

P-15: Oliver Szasz, Gabor Andocs, Nora Meggyeshazi, Andras Szasz (2012) Modulation effect in oncothermia



Modulation effect in oncothermia

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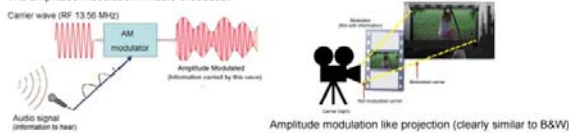
Objective

One of the most special and distinguished effect of oncothermia is the modulation. This special effect is important for selection and apoptotic action of oncothermia, applied on basic of multiple patents, [1], [2], [3]. The applied amplitude modulated signal is of course not simple. Presently the amplitude modulated electromagnetic applications have their renewing in the professional literature [Szasz et al Oncothermia, Springer, 2010]. Our objective is to show the oncothermia modulation which is a new way of the modulation technique.

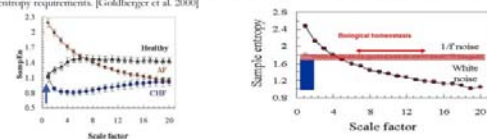
Introduction

The carrier wave (13.56 MHz frequency) delivers the energy focused to the tumor-cells, but the information is delivered by the pattern carrying by the wave. The pattern is formed by the modulation (symmetric change of the amplitude of the carrier). The modulation is similar to the movie-projection. The beam originally starts from a white lamp source, which is the "carrier" of the info. When we see only this, only a white light-spot could be observed, no info is carried. The info is saved on a film, which is illuminated by the source light. The white light started to be "modulated" and the info from the "modulator" started to be carried by the beam. The transparent picture is projected to the silver-screen.

The amplitude modulation in radio-broadcast

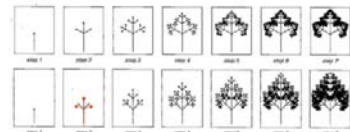


The information which oncothermia has to deliver is the collectivity. This information is characteristic of the healthy cells, they are existing in collective harmony. This harmony makes the full control on their apoptosis, which is the most important prevention against the malignant proliferation. The cellular connections coordinate the harmony, and "glue" the cells together in an integrative tissue, blocking their free movements out. These are missing in malignancy, where the autonomic cells are able to disseminate by blood-stream and causing the metastases as the main mortality factor in cancer-statistics. The harmonic cooperation of the cells is characterized by the equal entropy in all the scales of the living tissue [Goldberger et al, 1998]. This is far not the case in any unhealthy conditions, where the homeostatic equilibrium is broken [Ligei et al, 2011]. The proper homeostasis in living systems is characterized by the special time fractal noise so called 1/f frequency. The system which has this noise harmony, satisfies the constant entropy requirements, [Goldberger et al, 2000].



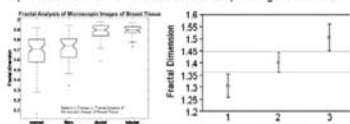
Fractals in space

Fractals in nature are widely appearing. The natural shapes of the living organisms, organs and all the structures are fractal-like organized. The fractals in space are self-similar starting from a simple template. A small change of the template changes the final structure robustly.



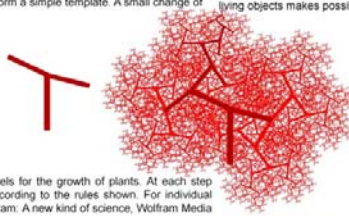
Steps in the evolution of substitution systems that provide simple models for the growth of plants. At each step every growing stem is replaced by a collection of three new stems according to the rules shown. For individual stems this type of branching is known in botany as monopodial. (S. Wolfram: A new kind of science, Wolfram Media Inc. 2002, pp.400)

Space-fractals characterize well main of the pathological statuses.



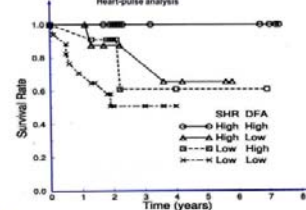
The problem of the autonomy of the malignant cells makes the treatment very much complicated, because the cancer has its own fractal structure. [Balkema J, Franssen L, Fractal Analysis of Microscopic Images of Heart Tissue]

The analysis of the fractal structures of malignancies could even indicate the stage of the disease [Lambasco M, Magliocco AM, (2008) Relationship between tumor grade and computed architectural complexity in breast cancer specimens, Human Pathology, 39:740-746].



Fractals in time

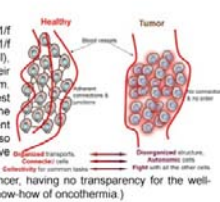
Same structure in time could be constructed as exists in the space. Analysis of the time-fractals of the dynamism of living objects makes possible to control their wellness as well as to predict their failures.



Method

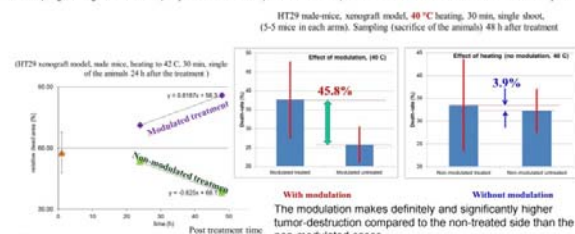
In oncothermia a special amplitude modulated t by fractal is [2].

The modulation is far from any sinus or other periodic patterns, it is 1/f spectrum, having definite templates for its construction. The 1/f fluctuation characterizes all the harmonic sounds (like music as well), but of course all the musical pieces are different (even their interpretation could be different) despite of their identical 1/f spectrum. This is which we use for fractal modulation technique. The newest progress applies well established personalized template of the modulation [3], which based on the personal time-fractal of the patient and his own tumor pathology. The modulation electronically needs also special solutions, because the highly capacitive system (and capacitive the coupling on impedance basis) could badly modify the spectrum. The malignant absorption selects according to the disorder of the cancer, having no transparency for the well-chosen modulated RF carrier frequency (It is a patented method and know-how of oncothermia.)



Results

Measurements in comparison the modulated and nonmodulated treatments in vivo show the differences. The modulated treatment side and the untreated side of double tumorous mice shows 45% distortion rate after single-shot (30 min) treatment on 40 °C, between the treated and untreated sides of mice (three animals 6 lesions in one measurement point), while the same experimental setup in non-modulated treatment case makes only less than 4% difference between the treated and untreated lesions of the same animals. In study the time-course of the animals, we received also important data: the modulation starts the apoptotic process, and after one and two days the tumor-destructive process is developing, killing the tumor rapidly. In the same experimental setup, the non-modulated treatment makes only the usual destruction after the treatment.



The modulation reestablishes the apoptosis, the natural cell-killing process, and after 48 h the effect is obviously acting. (HT29 xenograft model on single-tumor-bearing mice.)

Conclusion

Oncothermia modulation is one of the three specialties of this treatment. Its efficacy and its role in the personalization process introduced effective tool for apoptotic cancer-cell destruction.

More detailed explanation and background of the modulation applications in Oncothermia could be obtained from the Oncothermia book [Szasz et al, Springer 2010]. The method is patented

References

- [1] Szasz A, Szasz N, Szasz O (2009) Radiofrequency hyperthermia device with target feedback signal modulation. European Patent Application No. EP 08075820.4
- [2] Szasz A, Szasz N, Szasz O (2011) Device and procedure for measuring and examining the signal of systems releasing measurable signals during operation or in response to external excitation. European Patent Application No. EP 05798498.1
- [3] Szasz A, Szasz N, Szasz O (2012) Fractal templates and fractal feedback in homeostatic control. European Patent Application (pending).
- [4] Blackman CF (2012) Treating cancer with amplitude-modulated electromagnetic fields: a potential paradigm shift, again? British Journal of Cancer 106, 241 – 242

