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New Way to Treat Cancer

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Abstract

The disadvantages of chemotherapy and ionizing radiation as methods of treating oncological diseases are indicated. Theoretically, a method of suppressing tumor cells by irradiation with an electromagnetic field, the frequency of which coincides with the natural frequency of torsional vibrations of the DNA spirals of tumor cells, is substantiated. It has been shown in a number of pathogenic bacteria that using this method it is possible to inhibit the survival of these bacteria, in some cases to zero. A method of necrosis of tumor tissues is proposed, which is not an alternative to chemotherapy or surgery, but can become an auxiliary tool in the application of chemotherapy and surgery. A number of experiments on irradiation of tumors in laboratory rats were conducted, and a decrease or disappearance of tumors was found.

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Introduction

Mechanical Impact

One of the methods of destruction of malignant neoplasm cells is DNA rupture using ultrasound [1, 2]. Relative frequencies of cleavage of the phosphodiester bond in all 16 dinucleotides were obtained. Increasing the database of analyzed data to 20 thousand nucleotides allowed us to obtain relative cleavage frequencies for 256 tetranucleotides. The disadvantage of the method is that ultrasound damages neighboring tissues and does not prevent metastases.

Standard Chemotherapy

Chemotherapy used in the treatment of oncological diseases includes the use of a number of antitumor antibiotics, as well as drugs of other groups: fluorouracil, Adriamycin, vinblastine, vinelbine (the last are pink periwinkle alkaloids). Ceruloplasmin is successfully used to improve the condition, especially during chemotherapy. Ceruloplasmin corrects the damage caused by chemistry, as well as the consequences of tumor intoxication itself.

The use of antioxidants is effective only as a preventive measure, but in this series, vaticanol-C is also used. It prevents the activation of protein kinase, which triggers cell division. A complex mechanism leads to the death of tumor cancer cells and to the disappearance of the tumor. Its precursor is an antioxidant, resveratrol. Its molecule consists of two connected phenolic rings. The drug is unstable. A way has been found to produce more complex molecules consisting of several resveratrol molecules, for example, two – epsilon-viniferin, or four. This substance is called vaticanol-C and consists of four resveratrol molecules joined

together. Vaticanol-C is chemically stable and has the properties of resveratrol.

A number of studies have found that vaticanol-C cures tumorous tumors in laboratory mice.
The drug Genz-644282 (clinical trials began in 2011) disrupts DNA doubling during the division of tumor cells, which leads to their death.

The mechanism of action of drugs from the group of camptothecins obtained from the bark of the Tree of Life – Camptotheca acuminata, a relict tree from the mountain forests of southwestern China, was revealed.

Genz-644282 and ARC-111 belong to the third generation of anti-tumor agents that block the activity of topoisomerase I, a cellular enzyme that weakens tension in a twisted DNA helix when one end of it unwinds during the synthesis of two new DNA helices, which is necessary for cell division.

Genz-644282 and ARC-111 are similar to camptothecin in their mechanism of action, but they have improved toxicological properties and cause fewer side effects. Camptothecin of natural origin, like its synthetic analogues Topotecan (Topotecan) and Irinotecan (Irinotecan), effectively kills tumor cells, but has side effects characteristic of chemotherapeutic agents: in particular, hair loss, weight loss, nausea, intestinal dysfunction.

The group of second-generation camptothecins also includes 9-aminocaptothecin (9AC), 9-nitrocamptothecin (9NC) and GG211 [7-(4-methyl piperazino-methylene)-10,11-ethylenedioxycamptothecin]. They have also shown high efficacy in the treatment of tumors. Camptothecins are considered one of the most promising anti-tumor drugs of the 21st century.

Anyway, antitumor chemicals cause severe consequences for the body.
membranes.

To avoid general poisoning of the body, chemotherapy uses a method of delivering substances directly to the tumor that increase the permeability of cell membranes.
However, it is possible to get rid of the use of chemotherapy altogether.
By itself, chemotherapy is effective, as a rule, only after surgery, there are cases when it had no effect.

On the other hand, the use of chemotherapy is limited due to the ability of malignant neoplasm cells to develop resistance, resistance to drugs that affect only mutated cells and do not have a damaging effect on normal cells of the body.

Radiation Exposure

Alternative methods include exposure to harsh X-rays or radiation from radioactive elements. However, it cannot be “delivered” directly to the tumor and on its way to it affects healthy tissues, which in itself can cause leukemia and other difficult-to-treat diseases.

Warming up the tumor with the help of an electromagnetic field as an addition to chemotherapy does not always have an effect.

Under the influence of high—frequency fields, free radicals arise in cells that can cause oxidative destruction of cellular structures - both at the level of the cell membrane and at the level of the DNA chain.

There are also works on the effects of millimeter waves. However, such waves are absorbed by the skin layer.
On 31.5.2011, the WHO International Agency for the Study of Oncology (IARC) officially added the electromagnetic field of the radio frequency range to the list of possible carcinogens.

Litvyakov’s work studied the effect of EMF on tumor cell culture, which was obtained from freshly isolated cells. It has been shown that repetitive high-power microwaves can have an inhibitory effect on the process of DNA and RNA synthesis in tumor cells of mastocytoma P-815 and decrease the rate of proliferation [3]. This effect depends on the pulse repetition rate.

High-power microwave pulses interfere with the transcription process in tumor cells. No activation of the DNA repair system was detected due to irradiation of non-splitting mononuclear blood cells. This indicates that repetitive high-power microwaves cannot initiate the rupture of a single strand in the DNA of tumor cells. It is assumed that under the influence of micro-

wave irradiation, the conformation of transcription enzymes changes, which leads to a significant inhibition of RNA synthesis.

The paper does not specify a specific frequency of microwaves, which indicates that the mechanism of their action is unknown to the authors, as reported by the authors themselves.

The authors refer to other works with the specified microwave frequencies, where it is argued that the action of microwave leads to the breaking of bonds of complementary pairs of nitrogenous bases. However, the resonance of these bonds lies not in the microwave, but in the terahertz range. In addition, the frequency of the order of 4 GHz is resonant for the natural frequency of torsional vibrations of some human DNA and therefore can damage healthy tissues.

The authors themselves believe that the action of microwave leads to single-strand breaks in DNA. But if such gaps had occurred, the authors would have found not a decrease in the rate of proliferation, but a lack of proliferation. Litvyakov himself points out that this explanation is incorrect.

It is significant that the authors worked with isolated cultures, in vitro, and used high-power microwave radiation. High-power microwave radiation causes thermal heating, which induces a skin effect that prevents the penetration of the field into the human body. Thus, the non-resonant field used by the authors cannot be used for the treatment of oncological diseases.

At the same time, since the authors used the thermal power level of the field, although the exposure time was only 5 seconds, they may have observed the effects of thermal heating.

In the effect of low-intensity centimeter electromagnetic waves (8.15-18 GHz, 1 MW/cm2, 1.5 hours per day daily for 20 days) on the production of tumor necrosis factor, interleukin-2, interleukin-3 and expression of heat shock protein 72 in cells of healthy mice and animals with experimental solid tumors induced by transplantation of Ehrlich ascitic carcinoma cells [4]. The multidirectional effects of electromagnetic radiation on the secretion of interleukin-2 and tumor necrosis factor and the absence of radiation effects on the production of interleukin-3 by immunocompetent cells of healthy mice were revealed. At the same time, irradiation of tumor carriers led to the elimination of the suppression of antitumor resistance caused by malignation, causing stimulation of the synthesis of tumor necrosis factor, restoration of interleukin-2 secretory activity of immunocompetent cells and a decrease in the degree of lymphopenia. In addition, it was found that regular exposure to electromagnetic waves acts as repetitive stress, which leads to the formation of heat shock protein 72 in the cells of irradiated healthy mice and irradiated tumor carriers. We believe that the immunomodulatory effect of low-intensity electromagnetic waves can be used for immunocorrection and suppression of tumor growth.

Thus, the Article Deals with:

1. The effect of microwave EMF on the immune system, but not on the tumor itself, i.e., this is a significantly different topic.
2. Radiation affects the body with a specific malignant neoplasm. It is possible that with another cancer, the immune system will react in a different way,
3. Radiation causes stress and expresses the heat shock gene, which can be dangerous for the body. It is also known that multi-day radiation has an accumulative character and does not depress the nervous system, including the reticular formation.
4. The mechanism of action of microwave EMF has not been identified, these frequencies lie far from the natural frequency range of torsional vibrations of tumor cells.

In addition to the above, new methods have been developed: laser therapy, cryosurgery, hyperthermia, photodynamic therapy, and radio wave therapy [5-7]. However, the use of radio waves is limited to local heating, which does not help in all cases, and the penetration of intense radio waves into the human body is limited to 12-15 cm.

Materials And Methods

Justification of the New Method

The essence of the new method is the use of EMF to destroy tumor cells.

As is known, the DNA helix, in addition to the UV and IR spectra, has its own frequencies in the microwave

range. Thus, the frequency of torsional vibrations of bacterial DNA is several GHz [8].

As is known, in addition to the ultraviolet and infrared spectrum, DNA has its own modes in the microwave spectrum. For the first time, the radiation of an electromagnetic field by excited DNA molecules was discovered by the Frank-Kamenetsky group in 1979. The group determined that this electromagnetic field has an ultrahigh frequency (GHz) and associated radiation with torsional vibrations of the DNA helix [9].

It was suggested and proved that if a DNA molecule is capable of emitting, then it is also capable of absorbing microwaves, coming into an excited state [10]. If there is a frequency of study, there must be an equal frequency of absorption. This frequency should be proportional to the frequency of torsional oscillations of the spring pendulum. That is, it is a function of the length of the DNA helix.

1. It was found that various microwave frequencies reduce the survival rate of E. coli her 'exg' by up to 50%, and the dependence of survival on the time of irradiation was found [8].

2. This dependence was recalculated to a frequency dependence [10]. It is found that the dependence curve has a resonant character, and the resonant frequency is determined. Using the Lagrangian formalism, the frequency of torsional vibrations of the helix of any DNA is determined:

$$f = 21,75 \cdot (\mathrm{BP})^{-1/2} \ \mathrm{THz} \ (1)$$

BP is the number of nucleotide pairs. The rigidity of the DNA helix is obtained due to DNA compactification. The coefficient in the formula is calculated by substituting the obtained resonant frequency and the number of nucleotide pairs of E. coli her'exg' DNA into the formula and reflects integrally the rigidity of the DNA helix, its packaging, interaction with the environment and other factors.

3. The formula was used to determine the resonance frequency for the DNA of another E. coli strain, ATCC 25922, whose DNA contains 5,130,767 nucleotide pairs. An Agilent Technologies E82570 1 type microwave generator, which creates harmonic polarized oscillations, and an amplifier of the same brand were used for irradiation. The experimental and control strains were isolated from exposure to daylight. Bacterial cultures were placed in saline solution with a power flow density of 2.5 mW/cm2. The exposure time is 3 hours. Irradiation with this frequency 9,6 GHz (nor any other) led to a sharp decrease in survival rate up to 20%.

4. The resonance frequency of the DNA of Mycobacteria M. Avium 104, fatal to HIV-infected people, was calculated. Irradiation of these mycobacteria with the calculated frequency completely destroyed them.The exposure time is 6 hours.

5. The resonance frequency was calculated for Mycobacterium tuberculosis H37Rv. The method of marginal dilutions was used. Cultivation was carried out on egg medium of Finn II. The exposure time is 104 hours. Irradiation at this frequency reduced the survival rate of the bacterium a thousandfold [11].

6. A direct experiment was conducted on the absorption of microwave EMF by DNA molecules. An E. coli M17 culture was irradiated, and absorption at the calculated frequency was detected [12].

Thus, it is Shown that:

1. The DNA molecule actually absorbs microwave EMF in a resonant way.
2. With the help of microwave EMF, various cells can be suppressed or destroyed.

Confirmations

1. In 2009, Malinetskaya's group built a model for 400 nucleotide pairs, the result of machine counting coincided with the result of calculation according to formula (4) – about 100 THz [13].

2. It was shown that irradiation of E. coli culture leads to a sharp decrease in the ability of DNA to self-repair [14]. It turned out that the frequency of the external EMF exactly coincides with the calculation according to formula (1).

3. It was found that microwave dramatically increases the number of single-strand breaks, mathematical modeling showed that the optimal frequency coincides

with the calculation according to formula (1) [15].
4. It was found that using microwave it is possible to destroy flu strains. It turns out that the resonant frequency found in is a subharmonic consistent with formula (1) [16].

Theory

The method of suppressing the growth of tumor cells is also based on the excitation of torsional vibrations of the DNA spirals of tumor cells by an electromagnetic field. This method, as we saw above, has been tested on a number of pathogenic bacteria. The elimination of E. coli-type infections takes up to 3 hours. The destruction of mycobacteria, fatal to HIV-infected people, takes 6 hours. 104 hours of continuous radiation is required to destroy Mycobacterium tuberculosis Since the proliferation coefficient of tumor cells is quite high, the rate of their division is much higher than that of ordinary dividing cells of the human body, respectively, the exposure time by the microwave field is within 6-12 hours.

The possibility of using the method is determined by the fact that the natural frequency of torsional vibrations of the DNA spirals of mutated tumor cells differs from the natural frequency of torsional vibrations of the DNA spirals of healthy tissue cells.

Microwave EMF is absorbed only by the DNA molecule of the tumor cell, the resonant frequency of which coincides with the frequency of EMF. The rest of the DNA of the human body is not affected. In addition, since the waves used are centimeter waves, they do not affect any other molecules in the body, nor any cell organelles [17]. Thus, unlike ultrasound or ionizing radiation, non-thermal resonant microwave EMF does not damage neighboring tissues.

A significant difference of this method is the non-thermal level of power flux density, which allows microwave EMF to pass freely through the human body, lingering only on the DNA of tumor cells. The free passage of microwave EMF through body tissues is due to the fact that blood, which is a conductor at low frequencies, behaves like a dielectric at ultrahigh frequencies. The free penetration of non-thermal microwave through the human body solves the problem of distant metastasis.
The fact that the microwave EMF level is not thermal is the second condition for the free penetration of the field through the human body, since there is no skin effect.

Let's list once again the causes of the death of tumor cells under the influence of microwaves:

1. Microwave EMF dramatically reduces the ability of the DNA of the cell nucleus (mitochondrial and viral DNA are not affected) to self-repair.

2. Microwave EMF prevents doubling (replication) DNA and, accordingly, cell division. Namely: microwave EMF prevents:
• Begin the process of separating the strands of the DNA helix from each other;
• Enzymes to cut and stitch DNA; delayed DNA strands to finally replicate after separation;
• Prevents the current replication of the leading and lagging chains of the DNA helix. In general, these factors will create obstacles to the start of the work of the microtubule organization center "headed" by the centrosome (near the cell nucleus) and the division spindle by the beginning of mitosis, preparation for mitosis will not be carried out. The cell stops dividing and dies.

3. Microwave EMF interferes with the functioning of DNA in the period between divisions.

4. Microwave EMF dramatically increases the number of single-strand breaks in the DNA helix. The most important point of the method is that microwaves do not allow tumor cells (and (and pathogenic bacteria) to mutate, since they stop their division.

It is also assumed to use combined radiation, initially at least three different frequencies corresponding to the DNA frequencies of different chromosomes: the 1st (longest, lowest frequency), the main histocompatibility complex (6th chromosome) and the X chromosome.
The exact natural frequency of DNA torsional vibrations is determined using a spectrum analyzer.
skin effect.

Experiment

The method has been successfully tested on laboratory outbred rats with breast fibroadenoma. 34 laboratory

rats were used. The rats were placed in transparent plastic containers 7 cm x 7 cm x 20 cm.
To isolate the rats from daylight, black paper containing no heavy metals was used.

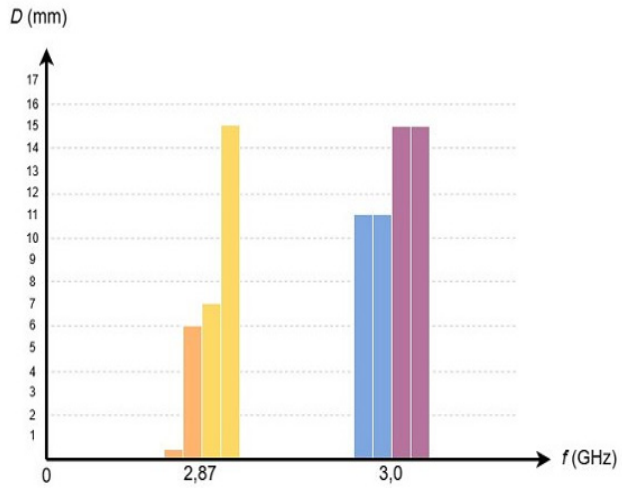
The containers were installed in an anechoic chamber in the area of maximum radiation power flux density. Since the DNA of the cells of the rat body is much longer than the DNA of bacteria, the frequency is correspondingly several times lower, therefore another generator is required.

One container was irradiated with an electromagnetic field with a frequency of 2.87 GHz, calculated according to the formula (1). The other container, the control one, was irradiated with an arbitrary frequency of 3 Ghz. The temperature is 23 degrees.A DSG830 Rigol ultrahigh frequency generator and an Agilent Technologies E82570 1 amplifier were used as a radiation source.

The density of the power flow near the container with the rat is 2 mW/cm2.
A frequency of 2.87 GHz was set on the generator (close to the natural frequency of torsional vibrations of the DNA helix of the 14th chromosome).
The daily exposure time is 14 hours. The number of days is 10 days.

Tumor reduction from 1.5 cm to about 0.7 cm and resorption of tumors smaller than 0.6 cm were found in 17 experimental rats.

No changes in tumor size were observed in 17 control rats (EMF irradiation with a frequency of 3 GHz).
One can sees results on Fig. 1



Here, D is the size of the tumor, 4 groups of rats: two control ones (blue and purple), exposure to the wrong frequency did not reduce D. Two experimental groups (orange and yellow), the yellow-orange diagram shows a decrease in the initial size of the tumor.

The tumor cells mutate, i.e., their DNA changes length. Therefore, to determine the frequency, both formula (1) and a series of experiments on 4 rats were used to clarify. In one of the rats, the tumor decreased in size at a frequency of 2.87 GHz. Since the number of rats to refine the formula is small, there was a certain risk, but the experiment was successful. That is, there is an effect at the calculated frequency, but there is no effect at another nearby frequency under the same other conditions. Thus, it can be assumed that the microwave waves destroyed the DNA of the tumor cells.

Conclusion

The fact that the close frequency of 3 GHz had no effect on rats suggests that the nature of exposure to microwaves is resonant.

The method is not designed for treatment in the case when the proliferating tumor growth goes through all organs and bones, the tissue changes, acquires the morphology of the affected tissue with atypical cells (with thickening of the membrane, swelling of the cytoplasm, etc.), muscle, mucosa, epithelial, connective, bones and cartilage. I.e., when the tumor acquires the morphology of that the tissue where it develops, but with an anomaly. For example, for the treatment of sarcoma, which "stitches" through a number of tissues of different densities, cell sizes and other properties, i.e., the frequency of natural oscillations of the DNA of tumor cells varies abruptly.

The possibility of using the method to interrupt amitosis has not been determined.

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