

Immunotherapy treatment has shown it can prolong life, reduce symptoms and improve quality of life.

“Nivolumab gave me the energy to live my life as normal giving me the ability to work full time”.

Carol
Living with lung cancer

Devolved nations: England, Wales & Scotland

Not all immunotherapies licensed to treat non-small cell lung cancer are currently available as a standard treatment on the NHS.

NHS doctors are only allowed to use drugs which have been approved by either National Institute for Health and Care Excellence (England and Wales) or Scottish Medicines Consortium (Scotland), or are pending a decision by NICE about routine commissioning (England).

These organisations look at a combination of how well a drug works and the cost of using the drug. They then compare it to other available drugs for the same health problem.

Unfortunately, this can lead to variations in the availability of these drugs on the NHS, depending on which country in the UK you live in and whether or not they have been approved for use on the NHS.

Why is immunotherapy not always suitable?

Immunotherapy is an effective treatment for some lung cancer patients but not for others. It seems that the immune system can only recognise cancer cells that have particular genetic mutations.

These mutations are a permanent alteration in the DNA sequence that make up a gene. Epidermal growth factor receptor (EGFR) and anaplastic lymphoma kinase (ALK) are proteins which are involved in cell growth. Mutated (changed) forms of the EGFR and ALK gene and proteins have been found in non-small cell lung cancer.

If your cancer is EGFR/ALK mutated, you will be offered targeted therapy and chemotherapy before immunotherapy.

Your doctor will attempt to quantify your general wellbeing and activities of daily life. This measure (performance status) is used to determine if you are fit enough for treatment. If you are a smoker and decide to stop you are more likely to have a successful outcome.

Careful consideration has to be given to patients who have an autoimmune disease. This will typically disqualify someone from being prescribed an immunotherapy treatment approved by the NHS. This will also disqualify patients from taking part in a clinical trial, as there is concern immunotherapy could worsen their autoimmune disease.

How is immunotherapy given?

Immunotherapies are given to you as an infusion (drip) into a vein in the arm, or a long plastic tube into a vein in the chest known as a port-a-cath or power-port.

Nivolumab is given every two weeks for a maximum of two years. Pembrolizumab is given every three weeks for a maximum of two years. Treatment takes approximately 90 minutes. Your oncologist will discuss how many treatments you need for your tumour.

What are the side effects?

Immunotherapy can cause many different types of side effects which worsen or fail to improve over time.

Common side effects are generally mild and include feeling tired (fatigue), itching, skin rash, loss of appetite, cough, nausea, constipation, joint pain and diarrhoea.

Immunotherapy can sometimes cause your immune system to become too active. This may cause your body to react against normal tissues, such as your lungs, liver and colon. Your thyroid function may be affected (Hypothyroidism is the commonest immune-related toxicity).

What immunotherapy research is happening?

Research is underway with a number of immunotherapy drugs to treat lung cancer.

Research is looking at the use of these drugs on their own and also, if they can work better in combination with other treatments. Some immunotherapy drugs have already been approved and others are currently being researched.

There are currently over 2,000 thousand drugs being developed as immunotherapy for cancer.

How can I find out more about lung cancer treatment?

Your clinical team will be able to talk about treatment most relevant to you. People who have been diagnosed with lung cancer should be assigned to a Lung Cancer Nurse Specialist who will be able to offer information and support.

We have more information on lung cancer treatment. Contact us for on Freephone: **0800 358 7200**, or visit our website www.roycastle.org

Ver. 1.1: Oct. 2018

Review date: Oct. 2020

