# Tumor Treating Fields (TTF)

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


- How are TTFields used to treat tumors?
- Do TTFields use radiation?
- What are the side effects of TTFields?
- For more information on TTFields


## How are TTFields used to treat tumors?

TTFields 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 TTFields 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.

TTFields may be used alone or along with other treatments, such as chemo[1]. TTFields 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)[2]
- **Optune Lua** is approved for pleural mesothelioma[3] that can't be removed with surgery

Research studies are also looking at using TTFields for other types of cancers, such as pancreatic, non-small cell lung, ovarian, and breast cancer.

## Do TTFields use radiation?

TTFields do use radiation[4], but it's a different type of radiation than traditional radiation therapy[5]. 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?

Since TTFields use low energy, non-ionizing radiation, side effects tend to be mild. The most common side effect is skin irritation in the area where the electrodes are worn.

Other side effects are also possible, depending on where the electrodes are placed on

1. www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html
2. www.cancer.org/cancer/types/brain-spinal-cord-tumors-adults/about/types-of-brain-tumors.html
3. www.cancer.org/cancer/types/malignant-mesothelioma.html
4. www.cancer.org/cancer/risk-prevention/radiation-exposure.html
5. www.cancer.org/cancer/managing-cancer/treatment-types/radiation/external-beam-radiation-therapy.html
6. www.cancer.org/cancer/types/brain-spinal-cord-tumors-adults/treating/alternating-electric-field-therapy.html
7. www.cancer.org/cancer/types/malignant-mesothelioma/about/new-research.html

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**Written by**

The American Cancer Society medical and editorial content team (https://www.cancer.org/cancer/acs-medical-content-and-news-staff.html)

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as editors and translators with extensive experience in medical writing.