



**Neuroendocrine
Cancer UK**

Incorporating The Ann Edgar Trust



NEUROENDOCRINE CANCER

TREATMENT: RADIATION BASED THERAPIES

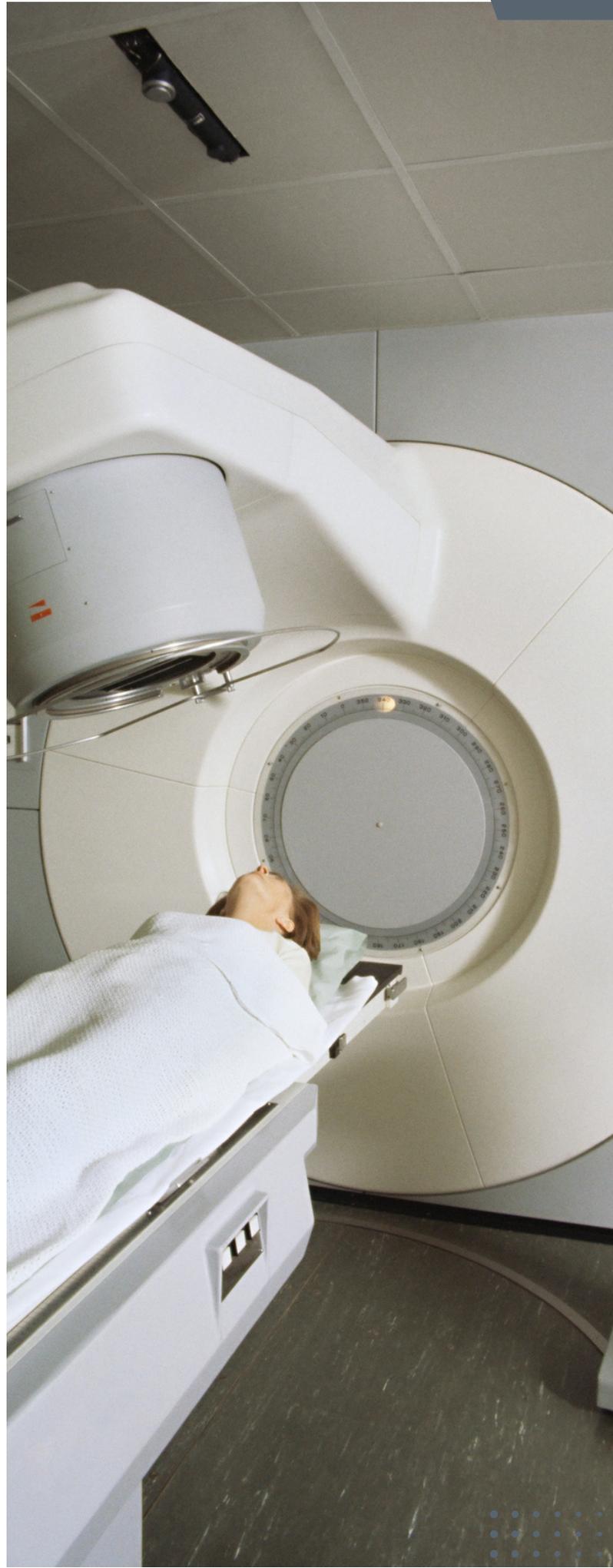
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www.neuroendocrinecancer.org.uk



Radiation therapy (also called radiotherapy) is a cancer treatment that uses high doses of radiation to kill cancer cells and shrink tumours.



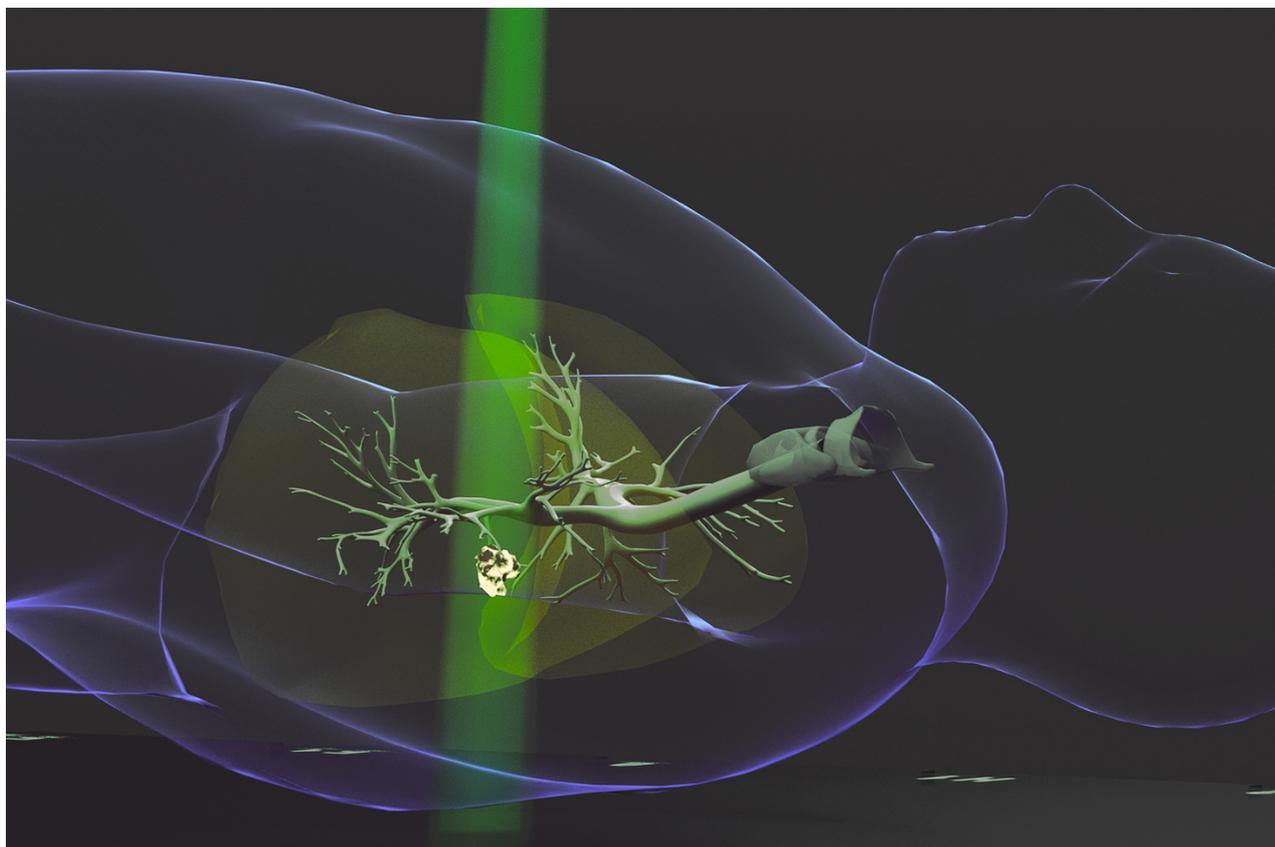
How does radiation therapy work?

At certain doses, radiation therapy kills cancer cells or slows their growth by damaging their DNA. Cancer cells whose DNA is damaged beyond repair stop dividing or die. When the damaged cells die, they are broken down and removed by the body.

However, radiation therapy does not kill cancer cells right away. It can take several treatments over several days, weeks or even months before DNA is damaged enough for cancer cells to die. Then, cancer cells may keep on dying for weeks or months after radiation therapy ends.

Radiation therapy may be classed as external beam or internal treatment and the type of treatment you may be offered will depend on the type, site, size and position of the tumour(s) to be treated.

Your medical team will also need to assess your current health, the risk/benefit of treatment – and what other treatments you may have already had or may need to have in the future. For example – if you have already had external beam radiotherapy to a specific site of the body, you may not be able to have further therapy to that same area, because of the risk of doing more harm than good.



External Beam Radiation Therapy

(You may see this abbreviated to EBRT or DXT)

External beam radiation therapy comes from a machine that aims radiation at your cancer. The machine does not touch you, but can move around you, sending radiation to a specific part of your body from many directions.

External beam radiation therapy is a local treatment, which means it treats a specific part of your body. For example, if you have cancer in your lung, EBRT will target your lung tumour and not to your whole body. Radiotherapy may be given after surgery to kill any cancer cells that might remain at the margins of or original site of your tumour.

EBRT may also be used as a palliative (non-curative) treatment for painful bone secondaries – if isolated in specific spots, rather than disseminated (spread throughout the skeleton).



Internal Radiation Therapies

Internal radiation therapy is a treatment in which a source of radiation is put inside your body. The radiation source can be solid or liquid.

Internal radiation therapy with a solid source is called brachytherapy. In this type of treatment, seeds, ribbons, or capsules that hold a radiation source are placed in your body, in or near the tumour. Like external beam radiation therapy, brachytherapy is a local treatment and treats only a specific part of your body. It may be used to treat cancers of the prostate gland or female reproductive system.



Internal radiation therapy with a liquid source is called systemic therapy. Systemic means that the treatment travels in the blood to tissues throughout your body, seeking out and killing cancer cells. You receive systemic radiation therapy by swallowing, through a vein via an IV line, or through an injection.



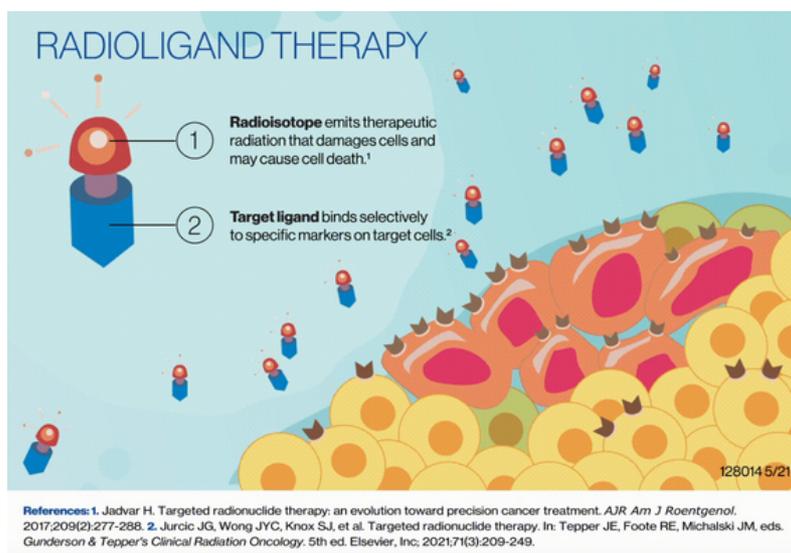
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As mentioned in [Interventional Radiology](#).

Radioligand Therapy – also known as PRRT

PRRT (Peptide Receptor Radionuclide Therapy) delivers radiation to specifically targeted cancer cells, with a minimal effect on healthy cells.

A radioligand is made of two parts: a ligand, which can find cancer cells that have a particular surface molecule – in Neuroendocrine Cancer – we use Octreotide as it has a particular affinity for certain Neuroendocrine Cancer cells, and a radioisotope, which emits therapeutic radiation to kill these cells. The radioligand can target cells anywhere in the body.





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

Radiation therapy is a cancer treatment that uses high or concentrated doses of radiation to kill cancer cells and shrink tumours. Radiation effects can vary and will be dependent on the dose, the treatment (external or internal) and the site being treated. Effects may also vary depending on whether you have already had radiation and / or chemotherapy. Complications of radiation therapy include:



Fatigue – may be due to other potential effects of radiation such as possible anaemia, the increased energy requirement your body needs to deal with repair and recovery or simply the time it takes. For example, many External Beam Therapies need a daily attendance at hospital for several weeks (the procedure itself may only take minutes, but unless you live nearby and / or have your own transport, each session can involve a whole day).



Bone marrow suppression – radiation therapy can have an effect on how well the bone marrow can continue 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 radiation particles 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.



Nausea/vomiting.



Fertility – depending on the type of treatment and the area to receive radiation, fertility may be affected.



Radiation dose restrictions – if you have previously been treated with radiation and / or chemotherapy – your specialist team will need to consider whether these earlier treatments may alter the type and dosage of radiation the treatment will involve.



Pain / inflammatory response – the body may see the procedure 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).



Target site skin reaction – this is more common in External Beam Radiotherapy – where a specific spot/site of the body is targeted to receive radiation. As the beam passes through the skin it can cause surface irritation – from a reddening or irritation of the skin to something like a burn. Very rarely this can lead to the breakdown of skin – this is rare, the team giving you treatment will keep a close eye on skin health to prevent this happening.



Fibrosis / damage – as above, this may be more common in External Beam radiotherapy, but effects deeper tissue, rather than the skin surface. As the beam passes through body tissue it can cause irritation and inflammation leading to internal 'scarring' – this is known as fibrosis – and is a more common side effect in EBRT to the lungs and abdominal/pelvic area.

Very rarely.



MDS – this is a type of blood cancer that affects the bone marrow. It causes low levels of one or more types of blood cells. You will be carefully monitored during and after treatment, by blood tests, to ensure that healthy cells are not damaged – but if they are, this is found as soon as possible to reduce the risk of this damage leading to cancerous changes.

You will be given self-care advice (for before and after treatment): this will include how to best prepare for the procedure and what to expect afterwards – including when to seek medical help.

