

Title: Weak Magnetic Fields in Human Rehabilitation

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Opinion paper

The living organism is a network with automatic regeneration and organization that has a high grade of stability. This stability is totally dynamic and is characterized by continuous multidimensional and interdependent fluctuations. The network is the fundamental organization approach for the all living system, In fact, the networks produce continuously themselves with transformation or substitution of your components : so we are continuous structural modifications but anyway the fundamental diagram is preserved . The body system is able to receive a perturbation but in not able to receive a line of trend. Moreover, the body system is able to receive an environmental perturbation and answer with an independent and cognitive modality, and so, if it is a too big perturbation you have the tissue lesion of the body.

Fundamental in our medicine is the correlation between the *Body Dynamics Processes* and the phases of the bioprogessive regenerative rehabilitation plan. The our the bioprogessive regenerative rehabilitation plan is composed by an initial definition of the patient's cybernetic system to realize both a pain scale evaluation and to control pain with a regeneration approach to the tissue. This model is focalised to create regeneration and improvement of performances mind-matter correlated at the same time with the reduction of pain. The final rehabilitative process are to realize at the mind level a new corticalization of the motion and at the matter level a regeneration of the coherence of the bone-muscle-fascial system , basic system during the motion. The the bioprogessive regenerative rehabilitation plan is realised with three step : 1) first increase the capacity of the bone-muscle-fascial system and the somatosensory afferent , 2) second realize therapy of movement in microgravity environment, 3) third using evolved physical energy applied

to the body's system like weak magnetic fields. The human system does not vibrate as a single mass with a natural frequency, but the organs and every single cell in the human body have their own resonance frequency. Then, this causes an amplification or attenuation of the input vibrations by each area of the body, according to its resonance frequency.

There are technologies that exploit magnetism that endorse their effectiveness on the treatment of lesions (bone and muscle) given the ability to accelerate recovery times after an injury or after a stabilization operation - are the PEMF or low-frequency pulsed magnetic fields. *"Nothing is still — everything is vibration" said Albert Einstein "In the universe everything vibrates and"* even the living system is interested in this reality this manifested outside and inside of him. *"The Vibration is a life force"* and regarding the human body the vibrations effects can be divided into two areas: the positive like the low-frequency magnetic fields and the negative. Zhadya has demonstrated that the human being is able to decode the information, useful to the maintenance of its homeostasis, through the phenomenon of resonance. The resonance is a form of communication in which the body responds in multiple forms. The dysfunction occurs just when the resonance phenomenon can not take place: according to the laws of balance, comfort and energetic economy we can allow the maximum effectiveness of the gesture in the absence of pain with maximum energy economy through changes in the intra- and extra-cellular metabolism, experimentally has been shown that it is possible to act on cell metabolism through weak magnetic fields.

In 2009 Montagnier, has demonstrated the validity of the coherence domains, declaring as the water is not an inert substance, being able to take special configurations such 'extra-emitting electromagnetic waves weak. Living organisms are immersed in the static Earth's magnetic fields that vary with time of day and the seasons and have intensity and frequency cyclotron capable of producing movements of ions across membranes. Therefore it is clear the influence of magnetic fields on the kinetics of the ions and polar organic structures across cell membranes, especially in the determinism and preservation of homeostasis and both of circadian rhythms.

Therapy to rebalance the electrochemical cell can possibly influence and stimulate the metabolism in human cells by orderly regulating the traffic of selective ion between the inside and outside of the cells membrane by means of electromagnetic fields at very low intensity and at a precise frequency, defined Bioresonance Cyclotron.

The Bioresonance Cyclotron emits an 'emission of an electromagnetic field oriented in the low frequency that through a selective increase cell permeability between the action on the ions that are able to control the opening and closing of the membranes channels so to restore an electrochemical balance in the cells in which it had been previously altered.

Our bioprogressive regenerative and rehabilitative plan from 15 years is constituted by the use of weak magnetic fields like Bioresonance Cyclotron. The studies performed from our scientist group are presented on end.

In 2009 R. Saggini, R.G. Bellomo, A. Saggini, and E. Toniato. are published the study on : *“Rehabilitative treatment for low back pain with external pulsed electromagnetic fields“* in the International Journal of Immunology and Pharmacology. This work using magnetic fields at very low intensity at 10 microtesla are able to reduce significantly Vas and to modulate IL6 with repair stimulation related to reduction of IL6 and of IL4 in a group of low back pain chronic patients¹.

In 2014 Di Bonaventura G., Pompilio A., Crocetta, V., De Nicola, S., Barbaro, F., Giuliani, L., D'Emilia, E., Fiscarelli, E., Bellomo, R.G., Saggini, R. in Future Microbiology has published the work *"Exposure to extremely low-frequency magnetic field affects biofilm formation by cystic fibrosis pathogens"*. The aim of study was to evaluate the in vitro effects of extremely low-frequency magnetic field (elf-mf) on growth and biofilm formation by staphylococcus aureus, pseudomonas aeruginosa, burkholderia cepacia and stenotrophomonas maltophilia strains from cystic fibrosis patients².

The motion of selected ions (fe, ca, cu, zn, mg,k, na) was stimulated by the ion resonance effect, then influence on growth and biofilm formation/viability was assessed by spectrophotometry or viability count. The results shows that most of the differences observed (312 out of 328; 95.1%) indicated increased growth, appearing already at the end of exposure (7-h incubation) (68 out of 84, 80.9%), and persisting up to 24-h incubation (59 out of 84, 70.2%), without differences among species tested. Overall, most of differences measured (26 out of 42, 61.9%) showed a significant reduction in biofilm biomass formation, compared with unexposed controls, while increased biofilm levels were observed in only 38.1% (16 out of 42). With regard to differences suggestive for a significant increase in biofilm biomass formed, most of these were observed for S. maltophilia (8 out). Exposure to ELF significantly reduces biofilm viability and the magnitude of this effect resulted to be both species- and ion-specific. Exposure to ELF in fact significantly decreases biofilm formation, probably not depending on a bactericidal effect but rather to reduced bacterial adherence to substratum secondary to altered permeability of the ionic channels of cell membrane.

In final, we present a preliminary data of a work in a population of chronic multiple arthrosis treated with a specific intensity at a frequency of 10 microtesla with a weak magnetic wave sistem and analyzed with BIA of Akern. The results showed: an important reduction in extracellular water content with an increase in intracellular water, associated an increase in BCM (active cell mass). The picture seems attributable, at least for the most part, to a variation of the electrical membrane

situation (consequent to a different activation of the ion pumps), which allows rehydrating, and therefore going towards a condition of greater well-being, to cells previously dehydrated.

In conclusion the use of weak magnetic fields^{3,4,5} could offer new perspectives into both prevention and rehabilitation and the application of this apparatus in opposed to TMS.

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