

## Novel Terahertz-Based Radiation Treatment of Cancer Without Side Effects

Dr. Boris G. Tankhilevich

CEO and Founder, Magtera, Inc. [www.magtera.com](http://www.magtera.com)**\*Correspondence author****Dr. Boris G. Tankhilevich,**

CEO and Founder

Magtera, Inc. [www.magtera.com](http://www.magtera.com)

Submitted : 25 Oct 2023 ; Published : 16 Nov 2023

**Citation :** Tankhilevich, B. G. (2023). Novel Terahertz-Based Radiation Treatment of Cancer Without Side Effects. J Pharma Res Dev., 4(2): 1-3. DOI : <https://doi.org/10.47485/2694-5614.1022>

**Abstract**

Every bio molecule can be fingerprinted by a set of unique THz frequencies. There is a substantial plurality of such frequencies that comprise a fingerprint for any bio molecule. Therefore, cancer cells have different THz fingerprints than healthy cells. The idea is to destroy cancer cells by directing the focused energy Terahertz beam at cancer cell's THz resonance frequencies (that do not coincide with the THz resonance frequencies of the healthy cells) by using Proprietary Tunable THz Magnon Laser. We offer new revolutionary treatment of cancer with the Magtera Proprietary, tunable THz Magnon Laser which has the size of a fingernail.

**First step:** Detect the THz modes for cancer cells. **Second step:** Find a THz window of penetration in body fluids that corresponds to one of these modes by using the highly tunable THz Magnon Laser that bridges the THz Gap. **Third step:** finding the THz frequencies of the cancer cells that do not coincide with the THz resonance frequencies of the healthy cells. **Fourth step:** applying the min THz energy at THz frequencies of the cancer cells that do not coincide with the THz resonance frequencies of the healthy cells capable of destruction the cancer cells.

No side effects. Indeed, as health cells have different THz frequencies than cancer cells, only cancer cells will be affected.

**Keywords:** Cancer, Treatment, Terahertz Laser

**Biography**

Dr. Tankhilevich is the co-founder and CEO of Magtera. Previously, Dr. Tankhilevich was a Research Scientist at the Academy of Science in St. Petersburg and is credited with being the first to realize magnon systems can be used as a source of terahertz radiation.

**Background****Deaths in the United States among persons with cancer**

Cancer was the second leading cause of death, after heart disease, in the United States in 2020. In 2020, there were 602,350 cancer deaths; 284,619 were among females and 317,731 among males.

**What were the leading causes of cancer death in 2020?**

Lung cancer was the leading cause of cancer death, accounting for 23% of all cancer deaths. Other common causes of cancer death were cancers of the colon and rectum (9%), pancreas (8%), female breast (7%), prostate (5%), and liver and intrahepatic bile duct (5%). Other cancers individually accounted for less than 5% of cancer deaths.

In 2020: (a) 136,084 people died of lung cancer (63,135 females and 72,949 males); (b) 51,869 people died of colorectal cancer (23,826 females and 28,043 males); (c) 46,774 people died

of pancreatic cancer (22,495 females and 24,279 males); (d) 42,275 females died of breast cancer; (e) 32,707 males died of prostate cancer; (f) 28,227 people died of liver and intrahepatic bile duct cancer (9,591 females and 18,636 males).

**Types of Cancer Treatment**

- Chemotherapy
- Hormone Therapy
- Hyperthermia
- Immunotherapy to Treat Cancer
- Photodynamic therapy
- Radiation therapy
- Surgery

**Chemotherapy Treatment**

Chemotherapy is a type of cancer treatment that uses drugs to kill cancer cells. However, chemotherapy can cause severe side effects. Indeed, chemotherapy also kills or slows the growth of healthy cells that grow and divide quickly.

**Side effects**

Chemotherapy can cause severe side effects. Indeed, chemotherapy also kills or slows the growth of healthy cells that grow and divide quickly.

## Hormone Therapy

### Treatment

Hormone therapy is a treatment that slows or stops the growth of breast and prostate cancers that use hormones to grow.

### Side effects

Hormone therapy can cause side effects because hormone therapy blocks the body's ability to produce hormones or interferes with how hormones behave.

## Hyperthermia

### Treatment

Hyperthermia is a type of treatment in which body tissue is heated to as high as 113 °F to help damage and kill cancer cells.

### Side effects

Hyperthermia can also cause side effects. Indeed, diarrhea, nausea, and vomiting are common after whole-body hyperthermia. It can also cause more serious side effects that are not common, including heart and blood vessel problems.

## Immunotherapy to Treat Cancer

### Treatment

Immunotherapy is a type of cancer treatment that helps the body's immune system fight cancer. The immune system helps the body to fight infections and other diseases. It is made up of white blood cells and organs and tissues of the lymph system. Thus, immunotherapy is a type of biological therapy. Biological therapy is a type of treatment that uses substances made from living organisms to treat cancer.

### Side effects

However, immunotherapy can also cause side effects. Indeed, many corresponding side effects are caused when the immune system that is revved-up to act against the cancer also acts against healthy cells and tissues in the body.

## Photodynamic therapy (PDT)

### Treatment

Photodynamic therapy (PDT) uses a drug that is activated by light, called a photosensitizer or photosensitizing agent, to kill

cancer cells. The light can come from a laser or other source, such as LEDs.

### Side effects

Photodynamic therapy also causes side effects by still causing burns, swelling, pain, and scarring in the treatment area. But the main limitation of PFT is that it is used as a local treatment, which means it treats only a specific part of the body.

## Radiation therapy

### Treatment

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

### Side effects

Radiation therapy can cause severe side effects because radiation not only kills or slows the growth of cancer cells, but it can also affect and damage nearby healthy cells.

## Surgery

### Treatment

Surgery is used to treat cancer locally; it is a procedure in which a surgeon removes cancer from your body.

### Side effects

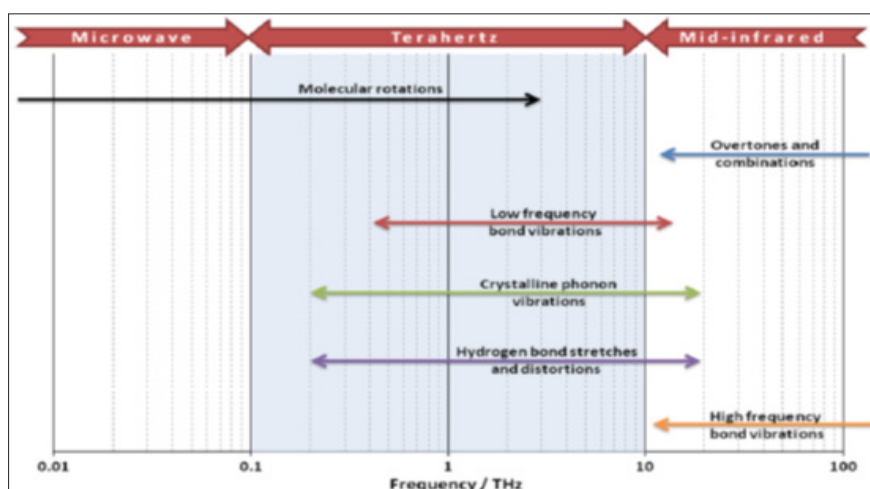
Side effects include damaging the healthy tissues, nerves, removing the healthy tissue nearby to cancer cells tissue., or failure to remove all cancerous cell tissues.

## Side Effects of existing types of Cancer Treatment

Thus, all current methods of Cancer treatments can cause side effects.

## Magtera Novel Approach-Terahertz-based radiation of Cancer without side effects.

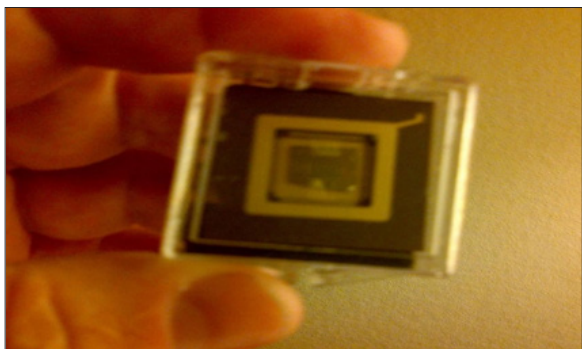
Every bio molecule can be 'fingerprinted' by a set of unique THz frequencies. There is a substantial plurality of such frequencies that comprise a fingerprint for any bio molecule as shown in FIG. 1. [1].



**Figure 1:** Illustrates various modes of molecular dynamics in THz region. THz Gap highlighted. All cancer cells resonance frequencies are in THz region.

Therefore, cancer cells have **different THz fingerprints** than healthy cells.

The idea is to destroy cancer cells by directing the focused energy Terahertz beam at cancer cell's THz resonance frequencies (that do not coincide with the THz resonance frequencies of the healthy cells) by using Proprietary Tunable THz Magnon Laser [2] as shown in FIG.2



**Figure 2:** actual size of the Magtera Proprietary, tunable THz Magnon Laser-Micro Synchrotron on-a-chip

#### Four steps of cancer treatment using proprietary Magtera Technology without side effects.

Treatment'

**First step:** Detect the THz modes for cancer cells. The most probable THz modes would be intermolecular modes: librations, low frequency bond vibrations; hydrogen bond stretches and distortions; molecular rotations. There are plenty of such modes. We use minimum THz energy ( $E_{\text{THz\_Detection\_Min}}$ ) to do detection.

**Second step:** Find a THz window of penetration in body fluids that corresponds to one of these modes by using the highly tunable THz Magnon Laser that bridges the THz Gap. (Cao et al., 2022).

**Third step:** finding the THz frequencies of the cancer cells

that do not coincide with the THz resonance frequencies of the healthy cells.

**Fourth step:** applying the min THz energy (at THz frequencies of the cancer cells that do not coincide with the THz resonance frequencies of the healthy cells) capable of destruction the cancer cells  $E_{\text{THz\_Destruction\_Min}} > E_{\text{THz}[2]}$ .

#### Side effects

No side effects. Indeed, as healthy cells have different THz frequencies than cancer cells, only cancer cells will be affected.

#### Conclusion

This is a theoretical paper. Magtera is actively seeking partners and investors to bring this new approach to life.

#### References

1. Parrott, E. P. J., Sun, Y., & Pickwell-MacPherson, E. (2011). Terahertz spectroscopy: Its future role in medical diagnoses. *J. Mol. Struct.* 1006, 66–76. DOI:10.1016/j.molstruc.2011.05.048
2. Tankhilevich, B. G., Nicholas, J. K., & Charles T. T. (2020). Tunable multilayer Terahertz Magnon generator. JUSTIA Patents. US Patent No. 11,515,687. Retrieved from <https://patents.justia.com/search?q=Tunable+multilayer+Terahertz++Magnon>
3. X-C. Cao., J-H. Hao., Q. Zhao., F. Zhang., J-Q. Fan., & Z-W. Dong. (2022). "Analysis of High-Frequency Atmospheric Windows for Terahertz Transmission Along Earth-Space Paths," in *IEEE Transactions on Antennas and Propagation*, 70(7), 5715-5724. DOI: 10.1109/TAP.2022.3161435

**Copyright:** ©2023 Dr. Boris G. Tankhilevich. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in anymedium, provided the original author and source are credited.