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Tumor Treating Fields (TTF)

Tumor treating fields (also known as **TTFs**) are a type of cancer therapy that use low-energy electrical fields to disrupt cancer cells' ability to grow and divide. TTFs may also be called **alternating electric fields**.

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How are TTFs used to treat tumors?

TTFs are delivered through a special portable device with electrodes that are placed on your skin near the tumor. These electrodes are connected to a portable battery that you can carry in a backpack. The device sends mild electrical currents that target cancer cells while sparing most nearby healthy cells. The TTFs device usually needs to be worn for at least 18 hours each day, but people can continue most of their daily activities while wearing it.

TTFs may be used alone or along with other treatments, such as [chemo](#)¹ or [immunotherapy](#)². TTFs tend to have few side effects (see below), so they may be used if other treatments have already been tried.

Two tumor treating fields devices are FDA-approved to treat cancer:

- **Optune Gio** is approved for new or recurrent [glioblastoma \(GBM\)](#)³
- **Optune Lua** is approved for pleural [mesothelioma](#)⁴ that can't be removed with surgery, as well as for metastatic [non-small cell lung cancer](#)⁵ that's grown during or after treatment with chemo.

Research studies are also looking at using TTFIELDS for other types of cancers, such as pancreatic cancer.

Do TTFIELDS use radiation?

TTFIELDS do use [radiation](#)⁶, but it's a different type of radiation than [traditional radiation therapy](#)⁷. The electrical fields created in TTFIELDS are a type of **non-ionizing radiation**. Other types of non-ionizing radiation include radio waves, microwaves, and visible and infrared light.

Non-ionizing radiation doesn't have as much energy as **ionizing radiation** does. Traditional radiation therapy uses high-energy ionizing radiation to kill cancer cells. Ionizing radiation can damage healthy cells nearby, which can cause side effects.

What are the side effects of TTFIELDS?

Side effects of TTFIELDS devices are usually limited to the electrode sites. They can include:

- Skin irritation
- Allergic reactions
- Local warmth and tingling sensations
- Muscle twitching
- Infections
- Breakdown of the skin (ulcers)

Other side effects are also possible. For example, TTFIELDS devices worn on the scalp can cause:

- Headaches
- Sleep problems
- Mood changes
- Increased risk of seizures

Some people might not be good candidates for treatment with TTFIELDS, because of other health issues they have. Talk to your doctor to learn more about whether this type of treatment might be right for you.

For more information on TTFields

Learn more about how TTFields are used to treat [glioblastoma](#)⁸, [mesothelioma](#)⁹, and [non-small cell lung cancer](#)¹⁰.

Hyperlinks

1. www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html
2. www.cancer.org/cancer/managing-cancer/treatment-types/immunotherapy.html
3. www.cancer.org/cancer/types/brain-spinal-cord-tumors-adults/about/types-of-brain-tumors.html
4. www.cancer.org/cancer/types/malignant-mesothelioma.html
5. www.cancer.org/cancer/types/lung-cancer/about/what-is.html
6. www.cancer.org/cancer/risk-prevention/radiation-exposure.html
7. www.cancer.org/cancer/managing-cancer/treatment-types/radiation/external-beam-radiation-therapy.html
8. www.cancer.org/cancer/types/brain-spinal-cord-tumors-adults/treating/alternating-electric-field-therapy.html
9. www.cancer.org/cancer/types/malignant-mesothelioma/treating/tumor-treating-fields.html
10. www.cancer.org/cancer/types/lung-cancer/treating-non-small-cell/tumor-treating-fields.html

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