



**Neuroendocrine  
Cancer UK**

Incorporating The Ann Edgar Trust



NEUROENDOCRINE CANCER

# TREATMENT: CHEMOTHERAPY AND TARGETED MOLECULAR THERAPIES

2023



[www.neuroendocrinecancer.org.uk](http://www.neuroendocrinecancer.org.uk)



## Chemotherapy

Chemotherapy is a cancer treatment where medicine is used to kill cancer cells.

There are many different types of chemotherapy medicine, but they all work in a similar way.

They stop **cancer** cells reproducing, which prevents them from growing and spreading in the body.

## Molecular Targeted Therapy

In cancer, a type of treatment that uses drugs or other substances to target specific molecules involved in the growth and spread of cancer cells. Blocking these molecules may kill cancer cells or may keep cancer cells from growing or spreading.

Molecularly targeted therapy may cause less harm to normal cells and may have fewer side effects than other types of cancer treatment.



## What is the key difference between Chemotherapy and Targeted Molecular Therapies?

- Targeted therapies act on specific molecular targets that are associated with cancer, while most chemotherapies act on all rapidly dividing normal and cancerous cells.
- Targeted therapies often block tumour cell proliferation (cytostasis), and have a specific target whereas chemotherapy kills both tumour and normal rapidly dividing cells (cytotoxic) and does not have a specific molecular target.
- In Neuroendocrine Cancer – chemotherapy is primarily used to treat Neuroendocrine Carcinoma, while the named Targeted Molecular Therapies here, are used only in Neuroendocrine Tumours.

**Immunotherapy** uses our immune system to fight cancer, by helping the immune system to recognise and attack cancer cells. Some types of immunotherapy are also called targeted treatments or biological therapies. It can be given on its own or alongside other cancer treatments.

At present the only licensed immunotherapy available in the UK for Neuroendocrine Cancer – is Avelumab – which is used in the treatment of Merkel Cell Carcinoma (Neuroendocrine carcinoma of the Skin) that has spread (metastasised).



## Chemotherapy

There are many different types of chemotherapy, but they all work in a similar way, to stop cancer cells reproducing, which prevents them from growing and spreading in the body.

### How is it administered?

Chemotherapy can be given orally (in tablets) or Intravenously (through a vein) to slow tumour growth or try to reduce tumour size:

- Intravenous chemotherapy is usually done in hospital and involves chemotherapy drugs being given through a tube in a vein in your hand, arm or chest
- Oral chemotherapy usually involves taking a course of medicine at home, with regular check-ups in hospital.

### Who is offered Chemotherapy?

Chemotherapy is often the first line treatment of choice for “poorly differentiated” Neuroendocrine Cancer, that is, [Neuroendocrine Carcinomas \(NEC\)](#) – from any site.

It may also be effective in certain Lung and Pancreatic Neuroendocrine Tumours (NETs) – but less helpful for others, therefore other options for treatment are considered in these patients.

Chemotherapy can be given as a standalone therapy, as a single chemotherapy drug or a combination of chemotherapy drugs – but it may also be used to increase tumour cell sensitivity to radiation therapies or be given before and/or after surgery.

In Neuroendocrine Cancer combination chemotherapy is usually given – combinations that may be used include:

- Streptozocin and Etoposide
- Carboplatin or Cisplatin and Etoposide
- Capecitabine and Temozolamide (CapTem).

Your oncologist (cancer specialist) or nurse specialist will be able to give you both written and verbal information about the chemotherapy drug(s) that will be used in your care – this information will also include any potential side-effects and also any alert signs to look out for that may need urgent medical review. You will also be given contact details for the chemotherapy unit and an on-call 24hr number to ensure you have immediate access to care should you need it.



## Targeted Molecular Therapies

can be given orally (in tablets) or Intravenously (through a vein) to slow tumour growth or try to reduce tumour size.

They are drugs or other substances that work against cancer by interfering with specific molecules that are involved in the growth, progression, and spread of cancer. Many different targeted therapies have been approved for use in cancer treatment. These therapies include hormone therapies, signal transduction inhibitors, gene expression modulators, apoptosis inducers, angiogenesis inhibitors, immunotherapies, and toxin delivery molecules. Further information on these different types of therapy can be found at [CRUK](#).

## Current Targeted Molecular Therapies that are used in Neuroendocrine Cancers – treat ‘well-differentiated’ Grade 1-2 Neuroendocrine Tumours (NETs) – and include:

### Everolimus (Afinitor)

A targeted drug that blocks mTOR, a protein in cells that normally helps them grow and divide. Everolimus may also stop tumours from developing new blood vessels, which can help limit their growth.

Everolimus is currently licensed within the UK to treat inoperable non-functioning, well differentiated, Grade 1-2 Neuroendocrine Tumours that start in the pancreas, gastrointestinal system or lung(s) and are showing signs of ongoing growth and / or spread.

### Sunitinib (Sutent)

A targeted drug that works by stopping tumours from developing new blood vessels (angiogenesis) and also blocking growth-stimulating proteins in the cancer cell itself.

Sunitinib is currently licensed within the UK to treat inoperable non-functioning, well-differentiated, Grade 1-2 Neuroendocrine Tumours that start in the pancreas and is showing signs of ongoing growth and / or spread.





## Effects of Treatment

Neuroendocrine Cancer Treatments work in a variety of ways – and whilst we wish it wasn't the case, side-effects can occur – not will occur – but can occur.

Many of these, if they happen, can be mild and manageable – others may cause an alteration or adjustment in treatment, such as reduced dose or interval – occasionally a treatment may have to stop – either temporarily (a 'treatment break') or permanently, because the side-effect is more severe.

You may also be given treatments in a different order to what was first planned or how you may see them given in others – remember – your treatment plan will be personalised to you. But it is only possible to deal with changes and side-effects, if you are able to talk them through with your specialist nurse or team.

If you notice a change, or don't feel well, during or after a treatment – it may be tempting to ignore it or not mention it or wait a few weeks to see if things improve. You may be worried that if you do highlight any changes, your treatment may be stopped. However, the sooner your team knows what is happening, the sooner they can help you to deal with any changes – which will not always mean stopping treatment.

Changes or new symptoms may not always be caused by your treatment – Neuroendocrine Cancer itself can cause alterations in health – and other unrelated health issues can also occur. So, it can be helpful to know what to expect from treatment, what to look out for – and, importantly, when and who to contact if changes occur.



## Complications and Side effects

Chemotherapy is a cancer treatment where medicine is used to kill cancer cells.

Targeted Molecular Therapies are drugs or other substances that work against cancer by interfering with specific molecules that are involved in the growth, progression, and spread of cancer.

Both treatments can also have an effect on healthy cells – which may lead to complications such as:



Fatigue – may be due to possible anaemia, the increased energy requirement your body needs to deal with repair and recovery or simply the time it takes. For example, these treatments can require a more regular attendance at hospital for several weeks or months (the appointment itself may only take minutes, but unless you live nearby and / or have your own transport, each session can involve a whole day out).



Bone marrow suppression – these treatments can have an effect on how well the bone marrow continues to produce blood cells. We need healthy blood cells to deliver oxygen and nutrition around our body, help fight infection and also repair damage and prevent bleeding. If bone marrow production of cells is reduced this can lead to anaemia, reduced immunity, delayed healing and bruising/bleeding.



Altered liver or kidney function – both the liver and kidneys are involved in the regulation, filtering and elimination of waste products in our bodies, including products within the bloodstream. Substances from damaged tumour cells and the breakdown of treatment products, once they have done their job, need to be eliminated from the body – and the liver and kidneys are vital in this. However, sometimes these substances can cause damage to healthy liver and kidney cells – leading to reduced function. NB some chemotherapy drugs may also lead to a change in urine colour and / or odour.



Nausea/vomiting – sore mouth and /or altered taste and appetite – the lining of our gut, from our mouth to our anus is made up of cells that are constantly renewing and replacing themselves – certain treatments may see these rapidly dividing and changing cells as no different to cancer cells – which can lead to mouth ulcers and /or nausea/vomiting.



Diarrhoea / constipation – the effect mentioned above can also alter how the bowel works.





Dose restrictions – if you have previously been treated with radiation and / or chemotherapy – your specialist team will need to consider whether these earlier treatments will affect planned treatment. Some drugs may have a lifetime dose limit, other earlier treatments may increase or reduce effectiveness of planned care.



Fertility – depending on the type of treatment fertility may be affected.



Pain / inflammatory response – the body may see treatment as an injury. The natural response to injury is inflammation – caused by a rush of protective and repair factors to the site of harm. The tumour doesn't want to be killed, but as its cells are attacked, it may release certain substances that cause inflammation (swelling) – which can lead to discomfort and / or pain.

Rarely, a more severe reaction may be experienced as tumour cells are damaged and die – this sudden destruction can cause the release of certain chemicals into the bloodstream, that the kidneys cannot get rid of as fast as they'd like – this is called Tumour Lysis Syndrome. Typically, onset is within 1-5 days of the procedure or chemotherapy and severity can range from a few abnormal blood results to the other extreme, which may include renal failure and cardiac disturbances (heart problems).



Hair thinning / loss, nail and skin changes – hair (anywhere on the body), skin and nails, like the lining of the gut, are also made up of cells that rapidly divide, renew and replace themselves – therefore, as in the gut, you may see changes in your hair, nails and skin. Once treatment has completed or stopped – these cells recover and 'normal' growth restarts.



Interactions – certain other medications and / or food substances, such as grapefruit juice, may affect how well your planned treatment works. Some can increase their effect, others may reduce their effect. Your specialist team will recommend you on this.



Allergy/ severe intolerance – very rarely an allergic reaction to treatment may occur – which is why some treatments may be started under close medical supervision. It may not be the drug itself but may be something in its preparation or content. For example, some people cannot tolerate medications in that come in capsules (the type that can be opened, rather than shape). Any severe reaction should be considered a medical emergency – if not in hospital, then you would be recommended to call 999 or attend A&E/ nearest medical service asap.

