

Tumor Treating Fields (TTF) Electrical Cancer Therapy

Treating cancer with low-intensity electrical fields to suppress cancer cell proliferation.

What is Tumor Treating Fields (TTF) therapy?

Tumor Treating Fields are low intensity, alternating electric fields within the intermediate frequency range. TTF disrupts cell division through physical interactions with key molecules during mitosis. This non-invasive treatment targets solid tumors and has no effect on normal undividing cells.

The delivery system is portable and is designed to allow patients to go about their daily activities while receiving treatment.

Effectiveness of the treatment

The effectiveness of TTF is considered to be similar to that of chemotherapy. However, chemotherapy has side effects which destroy normal cells as well. It is not recommended to be used for long term treatment because of drug resistance and accumulation of toxicity. TTF on the other hand is considered a safe treatment which doesn't have any problems in terms of drug resistance and accumulation of toxicity. Also, it is possible to use TTF with other conventional treatments such as chemotherapy. We believe that there are synergistic effects using TTF with immunotherapy, especially GcMAF macrophage activating factor. We recommend GcMAF be used in combination with TTF for best results and to achieve complete systemic treatment.

Mechanisms of TTF

In general

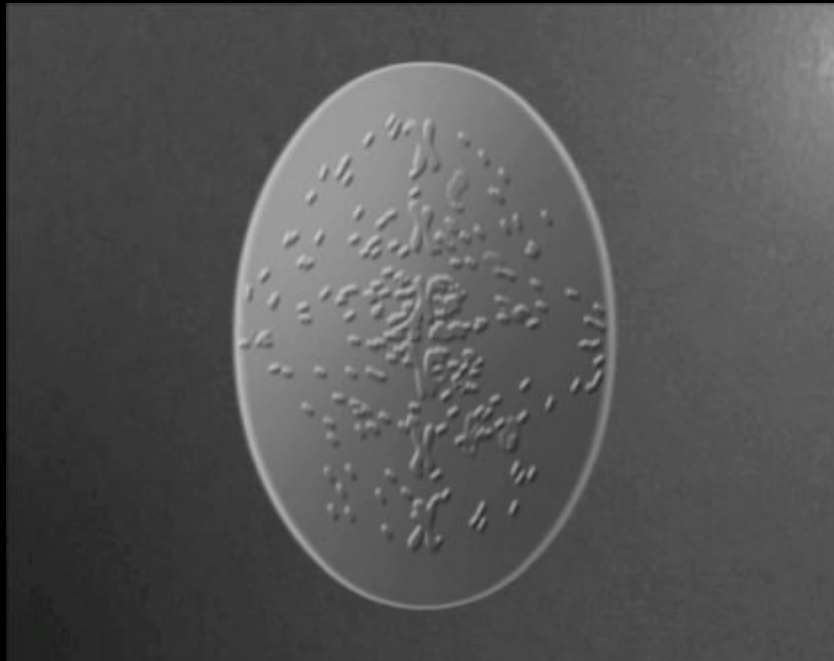
- It generates low-intensity electrical fields to consistently destroy cancer cells.
- Electrical fields do exist around the place where electric current flows.
- Electrical fields attract the substances that have electrical charge.
- It behaves in a similar way to gravity.
- It suppresses cancer cell proliferation.

At the cellular level 1

- The electrical fields are even in the undivided cells.
- Cell division is categorized into mitosis which is the nucleus division through the fast and highly complex process and cytokinesis which is the cytoplasm division into two.
- As the early stage in mitosis, the spindle starts to be formed by the polymerization of the microtubule.
- Under the existence of the electrical fields, the polymerization is impeded and that leads to the mitotic arrest because each microtubule is arranged along the electrical fields.

Metaphase: impedance of constructing microtubule => apoptosis

The effects of TT fields while cell division is occurring mechanism 1



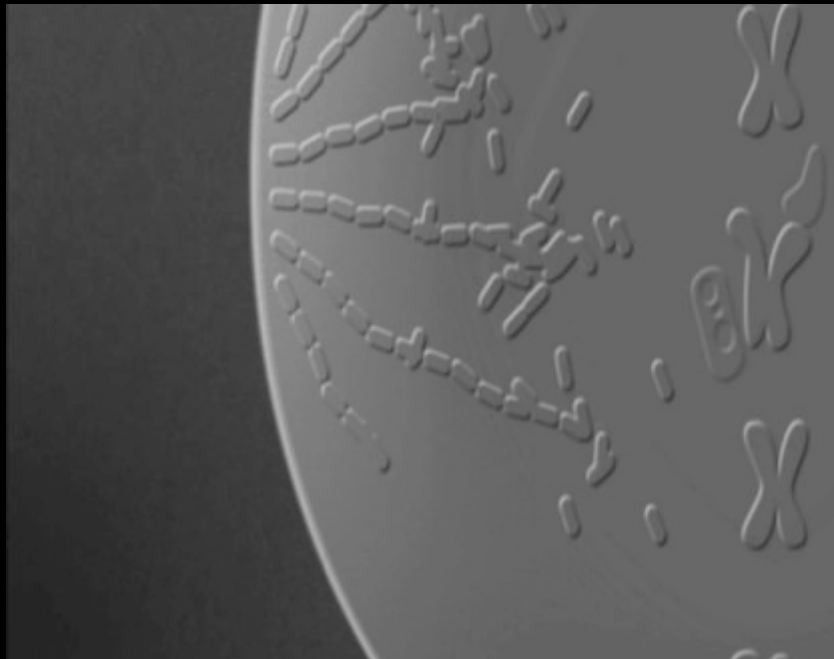
As an early stage in mitosis, the spindle starts to be formed by the polymerization of high polarity microtubule.

The effects of TT fields while cell division is occurring mechanism 1



The electrical fields are even in the undivided cells.

The effects of TT fields while cell division is occurring mechanism 1



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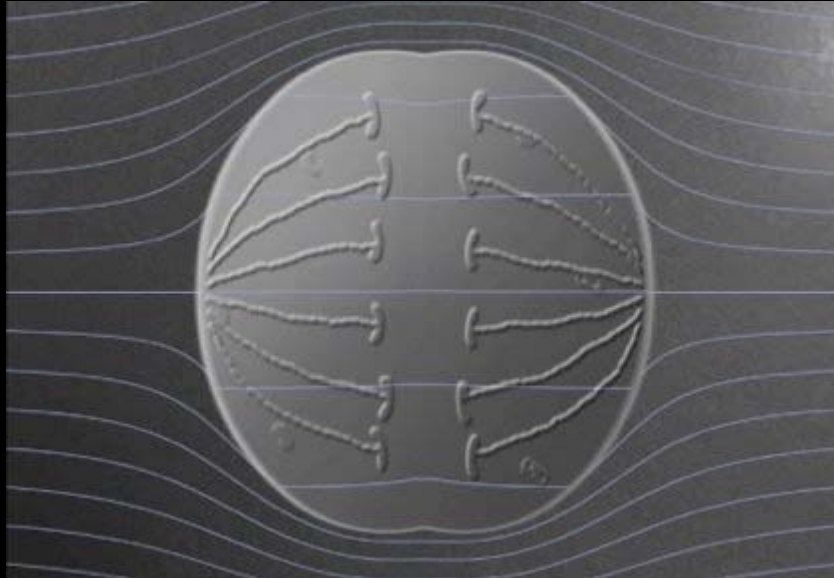
At the cellular level 2

- In the cells where the spindle formation has completed, the cell starts to divide into two.
- While the division is occurring, because the form of the cell becomes a sandglass-type, the electric field distribution becomes uneven.

- As a result, cell components get pushed into the constricted part, and the cell gets destroyed.

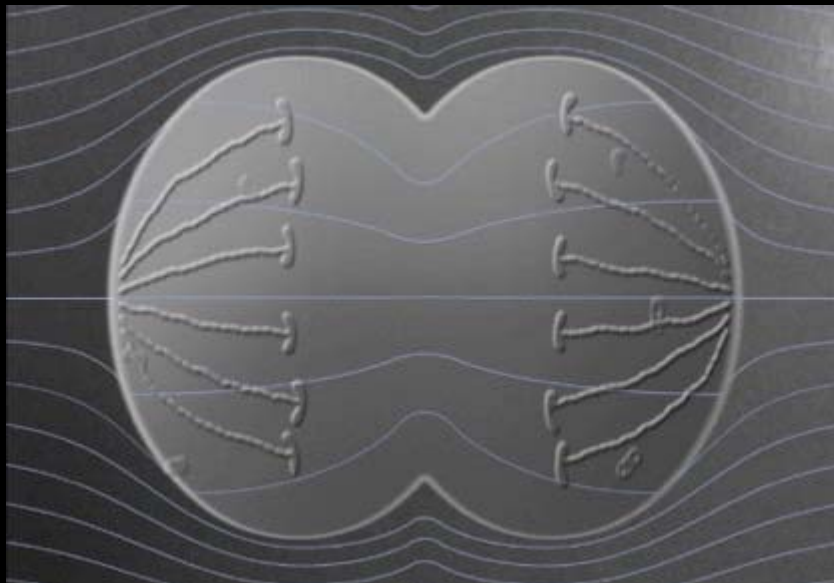
Telophase: Move into the constricted parts of macromolecules and organelles => cell destruction

The effects of TT fields while cell division is occurring mechanism 2



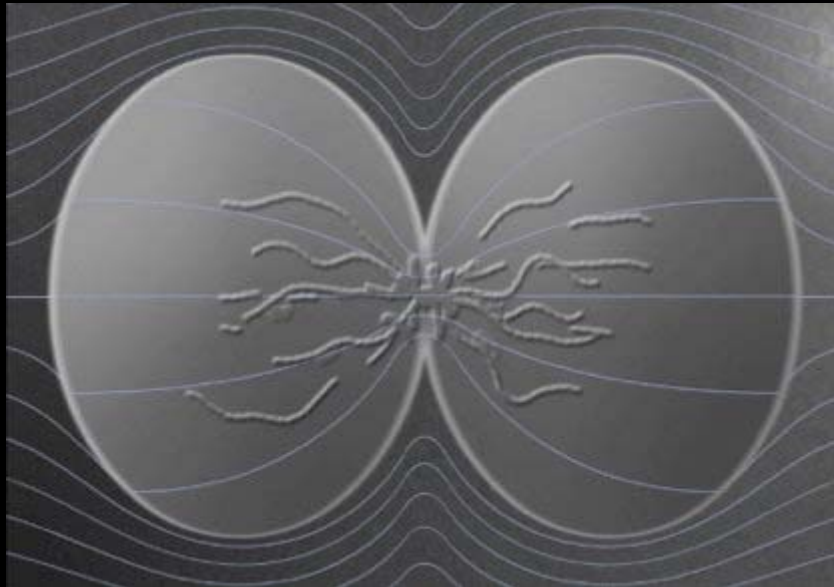
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The effects of TT fields while cell division is occurring mechanism 2



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The effects of TT fields while cell division is occurring mechanism 2

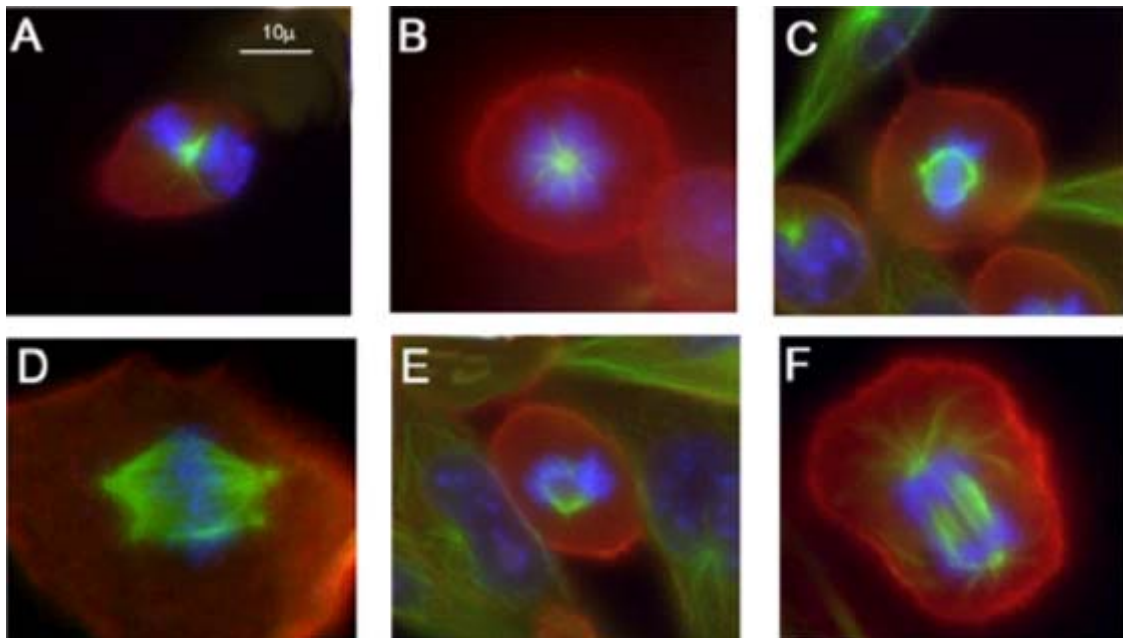


As a result, cell components get pushed into the constricted part, and the cell gets destroyed.

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The examples of impedance of constructing microtubule and Apoptosis

The impedance of constructing microtubule after forming the abnormal spindle

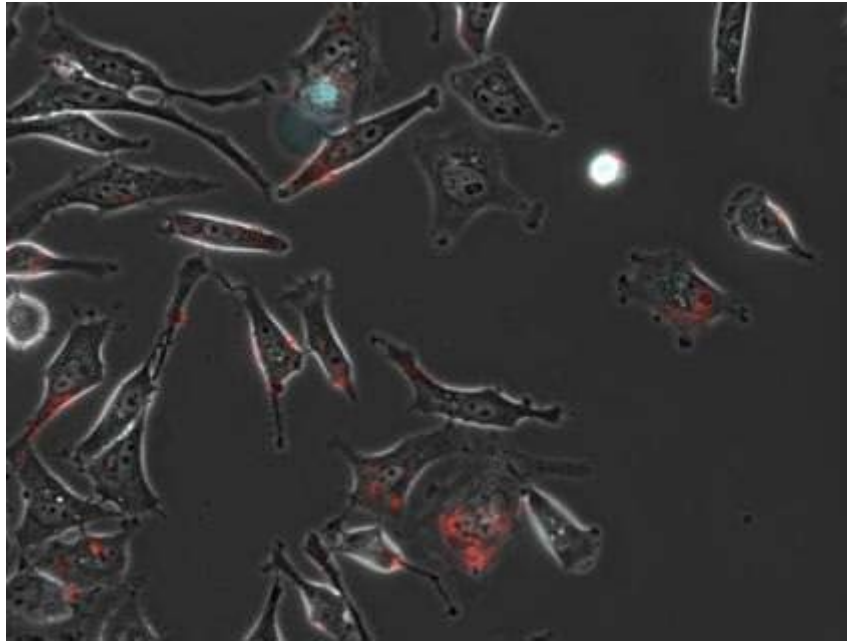


Immunohistostaining

The pictures of abnormal mitosis of the cells where electric field was processed

Microtubule (green), actin (red), DNA (blue)

Apoptosis



Kirson et al., Cancer Research, May 2004

Annexin staining (red), detecting the alteration of cell membrane caused by apoptosis

Video introducing TTF

A screenshot of the TEDMED 2011 video page for Bill Doyle's talk, "The Fourth Modality: Tumor Treating Fields". The page features a large video player with a play button in the center. To the left of the player, the title "Treating cancer with electric fields" is displayed, along with the speaker's name "Bill Doyle" and the event details "TEDMED 2011 - 10:35 - Filmed Oct 2011". Below the video player, there is a section with social media sharing options (Twitter, Facebook, YouTube, etc.) and a view count of 449,157. The main text describes the talk: "Surgery, chemotherapy and radiation are the best-known methods for treating cancer. At TEDMED, Bill Doyle presents a new approach, called Tumor Treating Fields, which uses electric fields to interrupt cancer cell division. Still in its infancy — and approved for only certain types of cancer — the treatment comes with one big benefit: quality of life." Below this text are links for an "Interactive transcript" and "Bill Doyle's reading list". On the right side of the page, there is a section for "Beyond Measure: The Big Impact of Small Changes" with a "GET THE BOOK" button. At the bottom, there are "Playlists to watch" including "Will doctors save", "11 must-see TED Talks", and "Share and the Revolution".

This video presented in 2011 on TED introduces the mechanisms of TTF with curative examples.

Watch the video on: [TED YouTube](#)

Treatment applications of TTF

Although this treatment is mainly used for the patients with malignant glioblastoma, lung cancer and breast cancer, it is also considered to treat almost all of the solid cancers such as brain tumors, metastatic lung cancer, esophageal cancer, throat cancer, laryngeal cancer, stomach cancer, liver cancer, metastatic liver cancer, pancreatic cancer, colon cancer, ovarian cancer, uterine cancer, kidney cancer, prostate cancer, bladder cancer and sarcoma.

Treatment method

Patients wear a helmet mask and a vest or short pants.



The vest and helmet worn for treatment is made to order to fit each patient. The electric fields are designed to be specific for each patient after accessing scans. This treatment is used daily in your home and the electric field is adjusted every 1-3 months after checking CT or MRI at our clinic.



Blanket (sleeping bag) type TTF device for use in combination with jacket and helmet devices.

The safety and side effects of TTF

This treatment does not affect normal cells so there are less side effects reported compared to chemotherapy. No serious side effects have not been reported.

Cost

Contact:

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40 St Benedicts Street, Newton, Auckland 1010, New Zealand

We Need:

Name of Disease:

Metastasis:

Head circumference (cm):

Upper chest circumference (cm):

Waist circumference (cm):

Hip circumference (cm):

Height (cm):

Weight (kg):

Age of patient: