E.M.O.S.T.

THE

ELECTROMAGNETIC OWN SIGNAL THERAPY

presented by

Dr. Attila Erdőfi-Szabó Ph.D.

Biophysicist, developer of EMOST method

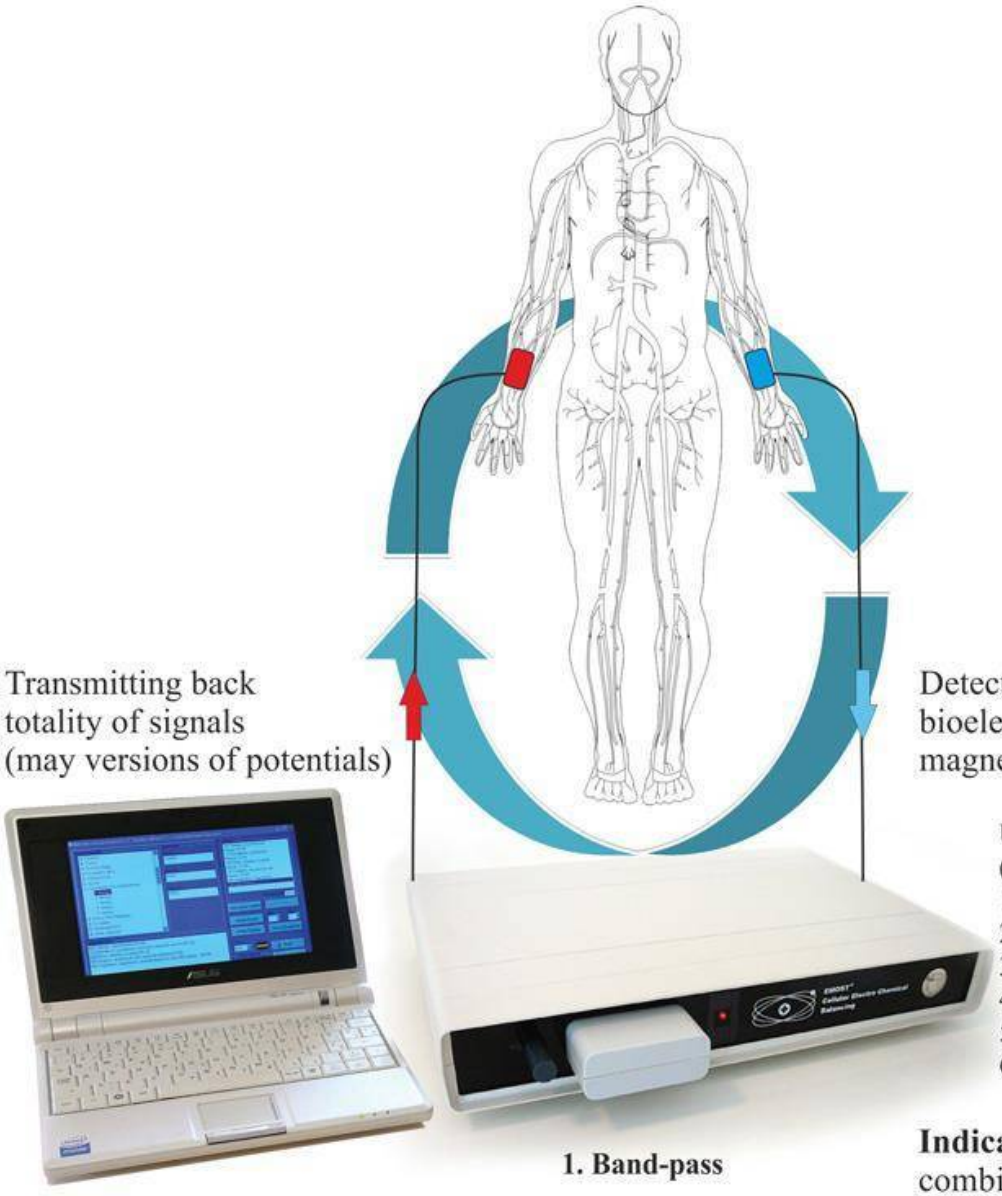
doctor of Medical- and Health Sciences

www.biolabor-med.com

2011

The EMOST® process

transmitting the natural based extrem-low intensity analogue signals back in natural range



Transmitting back
totality of signals
(may versions of potentials)

Detection of natural
bioelectric and bioelectro-
magnetic signals

Used bands of detected signals
(may periods of potentials)

1. 1-10 signal/sec
2. 10-100 signal/sec
3. 100-1000 signal/sec
4. 1000-10000 signal/sec
5. 10000-100000 signal/sec
6. 100000-1000000 signal/sec

1. Band-pass

2. Amplification

-20 dB,
60 dB

3. Expansion, and extension of variations

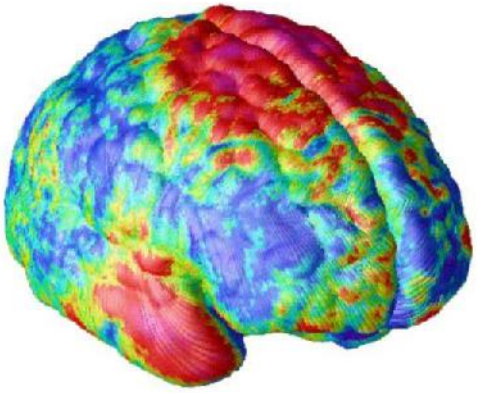
Fourier transform
-14 dB to 5 MHz
0,1 sec. – 102 sec

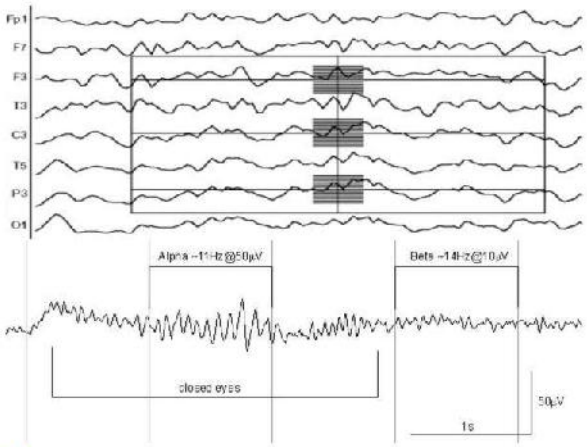
Indicatio:
combinations of signal-bands,
variations of amplification
and extension of variations

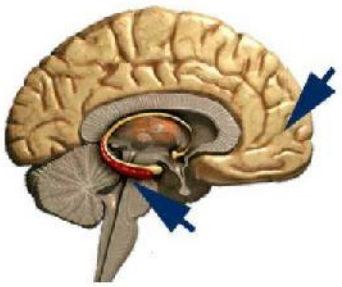
CE 1979
MEDICAL DEVICE

PRESUMABLY UNIQUE OF THE WORLD ...2011...

Developer/owner: EMOST Nano-MED Ltd., Manuf.: Caduceum Ltd., Excl.Distributor: BioLabor Biophysic Ltd.
www.biolabor-med.com







Probably:

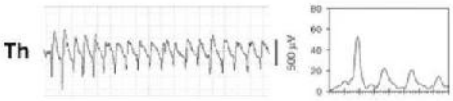
Frontal lobe: also involved in emotion, and in the ability make plans, think creative, and combinations of synapses (from/to memories, experiences etc.)

Amygdala: evaluates sensory information, determining it's importance, agression, anxiety...

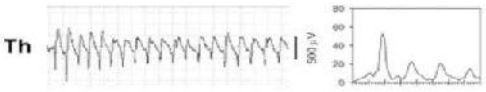
Thalamus: relay center, directs sensory messages (signaling testosterone immun function, apoptose etc.)

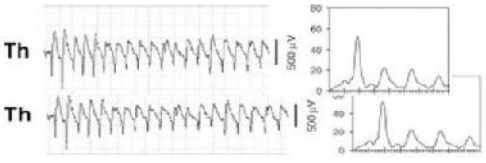
Hypothalamus: responsible for regulating basic biological needs: temperature, thirst, hunger etc.

EMOST ™ recognising and separating it's functional bioelectric signals in it's natural range: (from 1 Hz, potentials µV)



EMOST ™ makes slightly variations of amplification (from 1 Hz, potetntials µV, from -20 dB to 60 dB) via analogue (non-linear, non-digitalized) mode, and makes expansion, slightly extension of functional signal variations via Fourier lines (-14 dB, 5 MHz)



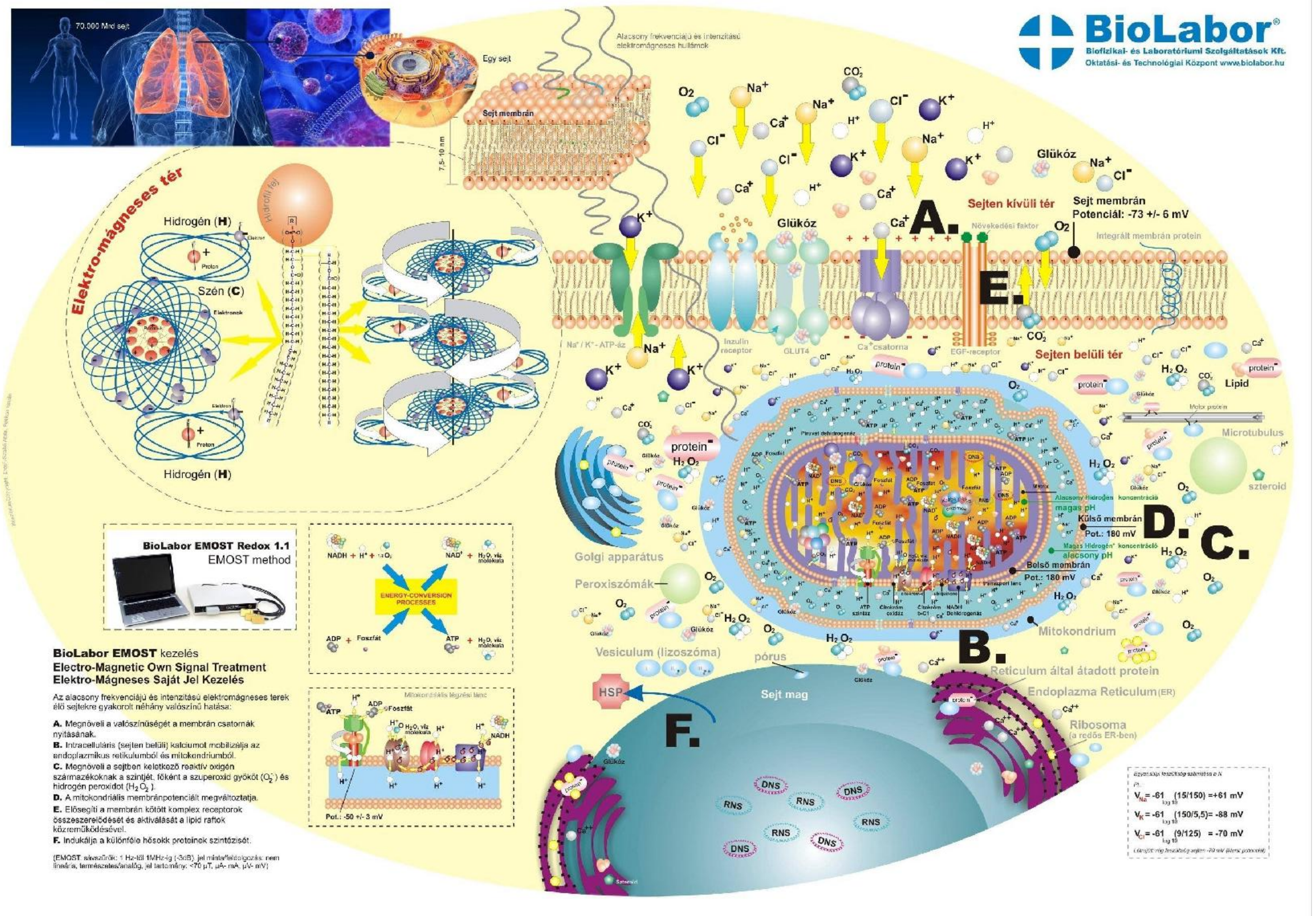


EMOST ™ - the EM Own Signal therapy ™ - then the variations and the original functional signal are returned through another free nerve ending zone, and helps for the neurovegetative system in signal transmission, signal recognising and electro-chemical balancing.

EMOST ™ - the EM Own Signal therapy ™ - the retransmitted own information helps re-coordinating of functional signal, and the retransmitted own functional signal energy has enough redundancy to overcome the dead point and to regain balance.

Comparsion to the best of our knowledge	EMOST™	Tens stimuli	Accupuncture	Electr-accupuncture	Homeopathy	Medicinal product	Psychiatry
self-medication	yes	no	no	no	no	no	maybe
self-regulating process	yes	no	no	no	yes	no	yes
natural healing	yes	no	no	no	maybe	no	yes
works via neurovegetative system	yes	yes	yes	yes	no	maybe	maybe
works in non-defense reactions	yes	no	maybe	maybe	no	maybe	yes
non-invasive	yes	no	no	no	no	no	maybe
use in course enough	yes	maybe	maybe	maybe	maybe	no	maybe
effect self-memorising	maybe	no	no	no	maybe	no	yes
natural based	yes	no	no	no	maybe	maybe	yes
use own biological signals	yes	no	no	no	maybe	no	yes
without contraindications	yes	no	no	no	maybe	no	yes
extrem-low risks	yes	no	yes	no	yes	maybe	yes
interactivity in median effective dose	yes	no	yes	no	no	no	yes
holds natural balance	yes	no	maybe	maybe	yes	maybe	yes
well-indicated	yes	maybe	yes	yes	yes	yes	no
activate the self-checking system	yes	yes	yes	maybe	yes	maybe	no
balance the electro-chemical processes	yes	maybe	yes	yes	yes	yes	maybe
balance the cellular metabolism	yes	yes	maybe	maybe	maybe	yes	maybe
balance the cellular electro-chemical flows	yes	maybe	yes	yes	no	maybe	no
balance parasymphatic and sympathic's	yes	no	yes	maybe	maybe	maybe	maybe
helps for the neurovegetative system	yes	yes	yes	yes	no	yes	maybe
helps in signal transmission	yes	no	yes	maybe	no	maybe	no
helps in signal recognising	yes	no	no	no	maybe	maybe	no
helps via neurotransmitters	yes	maybe	maybe	maybe	yes	yes	maybe
helps in flow of potential-action potential	yes	no	yes	no	no	no	no
helps in neuroendocrine balance	yes	no	no	no	maybe	maybe	yes
helps in neuro-immunological flows	yes	no	maybe	maybe	no	maybe	maybe
helps in psycho-somatic based problems	yes	no	no	no	maybe	maybe	yes
helps in somato-psychic based problems	yes	yes	yes	yes	yes	yes	yes
easy-to-use	yes	maybe	no	no	no	no	no

EMOST™ módszer összehasonlítás, a legjobb tudásunk szerint	EMOST™	Tens stimulátor	Akkupunktúra	El. akkupunktúra	Homeopátia	Gyógyszer készítm.	Pszichiátria
Egyszerű használat	igen	talán	nem	nem	nem	nem	nem
Öngyógyító mechanizmusú	igen	nem	nem	nem	nem	nem	talán
Önszabályzási mechanizmusú	igen	nem	nem	nem	**igen**	nem	**igen**
Természetes gyógyulást eredményez	igen	nem	nem	nem	talán	nem	**igen**
Idegrendszeren keresztüli működés	igen	**igen**	**igen**	**igen**	nem	talán	talán
Nem védekező mechanizmusra épít	igen	nem	talán	talán	nem	talán	**igen**
Behatolás mentes	igen	nem	nem	nem	nem	nem	talán
Kúraszerű (nem-folyamatos) ellátás	igen	talán	talán	talán	talán	nem	talán
Ön-emlékeztető kihatás	talán	nem	nem	nem	talán	nem	**igen**
Természetes forrású eljárás	igen	nem	nem	nem	talán	talán	**igen**
Saját biológiai jel használat	igen	nem	nem	nem	talán	nem	**igen**
Kontraindikáció nélküli	igen	nem	nem	nem	talán	nem	**igen**
Extrém-alacsony kockázatú	igen	nem	**igen**	nem	**igen**	talán	**igen**
Alkalmazkodó dózisú (alul- vagy túladagolás helyett)	igen	nem	**igen**	nem	nem	nem	**igen**
Természetes egyensúlyt megtart	igen	nem	talán	talán	**igen**	talán	**igen**
Jól irányítható (indikálható)	igen	talán	**igen**	**igen**	**igen**	**igen**	nem
Prompt aktiválja az önellenőrző rendszert	igen	**igen**	**igen**	talán	**igen**	talán	nem
Egyensúlyozza az elektrokémiai folyamatokat	igen	talán	**igen**	**igen**	**igen**	**igen**	talán
Egyensúlyozza a sejtszintű anyagcserét	igen	**igen**	talán	talán	talán	**igen**	talán
Egyensúlyozza a sejtszintű elektrokémiai folyamatokat	igen	talán	**igen**	**igen**	nem	talán	nem
Egyensúlyozza a paraszimpatikus és szimpatikus rendszert	igen	nem	**igen**	talán	talán	talán	talán
Segíti a neurovegetatív rendszert	igen	**igen**	**igen**	**igen**	nem	**igen**	talán
Segíti a jelfelismerést	igen	nem	nem	nem	talán	talán	nem
Segíti a jeltovábbítást	igen	nem	**igen**	talán	nem	talán	nem
Támogatás a neurotranszmittereken keresztül folyik	igen	talán	talán	talán	**igen**	**igen**	talán
Segíti a potenciál-akciós potenciál folyamatokat	igen	nem	**igen**	nem	nem	nem	nem
Segíti a neuroendokrin egyensúlyt	igen	nem	nem	nem	talán	talán	**igen**
Segíti a neuro-immun folyamatokat	igen	nem	talán	talán	nem	talán	talán
Segítség pszicho-szomatikus alapú betegségben	igen	nem	nem	nem	talán	talán	**igen**
Segítség szomato-pszichés alapú betegségben	igen	**igen**	**igen**	**igen**	**igen**	**igen**	**igen**



BioLabor EMOST kezelés
Electro-Magnetic Own Signal Treatment
Elektro-Mágneses Saját Jel Kezelés

Az alacsony frekvenciájú és intenzitású elektromágneses terek élő sejtekre gyakorolt néhány valószínű hatása:

A. Megnöveli a valószínűségét a membrán csatornák nyitásának.

B. Intracelluláris (sejten belüli) kalciumot mobilizálja az endoplazmikus retikulumból és mitokondriumból.

C. Megnöveli a sejtben keletkező reaktív oxigén származékoknak a szintjét, főként a szuperoxid gyököt (O_2^-) és hidrogén peroxidot (H_2O_2).

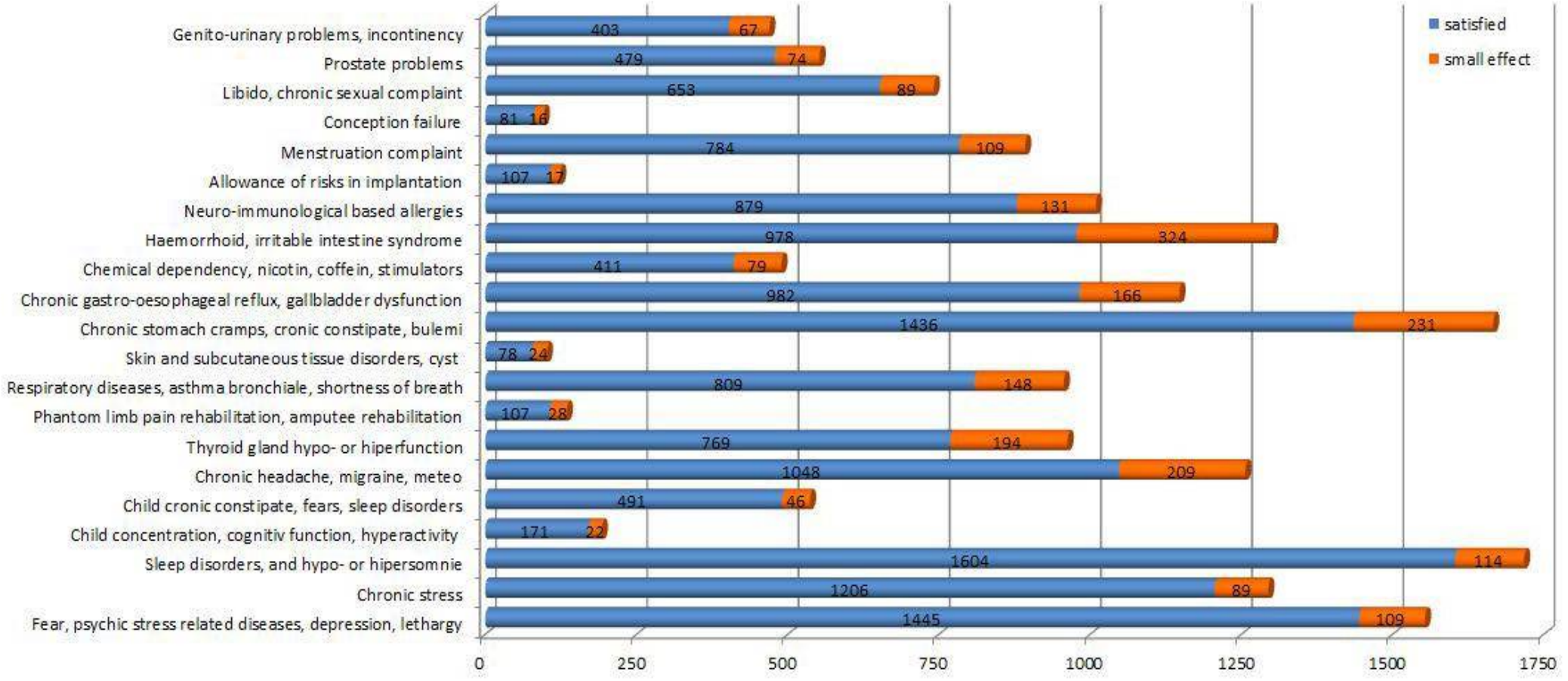
D. A mitokondriális membránpotenciált megváltoztatja.

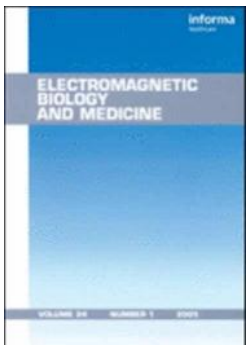
E. Elősegíti a membrán kötött komplex receptorok összeszerelődését és aktiválását a lipid raftok közreműködésével.

F. Indukálja a különféle hősokk proteinek szintézisét.

(EMOST sávszűrők: 1 Hz-től 1MHz-ig (-3dB), jel minta/feldolgozás: nem lineáris, természetes/analóg, jel tartomány: <70 µT, µA- mA, µV- mV)

Results rates of EMOST treatments from developing period to medical certificate in BioLabor franchise system. *(stats in CRM/14,921 courses/05-12, Dr. Attila Erdőfi-Szabó, chairman)*





EMOST: Elimination of chronic constipation and diarrhoea by low-frequency and intensity electromagnetic fields

Journal:	*Electromagnetic Biology and Medicine*
Manuscript ID:	Draft
Manuscript Type:	Original Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Bókkon, István; Semmelweis University, Doctoral School of Pharmaceutical and Pharmacological Sciences Erdőfi Szabó, Attila; BioLabor, Till, Attila; National Institute for Medical Rehabilitation, Budapest, Hungary, Erdőfi-Nagy, Éva; BioLabor Biophysical- and Laboratories Services Ltd, Lukács, Tünde; BioLabor Biophysical- and Laboratories Services Ltd,
Keywords:	Chronic diarrhoea, Chronic constipation, Low-frequency and intensity electromagnetic fields

EMOST: Elimination of chronic constipation and diarrhoea by low-frequency and intensity electromagnetic fields

[1,]Bókkon I, [2] Erdőfi-Szabó A, [3]Till A, [4]Lukács T, [5] Erdőfi-Nagy É,

2012

1 Chief Scientific Consulting of BioLabor Biophysical- and Laboratories Services Ltd, Budapest, Hungary

2 Pro Deo State University, Chairman of BioLabor Biophysical- and Laboratories Services Ltd, Budapest, Hungary

3 National Institute for Medical Rehabilitation, Budapest, Hungary

4 Accredited Biophysical Therapist, BioLabor Biophysical- and Laboratories Services Ltd, Budapest, Hungary

5 Accredited Biophysical Therapist, BioLabor Biophysical- and Laboratories Services Ltd, Budapest, Hungary

∗Corresponding author: István Bókkon

Corresponding author's Email: bokkoni@yahoo.com

Corresponding author's Address: H-1238 Budapest, Láng E. 68. Hungary

Corresponding author's Phone: +36 30 9769699

Corresponding author's Fax: + 36 1 217-091

Abstract

Previously, we reported about the effectiveness of the EMOST (Electro-Magnetic-Own-Signal-Treatment) treatments in reduction of phantom limb pain as well as improvement of the quality of sleep and mood in subjects under clinical circumstances. We also presented the successful application of EMOST for mental stress management of humans under catastrophic conditions. Our some years experience indicated that the efficiency of EMOST is much greater in children than in adult subjects. In addition, in children much less treatment is needed for recovery compared to adult subjects, as well as the duration of the treatment is shorter. It is possible that this particular success is due to the large plasticity of the central and the autonomic nervous system in young patients. Thus, our research pays special attention regarding the EMOST effectiveness in the field of chronic childhood diseases. Here we report about results of routine alternative treatments carried out at Biolabor Biophysics and Laboratory Services Ltd by EMOST device regarding to the elimination of chronic constipation and persistent diarrhoea in the case of two children. We also briefly present two important possible biological mechanisms such as redox processes and the bidirectional communication between skin cells and the nervous system regarding the efficiency of low-frequency and intensity electromagnetic fields (LFI-EMF) treatments.

Keywords: Chronic diarrhoea, Chronic constipation, Low-frequency and intensity electromagnetic fields (LFI-EMFs)

Introduction

Living cells produce a particularly weak non-linear electromagnetic activity in a wide spectrum of frequencies - from Hz to THz (Fraser and Frey, 1968; Isojima et al., 1995; Cohen and Popp, 1997; Kobayashi et al., 1999; Pokorný et al., 2001; Lipkova and Cechak, 2005; Cifra et al., 2011; Albrecht-Buehler, 2005; Wang, Bókkon et al., 2011) that is due to the various cellular mechanisms associated with biochemical/ bioelectric processes.

Although modern pharmacology has made considerable progress in the treatments of diverse diseases, we should also recognize that in many cases pharmacology treatments can be ineffective. In these cases, the application of biophysical low-frequency and intensity electromagnetic fields (LFI-EMFs) could offer new opportunities, because during various diseases, cells not only display altered biochemical processes but also generate altered non-linear bioelectric and bioelectromagnetic complex patterns.

To date, most investigations about electromagnetic exposition focus for the harmful effects that are due to the increased environmental artificial electromagnetic pollutions (especially microwaves and radiofrequencies, among others) (Viel et al., 2009; Abdus-salam et al., 2008; Hardell and Sage, 2008). However, several increasing evidences revealed that non-ionizing LFI-EMFs influence cell functions and can facilitate or initiating various healing processes, such as the delay of fractures, induction of analgesia, acceleration of wound re-epithelialization, inhibition of inflammatory processes, reduction of fatigue, improvement of multiple sclerosis and chronic pulmonary disease, among others (Orgel et al., 1984; Sandyk, 1996; Selvam, et al., 2007; Satter Syed et al., 1999; Lappin et al., 2003; Kumar et al., 2005; Alfieri et al.. 2006; Zhang et al.. 2007; Markov. 2007a; Tsang et al.. 2009; Mach and Persinger, 2009; Mancuso et al., 2007; Patruno et al., 2010).

We should make difference between the harmful effects of environmental electromagnetic pollutions from the possible application LFI-EMFs for therapies. The former is an uncontrolled harmful process but later is controlled procedure with specific electromagnetic frequencies, durations and wave forms.

In addition, the role of exposure time during LFI-EMF therapies is extremely critical (Di Carlo et al., 2002; Regoli et al., 2005). LFI-EMF radiations with a short-term exposition (about less than 45 min) can facilitate the immune system and cellular processes, but a long-term or continuous exposure to LFI-EMFs results in a decline in cytoprotection (Regoli et al. 2005; Di Carlo et al. 2002). Long-term electromagnetic exposition can shift the redox and calcium balance, which could cause additional cellular malfunctions. For example, NMDA receptors can be redox modulated by hydroxyl radicals (Aizenman, 1995; Bókkon and Antal, 2011), but long-term or continuous exposure to LFI-EMFs provoke aberrant NMDA receptor activities (Manikonda et al., 2007).

Here we report about the elimination of chronic constipation and persistent diarrhoea by LFI-EMF treatments by EMOST medical device (Figure 1) in the case of two children. We also briefly propose two important possible mechanisms such as redox processes and the bidirectional communication between skin cells and the nervous system regarding the efficiency of LFI-EMF treatments.

Chronic diarrhoea

Chronic diarrhoea (duration > 14 days or longer) is very complex symptom that is due to a wide range of aetiologies. Usually, there is more than one mechanism can be occurring simultaneously. Acute diarrhoea disorders usually due to the: I. Infections (bacterial as Salmonella, Shigella, Clostridium, and Yersinia or viral as Rotavirus, Adenovirus, Cytomegalovirus, and Human immunodeficiency virus *(*HIV)); II. Drugs (like antibiotics) or poisons; III. Immediate hypersensitivity reactions (Thapar and Sanderson, 2004).

Chronic diarrhoea can be produced by: I. Parasite infections (Giardia, Entamoeba, Cryptosoridia, etc.); II. Congenital disorders of digestion or absorption (cystic fibrosis, autoimmune disorders, enzyme defects, food allergies, among others). Irritable bowel syndrome (IBS) is one of the most common causes of chronic diarrhoea. Diabetes can also induce chronic diarrhoea when the nerves that supply the digestive tract are injured (Thapar and Sanderson, 2004).

Chronic diarrhea can make severe complications such as malnutrition, dehydration or weight loss. In addition, persistent diarrhoea is related to undernutrition, growth faltering, micronutrient deficiency, impeded neurodevelopment, increased morbidity and mortality in childhood, among others (Moore et al., 2010; Black et al., 2008; McAuliffe et al., 1986). The goal of chronic diarrhoea management is to eliminate the underlying cause. For example, diarrhea produced by infections can be treated with antibiotics (Schorling et al., 1991). In

other cases, management is simple eliminating a food (like in the case of lactose intolerance) or drug. However, in several cases, the cause of chronic diarrhoea is unknown.

Chronic Constipation

Constipation is a frequent gastrointestinal disorder in the pediatric (Borowitz et al., 2003; Youssef and Di Lorenzo, 2001) as well as in adult population (Drossman et al., 1993; Higgins and Johanson, 2004) that affects mostly women. Mild constipation can be defined as fewer than three stools per week and severe constipation as less than one stool per week. Constipation usually is caused by the slow movement of stool through the colon. In most cases chronic constipation has not any dietary or structural causes that can be revealed. Chronic constipation negatively affects the quality of life and produce high costs (Spinzi et al., 2009; Martin et al., 2006). Constipation requires an urgent assessment if it is accompanied by symptoms such as rectal bleeding, abdominal pain and cramps, nausea and vomiting, and involuntary loss of weight. Causes of functional constipation include, for example, dehydration, inflammatory bowel disease, psychosocial stress, parental disharmony, etc.

Regarding to nonpharmacologic strategies there is not any evidence, for example, that increased exercise and fluid intake could provide relief the symptoms of chronic constipation (Müller-Lissner et al., 2005). Nonpharmacologic biofeedback retraining of the pelvic floor for treatment of defecation provided effectiveness (Koh et al., 2008) but additional studies are needed in the future. Other managements of constipation can include dietary fiber, non-stimulant laxatives (osmotic laxatives such as saline laxatives, nonabsorbed sugars or polyethylene glycol thatcan increase intestinal water secretion) or stimulant laxatives (diphenylmethane or anthraquinone derivates), enemas, surgery, among others (Coremans, 2008). Stimulant laxatives should not be used more than a few days because they can permanently damage the colon and worsen constipation.

EMOST method and natural-based electromagnetic signal forms

EMOST medical device (Figure 1) can detect non-linear bioelectric and bioelectromagnetic signals from subjects' skin by special input/output electrodes. The collected signals are processed by computer of EMOST device. The subjects are treated by processed signals originated from device (frequency range between 1 Hz - 1 MHz; intensity range between 0.1-10 micro Tesla). A particular feature of EMOST method - compared to most of electromagnetic equipments - is that the subjects' own bioelectromagnetic signals that are detected from skin can be processed in analogue mode (non-digitalized). Then, analogue signals are radiated back using a flat electrode radiator through various band/signal combinations, with some amplification (-20dB- +60dB), to the skin's surface on the opposite side and extended by the higher range sounds of the signal. The special analogous process makes it possible that the biophysical information content of detected and back-transmitted electromagnetic signal is much larger than in digitized methods (Figure 1).

Fig. 1. EMOST Redox 1.1. Medical Device (Certificate: HU11/6192) controlled by a personal computer.

Stimuli by artificial electric and electromagnetic signal forms do not contain natural information originated from our body (Figure 2). In contrast, detected own signals include information, for example, from the nervous system, muscle activity or from any element of coordination. The electroencephalogram (EEG) or the electrocardiogram (ECG) of cardiac function include information-rich, nonlinear and natural signals, so, these are typically own

signals, which are originated from the subject, and they are not only continuous variable, but also are individual. It is reasonable to propose that the special efficiency of EMOST is due to the application of information-rich, nonlinear and natural-based signals from our body.

Fig. 2. Illustration about information-rich, natural (nonlinear) electroencephalogram signal, and artificial sinus and square signal forms.

Regarding to EMOST method, recently, we reported about the effectiveness of the EMOST treatments in reduction of phantom limb pain as well as improvement of the quality of sleep and mood in patients under clinical circumstances (Bókkon et al., 2010, 2011a, 2011b). We also presented the successful application of EMOST for stress management of humans under catastrophic conditions (Bókkon et al., 2012). Some preliminary experiments on twelve members of our BioLabor Ltd. regarding the effectiveness of single EMOST treatment on some serum parameters were also shown (Bókkon et al., 2012).

Our some years experience with EMOST revealed that in children much less management was needed for recovery compared to adult subjects, as well as the duration of the treatments were shorter (about with an average of 25 minutes compared to adult subjects with an average of 45 minutes). It is probable that this special effectiveness of EMOST treatments is due to the large plasticity of the central and the autonomic nervous system in young patients. Thus, our research pays special attention to study EMOST effectiveness in the field of (chronic) childhood diseases.

Possible mechanisms for spreading low frequency and low intensity electromagnetic signals in the body

Numerous hypotheses have been suggested to elucidate the influence of LFI-EMFs in living systems. For example, Eddy electric currents, resonance models, biomagnetites, the interference of quantum states of bound ions and electrons, coherent quantum excitations, stochastic and parametric resonance, and magnetosensitive free-radical processes, among others (Binhi, 1999; Bókkon and Salari, 2010). Despite these notions, the major effect of LFI-EMFs on cell functions remains unclear. It is reasonable to propose that more mechanisms act simultaneously on cellular systems under LFI-EMF expositions. However, here we emphasize and briefly present two important possible biological mechanisms such as redox processes and the bidirectional communication between skin cells and the nervous system regarding the efficiency of LFI-EMF treatments.

Redox regulation and LFI-EMF signals

Latest experiments have provided evidence that free radicals and their derivatives (redox regulation) act as essential signals (secondary messengers) during physiological (and pathophysiological) processes in intra- and intercellular signaling processes (Hidalgo et al., 2000; Hancock et al., 2001; Dröge, 2002; Turpaev, 2002; Fang et al., 2004; Ushio-Fukai and Alexander, 2004; Zhang and Gutterman, 2007; Kamsler and Segal, 2007; Valko et al., 2007; Kishida and Klann, 2007; Bókkon and Antal, 2011). Because several effects of LFI-EMFs can be explained by redox regulation and membrane processes, LFI-EMFs may have an important effect on redox mechanisms. According to the latest results of Morabito et al. (2010), LFI-EMFs modify the cellular redox state. Thus, it is possible that one of the important effects of the LFI-EMFs is to influence redox processes in cells and tissues via the circulating blood. In addition, according to Simkó (2007), the cell type-specific redox status is responsible for the effects of diverse electromagnetic expositions. It seems that some possible effects of diverse

electromagnetic fields are dependent on the cell type and the temporary spatiotemporal redox (and free radicals) patterns of cells. LFI-EMFs exposition could strengthen the cellular redox communication between cells and can influence the redox balance of the entire body via the circulating blood.

The skin as a neuroimmunoendocrine organ and LFI-EMF signals

The innervated skin is an extreme complex system and the largest organ of the body with numerous very important functions that is associated with the peripheral sensory nervous system (PNS), the autonomous nervous system (ANS), as well as the central nervous system (CNS) (Roosterman et al., 2006). The skin is not just a simple barrier protecting the body from dangers from the external environment. The skin bears densest and most complex innervation of all mammalian organs. There is growing evidence that the cutaneous peripheral nervous system has essential roles in skin homeostasis as well as in diseases. Cutaneous nerves can react to stimuli from the circulation and to emotions. Moreover, the central nervous system is directly (through efferent nerves or CNS-derived mediators) or indirectly (through the adrenal glands or immune cells) linked to skin functions (Figure 4) (Roosterman et al., 2006).

There is evidence that (Kreibig, 2010) autonomic nervous system serves as a major component in the emotion response. Recent studies support the notion that basic emotions have emotion-specific ANS activity/signature (Kreibig, 2010; Stephens et al., 2010). In Collet et al. (1997) experiments, basic emotion (happiness, surprise, anger, fear, sadness and disgust) induced specificity autonomic patterns in the skin regarding recorded parameters such as skin conductance, skin potential, skin resistance, skin blood flow, skin temperature and instantaneous respiratory frequency. It suggests that skin, as our largest organ, can represent stress related conscious and unconscious emotions directly by efferent nerves and mediators

from CNS or indirectly by the adrenal glands or immune cells. The represented stress related conscious and unconscious emotions can affect on biochemical, bioelectrical and bioelectromagnetic patterns.

There is bidirectional communication between skin cells and the nervous system that has essential roles in homeostatic regulation during physiological and pathophysiological states (Roosterman et al., 2006). Under LFI-EMF expositions, first the skin meets electromagnetic fields that can exert a complex effect on skin mechanisms. These complex effects can spread by different mechanisms by modulation of specific neuropeptides released from cutaneous nerves that act on target cells by paracrine or endocrine pathway. It is now well appreciated that complex interactions exist linking sensory and autonomic nerves to the immune and endocrine systems. Moreover, the skin itself generates neuromediators and neurotrophic factors that target nerve fibers, thereby modulating inflammation, immune responses during host defense, pain, and pruritus. Recently, Arck et al. (2010) proposed a unifying model about the gut-brain-skin communication axis**.**

Acupuncture therapy has been applied to various psychiatric diseases and chronic pain since acupuncture stimulation could affect brain activity (Hori et al., 2010). Recently, Yu H et al., (2009) reported that magnetic stimulation on HeGu acupoint can modulate ongoing EEG and affect specific brain regions compared with the mock point. Chen et al. (2006) revealed by 3D (124-ch) EEG power spectrum mapping and source imaging that HeGu acupuncture stimulation modulates limbic cingulum by frequency modulation manner. Acupuncture studies indicate that induced signals from skin could affect brain activity.

According to Vianale (2008) experiments, ELF-EMF can modulate chemokine production and keratinocyte growth by inhibition of the NF-kappaB signalling pathway and thus may inhibit inflammatory processes. In addition, Patruno et al. (2010) reported that ELF-EMF modulate expression of inducible nitric oxide synthase, endothelial nitric oxide synthase

as well as cyclooxygenase-2 in the human keratinocyte cells. Recent experiments support that pulsed electromagnetic or low energy and frequency magnetic fields influence the autonomic nervous system (Grote et al., 2007; Kraiukhina et al., 2010).

Nordlind et al. (2008) in their recent paper, titled, *The skin as a mirror of the soul: exploring the possible roles of serotonin*, state that, ".. alterations in the levels of 5-HT in extracellular fluids can alter the maturation, metabolism, migration and mitosis of its target cells, including those in both the brain and the skin. Serotonin (5-HT) is a significant bidirectional mediator between the neuroendocrine system and the skin. Recently, Irmak (2010) proposed that excitable Merkel cells in the skin (Merkel cells' function is still unclear), which are in close contact with sensory nerve endings, may take part in mammalian magnetoreception. The movement of melanosome with the changing electromagnetic field may open ion channels producing a receptor potential that can be transmitted to brain by sensory neurons.

All together, the above mentioned support that the LFI-EMF exposition can modulate biochemical, bioelectrical, and bioelectromagnetic processes in the skin and the modulated skin signals can affect the neuroendocrine system and modulate brain activity via ANS. Thus, the skin system may guarantee the spreading of low frequency and low intensity electromagnetic signals in the whole body in which LFI-EMF modulated cellular redox communication can also take significant roles.

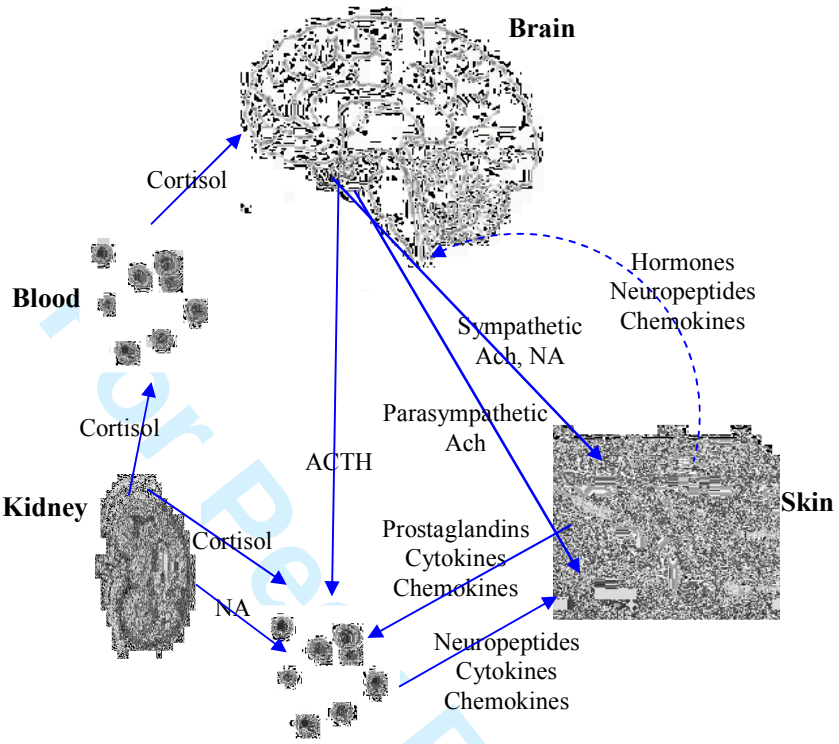


Fig. 3. Shematic illustration about complex communication between skin cells and the nervous system. Ach =acetylcholine, NA=noradrenaline, ACTH= Adrenocorticotropic hormone.

Case reports

In the next sections we report about results of routine alternative treatments carried out at Biolabor Biophysics and Laboratory Services Ltd by EMOST device. EMOST alternative routine treatments comply with the Declaration of Helsinki. Children‘s parents were informed about the EMOST method and they contribute to the treatments that were confirmed by their signatures. Parents also confirmed with their signatures that they contribute to report about results in scientific journal.

Case report 1

On April 2011 a 4-year-old girl was suffering from chronic constipation of unknown etiology had proved unresponsive to conventional treatments. According to her mother report, the girl had history of chronic constipation of 1 year. The girl was also hospitalized by history

of constipation treated with enemas and laxatives and provided with food recommendations. The girl has not any learning or mental disabilities and physical examination revealed a good general condition.

Family anamnesis: The mother is raising her child alone under difficult financial and life circumstances since the child was born.

EMOST treatments: The collected bioelectromagnetic input signals of 4-year-old girl were processed by preprogrammed EMOST device. She was treated by output preprogrammed electromagnetic signals of EMOST device via a flat electrode for 6 sessions. Each session was approximately 30 min, between all treatments with a weak pause. During and after the girl had completed the six treatments, she did not receive any additional treatments related to the elimination of persistent constipation.

Results: After the girl had completed the six treatments she and her mother reported the elimination of chronic constipation. We should mention that, on February 2012, about one year after EMOST treatments, we have established contact with girl. However, there was no any further constipation during this year, and girl reported a better general healthy state.

Case report 2

On March 2012, a foster mother reported about persistent diarrhoea for the over one year in her 7-year-old girl. This twin girl in question has somatic and cognitive lag compared with children of similar age. Her weight and height were significantly lag compared with her twin girl. The twin girl in question had severe physical and mental load, before she was placed with her foster mother. The girl is wearing glasses. She has no known allergies or medications. Since this girl was placed with her foster mother (about on January 2011), girl has always stinking, mucoid, undigested and watery stools 1-2 times per day with abdominal complaints. The application of various probiotics and lactose-free diet were ineffective

regarding the persistent diarrhoea. Coeliac test and abdominal ultrasound examination were also negative. Her laboratory workup was acceptable.

Perinatal anamnesis: Neglected geminate gravidity on 28th week with placenta abruption. Birth weight was 800 gram. The neonate girl was breathed for a week. In the 5th day she was suffered cerebral haemorrhage. In 1 month age she has necrotizing enterocolitis with ileum perforation. The perforated ileum segment was resected. She had received seven transfusions. In 7th month of age the ileostoma was closed. She was hospitalized for 7 months old. Due to the cholelithiasis she was treated by Ursofalk (ursodeoxycholic acid) to dissolve gallstones. In 2006, girl was examined via regular gastroenterology procedure because of the slow somatic progress, but there was not any chronic aberration.

Family anamnesis: The mother has totally neglected her twin daughters. What is known about the twin girl in question originated from the hospital reports. The twin girl in question had severe physical and mental load, before she was placed with a foster mother.

EMOST treatments: The collected bioelectromagnetic input signals of 7-year-old girl were processed by preprogrammed EMOST device. The patient was treated by output preprogrammed electromagnetic signals of device via a flat electrode for 14 sessions. Each session was approximately 30 min, between all treatments with a weak pause. During the girl had completed the 14 treatments, she did not receive any additional treatments related to the elimination of chronic diarrhoea.

Results: On June 2012, after 14 treatments, the foster mother reported that her girl has almost always normal stool and the incidence of slightly loose feaces is extreme rare (without mucoid stool). Girl has about one normal bowel movement per day, increased its power, and reported amount moderate abdominal discomfort. In addition, girl's appetite has been

increased. We continue the EMOST treatment of this twin girl in question for improving her somatic and cognitive lag. We hope we can report its results in the close future.

Discussion and conclusions

The elimination of persistent intestinal catarrh and chronic constipation by LFI-EMFs by EMOST method in the described cases of two children well demonstrated the opportunity of the application of biophysical low-frequency and intensity electromagnetic fields. These young girls, for about one year, were suffering from persistent diarrhoea or chronic constipation (with unknown etiology) but the biophysical treatment could put and end to their sufferings. The 4-year-old girl was suffered essentially psychological load. But the 7-year-old twin girl had both severe physical and mental load, before she was placed with a foster mother. Later, 7-year-old twin girl needed much more treatment for elimination of her intestinal disease compared to former. It is promising that durability of the achieved results in the case of girl with chronic constipation, because about one year after EMOST treatments there was not any further constipation during this year, and girl reported a better general healthy state. We should emphasize that not only these two children with gastrointestinal disorders were successfully treated by EMOST method but numbers of young patients were recovered with various diseases by this method in the last years.

The particular effectiveness of EMOST method is possible due to the analogous process of own non-linear signals detected from skin that makes it possible that the biophysical information content of detected and back-transmitted electromagnetic signal is much larger than in digitized methods. In addition, the application of patient's own signals also makes it possible that all treatment can be individualized.

We briefly described two potential biological mechanisms such as redox processes and the bidirectional communication between skin cells and the nervous system regarding the

effectiveness of LFI-EMF treatments. We also pointed out that skin system may guarantee the spreading of LFI-EMF signals in the whole body in which LFI-EMF modulated cellular redox communication also can have important roles.

However, in addition to the modern pharmacologic and psychological methods, LFI-EMF treatments and developments should get more possibility and attention in the application of biophysical treatment of diseases in the future, because during diverse diseases, cells and living systems not only display altered biochemical processes but also produce altered non-linear bioelectric and bioelectromagnetic complex patterns.

CONFLICT OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content.

References

Abdus-salam, A., Elumelu, T., Adenipekun, A. (2008). Mobile phone radiation and the risk of cancer; a review. *Afr. J. Med. Med. Sci.* 37:107–118.

Aizenman, E. (1995). Modulation of N-methyl-D-aspartate receptors by hydroxyl radicals in rat cortical neurons in vitro. *Neurosci.Lett.*189:57–59.

Albrecht-Buehler, G. (2005). A long-range attraction between aggregating 3T3 cells mediated by near-infrared light scattering. *PNAS USA* 102:5050–5055.

Alfieri, R. R., Bonelli, M. A., Pedrazzi, G., et al. (2006). Increased levels of inducible HSP70 in cells exposed to electromagnetic fields. *Radiat. Res.* 165:95–104.

Arck, P., Handjiski, B., Hagen, E., et al. (2010). Is there a 'gut-brain-skin axis'? *Exp. Dermatol.* 19:401–405.

Binhi, V. N. (1999). An analytical survey of theoretical studies in the area of magnetoreception. In: Repacholi, M. H., Rubtsova, N. B., Muc, A. M. eds. Electromagnetic Fields: Biological Effects and Hygienic Standardization. (pp. 155–170). World Health Organization. Switzerland, Geneva.

Black, R. E., Allen, L. H., Bhutta, Z. A., et al. (2008). Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet* 371:243–260.

Bókkon, I,. Antal, I. (2011). Schizophrenia: redox regulation and volume transmission. *Curr. Neuropharm.* 9:289 – 300.

Bókkon, I., Salari, V. (2010). Information storing by biomagnetites. *J. Biol. Phys.* 36:109–120.

Bókkon, I., Till, A., Erdőfi-Szabó, A. (2010). Phantom pain reduction by non-ionizing electromagnetic treatment. *Hungarian Epidem.* 7:(Suppl 4)15.

Bókkon, I., Till, A., Erdőfi-Szabó, A. (2011a). Non-ionizing electro-magnetic-own-signal-treatment. *Eur. Biophys. J.* 40(Suppl. 1):S191.

Bókkon, I., Till, A., Erdőfi-Szabó, A. (2011b). Phantom pain reduction by electromagnetic treatment. *Electromagn. Biol. Med.* 30:115–127.

Bókkon, I., Till, A., Erdőfi-Szabó, A. et al., (2012). EMOST: Report about the application of low-frequency and intensity electromagnetic fields in disaster situation and commando training. *Electromagn. Biol. Med.* DOI: 10.3109/15368378.2012.681823.

Borowitz, S. M., Cox, D. J., Tam, A., et al. (2003). Precipitants of constipation in early childhood. *J. Am. Board. Fam. Pract.* 16:213–218.

Chen, A. C., Liu, F. J., Wang, L., Arendt-Nielsen, L. (2006). Mode and site of acupuncture modulation in the human brain: 3D (124-ch) EEG power spectrum mapping and source imaging. *Neuroimage* 29:1080–1091.

Cifra, M., Fields, J. Z., Farhadi, A. (2011). Electromagnetic cellular interactions. *Prog. Biophys. Mol. Biol.* 105:223–246.

Cohen, S., Popp, F. A. (1997). Biophoton emission of the human body. *J. Photochem. Photobiol. B.* 40:187–189.

Collet, C., Vernet-Maury, E., Delhomme, G., Dittmar, A. (1997). Autonomic nervous system response patterns specificity to basic emotions. *J. Auton. Nerv. Syst.* 62:45–57.

Coremans, G. (2008). Prucalopride: the evidence for its use in the treatment of chronic constipation. *Core Evid.* 3:45–54.

Di Carlo, A., White, N., Guo, F., et al. (2002). Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection. *J. Cell. Biochem.* 84:447–454.

Dröge, W. (2002). Free Radicals in the Physiological Control of Cell Function. *Physiol. Rev.* 82:47–95.

Drossman, D. A., Li, Z., Andruzzi, E., et al. (1993). U.S. householder survey of functional gastrointestinal disorders. Prevalence, sociodemography and health impact. *Dig. Dis. Sci.* 38:1569–1580.

Fang YZ, Yang S, Wu G: 2004, Free radical homeostasis. *Sheng Li Ke Xue Jin Zhan* 35: 199–204.

Fraser, A., Frey, A. H. (1968). Electromagnetic emission at micron wavelengths from active nerves. *Biophys. J.* 8:731–734.

Grote, V., Lackner, H., Kelz, C., et al. (2007). Short-term effects of pulsed electromagnetic fields after physical exercise are dependent on autonomic tone before exposure. *Eur. J. Appl. Physiol.* 101:495–502.

Hancock, J. T., Desikan, R., Neill, S. J. (2001). Role of reactive oxygen speciesin cell signalling pathways. *Biochem. Soc. Trans.* 29:345–350.

Hardell, L., Sage, C. (2008). Biological effects from electromagnetic field exposure and public exposure standards. *Biomed. Pharmacother.* 62:104–109.

Hidalgo, C., Carrasco, M. A., Muñoz, P., Núñez, M. T. (2000). A role for reactive oxygen/nitrogen species and iron on neuronal synaptic plasticity. *Antioxid. Redox Signal.* 9:245–255.

Higgins, P. D., Johanson, J. F. (2004) Epidemiology of constipation in North America: a systematic review. *Am. J. Gastroenterol.* 99:750–759.

Hori, E., Takamoto, K., Urakawa, S., et al. (2010). Effects of acupuncture on the brain hemodynamics. *Auton Neurosci* 157:74–80.

Irmak, M. K. (2010). Multifunctional Merkel cells: their roles in electromagnetic reception, finger-print formation, Reiki, epigenetic inheritance and hair form. *Med. Hypotheses* 75:162–168.

Isojima Y, Isoshima T, Nagai K., et al. (1995). Ultraweak biochemiluminescence detected from rat hippocampal slices. *NeuroReport* 6:658–660.

Kamsler, A., Segal, M. (2007). *Control of neuronal plasticity by reactive oxygen species. Antioxid. Redox Signal,* 9:165–167.

Kishida, K. T., Klann, E. (2007). Sources and targets of reactive oxygen species in synaptic plasticity and memory. *Antioxid. Redox Signal.* 9:233–244.

Kobayashi, M., Takeda, M., Sato, T., et al. (1999). In vivo imaging of spontaneous ultraweak photon emission from a rat's brain correlated with cerebral energy metabolism and oxidative stress. *Neurosci. Res.* 34:103–113.

Koh, C. E., Young, C. J., Young, J. M., Solomon, M. J., Koh, C. E., Young, C. J., Young, J. M., Solomon, M. J. (2008). Systematic review of randomized controlled trials of the effectiveness of biofeedback for pelvic floor dysfunction. *Br. J. Surg*. 95:1079–1087.

Kraiukhina, K. Iu., Lobkaeva, E. P., Deviatkova, N. S. (2010) Effect of the low-frequency impulse magnetic field on the autonomic nervous system in animals. *Biofizika* 55:720–726

Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. *Biol. Psychol.* 84:394–421.

Kumar, V. S., Kumar, D. A., Kalaivani, K., et al. (2005). Optimization of pulsed electromagnetic field therapy for management of arthritis in rats. *Bioelectromagnetics* 26:431–439.

Lappin, M. S., Lawrie, F. W., Richards, T. L., Kramer, E. D. (2003) Effects of a pulsed electromagnetic therapy on multiple sclerosis fatigue and quality of life: a double-blind, placebo controlled trial. *Altern. Ther. Health. Med.* 9:38–48.

Lipkova, J., Cechak, J. (2005). Existence of Electromagnetic Radiation in Humans in. ELF Band. *Prog. Electromagnetics. Res. Sym.* 1:227–230.

Mach, Q. H., Persinger, M. A. (2009). Behavioral changes with brief exposures to weak magnetic fields patterned to stimulate long-term potentiation. *Brain Res.* 1261:45–53.

Mancuso, M., Ghezzi, V., Di Fede, G. (2007). Utilization of extremely low frequency (ELF) magnetic fields in chronic disease; five years experience: three case reports. *Electromagn. Biol. Med.* 26:311–313.

Manikonda, P. K., Rajendra, P., Devendranath, D., et al. (2007). Influence of extremely low frequency magnetic fields on Ca2+ signaling and NMDA receptor functions in rat hippocampus. *Neurosci. Lett.* 413:145–149.

Markov, M. S. (2007). Expanding use of pulsed electromagnetic field therapies. *Electromagn. Biol. Med.* 26:257–274.

Martin, B. C., Barghout, V., Cerulli, A. (2006). Direct medical costs of constipation in the United States. Manag. Care Interface 16:43–39.

McAuliffe, J. F., Shields, D. S., Auxiliadora de Sousa M., et al. (1986). Prolonged and recurring diarrhea in the northeast of Brazil: examination of cases from a community-based study. *J. Pediatr. Gastroenterol. Nutr.* 5:902–906.

Moore, S. R., Lima, N. L., Soares, A. M., et al. (2010). Prolonged episodes of acute diarrhea reduce growth and increase risk of persistent diarrhea in children. *Gastroenterology* 139:1156–1164.

Morabito, C., Rovetta, F., Bizzarri, M., et al. (2010). Modulation of redox status and calcium handling by extremely low frequency electromagnetic fields in C2C12 muscle cells: A real-time, single-cell approach. *Free Radic. Biol. Med.* 48:579–589.

Müller-Lissner, S. A., Kamm, M., Scarpignato, C., Wald, A. (2005). Myths and misconceptions about chronic constipation. *J. Gastroenterol.* 100:232–242.

Nordlind, K., Azmitia, E. C., Slominski, A. (2008). The skin as a mirror of the soul: exploring the possible roles of serotonin. *Exp. Dermatol.* 17:301–311.

Orgel, M. G., O'Brien, W. J., Murray, H. M. (1984). Pulsing electromagnetic field therapy in nerve regeneration: an experimental study in the cat. *Plast. Reconstr. Surg.* 73:173–183.

Patruno, A., Amerio, P., Pesce, M., et al. (2010). Extremely low frequency electromagnetic fields modulate expression of inducible nitric oxide synthase, endothelial nitric oxide synthase and cyclooxygenase-2 in the human keratinocyte cell line HaCat: potential therapeutic effects in wound healing. *Br. J. Dermatol.* 62:258–266.

Pokorný, J., Hašek, J., Jelínek, F., et al. (2001). Electromagnetic activity of yeast cells in the M phase. *Electro- and Magnetobiol.* 20:371–396.

Regoli, F., Gorbi, S., Machella, N., et al. (2005). Pro-oxidant effects of extremely low frequency electromagnetic fields in the land snail Helix aspersa. *Free. Radic. Biol. Med.* 39:1620–1628.

Roosterman, D., Goerge, T., Schneider, S. W., et al. (2006). Neuronal control of skin function: the skin as a neuroimmunoendocrine organ. *Physiol. Rev.* 86:1309-1379.

Sandyk, R. (1996). Electromagnetic fields for treatment of multiple sclerosis. *Int. J. Neurosci.* 87:1–4.

Satter Syed, A., Islam, M. S., Rabbani, K. S., Talukder, M. S. (1999). Pulsed electromagnetic fields for the treatment of bone fractures. *Bangladesh. Med. Res. Counc. Bull.* 25:6–10.

Schorling, J. B., De Souza, M. A., Guerrant, R. L. (1991). Antibiotic use among children in an urban Brazilian slum: a risk factor for diarrhea? *Am.J. Public. Health.* 81: 99–100.

Selvam, R., Ganesan, K., Narayana Raju K. V., et al. (2007). Low frequency and low intensity pulsed electromagnetic field exerts its antiinflammatory effect through restoration of plasma membrane calcium ATPase activity. *Life Sciences* 80:2403–2410.

Simkó, M. (2007). Cell type specific redox status is responsible for diverse electromagnetic field effects. *Curr. Med. Chem.* 14:1141–1152.

Spinzi, G., Amato, A., Imperiali, G., et al. (2009). Constipation in the elderly: management strategies. Drugs Aging 26:469–474.

Stephens, C. L., Christie, I. C., Friedman, B. H. (2010). Autonomic specificity of basic emotions: evidence from pattern classification and cluster analysis. *Bioll. Psychol.* 84:463–473.

Thapar, N., Sanderson, I. R. (2004). Diarrhoea in children: an interface between developing and developed countries. *Lancet* 363:641–653.

Tsang, E. W., Koren, S. A., Persinger, M. A. (2009). Specific patterns of weak (1 microTesla) transcerebral complex magnetic fields differentially affect depression, fatigue, and confusion in normal volunteers. *Electromagn. Biol. Med.* 28:365–373.

Turpaev, K. T. (2002). Reactive oxygen species and regulation of gene expression. *Biochemistry (Mosc)* 67:281–292.

Ushio-Fukai, M., Alexander, R. W. (2004). Reactive oxygen species as mediators of angiogenesis signaling: role of NAD(P)H oxidase. *Mol. Cell. Biochem.* 264:85–97.

Valko, M., Leibfritz, D., Moncol, J., et al. (2007). Free radicals and antioxidants in normal physiological functions and human disease. *Int. J. Biochem. Cell. Biol.* 39:44–84.

Vianale, G., Reale, M., Amerio, P., et al. (2008). Extremely low frequency electromagnetic field enhances human keratinocyte cell growth and decreases proinflammatory chemokine production. *Br. J. Dermatol.* 158:1189–1196.

Viel. J. F., Cardis, E., Moissonnier, M., et al. (2009). Radiofrequency exposure in the French general population: band, time, location and activity variability. *Environ. Int.* 35:1150–1154.

Wang, C., Bókkon, I., Dai, J., Antal, I. (2011). First experimental demonstration of spontaneous and visible light-induced photon emission from rat eyes. *Brain Res.* 1369:1–9.

Youssef, N. N., Di Lorenzo, C. (2001). Childhood constipation: evaluation and treatment. *J. Clin. Gastroentol.* 33:199–205.

Yu, H., Xu, G., Yang, R. (2009). Somatosensory-evoked potentials and cortical activities evoked by magnetic stimulation on acupoint in human. *Conf. Proc. IEEE. Eng. Med. Biol. Soc.* 2009:3445–3448.

Zhang, D. X., Gutterman, D. D. (2007). Mitochondrial reactive oxygen species-mediated signaling in endothelial cells. *Am. J. Physiol. Heart. Circ. Physiol.* 292:H2023–H2031.

Zhang, X., Zhang, J., Qu, X., Wen, J. (2007). Effects of different extremely low-frequency electromagnetic fields on osteoblasts. *Electromagn. Biol. Med.* 26:167–177.

Figure legends

Figure 1. EMOST Redox 1.1. Medical Device (Certificate: HU11/6192) controlled by a personal computer.

Figure 2. Illustration about information-rich, natural (nonlinear) electroencephalogram signal, and artificial sinus and square signal forms.

Figure 3. Shematic illustration about complex communication between skin cells and the nervous system. Ach =acetylcholine, NA=noradrenaline, ACTH= Adrenocorticotropic hormone.

Fig. 1. EMOST Redox 1.1. Medical Device (Certificate: HU11/6192) controlled by a personal computer.

Fig. 2. Illustration about information-rich, natural (nonlinear) electroencephalogram signal, and artificial sinus and square signal forms.

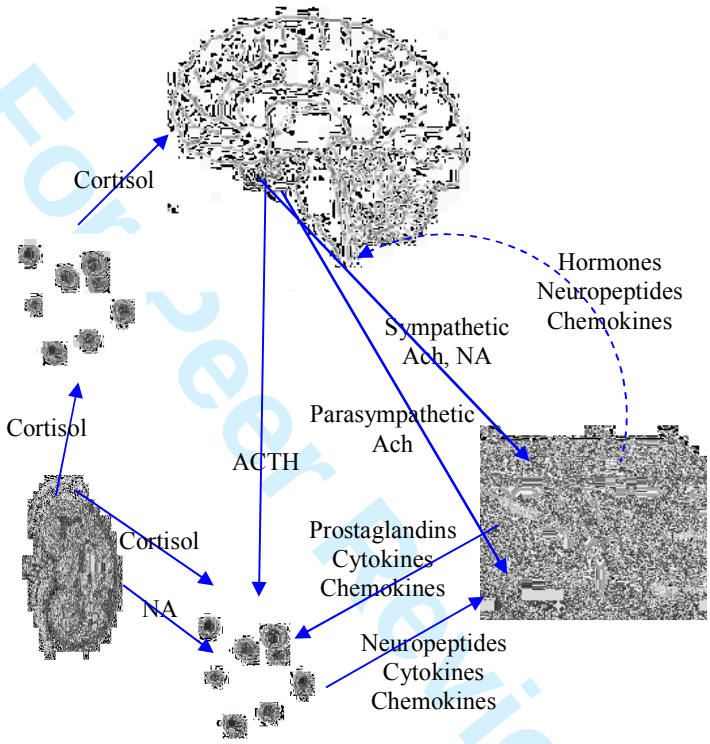
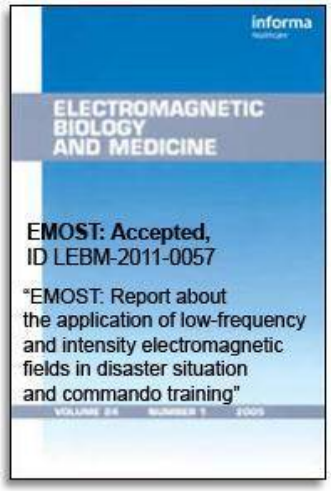


Fig. 3. Shematic illustration about complex communication between skin cells and the nervous system. Ach =acetylcholine, NA=noradrenaline, ACTH=_Adrenocorticotropic hormone.



EMOST: Report about the application of low-frequency and intensity electromagnetic fields in disaster situation and commando training

2012 In press DOI: 10.3109/15368378.2012.681823

[1*] István Bókkon, [2] Attila Erdöfi-Szabó , [3] Attila Till , [4] Róbert Balázs, [5] Zoltán Sárosi, [6]Zoltán László Szabó, [7]Gábor Kolonics, [8] George Popper

1 Chief Scientific Consulting of BioLabor Biophysical- and Laboratories Services Ltd, Budapest, Hungary

2 Pro Deo State University, Chairman of BioLabor Biophysical- and Laboratories Services Ltd, Budapest, Hungary

3 National Institute for Medical Rehabilitation, Budapest, Hungary

4 NATO Centre of Excellence for Military Medicine, Lessons Learned Branch Acting Branch Chief, Budapest, Hungary

5 Ret. Police Lieutenant-Colonel, Founder member of Hungarian Police Antiterror Unit, Branch Chief of Training Master Trainer of Special Units, Budapest, Hungary

6 Ret. Police Lieutenant-Colonel, Hungarian National Police and Provost Duties, Armed Marshalls Training Center (ORFK-KK) Marksman- and Tactical Units Training Department Chief, Budapest, Hungary

7 Hungarian Military Hospital, Assistant-head of Ambulance Department, Budapest, Hungary; Multinational Forces and Observers Sinai Mission-surgeon (from 2000 to 2001); NATO Skopje HQ surgeon (2003)
kolonicsg@yahoo.com

8 President of International Bodyguard and Security Services Association, Executive President and Professor of International Budo Academy, Budapest, Hungary

Running title: **Electromagnetic treatment in disaster and commando training**

∗Corresponding author: István Bókkon
Corresponding author's Email: bokkoni@yahoo.com
Corresponding author's Address: H-1238 Budapest, Lang E. 68. Hungary
Corresponding author's Phone: +36 20 570 6296
Corresponding author's Fax: + 36 1 217-091

Abstract

Recently, we published our results (Bókkon et al. 2011 Electromagn Biol Med.) regarding the effectiveness of the EMOST (Electro-Magnetic-Own-Signal-Treatment) method for the reduction of phantom limb pain under clinical circumstances. However, EMOST treatments not only significantly reduced phantom pain, but that most of the patients also reported about additional benefits such as improvement of their sleep and mood quality after treatments. Here we report some unusual applications of EMOST method under special situations. That is, we report about our effective EMOST treatments of humans under catastrophic conditions and commando training course. This article points out that it is reasonable to apply biophysical electromagnetic management under unique circumstances. We also report some preliminary experiments on twelve members of our BioLabor regarding the effectiveness of single EMOST treatment on some serum parameters and electrocardiogram.

Keywords: EMOST treatments, Catastrophic conditions, Commando training

Introduction

To the best of our knowledge, the treatment of humans by low-frequency and intensity electromagnetic fields under special situations has never been reported before. In this article, we report on the application of our EMOST method (Electro-Magnetic-Own-Signal-Treatment) in disaster situation and commando training. The goal of this paper is to demonstrate the non ionizing biophysical electromagnetic management under real-life and unique conditions and not the presentation of clinical or controlled trials.

Health-promoting effects of low-frequency and intensity electromagnetic fields

While the health-promoting outcomes of low-frequency and intensity electromagnetic fields (LFI-EMFs) can be divisive, numerous experiments suggested that LFI-EMFs are able to initiate different healing processes, such as induction of analgesia, acceleration of bone fracture processes and wound healing (re-epithelialization), antiinflammatory effects, decrease of fatigue and depression symptoms, improvement of multiple sclerosis, fibromyalgia, and chronic pulmonary disease, improvement of cardiovascular parameters, improvement of sleep and psychiatric disorders, etc. (Baldi et al., 2007; Barzelai et al., 2009; Mach and Persinger, 2009; Mancuso et al., 2007; Nishimura et al., 2011; Sandyk, 1997; Ghione et al., 2005; Kumar et al., 2005; Lappin et al., 2003; Satter Syed et al., 1999; Selvam et al., 2007; Patruno et al., 2010; Sutbeyaz et al., 2009; Zhang et al., 2007; Tsang et al., 2009; Cvetkovic and Cosic, 2009).

The contradictions of LFI-EMFs on health-promoting effects are due to several factors, among them: the lack of standardized experimental circumstances; the unsystematic application of artificial LFI-EMF signals; and furthermore the cell type-specific redox status can also be responsible for the effects of electromagnetic expositions (Simkó, 2007).

Too long expositions of LFI-EMF treatments are also extremely problematic. During LFI-EMF experiments and treatments, LFI-EMF radiations with a short-term exposition (less than 45 min) can facilitate the immune system and cellular processes [*](for example, through redox activation processes), but a long-term or continuous exposition to LFI-EMFs causes a decline in cytoprotection and can shift the redox and calcium homeostasis of cells (Di Carlo et al., 2002; Regoli et al., 2005).

[*]LFI-EMF exposition → stimulation of cellular membrane NADPH oxidase activity → superoxide redical generation $O2^{\cdot-}$ → increased activity of calcium channels Ca^{2+} and lipoxygenases → start of arachidonsav cascade and lipid peroxidation processes → expansion of signaling pathways in cells.

EMOST system

Our EMOST medical device can detect and scene non-linear, bioelectric and bioelectromagnetic signals of the patient (Bókkon et al., 2010, 2011a, 2011b). The collected signals from patients' skin are processed by preprogrammed EMOST device (Fig. 1). The patients are treated by preprogrammed signals of EMOST device (frequencies are in the range of 1 Hz - 1 MHz; intensity range between 0.1-10 micro Teslas, via very special input/output flat electrodes). A particular feature of our EMOST method - compared to many

electromagnetic equipments - is that the patient's own bioelectromagnetic signals, which are detected from skin are processed via analogue manner (non-digitalized) inside the EMOST device. This signals are transmitted back via a flat electrode radiator through different band/signal combinations, with some amplification (-20dB- +60dB), to the skin's surface on the opposite side and extended by the higher range sounds of the signal. The special analogous signal process of EMOST device makes it possible that the biophysical information content of detected and back-transmitted electromagnetic signal is much larger than in digitized methods.

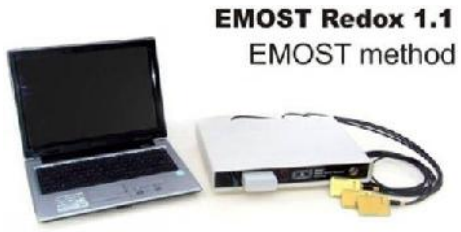


FIGURE 1 EMOST Redox 1.1 Medical Device (Certificate: HU11/6192) controlled by a personal computer.

Some possible effects of LFI-EMFs

Many possible mechanisms of various classical and quantum models have been suggested to elucidate the influence of LFI-EMFs in living systems (Binhi, 1999; Bókkon and Salari, 2010). A growing body of evidence suggested that several effects of LFI-EMFs therapies can be elucidated (or connected) by redox regulation and membrane-bound receptor mechanisms (Bauréus et al., 2003; Foster, 2003; Mathie et al., 2003). In addition, many experiments have revealed that reactive oxygen and nitrogen species as well as their derivatives act as essential signals in intracellular and intercellular communication (Dröge, 2002; Bókkon and Antal, 2011; Feissner et al., 2009; Kishida and Klann, 2007; Massaad and Klann, 2011; Powers et al., 2011; Valko et al., 2007; Zhang and Gutterman, 2007). The effect of LFI-EMFs on cell membranes and membrane-bound receptors can stimulate Ca2+-related pathways and free radical and redox-regulated processes. Thus, some of the fundamental effects of the EMOST treatment may be achieved via the redox balance of the body. It is likely that EMOST method can convey the detected and changed electromagnetic patterns of defective cells for surrounding and other cells, which facilitates intercellular communication via redox sensitive biochemical processes, and help restoration of homeostasis.

Biophysical therapeutic opportunities by LFI-EMF

Although modern pharmacology has made considerable progress in the medication of various diseases, we should also recognize that in many cases pharmacology treatments could be ineffective. In these cases, the biophysical LFI-EMF methods may offer some additional opportunities, because in various diseases, living cells do not only show altered biochemical processes but also generate altered non-linear bioelectric and bioelectromagnetic signals. Since each patient has a unique description of his/her own particular diseases, application of bioelectromagnetic own signals (EMOST) of patients for therapeutic applications may be effective especially compared to the diverse, artificial electromagnetic signals.

EMOST: phantom pain, sleep and mood quality

Recently, we presented our results regarding the effectiveness of the EMOST treatment (for six sessions) and the reduction of phantom limb pain under clinical circumstances (Bókkon et al., 2010, 2011a, 2011b). The EMOST method not only significantly reduced phantom pain, but also revealed additional benefits at most of the patients after expositions, such as improvement of their sleep and mood quality (Fig. 2).

We briefly mention here that we have established contact one year after our clinical EMOST experiments with those who took part in our research. However, there was no any further amputation in the EMOST treated patients during this year, and exposed patients reported a better general healthy states compared to sham exposed (control group). Pain is a key issue among veterans and members of the military due to increased survival rates from devastating injuries, including phantom limb pain after amputations (Ebrahimzadeh and Hariri, 2009; Wartan et a., 1997).

Since in many cases, various phantom pains can be disabling and can lead to a lifelong struggle with chronic pain, our EMOST method may offer a new possibility for the reduction of individual phantom pains.

FIGURE 2 Treatment of amputees by EMOST in the clinic.

Stress responses

Task stressors are a common problem in police officers, soldiers, veterans, as well as in special commandos (Carlier et al., 2000; Renck et al., 2002; Miller, 2011). The exposure to diverse violent situations, witnessing distressing events and seeing victims are some of the task related stressors. These task stress induced symptoms can range from mild to severe.

Traumatic stress experiences often produce peritraumatic stress responses during and immediatelly after effects of trauma and in subsequent acute and posttraumatic stress responses in stress exposed subjects. However, the perception of stress is individual dependent. What is stressful to **X** person may not cause stress in **Y** person, because it depends on the person's previous experiences, emotional and mental states.

Sleep disturbances and interpersonal problems are highly prevalent in military and police subjects with various scales of stress disorders that are associated with substantial co-morbidities and increased healthcare risks (Capaldi et al., 2011). PTSD symptoms may include nightmares, disturbing thoughts, re-experiencing phenomena, being socially detached from family and friends, hyper-arousal (such as feeling angry, irritable), etc.

Several evidences indicated that traumatic stress exposures and PTSD are common anxiety disorders in military and police subjects as well as in normal populations and can be associated with cardiovascular diseases, chronic fatigue syndrome, musculoskeletal disorders, etc. (Boscarino, 2004). People with PTSD are more likely to have hypertension, obesity, hyperlipidemia, and cardiovascular disease.

The biological processes that account for the observed associations between PTSD and cardiovascular disease may relate to dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and for continual over-stimulation of the autonomic nervous system that can promote the increases in blood pressure and lipid levels (Bedi and Arora, 2007).

Immune function changes in PTSD subjects may also influence circulating levels of interleukin-6 (IL-6), IL-1, tumor necrosis factor (TNF), and C-reactive protein (CRP) (Rohleder and Karl, 2006). However, inflammatory mediators such as TNF, CRP, and IL-6, can stimulate atherosclerosis. Interactions among the immune and neuroendocrine systems may partly account for associations between PTSD and chronic disease outcomes.

Psychological and medical treatments for PTSD include group or individual psychotherapy (for example, cognitive-behavioral therapy) and pharmacotherapy such as the use of selective serotonin reuptake inhibitors (Spoont et al., 2010).

EMOST treatment of police commandos during training exercise

In 2011, we performed some EMOST treatments of twelve Hungarian police commandos (elite forces) during their hard training exercise. During commando trainings, police officers had been exposed to very difficult physical and psychological conditions for tree weeks. We provided our treatments (with official permission) on three consecutive days in the last week of exercising. The commandos came and went for shooting practice, physical training etc., and when they have a little pause, we performed EMOST treatments. As the Figure 3 shows, commandos were lying on the hard tables (sometimes with weapons) during EMOST treatments. So, the situation was very realistic.

The commandos were asked to rate their physical and psychological conditions on the 0–10 verbal numerical rating scale prior to the treatment and after the treatment during each three days. We also measured their cardiovascular risks prior to the treatments and after the treatments, and studied the speed of their reflexes via a simple task. Following the trend of the three treatments, after the third treatment, the studied parameters clearly showed a downward trend in cardiovascular risks, an improved physical and psychological conditions as well as a slightly increased reflex.

FIGURE 3 (A) Commandos were lying on the hard tables during EMOST treatments. (B) Prompt measure of cardiovascular risk.

EMOST treatments during flood disaster in Felsőzsolca, Hungary

Felsőzsolca is a small town in North-East of Hungary. In June, 2010 the biggest flood hit Felsőzsolca. Out of a total of 2200, about 1800 houses were damaged, and over 200 houses collapsed by the river Sajó. In addition to local residents, hundreds of soldiers, firefighters and

volunteers helped to save lives. The local government leaders as well as military and firefighter commanders continuously managed the rescue processes. Many managers had no sleep in 48 hours, and several residents suffered PTSD. Some voluntary psychologists also tried to reduce the extreme psychological stress caused by the flood.

Since our several years of EMOST application and our experiments indicated that EMOST can produce prompt effect to reduce stress and fatigue levels and to improve sleep and mood quality in patients, our BioLabor group also took part as volunteers in Felsőzsolca rescue-actions by EMOST treatments of several commanders and local residents that were exhausted at the border (see Figure 4 with our photos). We have treated about 80 managers and residents by some of special EMOST regeneration program. Most of the treated subjects rendered benefit improvements after 40 min treatment reported their reduced stress and fatigue levels and improved mood quality and concentration ability.

After traumatic stress (that frequently result in peri-traumatic stress), the sooner we use a variety of therapies, the smaller the chance to develop acute or posttraumatic stress state. However, biophysical LFI-EMF treatments may offer a special and prompt help in many particular situations.

FIGURE 4 Our photos have been taken in Felsőzsolca. (A) EMOST treatments of exhausted and stressed local residents, soldiers, firefighters. (B) Our car and local residents in a flooded street in Felsőzsolca, on June. 2010. (C) Residents used a boat to cross a flooded street in Felsőzsolca.

Preliminary experiments: Single EMOST treatment effect on electrocardiogram and the serum concentration of urea, albumin, cortisol, chloride, CPK, TSH, and CRP

We performed some preliminary experiments on twelve members of our BioLabor regarding the effectiveness of single EMOST treatment on some serum parameters and electrocardiogram (ECG). ECG results did not show statistic significant improvement after single EMOST treatment. In contrast, some serum factor such as uric acid, albumin, cortisol, chloride, Creatine phosphokinase (CPK), Thyroid stimulating hormone (TSH), C-reactive protein (CRP) indicated some remarkable changes following one treatment.

Cortisol, TSH, CRP, and CPK serum concentrations were reduced in the most of us. The albumin concentration usually showed a slight decrease and the uric acid concentration increased in almost all cases. Chloride level of serum showed a slight increase in almost every case. Of course, these few preface experiments have no great importance, but indicate EMOST treatment may reduce stress factors and affect on the redox/free radical processes as numerous studies reported regarding to the effect of low-frequency and intensity electromagnetic fields.

For example, cortisol levels were decreased in most of the members of our BioLabor after one EMOST treatment. Cortisol is a (glucocorticoid) steroid hormone that produced by the adrenal cortex in response to stress(Inslicht et al., 2011). Its major functions are, among them, to increase blood sugar through gluconeogenesis and suppress the immune system, but recent studies revealed that glucocorticoids (cortisol) have both stimulatory and suppressive effects on immune responses that are dependent on the GC concentration (Yeager et al., 2008).

Uric acid concentration increased in almost all cases after single EMOST treatment. However, uric acid is strong reducing agents (electron donors) and potent antioxidants (Warning, 2002). In humans, about the half the antioxidant ability of blood plasma comes from uric acid (Maxwell et al., 1997).

Chloride level also showed a slight increase in almost every case. Chloride is a prominent negatively charged ion in the blood, where it represents about 70% of the body's total negative ion content. However, chloride level has essential role of blood pH value that can influence pH-dependent redox/free radical processes. It seems that EMOST treatments may transiently potentiate functional redox processes.

However, we have started a large-scale, controlled testing of EMOST treatments (with forty subjects and with sham exposed controls) regarding its effectiveness on serum parameters and electrocardiogram. We hope that we can report the results in the near future.

Discussion and Conclusions

We have to stress again that our goal was not the presentation of clinical or controlled trials, but show the non ionizing electromagnetic management under real-life and also in unique conditions.

One may argue that the presented beneficial effects of our EMOST treatments were due to the placebo effect. However, it is unlikely that EMOST treatments could produce placebo effect on eighty subjects under flood disaster. In addition, during many years of EMOST application, we also effectively treated hundreds of children and babies with diverse health problems. It is also hardly possible that EMOST treatments could make placebo effects on babies. Furthermore, our recently published results on the effectiveness of the EMOST in reduction of phantom limb pain as well as improvement of the quality of sleep and mood in subjects under clinical circumstances also support the real effectiveness of EMOST.

Because the EMOST method based on non-linear, bioelectric and bioelectromagnetic signals of patients, it offers tailor-made opportunities. In addition, it is not realistic to apply a large number of psychologists under unexpected events and disaster conditions.

The presented EMOST application (Electro-Magnetic-Own-Signal-Treatment) under disaster conditions and commando training, may point out a further possible way of healing therapies in addition to the modern pharmacologic and psychological methods. We should also consider that the sooner we use a variety of therapies, the smaller the chance to develop acute or posttraumatic stress status after unexpected and disaster situations.

The aforementioned few preliminary experiments on members of our BioLabor regarding the efficiency of single EMOST treatment on serum parameters and electrocardiogram indicated that it is worthy to perform a large-scale, controlled testing that we have started.

Besides, not only for stress management should be considered, but also improve mental and physical states, concentration, cognitive and situation analysis abilities of exhausted troops and policemen after unexpected and catastrophic events.

In summary, we should consider biophysical electromagnetic managements as a further possible way of healing therapies in addition to the pharmacologic and psychological methods, especially under unique, unexpected and disaster situations.

CONFLICT OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content.

ACKNOWLEDGEMENTS

Authors gratefully thank the police contribution to perform our experiments for Géza Simon, Colonel, Director of Hungarian National Police and Provost Duties, Armed Marshalls Training Center (ORFK-KK). Authors also gratefully thank for commandos their participation in our survey related to EMOST treatments. Bókkon's URL: www.bokkon-brain-imagery.5mp.eu; BioLabor's URL: www.biolabor.org

References

Baldi, E., Baldi, C., Lithgow, B. J. (2007). A pilot investigation of the effect of Extremely low frequency pulsed electromagnetic fields on humans'heart rate variability. *Bioelectromagnetics* 28:64–68.

Barzelai, S., Dayan, A., Feinberg, M. S., et al. (2009). Electromagnetic field at 15.95-16 Hz is cardio protective following acute myocardial infarction. *Ann. Biomed. Eng.* 37:2093–2104.

Bauréus, K. C. L., Sommarin, M., Persson, B. R., et al. (2003). Interaction between weak low frequency magnetic fields and cell membranes. *Bioelectromagnetics* 24:395–402.

Bedi, U. S., Arora, R. (2007). Cardiovascular manifestations of posttraumatic stress disorder. *J. National Med. Assoc.* 99:642–649.

Binhi, V. N. (1999). An analytical survey of theoretical studies in the area of magnetoreception. In: Repacholi, M. H., Rubtsova, N. B., Muc, A. M. eds. Electromagnetic Fields: Biological Effects and Hygienic Standardization. (pp. 155–170). World Health Organization. Switzerland, Geneva.

Bókkon, I., Antal, I. (2011). Schizophrenia: redox regulation and volume transmission. *Curr. Neuropharm.* 9:289–300.

Bókkon, I., Salari, V. (2010). Information storing by biomagnetites. *J. Biol. Phys.* 36:109–120.

Bókkon, I., Till, A., Erdöfi-Szabó, A. (2010). Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. *Hungarian Epidemiology* 7/4/Suppl.:15.

Bókkon, I., Till, A., Erdöfi-Szabó, A. (2011a). Non-ionizing Electro-Magnetic-Own-Signal-Treatment. *Eur. Biophys. J.* 40 (Suppl. 1): S191.

Bókkon, I., Till, A., Grass, F., Erdöfi-Szabó, A. (2011b). Phantom pain reduction by electromagnetic treatment. *Electromagn. Biol. Med.* 30:115–127.

Boscarino, J. A. (2004). Posttraumatic stress disorder and physical illness: results from clinical and epidemiologic studies. *Ann. N. Y. Acad. Sci.* 1032:141–153.

Capaldi, V. F., 2nd, Guerrero, M. L., Killgore, W. D. (2011). Sleep disruptions among returning combat veterans from Iraq and Afghanistan. *Mil. Med.* 176:879–888.

Carlier, I. V., Voerman, A. E., Gersons, B. P. (2000). The influence of occupational debriefing on post-traumatic stress symptomatology in traumatized police officers. *Br. J. Med. Psychol.* 73:87–98.

Cvetkovic, D., Cosic, I. (2009). Alterations of human electroencephalographic activity caused by multiple extremely low frequency magnetic field exposures. *Med. Biol. Eng. Comput.* 47:1063–1073.

Di Carlo, A., White, N., Guo, F., et al. (2002). Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection. *J. Cell. Biochem.* 84: 447–454.

Dröge, W. (2002). Free Radicals in the Physiological Control of Cell Function. *Physiol. Rev.* 82: 47–95.

Ebrahimzadeh, M. H., Hariri, S. (2009). Long-term outcomes of unilateral transtibial amputations. *Mil. Med.*174:593–597.

Feissner, R. F., Skalska, J., Gaum, W. E., Sheu, S. S. (2009). Crosstalk signaling between mitochondrial Ca2+ and ROS. *Front. Biosci.* 14:1197–1218.

Foster, K. R. (2003). Mechanisms of interaction of extremely low frequency electric fields and biological systems. *Rad. Prot. Dosim.* 106:301–310.

Ghione, S., Seppia, C. D., Mezzasalma, L., Bonfiglio, L. (2005). Effects of 50 Hz electromagnetic fields on electroencephalographic alpha activity, dental pain threshold and cardiovascular parameters in humans. *Neurosci. Lett.* 382:112–117.

Inslicht, S. S., Otte, C., McCaslin, S. E., et al. (2011). Cortisol Awakening Response Prospectively Predicts Peritraumatic and Acute Stress Reactions in Police Officers. *Biol. Psychiatry* Epub ahead of print.

Kishida, K. T., Klann, E. (2007). Sources and targets of reactive oxygen species in synaptic plasticity and memory. *Antioxid. Redox Signal.* 9:233–244.

Kumar, V. S., Kumar, D. A., Kalaivani, K., et al. (2005). Optimization of pulsed electromagnetic field therapy for management of arthritis in rats. *Bioelectromagnetics* 26:431–439.

Lappin, M. S., Lawrie, F. W., Richards, T. L., Kramer, E. D. (2003). Effects of a pulsed electromagnetic therapy on multiple sclerosis fatigue and quality of life: a double-blind, placebo controlled trial. *Altern. Ther. Health Med.* 9:38–48.

Mach, Q. H., Persinger, M. A. (2009). Behavioral changes with brief exposures to weak magnetic fields patterned to stimulate long-term potentiation. *Brain Res.* 1261:45–53.

Mancuso, M., Ghezzi, V., Di Fede, G. (2007). Utilization of extremely low frequency (ELF) magnetic fields in chronic disease; five years experience: three case reports. *Electromagn. Biol. Med.* 26:311–313.

Massaad, C. A., Klann, E. (2011). Reactive oxygen species in the regulation of synaptic plasticity and memory. *Antioxid. Redox Signal*. 14:2013–2054.

Mathie, A., Kennard, L. E., Veale, E. L. (2003). Neuronal ion channels and their sensitivity to extremely low frequency weak electric field effects. *Rad. Prot. Dosim.* 106:311–316.

Maxwell, S. R., Thomason, J. H., Sandler, D., et al. (1997). Antioxidant status in patients with uncomplicated insulin-dependent and non-insulin-dependent diabetes mellitus. *Eur. J. Clin. Invest.* 27:484–490.

Miller, G. (2011). The invisible wounds of war. Healing the brain, healing the mind. *Science* 333:514–517.

Nishimura, T., Tada, H., Guo, X., et al. (2011). A 1-μT extremely low-frequency electromagnetic field vs. sham control for mild-to-moderate hypertension: a double-blind, randomized study. *Hypertens. Res*. 34:372–377.

Patruno, A., Amerio, P., Pesce, M., et al. (2010). Extremely low frequency electromagnetic fields modulate expression of inducible nitric oxide synthase, endothelial nitric oxide synthase and cyclooxygenase-2 in the human keratinocyte cell line HaCat: potential therapeutic effects in wound healing. *Br. J. Dermatol.* 162:258–266.

Powers, S. K., Talbert, E. E., Adhihetty, P. J. (2011). Reactive oxygen and nitrogen species as intracellular signals in skeletal muscle. *J. Physiol.* 589:2129–2138.

Regoli, F., Gorbi, S., Machella, N., et al. (2005). Pro-oxidant effects of extremely low frequency electromagnetic fields in the land snail Helix aspersa. *Free Radic. Biol. Med.* 39:1620–1628.

Renck, B., Weisaeth, L., Skarbö, S. (2002). Stress reactions in police officers after a disaster rescue operation. *Nord. J. Psychiatry* 56: 7–14.

Rohleder, N., Karl, A. (2006). Role of endocrine and inflammatory alterations in comorbid somatic diseases of post-traumatic stress disorder. *Minerva Endocrinol.* 31:273–288.

Sandyk, R. (1997). Treatment with electromagnetic fields reverses the long-term clinical course of a patient with chronic progressive multiple sclerosis. *Int. J. Neurosci.* 90:177–185.

Satter Syed, A., Islam, M. S., Rabbani, K. S., Talukder, M. S. (1999). Pulsed electromagnetic fields for the treatment of bone fractures. *Bangladesh. Med. Res. Counc. Bull.* 25:6–10.

Selvam, R., Ganesan, K., Narayana Raju, K. V., et al. (2007). Low frequency and low intensity pulsed electromagnetic field exerts its antiinflammatory effect through restoration of plasma membrane calcium ATPase activity. *Life Sciences* 80:2403–2410.

Simkó, M. (2007). Cell type specific redox status is responsible for diverse electromagnetic field effects. *Curr. Med. Chem.* 14:1141–1152.

Spoont, M. R., Murdoch, M., Hodges, J., Nugent, S. (2010). Treatment receipt by Veterans after a PTSD diagnosis in PTSD, mental health, or general medical clinics. *Psychiatric Services* 61:58–63.

Sutbeyaz, S. T., Sezer, N., Koseoglu, F., Kibar, S. (2009). Low-frequency pulsed electromagnetic field therapy in fibromyalgia: a randomized, double-blind, sham-controlled clinical study. *Clin. J. Pain.* 25:722–728.

Tsang, E. W., Koren, S. A., Persinger, M. A. (2009). Specific patterns of weak (1 microTesla) transcerebral complex magnetic fields differentially affect depression, fatigue, and confusion in normal volunteers. *Electromagn. Biol. Med.* 28:365–373.

Valko, M., Leibfritz, D., Moncol, J., et al. (2007). Free radicals and antioxidants in normal physiological functions and human disease. *Int. J. Biochem. Cell. Biol.* 39:44–84.

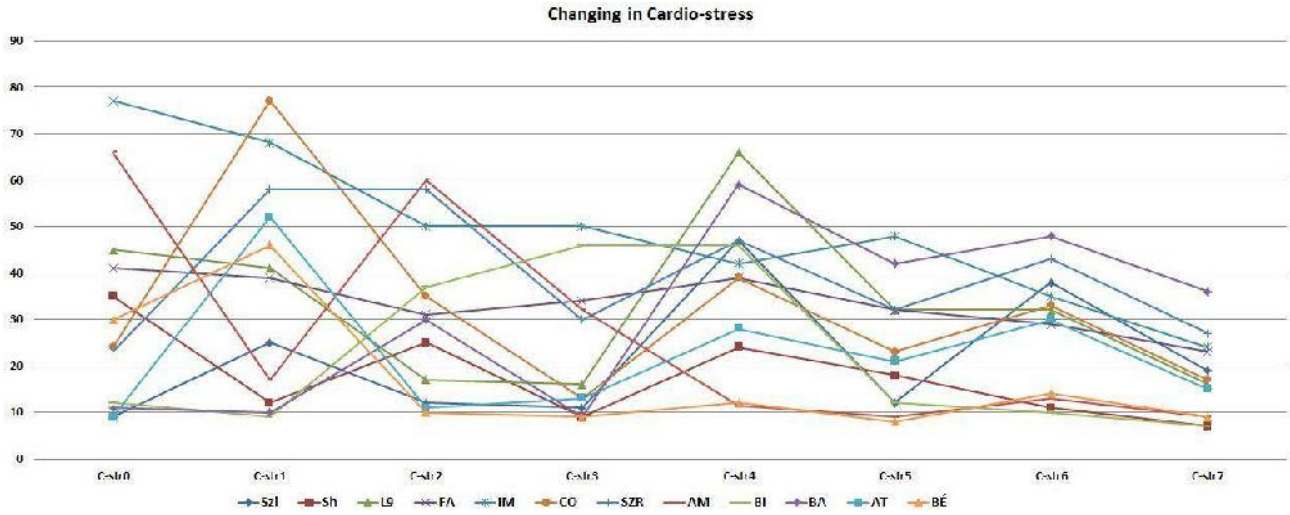
Waring, W. S. (2002). Uric acid: an important antioxidant in acute ischaemic stroke. *QJM.* 95: 691–693.

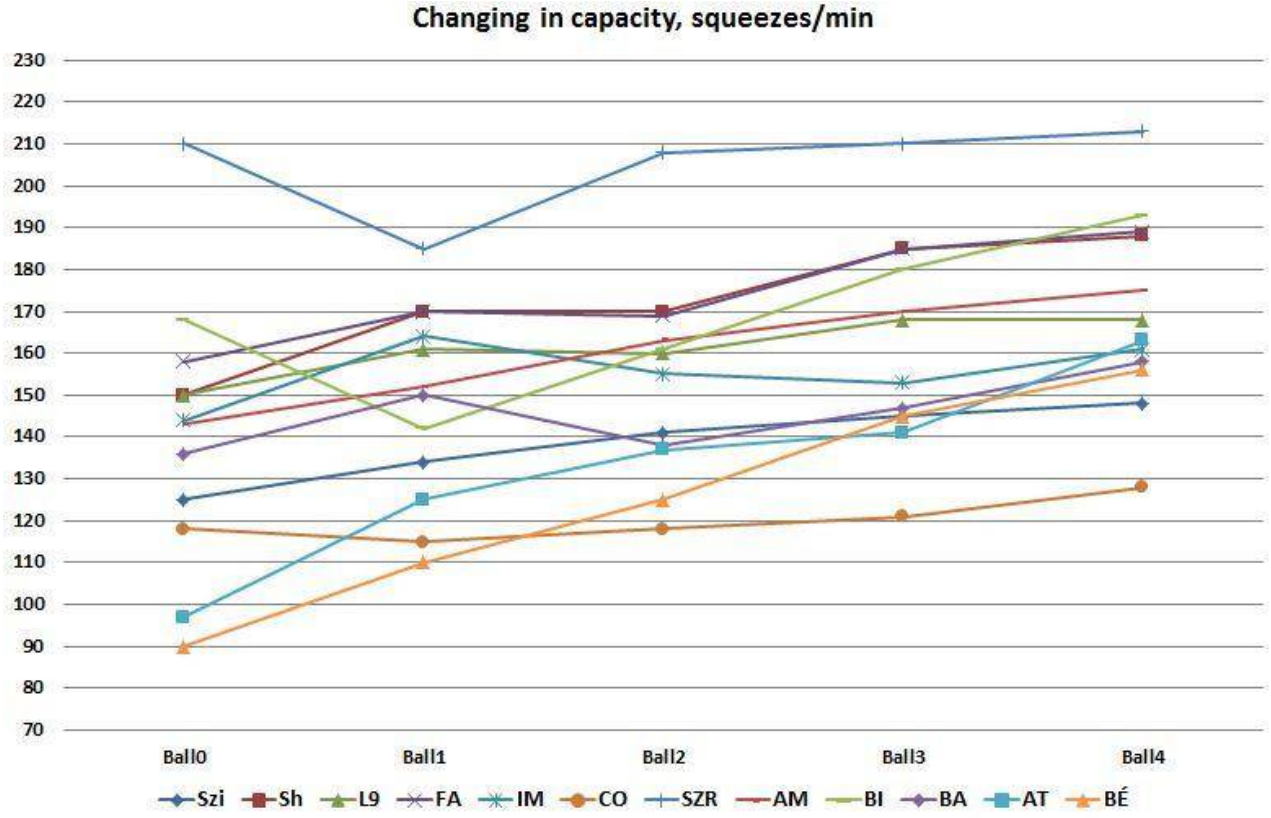
Wartan, S. W., Hamann, W., Wedley, J. R., McColl, I. (1997). Phantom pain and sensation among British veteran amputees. *Br. J. Anaesth.* 78:652–659.

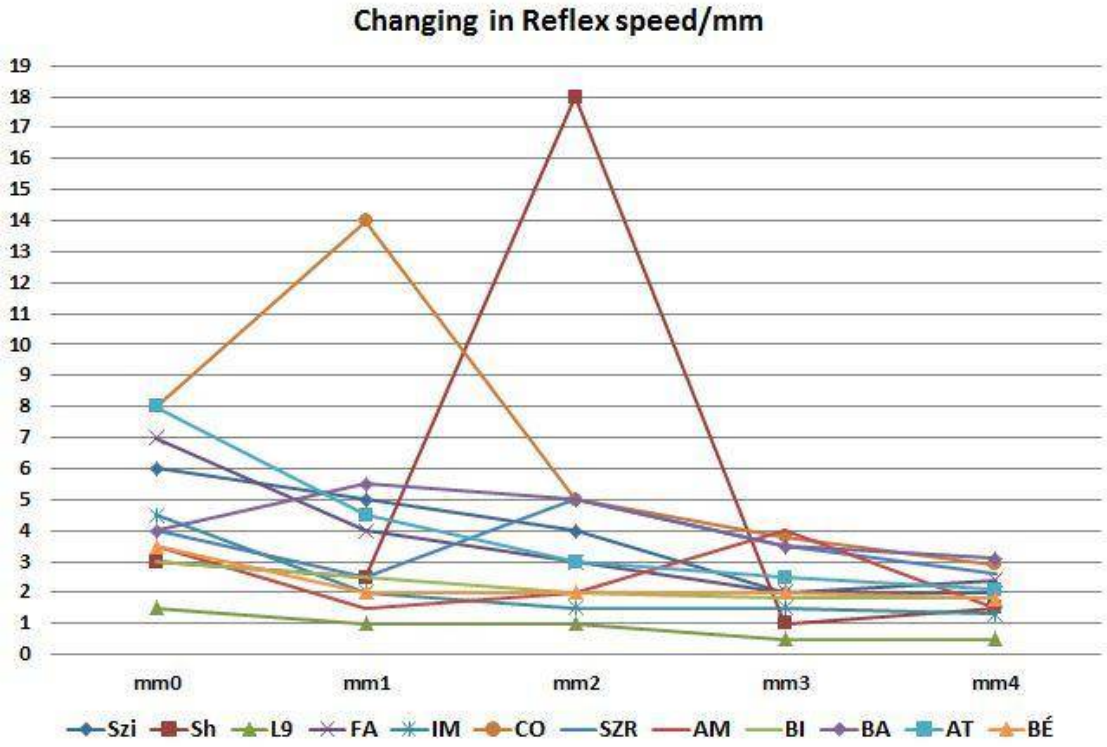
Yeager, M. P., Pioli, P. A., Wardwell, K., et al. (2008). In vivo exposure to high or low cortisol has biphasic effects on inflammatory response pathways of human monocytes. *Anesth. Analg.* 107:1726–1734.

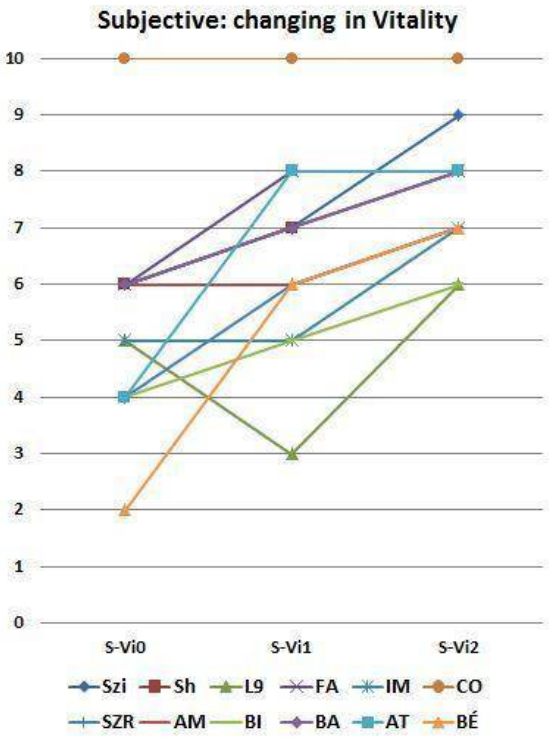
Zhang, D. X., Gutterman, D. D. (2007). Mitochondrial reactive oxygen species-mediated signaling in endothelial cells. *Am. J. Physiol. Heart Circ. Physiol.* 292:H2023–H2031.

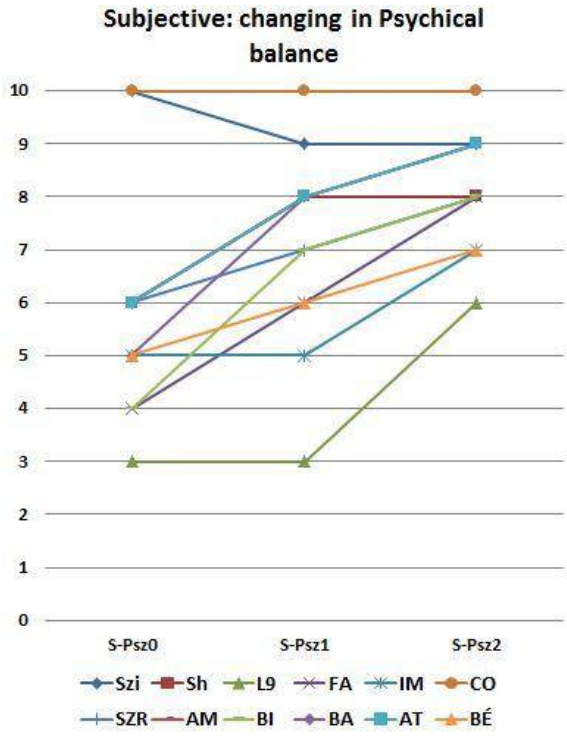
Zhang, X., Zhang, J., Qu, X., Wen, J. (2007). Effects of different extremely low-frequency electromagnetic fields on osteoblasts. *Electromagn. Biol. Med.* 26:167–177.

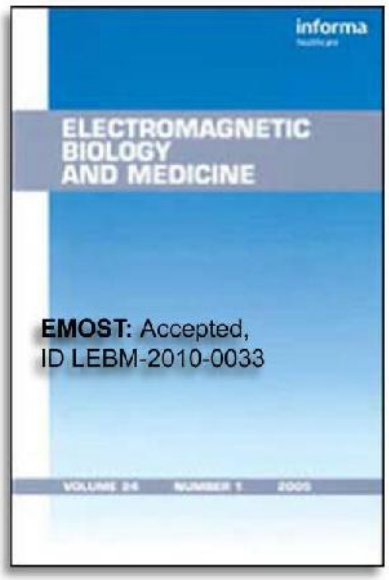

Changing in Cardio-stress
90
80
70
60
50
40
30
20
10
0
Szi
Sh
L9
FA
IM
CO
SZR
AM
BI
BA
AT
BÉ


Changing in capacity, squeezes/min
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
Ball0
Ball1
Ball2
Ball3
Ball4
Szi
Sh
L9
FA
IM
CO
SZR
AM
BI
BA
AT
BÉ


Changing in Reflex speed/mm
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
mm0
mm1
mm2
mm3
mm4
Szi
Sh
L9
FA
IM
CO
SZR
AM
BI
BA
AT
BÉ


Subjective: changing in Vitality
10
9
8
7
6
5
4
3
2
1
0
S-Vi0
S-Vi1
S-Vi2
Szi
Sh
L9
FA
IM
CO
SZR
AM
BI
BA
AT
BÉ


Subjective: changing in Psychical balance
10
9
8
7
6
5
4
3
2
1
0
S-Psz0
S-Psz1
S-Psz2
Szi
Sh
L9
FA
IM
CO
SZR
AM
BI
BA
AT
BÉ



Phantom pain reduction by low-frequency and low-intensity electromagnetic fields

[1*]Bókkon István, [2]Till Attila, [3]Grass Friedrich, [4]Erdöfi-Szabó Attila

Revised version 2011

[1] Doctoral School of Pharmaceutical and Pharmacological Sciences, Semmelweis University, Budapest, Hungary

[2] National Institute for Medical Rehabilitation, Budapest, Hungary

[3] Department for Biological Psychiatry, Medical University of Vienna

[4] Director of BioLabor, Budapest, Hungary

Running title: **Phantom pain reduction by electromagnetic fields**

[*]Corresponding author: Bókkon István
Corresponding author's Email: bokkoni@yahoo.com
Corresponding author's Address: H-1238 Budapest, Lang E. 68. Hungary
Corresponding author's Phone: +36 20 570 6296
Corresponding author's Fax: + 36 1 217-0914

Abstract

Although various treatments have been presented for phantom pain, there is little proof supporting the benefits of pharmacological treatments, surgery or interventional techniques, electroconvulsive therapy, electrical nerve stimulation, far infrared ray therapy, psychological therapies, etc. Here, we report the preliminary results for phantom pain reduction by low-frequency and intensity electromagnetic fields under clinical circumstances. Our method is called as Electromagnetic-Own-Signal-Treatment (EMOST). Fifteen people with phantom limb pain participated. The patients were treated using a pre-programmed, six sessions. Pain intensity was quantified upon admission using a 0-10 verbal numerical rating scale. Most of the patients (n=10) reported a marked reduction in the intensity of phantom limb pain. Several patients also reported about improvement in their sleep and mood quality, or a reduction in the frequency of phantom pain after the treatments. No improvements in the reduction of phantom limb pain or sleep and mood improvement were reported in the control group (n=5). Our non-linear electromagnetic EMOST method may be a possible therapeutic application in the reduction of phantom limb pain. Here, we also suggest that some of the possible effects of the EMOST may be achieved via the redox balance of the body and redox-related neural plasticity.

Keywords: Phantom pain, Low-frequency and intensity electromagnetic fields, EMOST method, Redox-related neural plasticity

Introduction

The amputation of a limb is generally followed by a sensation that the deafferented body part is still present. Phantom limb sensations can be generally perceived by amputees following amputation (Ramachandran and Hirstein, 1998). However, phantom limb sensations can also occur following spinal cord injury, nerve avulsion and in children with congenital limb aplasia (Moore et al., 2000; Melzack, 1992; Melzack et al., 1997). The phantom sensations usually resolve without treatment, except in cases in which phantom pain develops.

When amputees sense an intense pain in their missing body part, the phenomenon is known as phantom pain. Phantom pain is more frequent in patients with preamputation pain and is less likely in cases in which the amputation was performed when the patient was very young. While phantom pain is most common after the amputation of a leg or an arm, it can also occur after the surgical removal of a breast, rectum, testicle, penis, or eye, among others (Flor, 2002). The phantom pain aftereffect occurs in 50-80% of the patients who have undergone this type of surgery, and the most frequently reported types of pain include burning, tingling, and cramping (Sherman, 1994). Various other pains and types of sensation such as shocking, itching, shooting, squeezing, and throbbing, among others, can also occur. Although a high percentage of amputees experience phantom pain, every patient has a unique description concerning his/her particular sensations and the pain experienced, as well as the intensity and frequency of the sensations. Phantom pain generally resolves without treatment, except in cases in which chronic phantom pain develops.

There is increasing evidence that both peripheral and central neural mechanisms are involved in phantom pain, but the pathophysiological mechanisms of phantom pain remain unknown (Devor and Seltzer, 1999; Dhillon et al., 2005; Davis et al., 1998; Mackert et al., 2003; Mercier et al., 2006; Karl et al., 2001). One possible peripheral mechanism is that neuromas (a growth of the nerve tissue) form injured nerve endings at the stump site after the amputation of a limb and fire abnormal action potentials. In addition to peripheral processes, spinal mechanisms have also been considered to influence phantom pain (Bittar et al., 2005). Phantom limb pain is also strongly correlated with changes in the representational plasticity (cortical reorganization) in the somatosensory and motor cortices. According to the neuromatrix theory, there is an extensive, genetically predetermined, network that interconnects the thalamus-cortex-limbic system, and phantom pain could arise from an atypical reorganization of this neuromatrix (Melzack, 1993; Bittar et al., 2005). Psychological factors have also been investigated. Whereas psychological factors do not appear to cause the phantom pain, these factors might affect the severity and the progression of the pain (Sherman et al., 1987).

Although various treatments have been presented, there is little clinical proof supporting the benefits of pharmacological treatments, surgery or interventional techniques, electroconvulsive therapy, electrical nerve stimulation, far infrared ray therapy, pulsed radiofrequency ablation, or psychological therapies (for instance, mirror box therapy), among other treatments (Gnezdilov et al., 1995; Rasmussen and Rummans, 2000; Wiech et al., 2004; Irlbacher et al., 2006; Wilkes et al., 2008; Huang et al., 2009; Seidel et al., 2009; de Roos et al., 2010).

Here, we report the preliminary results for phantom pain reduction by Electromagnetic-Own-Signal-Treatment (EMOST) under clinical circumstances. Our EMOST method does not perform any electromagnetic wave modulation or wave inversion (phase shift) of recorded output bioelectric and bioelectromagnetic signals of subjects. EMOST method solely employs filtered, various low-frequency and intensity electromagnetic fields (between 1 Hz - 1 MHz) that is controlled via preprogrammed computer. The EMOST device is based on our new concept, i.e., very fast electromagnetic feedback of recorded bioelectromagnetic signals of subjects without any changes could promote and reinforce intra- and intercellular redox communication. We also discuss that low-frequency and intensity electromagnetic fields (LFI-EMFs) may influence the cortical reorganization and the neurogenesis.

Materials and Methods

Patients

Limb amputees (*with vascular and* arterial disease**,** *diabetes and accidents*) were recruited at the National Institute for Medical Rehabilitation in Budapest, Hungary. The limb amputees (experimental amputees (n=10) and control amputees (n=5)) were randomized to receive either an active EMOST treatment or a sham treatment. Our EMOST experiments were performed by permission of the Ethics Committee of the National Institute for Medical Rehabilitation, Budapest, Hungary.

Apparatus

The EMOST device (BioLabor-MCC HI 2.5.2) was used in the experiments. It contains three basic elements: (1) an input electrode, (2) signal-processing circuits and (3) an output electrode. The input and output flat electrodes were placed on the joints of patients. The input signals were originated from bioelectric and bioelectromagnetic signals of patients who were placed in direct contact with the specially designed flat electrodes. The input signals were recorded similarly to extracting information from electromagnetic brain function via electroencephalogram (EEG). Namely, the EMOST device (which is controlled by a personal computer) operates with the non-linear, bioelectromagnetic signals of the patient within preprogrammed frequency ranges (between 1 Hz - 1 MHz). The parameters (input filtered frequency ranges and output intensity) and exposure time can be preprogrammed. The collected input signals of patients can be filtered using pre-programmed, low-frequency ranges (between 1 Hz - 1 MHz) by device circuits. Output, low-frequency electromagnetic signals were emitted by an identical flat electrode. The output electromagnetic intensity range of the device is 0.1-10 microteslas. A photograph of the EMOST apparatus is shown Figure 1.

Figure. 1. The EMOST device (BioLabor-MCC HI 2.5.2) is controlled by a personal computer.

Treatments

The present research conformed to the Helsinki Declaration outlining the principles for medical research involving human subjects. All of the subjects completed an informed consent form prior to participation in the study. The collected bioelectromagnetic input signals of patients were processed by preprogrammed EMOST device. The patients were treated by output preprogrammed signals of EMOST device (frequencies in the range of 1 Hz - 1 MHz; intensity range between 0.1-10 micro Teslas) via a flat electrode (Fig. 2) for six sessions. Each session was approximately 45 min, between all treatments with a one-day pause. Sham exposed patients (control group) were placed in the same conditions as the exposure groups but EMOST device was turned off. Subjects could not notice anything different from active and sham treatments. Pain intensity was quantified upon admission using a 0-10 verbal numerical rating scale (NRS) (Fig. 3). The patients were asked to rate their pain on the verbal NRS prior to the therapy and after they had completed the six treatments. During and after the patients had completed the six treatments, they did not receive any additional treatments related to the reduction or elimination of phantom limb pain.

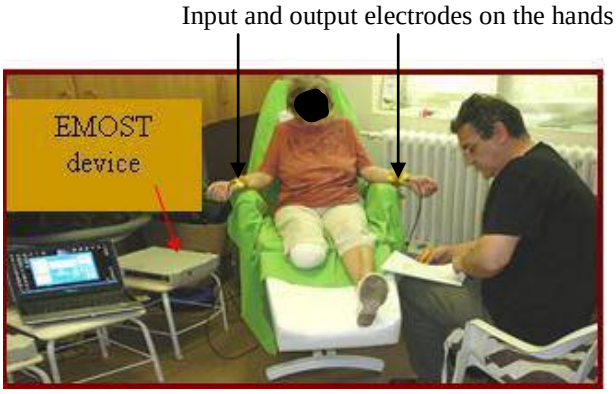


Figure. 2. Photograph of an amputee undergoing an EMOST treatment. While the operator was collecting patients' reports he was blind to the type of treatment (i.e., active or sham treatments).

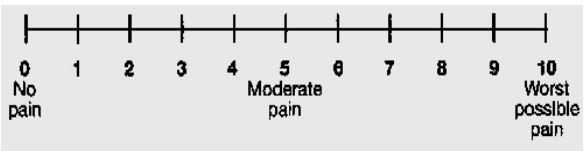


Figure. 3. Verbal numerical rating scale.

Results

The Student's t-test was used to analyze the data. The reduction of phantom limb pain by EMOST was statistically significant (*P < 0.05) as compared to the controls. Although our goal was to reduce phantom limb pain (or reduction in the frequency of phantom pain (PP↓)) via EMOST treatments, most of the patients also reported a marked improvement in their sleep and mood quality after the treatments. No improvements in the reduction of phantom limb pain or sleep and mood improvement were reported in the control group. The results obtained after six EMOST treatments are summarized in Table 1. All patients were followed for 2 weeks following their completed six treatments and there were no major differences in terms of phantom pain relief during this time.

	Patients	**Phantom pain intensity before the treatments**	**Phantom pain intensity after six completed EMOST treatments**	**Interval between the amputation date and the EMOST treatments**	**Additional improvements reported by patients after six EMOST treatments**	**Disease or Accident**
Patients with EMOST treatments	**I.**	6	0	1 month	Sleep	Diabetes
	II.	7	3	1/2 year	Sleep	Arterial
	III.	8	4	2 years	Mood	Diabetes
	IV.	6	2	1 month	Sleep, Mood	Arterial
	V.	1	0	8 years	Sleep, Mood	Arterial
	VI.	3	2	1 month	Sleep, Mood PP frequency↓	Arterial
	VII.	7	2	1 month	Sleep, Mood	Diabetes
	VIII.	7	4	1 month	Mood	Accident
	IX.	7	0	3 years	Sleep PP frequency↓	Diabetes
	X.	7	6	5 years	Mood	Diabetes and arterial

Table 1. This table summarizes the phantom pain intensity observed after completion of six EMOST treatments and additional improvements reported by the patients (The control group is not shown).

Discussion

Some possible effects of LFI-EMFs on cellular processes

Living cells display a particularly weak non-linear electromagnetic activity in a wide spectrum of frequencies - from Hz to THz, in cells (Fraser and Frey, 1968; Levin and Korenstein, 1991; Isojima et al., 1995; Cohen and Popp, 1997; Kobayashi et al., 1999; Pokorný et al., 2001; Lipkova and Cechak, 2005; Pelling et al., 2005) - that can be generated by diverse cellular mechanisms that are associated with biochemical processes.

Although the health effects of low-frequency and intensity electromagnetic fields (LFI-EMFs) are controversial, increasing evidence suggests that non-ionizing LFI-EMFs can influence numerous cell functions and are capable of initiating various healing processes, such as the delay of fractures, induction of analgesia, acceleration of wound re-epithelialization, inhibition of inflammatory processes, reduction of fatigue, improvement of multiple sclerosis and chronic pulmonary disease, among others (Orgel et al., 1984; Selvam et al., 2007; Reiter 1993; Satter Syed et al., 1999; Lappin et al., 2003; Kumar et al., 2005; Alfieri et al., 2006; Zhang et al., 2007; Markov 2007a; Tsang et al., 2009; Huo et al., 2009; Sutbeyaz et al., 2009; Mach and Persinger, 2009; Mancuso et al., 2007; Jing et al., 2010; Patruno et al., 2010).

Many potential causes have been suggested to explain the influence of LFI-EMFs in living systems, for example, Eddy electric currents, classical and quantum oscillator models, by the help of biomagnetites, cyclotron resonance, the interference of quantum states of bound ions and electrons, coherent quantum excitations, stochastic resonance, parametric resonance, bifurcation, and magnetosensitive free-radical and redox processes, among others (Binhi, 1999; Bókkon and Salari, 2010). Despite these explanations, the primary effect of LFI-EMFs on cell functions remains unclear. However, several effects of extremely low-frequency electromagnetic therapies may be explained (or connected) by redox regulations and membrane processes (Patruno et al., 2010; De Nicola et al., 2006; Di Loreto et al., 2009; Morabito et al., 2010).

Numerous experiments have provided evidence that reactive oxygen species (ROS) and reactive nitrogen species (RNS) and their derivatives act as fundamental signals (secondary messengers) during physiological (and pathophysiological) processes in intracellular signaling and intercellular communication processes (Hidalgo et al., 2000; Hancock et al., 2001; Dröge, 2002; Kamsler and Segal, 2007; Valko et al., 2007; Kishida and Klann, 2007; Forman et al., 2008; Bókkon and Antal, 2010). Because several effects of LFI-

EMFs can be explained by redox regulation and membrane processes, LFI-EMFs may have an important effect on redox mechanisms.

A growing body of evidence indicates that cell membranes play a key role in the transduction and amplification of LFI-EMF field signals (Bauréus et al., 2003; Foster, 2003; Mathie et al., 2003). Specifically, LFI-EMFs can affect the length of cell membranes and the number and variety of membrane-bound receptors. However, the activation of many cell surface receptors (for example, G protein-coupled receptors and receptor tyrosine kinases, among others) induces an influx of Ca^{2+} into the cells and the release of Ca^{2+} from the endoplasmic reticulum. Because ROS and calcium signals are intimately interconnected and calcium and ROS constitute the most significant intracellular signaling molecules in the regulation of various cellular functions (Gordeeva et al., 2003; Yan et al., 2006; Feissner et al., 2009), the effect of LFI-EMFs on cell membranes and membrane-bound receptors may cause these radiations to stimulate Ca^{2+}-related pathways and free radical and redox-regulated processes. Several cell surface receptors are regulated by redox processes (Dröge, 2002; Bókkon and Antal, 2010; Choi and Lipton, 2000; Nakashima et al., 2002; Kishida et al., 2005; Yang et al., 2006; Monteiro et al., 2008; Shi et al., 2010). Figure 4 shows some possible effects of LFI-EMFs on cellular processes.

In addition, LFI-EMF can have effects on the molecular transition states and can affect the kinetic processes of enzymes without thermodynamic kT energy. Importantly, magnetic fields are more effective when the tissue is out of equilibrium (Markov, 2007b). Consequently, LFI-EMFs experiments in healthy individuals do not reflect the potential response of patients who have endured an injury or disease. Because the cell type-specific redox status is responsible for the effects of diverse electromagnetic expositions (Simkó, 2007), it is possible that the effects of diverse electromagnetic fields are dependent on the cell type and the temporary spatiotemporal redox (and free radicals) patterns of cells.

It is important to note the role of exposure time during LFI-EMF therapies is especially critical. Radiations with a short-term exposure (according to our experience, less than 45 min) can facilitate (for example, through redox activation processes) the immune system and cellular processes, but a long-term or continuous exposure to LFI-EMFs results in a decline in cytoprotection (Regoli et al., 2005; Di Carlo et al., 2002). Long-term electromagnetic radiations may shift the redox and calcium balance, which could cause additional cellular malfunctions. For example, NMDA receptors can be redox modulated by

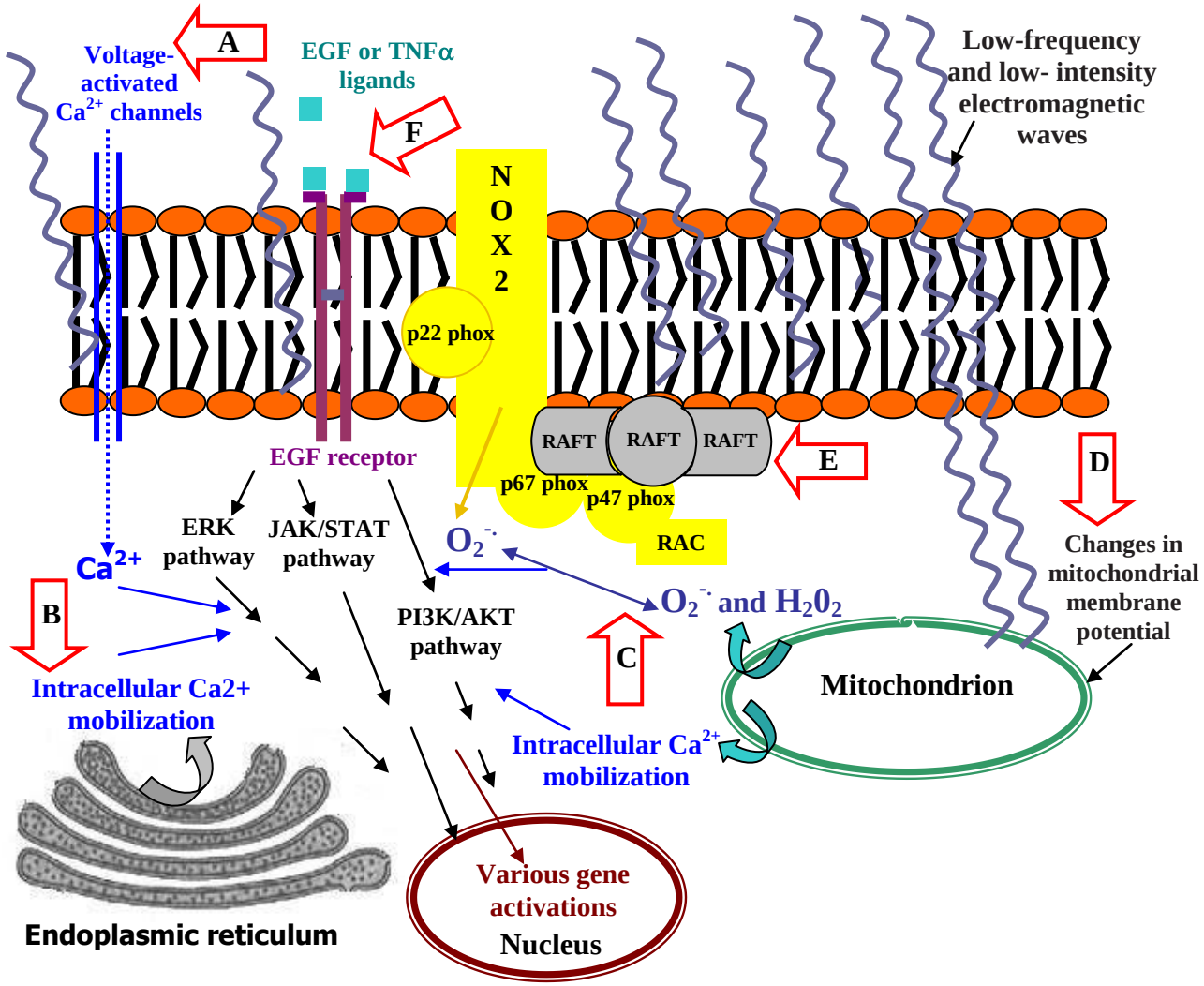


Figure. 4. Some possible effects of LFI-EMF fields on cellular processes. A growing body of evidence indicates that cell membranes, mitochondria, Ca^{2+} and ROS play key roles in the transduction and amplification of LFI-EMF field signals. ELF-EMFs may be capable of inducing a shift in cell status to an "activated" state. Lipid rafts (REFT, membrane microdomains) can play essential roles during the activation of membrane-bound receptors and enzymes by ELF-EMFs. **A.** Increases the open-channel probability. **B.** Intracellular Ca^{2+} mobilization. **C.** Increased intracellular $O_2^{-\cdot}$ and H_20_2 levels. **D.** Changes in mitochondrial membrane potential. **E.** Facilitation of NADPH oxidase (NOX) aggregation by membrane lipid drafts. **F.** Facilitate assembly and activation of membrane-bound receptors.

hydroxyl radicals (Aizenman, 1995), but long-term or continuous exposure to LFI-EMFs provoke aberrant NMDA receptor activities (Manikonda et al., 2007).

In most LFI-EMF experiments or treatments, various devices employ diverse artificial frequencies, which are waveforms that are modulated with respect to the frequency or the amplitude. LFI-EMFs with different characteristics, including different waveforms, frequencies and modulations, can have diverse (*or even opposing*) effects on biochemical signal processes during experiments. In other words, the effects of electromagnetic fields are associated with the type of electromagnetic field that is applied (Walther et al., 2007).

During various diseases, cells not only demonstrate altered biochemical processes but also produce altered non-linear electromagnetic complex patterns. Because it is impossible to investigate the whole range of artificial LFI-EMFs for potential therapeutic applications, it seems reasonable to use non-linear bioelectric and bioelectromagnetic signals from cells of the body for potential therapeutic applications that may be more effective than the diverse, artificial types of LFI-EMFs signals. However, the EMOST method is based on the utilization of the non-linear, bioelectric and bioelectromagnetic signals of the patients without any electromagnetic wave modulation or wave inversion of recorded output signals of subjects.

Since each patient with phantom pain has a unique description concerning his/her particular sensations and the pain experienced, and the effects of external electromagnetic fields are related to the type of electromagnetic field applied, it is possible that the treatment of particular phantom pain sensations will require specific method. Our EMOST device may guarantee this specific method, because it is based on the bioelectromagnetic fields of the patients' own living systems.

Phantom pain, neuromatrix theory, representation of body image, visual dreams, redox processes, EMOST treatment

The precise cause of phantom pain is incompletely understood, but most researchers agree that phantom pain and phantom sensations could originate from the central nervous system. LFI-EMFs can affect the length of cell membranes and various membrane-bound receptors as well as free radical and redox processes. During several years of EMOST application, we have found that our method generally affects the quality of sleep and mood in subjects. However, EMOST treatments not only significantly reduced phantom pain, but that most of the patients also reported these additional benefits (mainly about improvement of their sleep and mood quality) after six treatments (Table 1).

Recently, Ikeda et al. (2005) suggested that brain oxidation could be an initial process in sleep induction. They proposed that a mild enhancement of reactive species during wakefulness in the neuronal network that regulates sleep might trigger sleep induction. In other words, reactive species-related redox homeostasis plays an essential role in sleep/wake regulation.

Phantom limb pain can also occur in individuals who are born without limbs. Neurologists have hypothesized that the perception of our limbs can be hard-wired into our brain. According to the neuromatrix theory (Melzack, 1990), the representation of body image is genetically determined and can be modified by sensory input to generate a neurosignature. The regular neurosignature may be responsible for painless phantom limb sensations, whereas phantom pain could be due to an anomalous reorganization of the neuromatrix.

Michael Jouvet (1998) suggested that during sleep, an iteration process occurs at the DNA level that maintains and programs hereditary behavior. His notion may be related to the neuromatrix theory. Namely, during sleep, a neurocomputational process can maintain and reinforce the neurosignature and complex neuro-DNA patterns.

Mulder et al. (2008) reported that a large number of amputees continue to experience a body with all of the limbs intact during in their dreams. The visual perception from the eyes or the imagination generated internally employs the same (or a very similar) neural substrate in the visual cortex (Ganis et al., 2004; Slotnick et al., 2005; Borst and Kosslyn, 2008). In addition, in dream images, deficits occur that correlate with the damaged visual areas of the cortical brain. These phenomena indicate that the same (or a very similar) neural substrate of the visual cortex is used for the visual content of the dream image (Llinas and Pare, 1991). Such findings suggest that during sleep, visual dreams continue and/or reinforce the representation of a missing limb. After a limb has been amputated, the visual system from the eyes recognizes the lack of the limb, but the subconscious proprioceptive system and visual dreams (which are also produced by the subconscious) do not, because the subconscious brain mechanisms (proprioceptive system, neurosignature) have not yet changed.

According to the latest results of Morabito et al. (2010), low frequency and low intensity electromagnetic fields modify the cellular redox state. Thus, it is possible that one of the important effects of the EMOST method (that is based on the non-linear, bioelectromagnetic fields of the subject) is to influence redox processes in cells and tissues. However, reactive species and their derivatives act as fundamental signals (secondary messengers) in physiological (and pathophysiological) processes and are particularly important in redox signal systems. During EMOST treatments, the feedback of non-linear,

extra weak electromagnetic could strengthen the cellular redox communication between cells and can influence the redox balance of the entire body via the circulating blood. One outcome of these processes is that EMOST affects sleep and mood processes.

There are converging lines of evidence to support the hypothesis that sleep promotes brain plasticity. Glutamate is one of the main excitatory neurotransmitters in the visual cortex (Baughman and Gilbert, 1980), and the NMDA glutamate receptor is the most important molecular structure in controlling synaptic plasticity and memory functions. However, redox modulation has been recognized as a fundamental system in the regulation of the NMDA receptor (Bókkon and Antal, 2010; Choi and Lipton, 2000; Aizenman, 1995). In addition, glutamate receptors are reactivated during sleep-associated consolidation processes (Gais et al., 2008). It is possible that some of the important effects of the EMOST method are achieved via the redox balance of the body and redox-related plasticity during sleep.

In addition, weak magnetic fields with an optimal frequency and intensity have ameliorating effects on melatonin-related diseases (Persinger, 2006). However, melatonin is involved in the regulation of sleep, and can modulate hippocampus NMDA receptors, as well as brain and blood oxidative stress levels in ovariectomized rats. Furthermore, melatonin improves the antioxidant status (balance of the oxidant-antioxidant status) in the brain and liver (Subramanian et al., 2007; Dilek et al., 2010). According to Huse et al. (2001), opioids are effective in the treatment of phantom limb pain and may influence the cortical reorganization. Del Seppia et al. (2007) reported that non-ionizing electromagnetic fields could affect the nociceptive sensitivity and analgesia via opioid-mediated responses. Recently, Cuccurazzu et al. (2010) showed that extremely low-frequency electromagnetic fields can enhance the hippocampal neurogenesis in C57BL/6 mice.

Summary

We presented our preliminary results regarding the effectiveness of the EMOST method (which utilizes the non-linear, electromagnetic fields of the subjects) for the reduction of phantom limb pain under clinical circumstances. Because LFI-EMFs may affect cell membranes, membrane-bound receptors and free radical and redox processes, the cell type-specific redox status is likely responsible for the effects of various LFI-EMFs. Therefore, the EMOST method potentially can affect redox processes. For the reasons that redox homeostasis plays a fundamental role in physiological/ pathophysiological processes and sleep/wake regulation, and the brain oxidation can be an initial process in sleep induction, and

also because sleep promotes the brain plasticity, we hypothesize that some possible effects of EMOST improve redox and redox-related plasticity (*reorganization*).

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Acknowledgments

All of the authors gratefully acknowledge the assistance of the National Institute for Medical Rehabilitation, Budapest, Hungary.

References

Aizenman, E. (1995). Modulation of N-methyl-D-aspartate receptors by hydroxyl radicals in rat cortical neurons in vitro. *Neurosci. Lett.* 189:57–59.

Alfieri, R.R., Bonelli, M.A., Pedrazzi, G., Desenzani, S., Ghillani, M., Fumarola, C., Ghibelli, L., Borghetti, A.F., Petronini, P.G. (2006). Increased levels of inducible HSP70 in cells exposed to electromagnetic fields. *Radiat. Res.* 165:95–104.

Baughman, R.W., Gilbert, C.D. (1980). Aspartate and glutamate as possible neurotransmitters of cells in layer 6 of the visual cortex. *Nature* 287:848–850.

Bauréus, K.C.L., Sommarin, M., Persson, B.R., Salford, L.G., Eberhardt, J.L. (2003). Interaction between weak low frequency magnetic fields and cell membranes. *Bioelectromagnetics* 24:395–402.

Binhi, V.N. (1999). An analytical survey of theoretical studies in the area of magnetoreception. In: *Electromagnetic Fields: Biological Effects and Hygienic Standardization.* Repacholi, M.H, Rubtsova, N.B., Muc, A.M. eds. (pp:155–170) Switzerland, Geneva: World Health Organization.

Bittar, R.G., Otero, S., Carter, H., Aziz, T.Z. (2005). Deep brain stimulation for phantom limb pain. *J.* Clin. Neurosci. 12:399–404.

Bókkon, I., Antal, I. (2010). Schizophrenia: redox regulation and volume transmission. *Curr. Neuropharmacol*. In press.

Bókkon, I., Salari, V. (2010). Information storing by biomagnetites. *J. Biol. Phys.* 36:109–120.

Borst, G., Kosslyn, S.M. (2008). Visual mental imagery and visual perception: structural equivalence revealed by scanning processes. *Mem. Cognit.* 36:849–862.

Choi, Y.B., Lipton, S.A. (2000). Redox modulation of the NMDA receptor. *Cell. Mol. Life Sci.* 57:1535–1541.

Cohen, S., Popp, F.A. (1997). Biophoton emission of the human body. *J. Photochem. Photobiol. B* 40:187–189.

Cuccurazzu, B., Leone, L., Podda, M.V., Piacentini, R., Riccardi, E., Ripoli, C., Azzena, G.B., Grassi, C. (2010). Exposure to extremely low-frequency (50 Hz) electromagnetic fields enhances adult hippocampal neurogenesis in C57BL/6 mice. *Exp. Neurol.* 226:173–182.

Davis, K.D., Kiss, Z.H., Luo, L. (1998). Phantom sensations generated by thalamic microstimulation. *Nature* 391:385–387.

De Nicola, M., Cordisco, S., Cerella, C., Albertini, M.C., D'Alessio, M., Accorsi, A., Bergamaschi, A., Magrini, A., Ghibelli, L. (2006). Magnetic fields protect from apoptosis via redox alteration. *Ann. N. Y. Acad. Sci.* 1090:59–68.

de Roos, C., Veenstra, A.C., de Jongh, A., den Hollander-Gijsman, M., van der Wee, N.J., Zitman, F.G., van Rood, Y.R. (2010). Treatment of chronic phantom limb pain using a trauma-focused psychological approach. *Pain Res. Manag.* 15:65–71.

Del Seppia, C., Ghione, S., Luschi, P., Ossenkopp, K.P., Choleris, E., Kavaliers, M. (2007). Pain perception and electromagnetic fields. *Neurosci. Biobeh. Rev.* 31:619–642.

Devor, M., Seltzer, Z. (1999). Pathophysiology of damaged nerves in relation to chronic pain.

Dhillon, G.S., Kruger, T.B., Sandhu, J.S., Horch, K.W. (2005). Effects of short-term training on sensory and motor function in severed nerves of long-term human amputees. *J. Neurophysiol*. 93:2625–2633.

Di Carlo, A., White, N., Guo, F., Garrett, P., Litovitz, T. (2002). Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection. *J. Cell. Biochem.* 84:447–454.

Di Loreto, S., Falone, S., Caracciolo, V., Sebastiani, P., D'Alessandro, A., Mirabilio, A., Zimmitti, V., Amicarelli, F. (2009). Fifty hertz extremely low-frequency magnetic field exposure elicits redox and trophic response in rat-cortical neurons. *J. Cell. Physiol.* 219:334–343.

Dilek, M., Naziroğlu, M., Baha Oral, H., Suat Ovey, I., Küçükayaz, M., Mungan, M.T., Kara, H.Y., Sütçü, R. (2010). Melatonin modulates hippocampus NMDA receptors, blood and brain oxidative stress levels in ovariectomized rats. *J. Membrane Biol.* 233:135–142.

Dröge, W. (2002). Free Radicals in the Physiological Control of Cell Function. *Physiol. Rev.* 82: 47–95.

Feissner, R.F., Skalska, J., Gaum, W.E., Sheu, S.S. (2009). Crosstalk signaling between mitochondrial Ca2+ and ROS. *Front. Biosci.* 14:1197–1218.

Flor, H. 2002. Phantom-limb pain: characteristics, causes, and treatment. *Lancet Neurol.* 1: 182–189.

Forman, H.J., Fukuto, J.M., Miller, T., Zhang, H., Rinna, A, Levy, S. (2008). The chemistry of cell signaling by reactive oxygen and nitrogen species and 4-hydroxynonenal. *Arch. Biochem. Biophys*. 477:183–195.

Foster, K.R. (2003). Mechanisms of interaction of extremely low frequency electric fields and biological systems. *Rad. Protec. Dosimet.* 106:301–310.

Fraser, A., Frey, A.H. (1968). Electromagnetic emission at micron wavelengths from active nerves. *Biophys. J.* 8:731–734.

Gais, S., Rasch, B., Wagner, U., Born, J. (2008). Visual-procedural memory consolidation during sleep blocked by glutamatergic receptor antagonists. *J. Neurosci*. 28:5513–5518.

Ganis, G., Thompson, W.L., Kosslyn, S.M. (2004). Brain areas underlying visual mental imagery and visual perception: an fMRI study. *Brain Res. Cogn. Brain Res.* 20:226–241.

Gnezdilov, A.V., Syrovegin, A.V., Plaksin, S.E., Ovechkin, A.M., Ivanov, A.M., Sul'timov, S.A. (1995). Evaluation of the effectiveness of transcutaneous electroneuroanalgesia in phantom pain syndrome. *Anesteziol. Reanimatol.* 2:97–102.

Gordeeva, A.V., Zvyagilskaya, R.A., Labas, Y.A. (2003). Cross-talk between reactive oxygen species and calcium in living cells. *Biochemistry (Mosc.)* 68:1077–1080.

Hancock, J.T., Desikan, R., Neill, S.J. (2001). Role of reactive oxygen speciesin cell signalling pathways. *Biochem. Soc. Trans.* 29:345–350.

Hidalgo, C., Carrasco, M.A., Muñoz, P., Núñez, M.T. (2000). A role for reactive oxygen/nitrogen species and iron on neuronal synaptic plasticity. *Antioxid. Redox Signal.* 9:245–255.

Huang, C.Y., Yang, R.S., Kuo, T.S., Hsu, K.H. (2009). Phantom limb pain treated by far infrared ray. *Con. Proc. IEEE Eng. Med. Biol. Soci.* 2009:1589–1591.

Huo, R., Ma, Q., Wu, J.J., Chin-Nuke, K., Jing, Y., Chen, J., Miyar, M.E., Davis, S.C., Li, J. (2010). Noninvasive Electromagnetic Fields on Keratinocyte Growth and Migration. *J. Surg. Res.* 162:299–307.

Huse, E., Larbig, W., Flor, H., Birbaumer, N. (2001). The effect of opioids on phantom limb pain and cortical reorganization. *Pain* 90:47–55.

Ikeda, M., Ikeda-Sagara, M., Okada, T., Clement, P., Urade, Y., Nagai, T., Sugiyama, T., Yoshioka, T., Honda, K., Inoué, S. (2005). Brain oxidation is an initial process in sleep induction. *Neuroscience* 130:1029–1040.

In: Wall, P.D., Melzack, R. eds. *Textbook of pain* (pp. 129–164). Edinburgh: Churchill Livingstone.

Irlbacher, K., Kuhnert, J., Röricht, S., Meyer, B.U., Brandt, S.A. (2006). Central and peripheral deafferent pain: therapy with repetitive transcranial magnetic stimulation. *Der Nervenarzt* 77:1196,1198–1203.

Isojima, Y., Isoshima, T., Nagai, K., Kikuchi, K., Nakagawa, H. (1995). Ultraweak biochemiluminescence detected from rat hippocampal slices. *NeuroReport* 6:658–660.

Jing, D., Shen, G., Huang, J., Xie, K., Cai, J., Xu, Q., Wu, X., Luo, E. (2010). Circadian rhythm affects the preventive role of pulsed electromagnetic fields on ovariectomy-induced osteoporosis in rats. *Bone* 46:487–495.

Jouvet, M. (1998). Paradoxical sleep as a programming system. *J. Sleep Res.* 7:1–5.

Kamsler, A., Segal, M. (2007). Control of neuronal plasticity by reactive oxygen species. *Antioxid. Redox Signal.* 9:165–167.

Karl, A., Birbaumer, N., Lutzenberger, W., Cohen, L.G., Flor, H. (2001). Reorganization of motor and somatosensory cortex in upper extremity amputees with phantom limb pain. *J. Neurosci*. 21:3609–3618.

Kishida, K.T., Klann, E. (2007). Sources and targets of reactive oxygen species in synaptic plasticity and memory. *Antioxid. Redox Signal.* 9:233–244.

Kishida, K.T., Pao, M., Holland, S.M., Klann, E. (2005). NADPH oxidase is required for NMDA receptor-dependent activation of ERK in hippocampal area CA1. *J. Neurochem.* 94:299–306.

Kobayashi, M., Takeda, M., Sato, T., Yamazaki, Y., Kaneko, K., Ito, K., Kato, H., Inaba, H. (1999). In vivo imaging of spontaneous ultraweak photon emission from a rat's brain correlated with cerebral energy metabolism and oxidative stress. *Neurosci. Res*. 34:103–113.

Kumar, V.S., Kumar, D.A., Kalaivani, K., Gangadharan, A.C., Raju, K.V., Thejomoorthy, P., Manohar, B.M., Puvanakrishnan, R. (2005). Optimization of pulsed electromagnetic field therapy for management of arthritis in rats. *Bioelectromagnetics* 26:431–439.

Lappin, M.S., Lawrie, F.W., Richards, T.L., Kramer, E.D. (2003). Effects of a pulsed electromagnetic therapy on multiple sclerosis fatigue and quality of life: a double-blind, placebo controlled trial. *Altern. Ther. Health Med.* 9:38–48.

Levin, A., Korenstein, R. (1991). Membrane fluctuations in erythrocytes are linked to MgATP-dependent dynamic assembly of the membrane skeleton. *Biophys. J.* 60:733–737.

Lipkova, J., Cechak, J. (2005). Existence of Electromagnetic Radiation in Humans in. ELF Band. *Prog. Electromagnetics. Res. Sym.* 1:227–230.

Llinas, R.R., Pare, D. (1991). Of dreaming and wakefulness. *Neuroscience* 44:521–535.

Mach, Q.H., Persinger, M.A. (2009). Behavioral changes with brief exposures to weak magnetic fields patterned to stimulate long-term potentiation. *Brain Res.* 1261:45–53.

Mackert, B.M., Sappok, T., Grüsser, S., Flor, H., Curio, G. (2003). The eloquence of silent cortex: analysis of afferent input to deafferented cortex in arm amputees. *NeuroReport* 14:409–412.

Mancuso, M., Ghezzi, V., Di Fede, G. (2007). Utilization of extremely low frequency (ELF) magnetic fields in chronic disease; five years experience: three case reports. *Electromagn. Biol. Med.* 26:311–313.

Manikonda, P.K., Rajendra, P., Devendranath, D., Gunasekaran, B., Channakeshava., Aradhya, R.S., Sashidhar, R.B., Subramanyam, C. (2007). Influence of extremely low frequency magnetic fields on Ca2+ signaling and NMDA receptor functions in rat hippocampus. *Neurosci. Lett.* 413:145–149.

Markov, M.S. (2007a). Expanding use of pulsed electromagnetic field therapies. *Electromagn. Biol. Med.* 26:257–274.

Markov, M.S. (2007b). Pulsed electromagnetic field therapy history, state of the art and future. *Environmentalist* 27:465–475.

Mathie, A., Kennard, L.E., Veale, E.L. (2003). Neuronal ion channels and their sensitivity to extremely low frequency weak electric field effects. *Rad. Prot. Dosimet*. 106:311–316.

Melzack, R. (1990). Phantom limbs and the concept of a neuromatrix. *Trends Neurosci.* 13:88–92.

Melzack, R. (1992). Phantom limbs. *Scientific American* 266:120–126.

Melzack, R., Isreal, R., Lacroix, R., Schultz, G. (1997). Phantom limbs in people with congenital limb deficiency or amputation in early childhood. *Brain* 120:1603–1620.

Mercier, C., Reilly, K.T., Vargas, C.D., Aballea, A., Sirigu, A. (2006). Mapping phantom movement representations in the motor cortex of amputees. *Brain* 129:2202–2210.

Monteiro, H.P., Arai, R.J., Travassos, L.R. (2008). Protein tyrosine phosphorylation and protein tyrosine nitration in redox signaling. *Antioxid. Redox Signal.* 10:843–889.

Moore, C.I., Stern, C.E., Dunbar, C., Kostyk, S.K., Gehi, A., Corkin, S. (2000). Referred phantom sensations and cortical reorganization after spinal injury in humans. *Proc. Natl. Acad. Sci. USA* 97:14703–14708.

Morabito, C., Rovetta, F., Bizzarri, M., Mazzoleni, G., Fanò, G., Mariggiò, M.A. (2010). Modulation of redox status and calcium handling by extremely low frequency electromagnetic fields in C2C12 muscle cells: A real-time, single-cell approach. *Free Radic. Biol. Med.* 48:579–589.

Mulder, T., Hochstenbach, J., Dijkstra, P.U., Geertzen, J.H. (2008). Born to adapt, but not in your dreams. *Conscious. Cogn*. 17:1266–1271.

Nakashima, I., Kato, M., Akhand, A.A. (2002). Redox-linked signal transduction pathways for protein tyrosine kinase activation. Redox-linked signal transduction pathways for protein tyrosine kinase activation. *Antioxid. Redox Signal.* 4:517–531.

Orgel, M.G., O'Brien, W.J., Murray, H.M. (1984). Pulsing electromagnetic field therapy in nerve regeneration: an experimental study in the cat. *Plast. Reconstr. Surg.* 73:173–183.

Patruno, A., Amerio, P., Pesce, M., Vianale, G., Di Luzio, S., Tulli, A., Franceschelli, S., Grilli, A., Muraro, R., Reale, M. (2010). Extremely low frequency electromagnetic fields modulate expression of inducible nitric oxide synthase, endothelial nitric oxide synthase and cyclooxygenase-2 in the human keratinocyte cell line HaCat: potential therapeutic effects in wound healing. *Br. J. Dermatol.* 162:258–266.

Pelling, A.E., Sehati, S., Gralla, E.B., Gimzewski, J.K. (2005). Time dependence of the frequency and amplitude of the local nanomechanical motion of yeast. *Nanomedicine* 1:178–183.

Persinger, M.A. (2006). A potential multiple resonance mechanism by which weak magnetic fields affect molecules and medical problems: the example of melatonin and experimental "multiple sclerosis". *Med. Hypotheses* 66:811–815.

Pokorný, J., Hašek, J., Jelínek, F., Saroch, J., Palan, B. (2001). Electromagnetic activity of yeast cells in the M phase. *Electro- and Magnetobiol.* 20:371–396.

Ramachandran, V.S., Hirstein, W. (1998). The perception of phantom limbs. The D. O. Hebb Lecture. *Brain* 121:1603–1630.

Rasmussen, K.G., Rummans, T.A. (2000). Electroconvulsive therapy for phantom limb pain. *Pain* 85:297–299.

Regoli, F., Gorbi, S., Machella, N., Tedesco, S., Benedetti, M., Bocchetti, R., Notti, A., Fattorini, D., Piva, F., Principato, G. (2005). Pro-oxidant effects of extremely low frequency electromagnetic fields in the land snail Helix aspersa. *Free Radic. Biol. Med.* 39:1620–1628.

Reiter, R.J. (1993). Static and extremely low frequency electromagnetic field exposure: reported effects on the circadian production of melatonin. *J. Cell. Biochem.* 51:394–403.

Satter Syed, A., Islam, M.S., Rabbani, K.S., Talukder, M.S. (1999). Pulsed electromagnetic fields for the treatment of bone fractures. *Bangladesh Med. Res. Counc. Bull.* 25:6–10.

Seidel, S., Kasprian, G., Sycha, T., Auff, E. (2009). Mirror therapy for phantom limb pain–a systematic review. *Wien Klin. Wochenschr.* 121:440–444.

Selvam, R., Ganesan, K., Narayana Raju, K.V., Gangadharan, A.C., Manohar, B.M., Puvanakrishnan, R. (2007). Low frequency and low intensity pulsed electromagnetic field exerts its antiinflammatory effect through restoration of plasma membrane calcium ATPase activity. *Life Sciences* 80:2403–2410.

Sherman, R.A. (1994). What do we really know about phantom limb pain? *Pain Rev.* 1:261–274.

Sherman, R.A., Sherman, C.J., Bruno, G.M. (1987). Psychological factors influencing chronic phantom limb pain: an analysis of the literature. *Pain* 28:285–295.

Shi, Y., Yu, J., Jia, Y., Pan, L., Shen, C., Xia, J., Zhang, M. (2010). Redox-regulated lipid membrane binding of the PICK1 PDZ domain. *Biochemistry* 49:4432–4439.

Simkó, M. (2007). Cell type specific redox status is responsible for diverse electromagnetic field effects. *Curr. Med. Chem.* 14:1141–1152.

Slotnick, S.D., Thompson, W.L., Kosslyn, S.M. (2005). Visual mental imagery induces retinotopically organized activation of early visual areas. *Cereb. Cortex* 15:1570–1583.

Subramanian, P., Mirunalini, S., Pandi-Perumal, S.R., Trakht, I., Cardinali, D.P. (2007). Melatonin treatment improves the antioxidant status and decreases lipid content in brain and liver of rats. *Eur. J. Pharmacol.* 571:116–119.

Sutbeyaz, S.T., Sezer, N., Koseoglu, F., Kibar, S. (2009). Low-frequency pulsed electromagnetic field therapy in fibromyalgia: a randomized, double-blind, sham-controlled clinical study. *Clin. J. Pain* 25:722–728.

Tsang, E.W., Koren, S.A., Persinger, M.A. (2009). Specific patterns of weak (1 microTesla) transcerebral complex magnetic fields differentially affect depression, fatigue, and confusion in normal volunteers. *Electromagn. Biol. Med*. 28:365–373.

Valko, M., Leibfritz, D., Moncol, J., Cronin, M.T., Mazur, M., Telser, J. (2007). Free radicals and antioxidants in normal physiological functions and human disease. *Int. J. Biochem. Cell. Biol*. 39:44–84.

Walther, M., Mayer, F., Kafka, W., Schütze, N. (2007). Effects of weak, low-frequency pulsed electromagnetic fields (BEMER type) on gene expression of human mesenchymal stem cells and chondrocytes: an in vitro study. *Electromagn. Biol. Med.* 26:179–190.

Wiech, K., Kiefer, R.T., Töpfner, S., Preissl, H., Braun, C., Unertl, K., Flor, H., Birbaumer, N. (2004). A placebo-controlled randomized crossover trial of the N-methyl-D-aspartic acid receptor antagonist, memantine, in patients with chronic phantom limb pain. *Anesth. Analg.* 98:408–413.

Wilkes, D., Ganceres, N., Solanki, D., Hayes, M. (2008). Pulsed radiofrequency treatment of lower extremity phantom limb pain. *Clin. J. Pain* 24:736–739.

Yan, Y., Wei, C.L., Zhang, W.R., Cheng, H.P., Liu, J. (2006). Cross-talk between calcium and reactive oxygen species signaling. *Acta Pharmacol. Sin.* 27:821–826.

Yang, Z., Asico, L.D., Yu, P., Wang, Z., Jones, J.E., Escano, C.S., Wang, X., Quinn, M.T., Sibley, D.R., Romero, G.G., Felder, R.A., Jose, P.A. (2006). D5 dopamine receptor regulation of reactive oxygen species production, NADPH oxidase, and blood pressure. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* 290:R96–R104.

Zhang, X., Zhang, J., Qu, X., Wen, J. (2007). Effects of different extremely low-frequency electromagnetic fields on osteoblasts. *Electromagn. Biol. Med.* 26:167–177.

FIGURE 5 Treatments of amputees by EMOST in the clinic. *(A.Erdőfi-Szabó and I.Bókkon)*

translation of clinical reference letter

ORSZÁGOS ORVOSI REHABILITÁCIÓS INTÉZET

National Institute for Medical Rehabilitation, Budapest, Hungary
Budapest, Szanatórium utca 19. http://rehabint.hu/welcome.htm

Dear Mr. Dr. Attila Erdőfi-Szabó,

Since 2010 we have been using EMOST method at our department in the process of rehabilitation following limb amputation together with the procedures stated in the rehabilitation protocol. We have been using this technology aiming mainly at reducing and stopping phantom pain and reducing the post operation post traumatic stress of the patients having been operated on. After the medical attendance aiming at the above mentioned goals we experienced the following results:

a) there is less formation of phantom pain after the operation
b) higher number of decrease and stopping of phantom pain
c) post traumatic stress of limb absence is significantly less in the treated patients
d) healing of the wound is significantly faster, the stump can be strained much earlier
e) sleep quality in treated patients is significantly better than in the non-treated ones
f) psychological status of the patients treated is significantly more propitious than in non-treated ones

In our department we used this method with patients having defecation and urination problems which made the rehabilitation process more difficult and thus making their quality of life worse.
According to our experiences we can state that using the equipment for these purposes, defecation and urination malfunction of treated patients decreased significantly, including stool retention and urinary retention and the decrease and stop of incontinence caused by stress.

It is a particularly good result because of the limitation of motion and the high risk of motion deficits, because the imbalance of "freshly" Amputees and the the number of injuries caused by falling due to perceiving the not yet accepted altered body image can be significantly reduced.

Our experience also suggests that the central nervous system and autonomic nervous system treatments resulted in the patients body detection is better than in non treated patients.
This way getting used to artificial limb is quicker, and more efficient thus reducing the risk of falls and the consequential formation of necrosis of the stump, while the rehabilitation time improves.
As we have reported in the magazine *Electromagnetic Biology and Medicine*, we found that patients treated with our method are needed smaller proportion of reamputation so the positive results exist, thus long-term effects can be assumed.
According to our experience we have gained so far, the EMOST method and equipment is considered a promising method because of its beneficial and spectacular impact on the nervous system, the conductivity and the post traumatic stress.

On behalf of my colleagues and myself I claim to continue the collaboration in the research team's work, so that the procedure based on the further results can be included in the protocol of amputee rehabilitation.

I wish you success in your work,
18.06.2012, Budapest
Dr. Attila TILL, Chief Medical Head of Department, Amputation Surgical Dep.,
National Institute for Medical Rehabilitation

**ORSZÁGOS
ORVOSI
REHABILITÁCIÓS
INTÉZET**

Amputációs Sebészeti Osztály
Osztályvezető: dr.Till Attila
1121 Budapest, XII. Szanatórium u. 19.
Tel.: +36/1/**391-1900, 391-1901** Fax:+36/1/**200-2698**
e-mail: a.till@rehabint.hu

Cím: Dr. Erdőfi-Szabó Attila Ph.D.
BioLabor Biofizikai- és Laboratóriumi Szolgáltató Kft.

Tisztelt Dr. Erdőfi-Szabó Attila úr!

2010 májusa óta alkalmazzuk osztályunkon az EMOST módszert az alsó végtag amputációt követő rehabilitáció folyamatában, a rehabilitációs protokollban szereplő eljárások mellett. Az elmúlt időszakban főként célzottan, a fantomfájdalom csökkentése, megszűntetése, illetve a betegek műtéti beavatkozást követő „post-traumás" stressz csökkentése céljából használtuk a technológiát. A fent meghatározott célokból indított kezelések után az alábbi eredményeket tapasztaltuk:

a) a fantomfájdalom kialakulása kisebb arányú a műtétet követően kezelt betegeknél

b) a fantomfájdalom csökkenése, megszűnése nagyobb arányú a kezelt betegeknél

c) a végtagvesztést követő post-traumás stressz jelentősen kisebb a kezelt betegeknél

d) a sebgyógyulás jelentősen gyorsabb, a csonk hamarabb terhelhető a kezelt betegeknél

e) a kezelt betegek alvásminősége jelentősen jobb a nem kezeltekénél

f) a kezelt betegek pszichés állapota jelentősen kedvezőbb a nem kezelteknél

Az osztályunkon, olyan betegeken is alkalmazzuk a módszert, akiknél széklet- és vizeletürítési panaszok is nehezítették a rehabilitáció folyamatát, egyben rontották a betegek életminőségét. Tapasztalataink alapján kijelenthetjük, hogy a készülék e célú kezelési programjainak hatására a kezelt személyek ürítési zavarai is jelentősen csökkennek, beleértve a széklet- vizelet visszatartás illetve a stressz okozta vizelet inkontinencia csökkenését, megszűnését is. Ez a mozgás korlátozottság és a nagy kockázatot jelentő mozgásdeficit miatt kiemelten jó eredmény, hiszen a „friss" amputáltak egyensúlyzavara és a még el nem fogadott, megváltozott testkép okozta gyakran észlelt eléséből származó sérülések száma jelentősen mérsékelhető.
Tapasztalatunk alapján kijelenthető, hogy a központi idegrendszeri és autonóm idegrendszeri kezelések eredményeképpen a kezelt betegek testérzékelése is jobb a nem kezelt betegekénél, ez a művégtag megszokását gyorsítja, a használatát javítja, így csökkenti az elesés kockázatát, valamint a következményes csonkelhalás kialakulását, egyúttal a rehabilitációs időt is javítja.
Ahogy arról az Electromagnetic Biology and Medicine c. szaklapban beszámoltunk, tapasztaltuk, hogy a kezelt betegeknél a reamputáció szükségessége kisebb arányú, az elért kedvező eredmények tartósan fennállnak, így a hosszabb távú hatásmegtartás vélelmezhető.
Az eddig szerzett tapasztalataink alapján az EMOST módszert és készüléket az idegrendszerre, az ingervezetésre, és a „post-traumás" stresszre gyakorolt jótékony és

látványos hatása miatt ígéretes módszernek tekintjük. Munkatársaim és magam nevében kijelentjük, hogy továbbiakban is közreműködünk a kutató team munkáiban, hogy az eljárás a további eredmények alapján a rehabilitációs protokollokba illeszthetővé válhasson.
Munkájukhoz sok sikert kívánok!

Budapest, 2012. június 18.

Országos Orvosi Rehabilitációs Intézet
1528 Budapest XII., Szanatórium u. 19.
Telefon: 391-1944; Fax: 391-1977
ÁNTSZ-016010201
Amputációs Sebészeti osztály
osztályvezető főorvos: dr. Till Attila

Dr. Till Attila,
osztályvezető főorvos

Publikációk:

1. Szombathelyi Zs. – Kárpáthy E. – **TILL A.**
Comparative in vitro study of RGH-2981, a new peripherial blood flow enhancer on animal and pathological human arteries = Pol. J. Pharmacol. Pharm. 1989. 41. 591-595. p.
IF: 0,195
Cit.: -

34. **TILL A.**
Amputáció és rehabilitáció időskorban= Családorvosi Fórum 2010. február. 28-30.p.

35. **TILL A.**
Alsó és felső végtagi protetika
in: Rehabilitációs orvoslás /szerk: Vekerdy-Nagy Zsuzsanna – Medicina Könyvkiadó Zrt., Budapest, 2010.295-299.p.

36. **TILL A.**
Amputáltak és dysmeliások rehabilitációja
in: Rehabilitációs orvoslás /szerk: Vekerdy-Nagy Zsuzsanna – Medicina Könyvkiadó Zrt., Budapest, 2010.574-583.p.

37. Bókkon I., **TILL A.**, Erdőfi-Szabó A.: A Phantom pain reduction by non- ionizing Electromagnatic treatment = Hungarian Epidemiology, = 010;7/4/Suppl. : 15.p. Abstract.

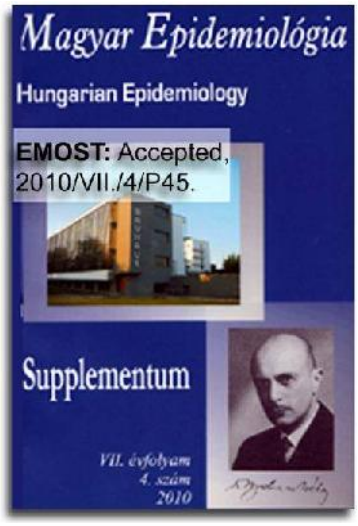
38. Bókkon I., **TILL A.**, Erdőfi-Szabó A.: Phantom pain reduction by non-ionizing electromagnetic treatment = Nature Precidings http://dx.doi.org/10.=038/npre.2010.4989.1 2010.

39. Bókkon I., **TILL A.**, Erdőfi- Szabó A.: Phantom pain reduction by low frequency and intensity electromagnetic fields: redox-related neural plasticity = Electromagnetic Biol.Med.

IF: 0,729

40. Bókkon I., **TILL A.**, Erdőfi-Szabó A.: Non-ionizing electromagnetic-own-signal-treatment =Europian Biophysics Journal. Vol.40.Supplement 1. August 2011. P-576.

41. Göbl A.,**TILL A.,** Rembeczki L.: tapasztalataink a „ problémás" diabeteses lábsebek gyógyításában a hiperbárikus oxigénterápia adjuvans alkalmazásával = Diabetologia Hungarica. Supplement.12. 04 .2012. P-68.



Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment

[1*]Bókkon István, [2]Till Attila, [3]Erdöfi-Szabó Attila

Poster presentation for International Conference of Preventive Medicine and Public Health
Theme category: Other

[1]Doctoral School of Pharmaceutical and Pharmacological Sciences, Semmelweis University, Budapest, Hungary

[2]National Institute for Medical Rehabilitation, Budapest, Hungary

[3]Director of BioLabor, Budapest, Hungary
2010

Abstract

While the health effects of low-frequency and intensity electromagnetic fields are controversial, an increasing body of evidence suggests that non-ionizing and low-frequency electromagnetic fields are capable of initiating various healing processes, such as the delay of fractures, induction of analgesia, inhibition of inflammatory processes, acceleration of wound re-epithelialization, decrease of fatigue, improvement of multiple sclerosis and chronic pulmonary disease, among others. Based on our years of experience testing a technique called non-ionizing *Electromagnetic-Own-Signal-Treatment*, here, we report the preliminary results for phantom pain reduction by this method under clinical circumstances. Our preliminary results showed not only a reduction in phantom pain in patients but also a marked improvement in their sleep and mood quality after the treatments. Here, we also suggest that some of the important effects of our method may be achieved via the redox balance of the body and redox-related neural plasticity. However, low-frequency and intensity electromagnetic fields can potentially provide useful methods for the treatment of diverse problematic disorders and can play important roles in public health of the 21st century medicine.

[*]Corresponding author: Bókkon István
Corresponding author's Email: bokkoni@yahoo.com
Corresponding author's Address: H-1238 Budapest, Lang E. 68. Hungary
Corresponding author's Phone: +36 20 570 6296

24-25. 11. 2011. National Medical Academy, KIEV, UKRAINE

методами рефлексотерапії сімейними лікарями дозволить підвищити якість надання медичної допомоги на етапі ПМСД. Передбачається, що дану програму буде розроблено та затверджено в кінці 2011 – на початку 2012 рр. і в II-III кварталі 2012 р. буде можливо розпочати підготовку сімейних лікарів по програмі даних циклів. Лікарі, які після проходження даних циклів виявлять бажання глибше вивчити теорію і практику рефлексотерапії, мають змогу пройти навчання на циклі «Спеціалізація з рефлексотерапії», програма якого розрахована на 3 місяці.

МЕТОД «EMOST» ELECTROMAGNETIC-OWN-SIGNAL-TREATMENT

Dr. Erdőfi-Szabó Attila PhD., Dr. Bókkon István PhD

(м. Будапешт, Угорщина)

ООО «BioLabor» по биофизическим и лабораторным услугам (Венгрия) и ООО «EMOST Nano-MED» по инновациям и производству медицинского оборудования (Венгрия) являются стратегическими партнерами Агентства регионального развития и международного сотрудничества «Закарпатья» (Валерий Грищенко/Erdőfi-Szabó Attila от 29.07.2011.). Целью сотрудничества являются проведение совместных украинско-венгерских исследований и развитие услуг в сфере обслуживания посттравматического стресса, перебоев со сном, аллергии, инконтиненции, реабилитации, аддикции, спортивного и детского здравоохранения.

ПРОФЕССИОНАЛЬНЫЕ УСПЕХИ

37 статьей, 150 ссылок о методе, участие в качестве ведущего в 11-ти клинических исследованиях, опубликованы 5 научных статьей в авторитетных медицинских журналах (см. ниже), за семь лет проведены более 600 профессиональных курсов по ПК, прочтены более 80 научных лекций.

РЕФЕРЕНЦИИ (с 2005 г., в 68 франшизных точках, смотри веб-сайт: www.biolabor.hu)

В рамках нашей системы работают 37 врачей, 45 специалистов натуральной медицины и 135 ассистентов на франшизных точках. С 2005 г. мы имеем более чем 40.000 довольных клиентов.

МЕТОД

Наш организм каждый день восстанавливает самого себя, вечером мы ложимся уставшим, а утром благодаря чему-то встаём «отдохнувшими», хотя мы не вводили дополнительную энергию. От чего это? Мы именно этим биологическим процессом занимаемся.Электромагнитные лучи, исходящие из Солнца в виде света и тепла обеспечивают основные условия жизни флоре и фауне. Электромагнитная энергия является основным условием Жизни, она лежит в основе молекулярных связей, поэтому надо было бы предполагать, что процедуры с электромагнитным методом не

альтернативные, а может быть универсальные способы лечения. Разработанным специалистами ООО «BioLabor» методом упорядочиваются собственные электрические и электромагнитные сигналы организма способом рефлексотерапии. Принимаются различного ритма и различной динамики потенциалы клиента, потом они аналоговым образом в определенных вариациях ослабляются и/или усиливаются и возвращаются в организм клиента. Именно такие, расширенные вариации потенциалов делают возможным их влияние на акционный потенциал, а таким образом, упорядочивание процессов на уровне молекул и клеток. Вариации потенциалов с определенной индикацией через поверхность кожи, расположенные в коже свободные нервные окончания, рецепторы и эффекторы, сосудистую систему, клетки Меркеля, иммунные клетки окажут непосредственное воздействие на центральную нервную систему, вегетативное симпатическое и парасимпатическое регулирование, иммунитет и информационную систему. Имеется возможность применения метода в электро-акупунктуре на стимуляцию, которая основана на собственных сигналах, этим достигается согласование взаимоотношений качеств потенциалов, осуществляющихся в данной зоне. Дальнейшим преимуществом является и то, что электрические потенциалы и нефизические моменты врача, осуществляющего терапию, остаются независимыми от клиента, что для обеих сторон предоставляет безопасность. Изменения происходят главным образом через окислительно-восстановительные процессы и точное регулирование нейротрансмиттерами. Вероятность появления побочных эффектов довольно маленькая из-за наличия рефрактерной фазы, уровень риска низкий, поскольку сигналы собственные, практически исключена перегрузка организма благодаря собственному уровню сигнала, а при их применении вместо риска интерференции искусственных (дигитализованных) электромагнитных сигналов имеется соответствующая, естественная когеренция. С этим методом можно работать с взаимосвязанными сигналами одновременно, поэтому имеется возможность сохранить их естественную взаимосвязь. С этим методом развиваются саморегуляция процессов, учебные и восстановительные способности организма. Благодаря тому, что на протяжении нескольких лет у нас приобретался благоприятный опыт по применению метода, стало возможным в некоторых областях регулярно им пользоваться. Кроме повседневного применения по некоторым направлениям, наш метод доказал своё право на существование так и в условиях стихийных бедствий, как и в особых военных условиях. Считается преимуществом метода и то, что требуется относительно малое количество процедур (4-6) и его эффект продолжительный.

ГЛАВНЫЕ ПРОЕКТЫ И РЕЗУЛЬТАТЫ

Разработка медицинских терапий

2005.г.: Центральная нервная система, нейровегетативная система; Настроение, концентрация, вялость; Нейротрансмиттерные процессы;

2006.г.: Ортомолекулярный и метаболический баланс; Педиатрия, лактозная и глютеновая интолерантность; Кооперация сосуд, почек и сердца; Аллергия, качество сна, инконтиненция; Психо-нейроиммунология и её взаимоотношения, стресс и болезни

2007.г.: Когнитивные функции;

2008.г.: Природные бедствия, посттравматический стресс; Фантомные боли после ампутаций; Детские процедуры, рост, развитие, социализация; Чрезвычайные ситуации, физический стресс и психические травмы в армии.

СОБСТВЕННЫЕ ПУБЛИКАЦИИ

- Bókkon I, Till A, Grass F, Erdöfi-Szabó A (2011) Phantom pain reduction by electromagnetic treatment. **Electromagnetic Biology and Medicine**
- Bókkon I, Till A, Erdöfi-Szabó A (2011) Non-ionizing Electromagnetic-Own-Signal-Treatment. **8th European Biophysics Congress**. 23-27 August, Budapest, Hungary.
- Bókkon I, Till A, Erdöfi-Szabó A (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. **International Conference of Preventive Medicine and Public Health.** 19-20 Nov. Pécs. Hungary.
- Bókkon I, Till A, Erdöfi-Szabó A (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. **Nature Precedings** 10.1038/npre.2010.4989.1
- Bókkon I, Till A, Erdöfi-Szabó A (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment.**Hungarian Epidemiology** 7/4/Suppl. p:15. Abstract
- Bókkon I., Till A., Erdöfi-Szabó A. (2011) Effect of Electromagnetic-Own-Signal-Treatment on electrocardiogram and the concentration of urea, cholesterine, albumin, cortisol, creatin, TSH, CRP in serum. Under process.
- Bókkon I., Till A., Erdöfi-Szabó A. (2011) Pilot study, Effects of Electromagnetic-Own-Signal-Treatment on PTS in military actions. Under processes.

ЭЛЕКТРОМАГНИТНАЯ РЕФЛЕКСОТЕРАПИЯ

Dr.Erdőfi-Szabó Attila PhD., Dr.Bókkon István PhD., Schmidtné Dr. Németh Mária

BioLabor Biofizikai és Laboratóriumi Szolgáltatások Kft.,

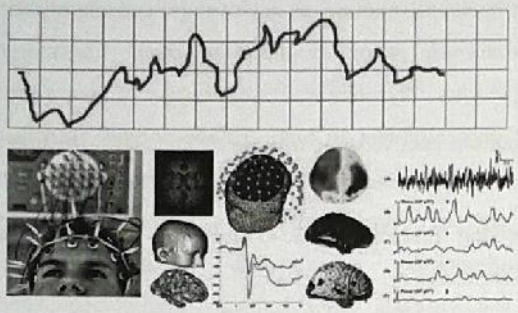
EMOST Nano-MED orvostechnikai Készülék Gyártó és Innovációs Kft.

Cím: 1122 Budapest, Városmajor u. 20. Magyarország, EU

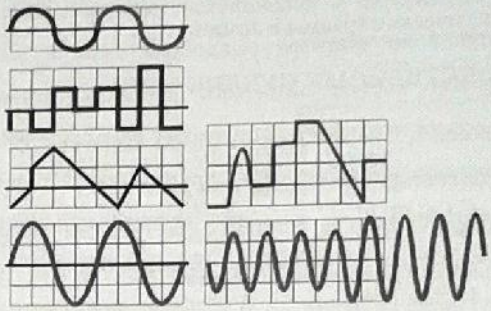
Telefon: +36 20 925 6116, cis@biolabor.hu www.biolabor.eu

(м. Будапешт, Угорщина)

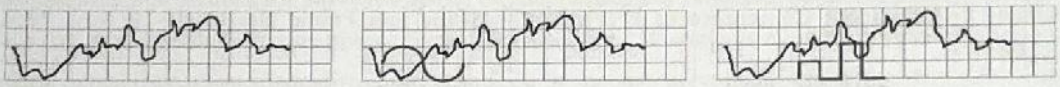
Образ естественных сигналов (потенциалов)

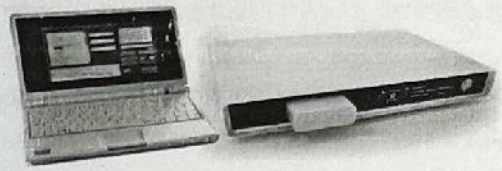


Образы искусственных ЭМ сигналов



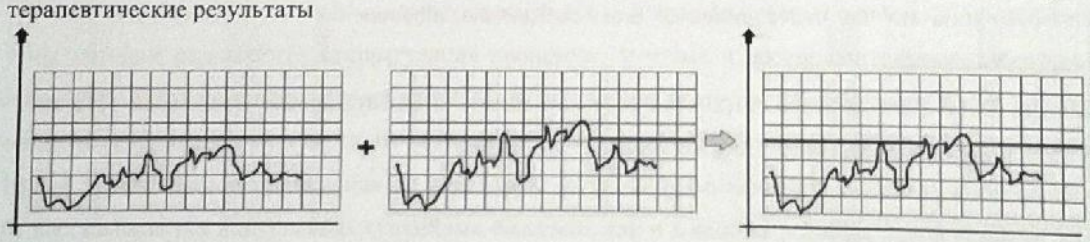
Относительно низкая результативность искусственных импульсов





BIOLABOR *Emost Redox 1.1*

Восприятие, расширение, возвращение вариаций естественных сигналов имеют лучшие терапевтические результаты



Лечение с собственным электромагнитным сигналом (Electromagnetic-Own-Signal-Treatment т.е. метод «EMOST») означает ощущение и систематическое, расширенное возвращение экстремально низкоинтенсивных биоэлектрических и биоэлектромагнитных излучений (биопотенциалов) человеческого организма. Этот метод путём возвращения организму через поверхность кожи системы биологических сигналов годен к изменению силы биоэлектрических сигналов организма и к оказанию воздействия на биологические процессы биохимическим путём, к точному регулированию органов. Метод «EMOST» через ослабленные и нежно усиленные сигналы (потенциалы) способен достичь точного регулирования акционных потенциалов, изменить их подпороговые и надпороговые свойства, которые влияют на функционирование наших органов, усвоение питательных веществ, выделение гормонов, и иммунную систему.

Testing the EMOST, result: the patient is sleeping (!) in noisy classroom (!), no pains (!), only well-experience.

EMOST™ biophysical treatments to reduce the risk of aggressive behaviour in prisons

Biophysical electromagnetic managements

by István Bókkon
2013

EMOST Redox 1.1 Medical Device (Certificate: HU11/6192) controlled by a personal computer.

1. Background

1.1. Prisoners

Testosterone, norepinephrine, serotonin, glucose metabolism, and the aggression

Many studies on testosterone activity show a relation between high plasma levels and a tendency towards aggression. It was suggested that the interaction between low serotonin and high testosterone concentrations in the central nervous system has an important effect on the neural mechanisms involved in the expression of aggressive behavior. It seems that testosterone modulates serotonergic receptor activity that directly affects aggression, fear and anxiety. In addition, violent criminals have abnormalities in their glucose metabolism as indicated by decreased glucose uptake in their prefrontal cortex and a low blood glucose nadir in the glucose tolerance test. Low non-oxidative metabolism can be a crucial component in the pathophysiology of habitually violent behavior among subjects with antisocial personality disorder. The level of norepinephrine is also higher in aggressive prisoners than in moderately aggressive jailed inmates, which suggests a pronounced role of norepinephrine in the formation the aggressive behavior.

Sleep problems and aggression

Clinical studies revealed that sleep problems can be a contributory factor in the development of reactive aggression and violence. It seems that the relation between sleep problems and aggression can be mediated by the negative effect of sleep loss on prefrontal cortical working, namely the loss of control over emotions, including loss of the regulation of aggressive impulses to context- appropriate behavior. In addition, other potential contributing mechanisms connecting sleep problems to aggression and violence are most likely found within the central serotonergic and the hypothalamic-pituitary-adrenal-axis. Individual variation within these neurobiological systems may be responsible for amplified aggressive responses induced by sleep loss in certain individuals. Recent studies revealed that prisoners have higher levels of anxiety, sleep problems and depression than the general population.

Prefrontal malfunctions and aggression

Numerous researchers suggested that the relationship between prefrontal malfunctions and the likelihood of acting aggressively is mediated by the failure to adaptively use that we called the ‘‘executive cognitive functions’’. Executive functioning allows people to respond to situations in a flexible manner, to make and adapt plans, and to base their behavior on internally held ideas rather than being governed solely by external stimuli. There are neuroimaging data that the prefrontal cortex plays an important function in the successful identification of facial expressions of emotion. The medial prefrontal cortex is most consistently activated by emotional stimuli, suggesting it has an essential role in emotional processing. Recent *Transcranial magnetic stimulation* (TMS) experiments also support the hypothesis of inhibition deficits and frontal cortex dysfunction in violent offenders when compared with non-violent control subjects. These prefrontal structural and biochemical malfunctions can cause the low arousal, poor fear conditioning, lack of conscience, and decision-making deficits that predispose to antisocial and psychopathic behavior. It is very possible that many aggressive behaviors come about mainly automatically, emotionally, and through conditioned association with other stimuli.

1.2. Prison officers and the burnout

Prison officers are exposed to special and very powerful stressors. The effects of this dangerous work on mental health are complex. WHO (2005) is predicting that by 2020, stress can be a major cause of workplace ill health. It is well known that prolonged or intense stress can have a negative impact on an individual’s mental and physical health. Workers who are stressed are also more likely to be unhealthy, poorly motivated, less productive and less safe at work (WHO, 2003).

Prison officers are among the most stressful of all occupations. The risk of suicide among prison guards is 39% higher than the rest of the working age population. Prison

officers - compared to the general population - have been found to have significantly lower life spans and higher rates of alcoholism, suicide, heart attacks, ulcers, and hypertension. Nowadays, officers have a high level of responsibility for the care, safety, security and rehabilitation of prisoners. In addition, there are large individual differences in the response to stress i.e. two prison officers can react in completely different ways to the same stressor.

Prison officers experience a number of negative feelings and attitudes leading to depleted emotional states (emotional exhaustion) such as burnout. The burnout is a tendency toward depersonalization, which occurs as employees become frustrated with their job and less concerned for their clients and results in increasingly negative work related attitudes. Maslach's model of burnout characterizes emotional exhaustion as depletion of emotional energy and a feeling that one's emotional resources are inadequate to deal with the situation.

2. EMOST (Electro-Magnetic-Own-Signal-Treatment) treatments

EMOST method and natural-based low-frequency and intensity electromagnetic signals

There has been increasing evidence about the health-promoting outcomes of low-frequency and intensity electromagnetic fields (LFI-EMFs) that are able to initiate different healing processes. EMOST medical device can detect non-linear, low-frequency and intensity bioelectric and bioelectromagnetic signals (as ECG or EEG signals) from subjects' skin by unique flat input/output electrodes. The collected signals are processed by computer of EMOST apparatus. The subjects are treated by processed signals originated from apparatus (signal density between 1 Hz - 1 MHz; intensity range is in natural pA mV). A particular feature of EMOST method - compared to most of electromagnetic equipments - is that the subjects' own bioelectro- bioelectromagnetic signals that are detected from skin can be processed in natural analogue mode (non-digitalized). The special analogous process makes it possible that the biophysical information content of detected and back-transmitted electro-electromagnetic signal is much larger than in digitized methods (Figure 1). Next, analogue signals are radiated back, using a flat electrode radiator through various signal density/signal combinations, with some signal amplification (-20dB- +60dB), to the skin's surface on the opposite side and extended by the higher range sounds of the signal (Figure 2).

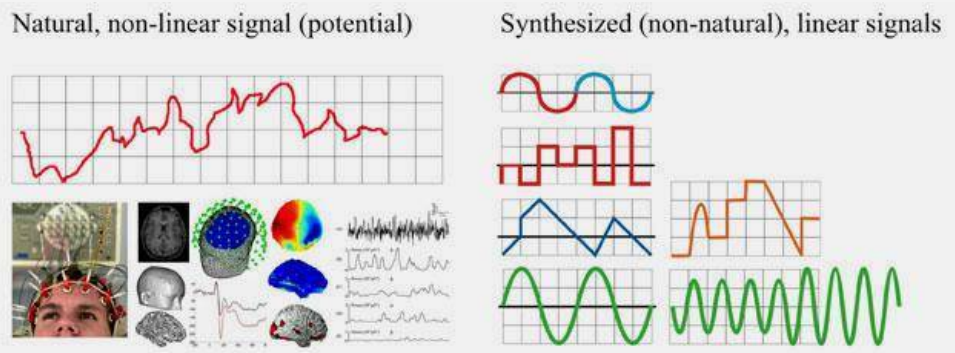


Figure 1. Differences of natural and synthesized (digilatized) signals, or impulses

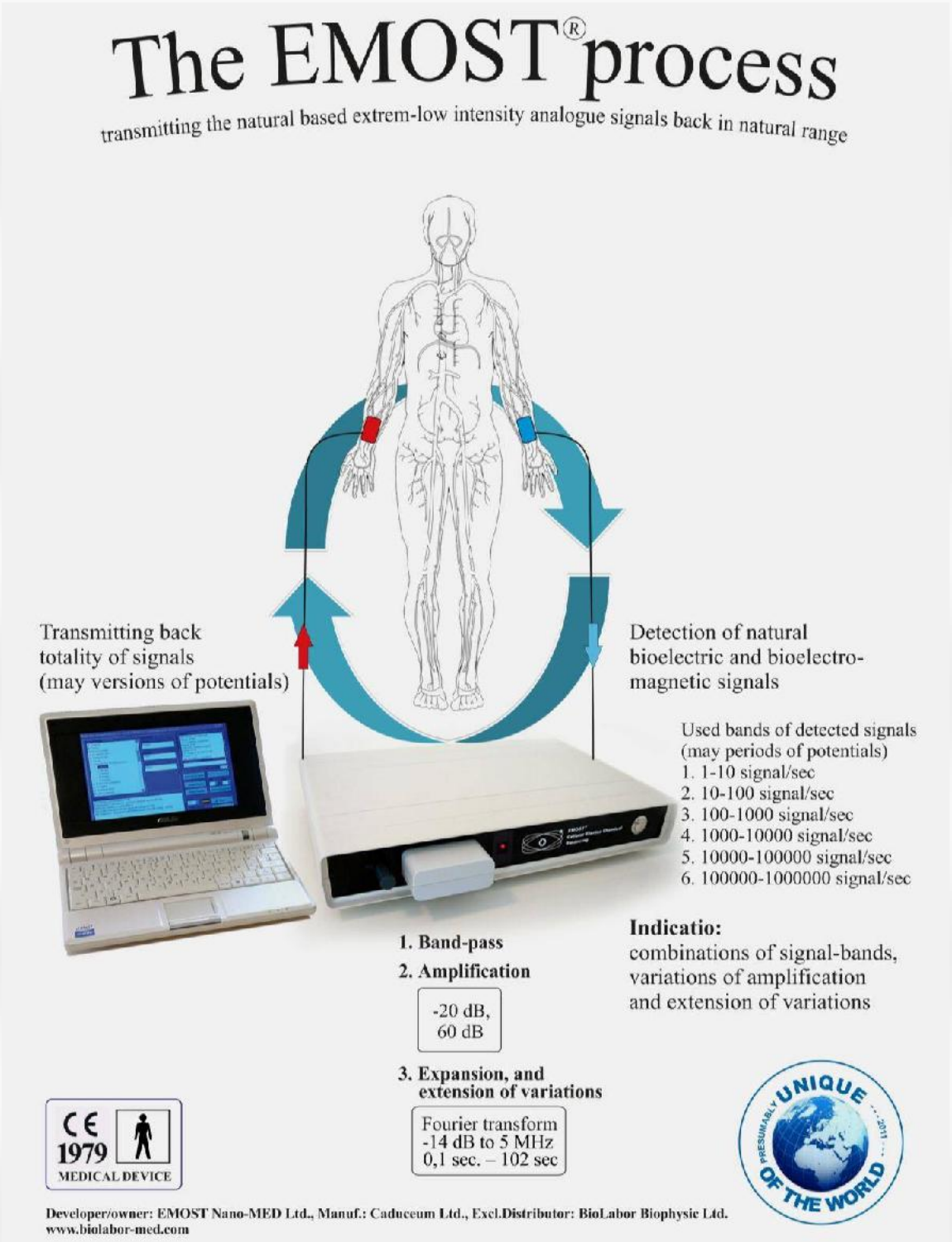


Figure 2. The EMOST process

EMOST method exerts its effect through the skin associated autonomous nervous system

The innervated skin is an incredible complex system and the largest organ of the body with numerous very important functions that is linked to the peripheral sensory nervous system (PNS), the autonomous nervous system (ANS), and the central nervous system (CNS). There is growing evidence that the cutaneous peripheral nervous system has essential roles in skin homeostasis as well as in diseases. Cutaneous nerves can react to stimuli from the circulation and to emotions. There is evidence that autonomic nervous system serves as a major component in the emotion response. Moreover, the central nervous system is directly (through efferent nerves or CNS-derived mediators) or indirectly (through the adrenal glands or immune cells) linked to skin functions (Figure 3). It suggests that skin, as our largest organ, can represent stress related conscious and unconscious emotions directly by efferent nerves and mediators from CNS or indirectly by the adrenal glands or immune cells. The represented stress related conscious and unconscious emotions can affect on biochemical, bioelectrical and bioelectromagnetic patterns. It is very probable that EMOST method exerts its major effect through the skin associated autonomous nervous system (ANS), which offers a unique therapy for the treatment of a numbers of different disorders. EMOST exposition can modulate biochemical, bioelectrical, and bioelectromagnetic processes in the skin, and the modulated skin signals can affect the neuroendocrine system and modulate brain activity through ANS.

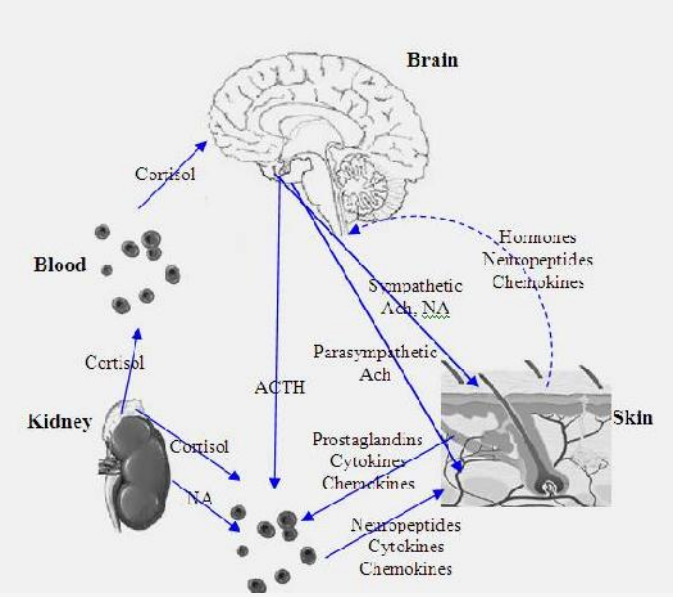


Figure 3. Shematic illustration about complex communication between skin cells and the nervous system.
Ach =acetylcholine, NA=noradrenaline, ACTH= Adrenocorticotropic hormone.

Why should be applied the EMOST method for prison officers and prisoners in prisons?

Our many years experience indicated (that we have published in academic journals) the efficiency of EMOST treatments for improve mental and physical states, i.e. stress reduction, sleep problems, improved mood, increased concentration ability, among them. The EMOST method has also been applied successfully to reduce stress under catastrophic conditions for many subjects (Figure 4). We also reported some preliminary experiments regarding the effectiveness of single EMOST treatment on some stress related serum parameters such as uric acid, albumin, cortisol, C-reactive protein etc. As we could see above, sleep and stress (aggression) are central problems under prison conditions. The systematic and routine application of EMOST treatment is not only able to reduce aggression, but also able to maintain overall health in prisons. Finally, the application of EMOST in prisons can produce significant cost saving and improve general health conditions.

Figure 4. In June, 2010 the biggest flood hit Felsőzsolca, in Hungary. Our photos have been taken in Felsőzsolca. (A) EMOST treatments of exhausted and stressed local residents, soldiers, firefighters. (B) Our car and local residents in a flooded street in Felsőzsolca, on June. 2010. (C) Residents used a boat to cross a flooded street in Felsőzsolca.

References

- Bókkon I, Erdöfi-Szabó A, Till A, Lukács T, Erdöfi-Szabó É. (2013) EMOST: Elimination of chronic constipation and persistent diarrhoea by low-frequency and intensity electromagnetic treatment in children: case reports**.** Electromagnetic Biology and Medicine In press
- Bókkon I, Erdöfi-Szabó A, Till A, Balázs R, Sárosi Z, Szabó ZL, Kolonics G, Popper G, (2012) EMOST: Report about the application of low-frequency and intensity electromagnetic fields in disaster situation and commando training. Electromagnetic Biology and Medicine 31, 394-403.
- Bókkon I, Till A, Erdıfi-Szabo A. (2011) Non-ionizing electro-magnetic-own-signal-treatment. European Biophysical Journal. 40 (Suppl. 1):S191.
- Bókkon I, Till A, Grass F, Erdöfi-Szabó A (2011) Phantom pain reduction by electromagnetic treatment. Electromagnetic Biology and Medicine 30, 115-127.
- Bókkon I, Till A, Erdöfi-Szabó A (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. Available from Nature Precedings <http://dx.doi.org/10.1038/npre.2010.4989.1> (2010)
- Bókkon I, Till A, Erdöfi-Szabó A (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. Hungarian Epidemiology 7/4/Suppl. p:15.
- Roosterman D, Goerge T, Schneider S W, et al. (2006) Neuronal control of skin function: the skin as a neuroimmunoendocrine organ. Physiol. Rev. 86:1309-1379.
- Nordlind K, Azmitia E C, Slominski A. (2008) The skin as a mirror of the soul: exploring the possible roles of serotonin. Exp. Dermatol. 17:301–311.
- Raine A, Lencz T, Bihrle S, LaCasse L, Colletti P. (2000) Reduced prefrontal gray matter volume and reduced autonomic activity in antisocial personality disorder. Arch Gen Psychiatry. 57:119-127.

- Virkkunen M, Rissanen A, Franssila-Kallunki A, Tiihonen J. (2009) Low non-oxidative glucose metabolism and violent offending: an 8-year prospective follow-up study. Psychiatry Res. 168:26–31.
- Chichinadze KN, Domianidze TR, Matitaishvili TTs, Chichinadze NK, Lazarashvili AG. (2010) Possible relation of plasma testosterone level to aggressive behavior of male prisoners. Bull Exp Biol Med. 149:7–9.
- Birger M, Swartz M, Cohen D, Alesh Y, Grishpan C, Kotelr M. (2003) Aggression: the testosterone-serotonin link. Isr Med Assoc J. 5:653–658.
- Gerra G, Avanzini P, Zaimovic A, Fertonani G, Caccavari R, Delsignore R, Gardini F, Talarico E, Lecchini R, Maestri D, Brambilla F. (1996) Neurotransmitter and endocrine modulation of aggressive behavior and its components in normal humans. Behav Brain Res. 81:19–24.
- Kamphuis J, Meerlo P, Koolhaas JM, Lancel M. (2012) Poor sleep as a potential causal factor in aggression and violence. Sleep Med. 13:327–334.
- Watson R, Stimpson A, Hostick T. (2004) Prison Health Care: a review of the literature. Int J Nurs Stud. 41:119–128.
- Condon L, Hek G, Harris F. (2007) A review of prison health and its implications for primary care nursing in England and Wales: the research evidence. J Clin Nurs. 16:1201–1209.
- Boudoukha AH, Hautekeete M, Abdellaoui S, Groux W, Garay D. (2011) Burnout and victimisation: impact of inmates' aggression towards prison guards. Encephale. 37:284–292.
- Hoaken PN, Allaby DB, Earle J. (2007) Executive cognitive functioning and the recognition of facial expressions of emotion in incarcerated violent offenders, non-violent offenders, and controls. Aggress Behav. 33:412–421.
- Bufkin JL, Luttrell VR. (2005) Neuroimaging studies of aggressive and violent behavior: current findings and implications for criminology and criminal justice. Trauma Violence Abuse. 6:176–191.
- Dodge KA. (2008) On the meaning of meaning when being mean: commentary on Berkowitz's "on the consideration of automatic as well as controlled psychological processes in aggression".Aggress Behav. 34:133–135.
- Philipp-Wiegmann F, Rösler M, Römer KD, Schneider M, Baumgart S, Retz W (2011) Reduced cortical inhibition in violent offenders: a study with transcranial magnetic stimulation. Neuropsychobiology 64:86–92.
- King Susan T. (2006) The Changing of the Guard: conceptualisations of prison officers' work in three South Australian prisons. Ph.D. thesis. http://theses.flinders.edu.au/uploads/approved/adt-SFU20070313.175216/public/02whole.pdf

(translation of reference letter)

HONVÉD
Önkéntes Kölcsönös Kiegészítő
Egészségbiztosító Pénztár
1135 Budapest, Aba u. 4.

ARMY Independent Voluntary Health Insurance Fund

1392 Budapest, Pf.:295 web:www.honvedep.hu E-Mail: honvedep@honvedep.hu
Tel:(+36 1) 412-3320,412-3321; HM 277-95 Fax:239-6749 HM fax: 278-94
1135 Budapest Aba utca 4.

Additional ARMY Independent Voluntary Health Insurance Fund was launched in March 1996 as a sector insurance and it has been opened as publicly found since 2005.
The number of institutional employers are over 100, who are paying their employer contribution. The fund's largest employer is the Ministry of Defence. The membership of health fund exceeds 30,000 people.

We have had a health service contract between our Health Service and Your Company for around three years, to provide the preventive care, screening, and health needs of our members.
During the last period of the staff took health services, which included medical tests after developing Personal Health Plans and treatments.

The treatments aimed at health prevention and rehabilitation, mainly:

- to improve physical well-being
- improving vital capacity
- treating post-traumatic stress
- other e.g. wound healing, digestion, allergies, pain relief

Recently many of our members took advantage of the advanced services.of your Health Service. Our members consider the service appropriate, effective and they are still being used.

Your professional commitment is demonstrated by being on demand at our events free of charge and by giving free presentation of your services. Hereby I would like to thank you for your work at our recent common successful introduction in Veszprém village (at Military Day).

I wish you good luck to your work, and I hope for further successful cooperation,
18.06.2012. Budapest, Hungary, EU

Dr. Miklós Rékai
managing director,
ARMY Independent Voluntary Health Insurance Fund

nyében Üdvözlettel:
Dr. Rékai Miklós
ügyvezető igazgató

HONVÉD
Önkéntes Kölcsönös Kiegészítő
Egészségbiztosító Pénztár
1135 Budapest, Aba u. 4.

Dr. Erdőfi-Szabó Attila Ph.D.,
BioLabor Biofizikai- és Laboratóriumi Szolgáltató Kft.

Tisztelt Dr. Erdőfi-Szabó Úr!

A Honvéd Önkéntes Kölcsönös Kiegészítő Egészségbiztosító Pénztár (továbbiakban: Pénztár) 1996. márciusában alakult ágazati pénztárként, 2005. áprilisától országos nyílt pénztárként működik. A munkáltatói hozzájárulást fizető munkáltatók száma meghaladja a 100-at. A pénztár legnagyobb munkáltatói tagja a Honvédelmi Minisztérium. A pénztár taglétszáma meghaladta a 30000 főt.

A Pénztárunk és Önök között közel három éve áll fenn szolgáltatói szerződés, tagságunk megelőző ellátási, szűrési, egészségvédelmi igényének biztosítása érdekében. Az elmúlt időszak alatt az állomány magán egészségügyi szolgáltatásokat vett igénybe, melyek között orvosi vizsgálatokat követő személyes egészségtervek kialakítása és kezelések szerepeltek.

A kezelések egészségőrző és rehabilitációs célúak, melyek jellemzően:

- fizikai közérzet javítás
- vitálkapacitás növelés
- post-traumás stressz kezelés
- egyéb, pl. sebgyógyulás, emésztés, allergia, fájdalomcsökkentés.

Az elmúlt időszakban számos Pénztártagunk vette igénybe az Önök korszerű szolgáltatásait.
Tagjaink a szolgáltatást megfelelőnek, eredményesnek találták, és jelenleg is folyamatosan igénybe veszik.

Szakmai elkötelezettségüket bizonyítja, hogy Pénztárunk rendezvényein, felkérésünkre Önön ellenszolgáltatás nélkül rendelkezésre állnak és térítésmentes bemutatót tartanak szolgáltatásaikról.

Ezúton mondok köszönetet legutóbbi sikeres Veszprémi közös bemutatkozásunkon végzett munkájukért.

Budapest, 2012. június 18 .-n

További sikeres együttműködést reményében. Üdvözlettel:

HONVÉD EGÉSZSÉGPÉNZTÁR * BUDAPEST 1. *

Dr. Rékai Miklós
ügyvezető igazgató

ORFK
Rendészeti Szervek Kiképző Központ
Lőkiképzés- és Intézkedéstaktikai Alosztály
Levélcím: 1097 Budapest, Vágóhíd u. 11-13.; 1903 Budapest, Pf. 314
BM ☎:28-012 Városi ☎:476-3445 BM fax:28-062 Városi fax:476-3446

Egyetértek:
Simon Géza
igazgató

translation of reference letter

Hungarian National Police and Provost Duties, Armed Marshalls Training Center (ORFK-KK) Marksman- and Tactical Units Training Department

approved by Simon Géza

director

Referring to your report of 15 November 2011 concerning the efficiency of EMOST treatments on the staff taking part in the training program for special units during the period of 4-7 October 2011, I congratulate you on the achieved results.

While consulted the staff about the treatment I got positive feedback on the treatment only. You managed to achieve development and measurable decrease of stress load in training circumstances.

Special congratulations on the proven results which exceeded your estimated rate.

I am delighted that the technology has been tested first in the world in the (Hungarian) National Police and Provost Duties, Armed Marshalls Training Center Marksman- and Tactical Units Training Department in lifelike mission environment, in real situations.

I wish you good luck to your work and to effective adaptation of your method.

28.11.2011, Budapest,

Zoltan Laszlo SZABÓ, Ret. Police Lieutenant-Colonel,
Marksman- and Tactical Units Training Department Chief

ORFK
Rendészeti Szervek Kiképző Központ
Lőkiképzés- és Intézkedéstaktikai Alosztály
Levélcím: 1097 Budapest, Vágóhíd u. 11-13.; 1903 Budapest, Pf. 314
BM ☎:28-012 Városi ☎:476-3445 BM fax:28-062 Városi fax:476-3446

Egyetértek:

Simon Géza
igazgató

Dr. Erdőfi-Szabó Attila Ph.D.,
BioLabor Biofizikai- és Laboratóriumi Szolgáltató Kft.

Tisztelt Dr. Erdőfi-Szabó Attila Úr!

Hivatkozva 2011.11.15-i Beszámolójára, melynek tárgya a 2011.10.04-07. időszakban kiképzési programon résztvevő speciális rendőri feladatokat ellátó állományon végrehajtott EMOST típusú kezelések eredményessége, gratulálok, hogy a megküldött eredményeket elérte.

Az állomány körében folytatott konzultáció során a kezeléssel kapcsolatban csak pozitív visszajelzést kaptam. Sikerült teljesítmény növekedést és mérhető stressz terhelés csökkenést elérniük kiképzési helyzetben.

Külön gratulálok ahhoz, hogy a tapasztalt eredmények felülmúlták az Önök által előre megbecsült mértéket, és örömmel tölt el, hogy az ORFK RSZKK intézményben lett a világon először tesztelve életszerű bevetési környezetben a technológia.

Munkájukhoz, és a módszer további eredményes alkalmazásához sok sikert kívánok,

Budapest. 2011.11.28.

ORFK RENDÉSZETI SZERVEK KIKÉPZŐ KÖZPONTJA BUDAPEST

Szabó Zoltán László r. alezredes
alosztályvezető

NATO CENTRE OF EXCELLENCE FOR MILITARY MEDICINE
H–1885 Budapest, P.o.B. 25
Phone: +36 (1) 883-0100 • Fax: +36 (1) 883-0120

TO: Dr. Erdőfi-Szabó Attila Ph.D.,
BioLabor Biofizikai- és Laboratóriumi Szolgáltató Kft
H-1122 Budapest Városmajor u. 20. I/20

SUBJECT: **LETTER OF APPRECIATION**

DATE: 18 JUNE 2012

Dear Professor, dear Attila,

Congratulation to your scientific results, which were recently published in Electromagnetic Biology and Medicine (2012.VI, DOI: 10.3109/ 15368378.2012.681823). I see it as a great prospective in future not-yet-conventional training and rehabilitation processes.

With the hope of further successful cooperation I wish you all the best!

Lieutenant Colonel Robert BALAZS MD
Lessons Learned Branch
Acting Chief

Dr Beatrix SKURDENKA

Specialist physician, factory doctor, ambulance doctor, general practitioner, gastroenterologist and practice in the field of cardiology
BUDAPEST – HUNGARY – EUROPEAN UNION

Subject: Medical opinion

I have been working within the frame of service of BioLabor since 2009, mainly in the field of medical visits and factory medical audit. During inspections I often experience accumulated complaints of patients, in such cases I suggest comprehensive change of life-style and also solutions helping self-regeneration in view of the results of treatment.

As I have the chance to examine the changes of condition, the visible efficiency of treatments and statement of subjects aroused my interest, and I got to know the biological-biophysical impact mechanism of the treatment, the EMOST treatment method of Biolabor from Attila Dr. Erdőfi-Szabó managing director, developer, and I have carried out treatments since January 2010.

Summary of my experience

1. Psychological overload, stress, lethargy (37 subjects)

   During inspections I experienced significant distress status, significant underregulation of dopamine, increased level of cortisol, typically high value of blood pressure and insufficient activity of the heart, typically respiratory disorders, hypoventillation, and also hypercapnia. On the first occasion of the series of treatments so-called Happy-Cocktail (#1) directed at the central nervous system. I gave a 45-minute treatment, after a short time at rest subjects typically reach the deep sleep phase, their breathing gets balanced, they are calm during the treatment. Their behaviour after treatment is typical of awakening, the second treatment occurs after a week.

   During the second treatment there are two types of experience with subjects. Less change can be experienced in case of those whose body is presumably dehydrated due to low water intake. Those subject whose water intake is proportional to the body weight, typically mention increased tranquillity, meanwhile higher vitality and increased vital performance. The second treatment, Happy Cocktail (#2) is mainly directed at the neurotransmitters and the limbic system, length of treatment 45 ins in both cases. During the treatment subjects are at rest, they require less conversation, I draw their attention to the importance of water intake.

   Experience at arrival to the third treatment is typically decrease of mood swings and increasing comfort, so the third, fourth and fifth treatment is carried out in the previously standardized way, in weekly rhythm, and then I check the changes of status. After the series of treatments subjects are usually in a more favourable steady state compared to that before the treatment, their stress level has

considerably improved, the level of dopamine and cortisol is typically better, symptoms of dispnea has considerably decreased, their mood and vitality has gotten better which they usually attribute to the treatments. In my opinion this method of treatment proves to be really effective in the treatment of stress which has remarkable guarding and preventive effect in point of stress risks and their adverse effects.

2. Accumulated complaints (56 subjects)

I experience in a lot of cases that the regulation of the body is unstable, under- and overfunctioning, compensation often occur just like hormonal and circulational processes. In case of experiencing morbidity and distress appearing among risk factors I carry out a comprehensive treatment named Maxi-Vital that improves well-being.

Behaviour of subjects during treatment is typically the same as introduced above so I would rather not repeat myself.

This series of treatments is central nervous system/anti-stress indicated for the first two times, then directed at metabolism, circulation, immunity; on the whole it is comprehensive, health improving purpose, requiring altogether five treatments. According to my experience improvement of homeostasis can be well demonstrated in the changes of status, significantly occurring improving measured values (circular efficiency, improvement of heart function, decrease of metabolic disorders) and improving well-being of subjects. In my opinion this series of treatments can greatly improve the chance of healing, regenerational ability, decreasing risks and adverse effects so in case of accumulated complaints this method can greatly improve the results of other therapies.

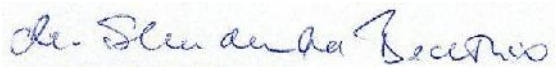
3. Own experience

Occasionally I also avail myself of the treatments, its stable stress reducing effect is really favourable for me, I also experience improvement of concentration and my vital capacity has considerably increased. It seems that the achieved results are overally capable of improving the subsystems and the overall body, so I started a series of treatments based on each other.

Summary

Based on the significant favourable changes of status I suggest this method for reducing stress risks and improving the chance of healing morbidity, presumably improving therapeutical efficiency, preserving and improving health, targeted treatments after researches controlled among clinical circumstances.

Date: Budapest, 14.03.2011



Dr Bea SKURDENKA, (speaks in english)
Tel.: +36 20 594 5050

Dr. Skurdenka Beatrix

Belgyógyász szakorvos, üzemorvos, mentőorvos, háziorvos, gasztroenterológus, és kardiológiai szakirányú gyakorlat
BUDAPEST

Tárgy: Orvosi vélemény

2009-óta dolgozom a BioLabor cég szolgáltatói körében, főként orvosi vizitek és üzemorvosi vizsgálatok terén. Az állapotfelmérések során nagy gyakorisággal tapasztalom a paciensek halmozott panaszait, ilyenkor javaslok átfogó életmód váltást és a kezelési eredmények ismeretében ön-regenerációt segítő megoldásokat is.

Mivel módom van az állapot változásokat is vizsgálni, a kezelések látható hatékonyságai és az alanyok nyilatkozatai felkeltették az érdeklődésemet, és Erdőfi-Szabó Attila ügyvezetőtől, fejlesztőtől megismertem a kezelés biológiai-biofiziológiai hatásmechanizmusát, a BioLabor EMOST kezelési módszerét, majd 2010 januártól magam is kezeléseket folytatok.

Tapasztalataim összegzése

1. Pszichés túlterheltség, stressz, lehtargia (37 alany)

   Az alanyoknál az állapotfelmérésekkor jelentős di-stressz állapotokat tapasztaltam, jelentős dopamin alulszabályozottságot, kortizol szint emelkedést, jellemzően magas vérnyomás értékeket és szívműködési elégtelenségeket, jellemzően légzési zavarokat, hipoventillációt, hipercapniát is. A kezelés sorozat első alkalmával központi idegrendszerre irányuló ún. Happy-Coctail (1.) 45 perces kezelést adtam, az alanyok rövid idő után, nyugalmi állapotban jellemzően mélytónusú alvásállapotba kerülnek, légzésük kiegyensúlyozottá válik, a kezelési idő alatt nyugodtak. A kezelés befejeztével az ébredésre jellemzőek a viselkedésformák, a második kezelés egy hét múlva történik.

   A második kezelési alkalommal az alanyoknál kétfajta tapasztalat van. Azoknál, akiknél a jellemző alacsony vízbevitel miatt a szervezet vélhetően dehidrált, ott kevésbé tapasztalható változás. Azoknál az alanyoknál, akiknél a vízbevitel a testtömeggel arányos, ők jellemzően fokozott nyugodtságot, mindközben nagyobb vitalitást és fokozott vitális teljesítményt említenek. A második kezelés a Happy-Coctail (2.) főként a neuro-transzmitterekre és a limbikus (hippocampus) rendszerre irányul, kezelési idő mk. 45 perc, a kezelés alatt az alanyok nyugodt állapotúak, beszélgetést kevésbé igényelnek, a vízfogyasztás fontosságára a figyelmüket felhívom.

   A harmadik kezelésre érkezők tapasztalata jellemzően a hangulat ingadozás csökkenése és a javuló közérzet, így a harmadik és negyedik, ötödik kezelés az előre standardizált módon folyik, heti ritmusban, azt követően ellenőrzöm az állapotváltozásokat. A kezelés sorozat befejeztével az alanyok jellemzően kedvezőbb egyensúlyi állapotban vannak a kezelést megelőzőhöz képest, stressz

szintjük jelentősen javult, dopamin és kortizol szint jellemzően javult, légszomj tünetek jelentősen csökkentek, kedélyállapotuk és vitalitásuk javult, melyet jellemzően a kezeléseknek tudnak be. Véleményem szerint, e kezelési mód igen hatásosnak bizonyul stressz kezelésében, mely jelentős óvó és preventív hatású a stressz kockázatok és szövődményeik tekintetében.

2. Halmozott panaszok (56 alany)

Sok esetben tapasztalom, hogy a szervezet szabályozottsága labilis, alul- és túlműködések, kompenzációk gyakoriak, hasonlóan mint a hormonális és keringési folyamatok. Amennyiben kóros állapotok is tapasztalhatók és mindezek mellett a di-stressz is megjelenik a kockázatok között, úgy átfogó, Maxi-Vitál c. közérzet javító kezelést folytatok le.

A kezelések során az alanyok viselkedései jellemzően azonosak az előzőben bemutatottal, így az ismétlésétől eltekintek.

Ez a kezelés sorozat első két alkalommal központi idegrendszer/anti-stressz indikációjú, majd anyagcsere, oxigén felvétel, keringés, immunitás irányú, összességében átfogó egészség fejlesztő célú, összesen öt kezelést igénylő. Tapasztalataim szerint jól demonstrálható az állapotváltozásban a homeosztázis javulása, szignifikánsan jelentkeznek a javuló mért értékek (keringési hatékonyság, szívműködési folyamatok javulása, anyagcsere zavar enyhülése) és az alanyok kedvező közérzeti állapot javulásai is. Véleményem szerint ez a kezelés-sorozat jelentősen javíthat a gyógyulási esélyeken, a regenerációs képességen, kockázatok és szövődmények csökkentésében, így halmozott panaszok esetében ez a módszer más terápiák eredményeit nagyban javíthatja.

3. Saját tapasztalat

Alkalom adtán kezeléseket magam is igénybe veszek, számomra igen kedvező a stabil stressz csökkentő hatása, koncentráció javulást is tapasztalok és a vitálkapacitásom is jelentősen megnőtt, az elért hatások úgy tűnik egészében képesek a szervezet alrendszereit és összességét javítani, ezért szisztematikusan egymásra épülő kezelés sorozatba kezdtem.

Összefoglalás

A számomra szignifikáns kedvező állapotváltozások alapján, ezt a módszert javaslom stressz kockázatok csökkentésére és kóros állapotok gyógyulási esélyének javítására, terápiák hatékonyságának vélhető javítására, egészségőrzésre és egészség fejlesztésre, klinikai körülmények között ellenőrzött kutatások után célirányos kezelésekre.

Kelt, Budapest, 2011.03.14.

Dr. Skurdenka Beatrix
Tel.: +36 20 594 5050

IBS - Irritable Bowel Syndrome

Dr Magdolna TŐKEY

Recovery from irritable bowel syndrome after seven years. Anamnesis: Man of 28 years, with IBS diagnosed seven years ago, psychological disturbances, progressive complaints of psychosomatic origin. Subject has been suffering from discomfort due to his illness, he can bear his transportation while travelling to the family owned venture only with parental help, by car. Due to his incontinence he has solved other journeys by parental toilet exploration and "toilet map" for years. This psychological load intensifies his complaints, complaints intensify his psychological load as a cycle, he has difficulties in building relationships due to his illness, furthermore he is not able to keep his partners. Parent comes across the method of Biolabor in the family-owned venture, in a photocopy shop. Afterwards they come for consultation and to take part in a free of charge trial. Indication: the first area is psychological unloading, the second target area is release of erosion in the bowel wall, regeneration of intestinal mucous membrane and regulation of its pH value, then the third target area is the improvement of the digestional process, hereby improvement, reactivation of the alimentary tract and absorption of alimentary substances.

Treatments take place in turns, on a weekly basis. During the first treatment he falls asleep, his parents receive it with curiosity. During the second treatment subject and parents tell that he feels and sleeps more comfortable. Right after the second treatment no stimulus of defecation occur any more. Before the third treatment the experience of the last two weeks indicate favourable changes, the frequency of defecation, faecal retention disorders falls nearly by half. After the third treatment he goes home alone by public transport. Before the fourth treatment an account is given about the experience of the last three weeks according to which his well-being has greatly improved, his inhibitions has decreased, respectively they do not occur, his taste and salivary excretion has become more intensive, his elimination is free of complaints. He arrives alone at the fifth treatment, talking about remarkable improvement, he is calmer and feels better, his faecal retention has become more controlled, controllable. Before the sixth treatment he talks about his experience in the last five weeks according to which his fears and worries have improved a lot due to the improvement of elimination, faecal retention; he reckons only one or two further treatments as reasonable "just to be on the safe side". Today, on 15th September 2010, on the day of the seventh treatment subject is completely calm, being in a psychologically unloaded state during the treatment, giving a healthy impression. Based on his account he "feels completely well", his previous experience of discomfort appear rather as memorials, however he can naturally get by them. The subject and his parents express that his load seems to end after several years of discomfort, secludedness, bad quality of life, and the method of BioLabor meant a solution for the subject (Zoltán) in his recovery from irritable bowel syndrome.

Dr Magdolna TŐKEY, physician, retired GP

MEDICAL OPINION

I got acquainted with the proprietary development method of BioLabor in 2007, and I have been a devotee of it since then. Based on my experience of several hundreds of patients I can say this self-regeneration stimulating method (EMOST) can be really useful for both the science of medicine and patients. I am convinced that human beings can heal themselves just as they can make themselves ill. This method works as a mirror. It seems it can confront the body with the ongoing biological processes, so it can facilitate re-checking of processes being behind the regeneration pace, self-regulation, self-recovery, homeostasis, and this is a great success.

Dr Tőkey Magdolna

Dr. Tőkey Magdolna

Dr Magdolna TŐKEY, physician, retired GP
+36 70 342 9968

Mrs Csűrös Dr Veronika Hajda
Parmaceutist, Naturopath-fitotherapist, Homeopathic consultant
Budapest - Hungary – European Union

Subject: Medical opinion

Dear enquirer,

I have used the equipment developed by BioLabor since 2007, the reason of my purchase was my receptiveness of modern equipments and supplementing allopathic therapies to increase their efficiency.

I can regard the efficiency of the method successful until today, mainly in case of chronic diseases where the conventional protocol could not reach sufficient recovery results. According to my experience the equipment provides outstanding results mainly in the improvement of the regulation system of the body, both in chronic and acute, stagnant stages.

Summary of my experience:

1. In case of sleeping disturbance, insomnia (267 subjects)
   4-5 treatments, carried out with a weekly frequency, are typically enough to reduce chronic problems remarkably, or to cease them. After the first, second treatment subjects experience improvement of their mood, a favourable change in their psychological state, improved metabolic process, and balanced circadian rhythm. After the completion of treatments their complaints are significantly reduced, typically ceased, their social and interpersonal relations get normal. According to my experience subjects preserve the state they reached also in the long run after the series of treatments, or rather their state often even improves after the series of treatments.
2. In case of allergy, irritation (158 subjects)
   Subjects typically suffer from several symptoms of irritation, allergy with more complaints at the same time. I start the treatments with stress relieving treatment which means 2-3 treatments, followed by natural and unknown antigen treatments every week, altogether 4-6 times. During the treatment moderate diet and increased water intake is suggested. (25 body kilogram/1 litre of water) According to my experience the stress relieving treatments already reduce complaints which refers to the psycho-neuro-immunological connections, psychosomatic effect. After finishing the series of treatments a significant part of subjects is free of complaints, the remaining small fraction needs nutritional immune intolerance test presuming enzyme disorders. I find the method outstanding in case of children with asthma bronchilae, atypic dermatitis. This is the point where I have to remark that I appreciate the Social Responsibility program of Biolabor, the caritative, free of charge treatment of children under ten years old is exemplary and unfortunately necessary.

3. I case of persistent mood disorder, lethargy (307 subjects)
   During my experience subjects get to the status of persistent mood disorder and lethargy in conjunction with metabolic and regulational disorders. Complaints are accompanied by sleeping disorders and also characterized by digestive, elimination disorders. I always start the treatments with stress relieving treatment, then I carry out both the sleeping disorder and digestive program once.

Based on the experience gained during these treatments I follow the treatments with mood disorder and Happy Cocktail program, typically 4-5 times on a weekly basis. Based on the last years the method is exceptionally indicated in such cases, subjects usually give an account of stable favourable changes, their drug addiction is considerably reduced, their social relations improve, their psychological status gets normal. It belongs to my opinion while the equipment helps to get over the "dead point" , it is also necessary to settle the root causes, but then this method gives an appropriate psychological method.

4. Incontinence, elimination disorders (156 subjects)

   The service of Biolabor's equipment provided in this field reaches success in such an area where there is no real alternative. Subjects usually arrive with several parallel symptoms, psychological/mood disorders, sleeping disorders, neurological overload and in many cases drug overload that have an effect on the sensitivity to stimuli, steroidal regulation, resistance. I always start the treatments with stress relieving treatment, then I carry out the series of incontinence treatment which means altogether 4 occasions on a weekly basis. In case the expected result is late during the treatment then I supplement it with stress relieving treatment and sleeping disorder program, so typically the expected favourable result can be achieved by 2-3 further treatments. In case of elimination disorders (chronic constipation) after 2-3 targeted treatments the equipment usually helps the regulation, correction of peristalsis, intestinal mucosa, hydration, reducing complaints by self-regulation.

5. Other experience:

- Conception program: In case of conception difficulties I suggest an allergy test for the mother in the first place. In case it exists then first I give a stress relieving (central nervous system, limbic balance, amygdala, hypophisis) treatment, followed by 4-5 targeted antiallergic program and I suggest the increase of fluid intake. After the treatments in the week of ovulation I start the Conception program which means 5 treatments, including estradiol, FSH, neurotransmitter balance, after which we usually reach the goal within two or three months in 70-80% of the cases.

- Children: According to my experience the treatments of children are really effective. 2-3 shorter targeted treatments are typically enough for a considerable improvement. The immune system strengthening programs are given with great efficiency to children getting into community, their healing time gets considerably shorter and they become comparatively more resistant. After 1-2 treatments hyperactive children generally calm down, become well-socialized, their emotions get more stable. In case of inhibited, fearsome children 3-4 mood improving treatments are enough for the change, and an accompanying results is that their vitality, appetite and activity improves, and their resistance also increases.

As a summary, I find the equipment and the method appropriate to reach the above mentioned goals, to help the self-healing mechanism of the body, to reduce chronic disorders.

Budapest, 6th May 2011

Mrs Csűrös Dr Veronika Hajda
Tel.: +36 30 999 99 47 *(speaks in english)*

Csűrösné Dr. Hajda Veronika
Gyógyszerész, Természetgyógyász-fitoterapeuta, Homeopátiás tanácsadó
Budapest

Tárgy: Orvosi vélemény

Tisztelt Érdeklődő!

2007-óta alkalmazok BioLabor által fejlesztett készüléket, vásárlásom oka a modern eszközök iránti fogékonyság és az allopátiás terápiák kiegészítése volt, a hatékonyság fokozása érdekében.

A mai napig sikernek könyvelhetem el a módszer hatékonyságát, főként a krónikus betegségek esetében, ahol a konvencionális protokoll nem érte el a megfelelő gyógyulási eredményeket. Tapasztalatom szerint a készülék főként a szervezet regulációs rendszerének javításában ér el kimagasló eredményeket, úgy az idült, mint a heveny, pangó állapotok esetében.

Tapasztalataim összegzése:

1. Alvás zavar, inszomnia esetében (267 alany)
   Jellemzően 4-5 kezelés elégséges a krónikus panaszok jelentős enyhítésére, megszüntetésére, melyet heti gyakorisággal hajtok végre. Az első, második kezelést követően az alanyok tapasztalják a közérzet javulását, a pszichés állapot kedvező változását, anyagcsere folyamataik is javulnak, cirkadián ritmusuk kiegyensúlyozódik. A kezelések befejeztével a panaszaik igen jelentős mértékben enyhülnek, jellemzően elmúlnak, szociális és interperszonális viszonyuk normalizálódik. Tapasztalatom szerint a kezelés sorozatot követően az alanyok hosszú távon is megőrzik az elért állapotukat, illetve a kezelés sorozat után még állapotjavulás is is gyakori.
2. Allergia, irritáció esetében (158 alany)
   Az alanyok jellemzően több panasszal egyidőben szenvednek az irritáció, allergia több tünetével. A kezeléseket stresszoldó kezeléssel kezdem, ez 2-3 kezelést jelent, majd természetes és ismeretlen antigénes kezelést hajtok végre, heti gyakorisággal, összesen 4-6 alkalommal. A kezelési idő alatt mérsékelt diéta, és fokozott vízfogyasztás javallott (mk. 25 testkg/1 liter víz). Tapasztalataim szerint a stresszoldó kezelések már enyhítik a panaszokat, ez utal a pszicho-neuro-immunológiai összefüggésekre, pszichoszomatikus ráhatásra. A kezelés-sorozat befejeztével az alanyok jelentős hányada mentes a panaszoktól, a fennmaradó kis hányaduk étel-alapanyag immun intolerancia vizsgálatra szorul enzimhiány vélelmével. Kimagaslónak találom a módszert a gyermekek esetében, asthma bronchiale, atipusos dermatitis panaszoknál, itt kell megjegyezzem, hogy a BioLabor Társadalmi Felelősségvállalási programját méltatom, a tíz év alatti gyermekek karitatív –díjmentes kezelése példaértékű és sajnos szükségszerű.

3. Tartós kedélyzavar, lethargia esetében (307 alany)
   Tapasztalataim során az alanyok anyagcsere és regulációs zavarokkal és pszichés terhekkel együtt jutnak el a tartós kedélyzavar és lethargia állapotába. A panaszok velejárója az alvás zavar és a jellemző emésztési, ürítési zavar is. A kezeléseket minden esetben stresszoldó kezeléssel kezdem, majd az alvás zavar és emésztési programot hajtom végre egy-egy alkalommal.

Az e kezelések alatt szerzett tapasztalatok alapján folytatom a kezeléseket kedélyzavar és Happy Coctail n. programmal, jellemzően 4-5 alkalommal, heti gyakorisággal. Az elmúlt évek alapján a számomra kiemelkedő ilyen indikációra a módszer, az alanyok jellemzően stabil kedvező eredményekről számolnak be, gyógyszerfüggésük jelentősen lecsökken, szociális kapcsolataik javulnak, pszichés állapotuk normalizálódik. E véleményemhez tartozik, hogy míg a készülék segít a „holtponton" átbillenni, a kiváltó okok rendezésére is szükség van, ehhez viszont megfelelő pszichés hátteret nyújt e módszer.

4. Vizelettartás, ürítési zavar (156 alany)
   A BioLabor készülék ezen a téren nyújtott szolgáltatása olyan területen ér el sikereket, amiben igazán nincs alternatíva. Az alanyok jellemzően több párhuzamos tünettel, pszichés/közérzeti zavarokkal, alvászavarral, idegrendszeri túlterheltséggel, és sok esetben gyógyszer túlterheltséggel érkeznek, melyek kihatással vannak az inger érzékenységre, szteroidális szabályzásra, rezisztenciára. A kezeléseket minden esetben stresszoldó kezeléssel kezdem, majd az Inkontinencia kezelés sorozatot hajtom végre, ami összesen 4 kezelési alkalmat jelent, heti rendszerességgel. Amennyiben a kezelések során a várt eredmény késik, úgy kiegészítem a stresszoldó kezeléssel, illetve alvás zavar programmal, így jellemzően további 2-3 kezeléssel elérhető a várt kedvező végeredmény. Ürítési zavarok (krónikus székrekedés) esetén a készülék jellemzően 2-3 célirányos kezelést követően segíti a perisztartika, bélnyálka hártya, hidratáció szabályzását, korrekcióját, a panaszok ön-regulcióval való csökkentését.

5. Egyéb tapasztalatok:
   - Fogantatási program: A gyermekvállalási nehézségek esetén elsőként az anya allergia vizsgálatát javaslom. Amennyiben az fennáll, elsőként stresszoldó (központi idegrendszer, limbikus egyensúly, amigdala, hipofízis) kezelést adok, majd 4-5 célzott, anti-allergia programot hajtok végre és a bevitt folyadék mennyiség fokozását javaslom. A kezelések befejeztével a tüszőrepedés hetében megkezdem a Fogant c. programot, amely 5 kezelést jelent, benne ösztradiol, FSH, neurotranszmitter egyensúly, melyek után az esetek 70-80 százalékában két három hónapon belül jellemzően sikereket érünk el.

   - Gyermekek: Tapasztalatom szerint a gyermekek kezelései igen eredményesek. Jellemzően 2-3 rövidebb idejű célirányos kezelés elégséges a jelentős javuláshoz. A közösségbe kerülő gyermekeknek nagyon jó hatásfokkal adjuk az immunerősitő célú programokat, a gyógyulási idejük jelentőesen rövidül, és összehasonlíthatóan ellenállóbbakká válnak. Hiperaktív gyermekek esetén 1-2 kezelést követően általánosan megnyugszanak, jól szocializálódnak, érzelmeik stabilabbá válnak. Gátlásos, félénk gyermekek esetében a 3-4 kedély javító kezelés kellő eredményű a változáshoz, vele járó eredmény, hogy vitalitásuk, étvágyuk, és aktivitásuk is javul, ellenálló képességük is javul.

Összefoglalva, a Készüléket és a módszert megfelelőnek találom a fenti célok elérésére, a szervezet öngyógyító mechanizmusának segítésére, krónikus panaszok csökkentésére.

Budapest, 2011. május 6.

Csűrösné Dr. Hajda Veronika
Tel.: +36 30 999 99 47

Dr. Horváth Julianna

Közegészségtan-Járványtan szakorvos

Orvosi vélemény

2007 óta dolgozom BioLabor által fejlesztett EMOST típusú, Elektro Mágneses Saját Jel Kezeléssel. Ezen időszak alatt, mintegy **1850** esetben, rendszeresen eredményes kezeléseket folytattam számos idült állapot esetén, ezek:

pszichikai stressz és idegrendszeri zavarok (890), krónikus fáradtság (320), allergia (170), emésztés (160), gyomor- és bélrendszeri zavarok (180), légzési zavarok (80), pajzsmirigy működési zavar (50). Tapasztalatom szerint jellemzően 4-5 célirányos kezelés elégséges, majd 1 hónap és 2 hónap múlva ismétlő, ú.n. emlékeztető kezelés megfelelő a hosszantartó hatáshoz.

Itt most részletezni kívánom a következő típusú kezeléseket is:

Fejfájás, krónikus migrén (21 alany):

migrénes és vegyes típusú fejfájások esetében egyaránt folytattam kezeléseket. Jellemzően 5-6 alapkezelés és általában 2-max 3 utókezelés szükséges a panaszok megszüntetéséhez. A kúrát a pszichés egyensúly javításával kezdem, majd az érfal és a keringés nyomását oldom, könnyítem a központi idegrendszer túl terheltségét, végül görcsoldó, ellazuló, elengedő programot adok.

Hipofízis működési zavar, menstruációs panaszokkal (9 alany):

Az alanyok jellemzően krónikus fáradtsággal és menstruációs zavarokkal jelentkeztek állapotfelmérésre. Az EIS-mérés lehetséges kóros hipofízis működést mutatott. Az 5 kezelésből álló kúrát a pszichés egyensúly javításával kezdem, majd a hormon-transzmitterek tisztításával, a hormontermelők frissítésével folytatom. Kezelést adok a neurovegetatív szabályozás javítására és oldom a belső görcsöket, segítem az ellazulást. A kezelt alanyok állapota rohamosan és nagymértékben javul. A 2 utókezelést követően teljesmértékű rendeződésről számolnak be.

Aranyér (17 alany):

Az alanyok vérző, fájdalmas aranyeres panaszokkal jelentkeztek. A bélszakasz gyulladásának csökkentésével, a vérzéses állapot megszüntetésével a fájdalom 3 kezelés után elmarad. A 4.-7. kezelés alatt beindul a regeneráció. Az alanyok jellemzően min. 1 évig teljesen panaszmentesek maradtak. Ismételt rövidített kezeléssel ez az állapot folyamatosan fenntartható.

Érdekesség:

3 fő, 5-7 év közötti gyermeket kezeltem köldöksérvvel. Kezelésük során oldottam a szöveti blokádokat. Szöveti irányítás szinkronizálására, sejtregenerációra irányuló programot alkalmaztam. Kezeltem a kötőszövet krónikus folyamatait, illetve stimuláltam a sejtszintű anyagcserét az EMOST segítségével. A kezeléseket 4-7 alkalommal végeztem, minek eredményeként a szövetek záródtak, a műtéti indikáció megszűnt.

Összességében rendkívül elégedett vagyok a módszer eredményeivel, és azok tartósságával.

Dr. Horváth Julianna, ***s.k.,***
Székesfehérvár, +36 30 463 44 57

Iringó Ingrid Tankó 14th Nov 2009 brain damage at birth, (birth stroke), birth hypoxia, muscle, Pier Robin syndrome diagnosed at the age of 2 months.

- ➔ Breathing, muscular spasm, visual and audial reflex, lack of pharyngeal reflex, pulmonary atrophy, faint, hardly viable status.

No. of EMOST™ treatments:

1. treatment on 19.06., XXXX, pneumonia, 339, digestion, oxygen intake.
2. 340, 366, 403, 339
3. 340, 366, 403, 339
4. 340, 341, 366, 403, 339

Experience until now:

Parents: "Her breathing is calmer, her eye-sight is better, better reaction to stimuli. The hearing

reflex improved, she reacts even from 2 meter far. There is no change in pharyngeal reflex. Her parents reckon the apperance of visual-audial reflex as a really favourable change. Her mood is better, the need of creating relationships appeared. Her mother is reading and after her song she seems to express pleasure, her grasp became stronger. According to the child's physician, Dr Julcsi Seres, the symptoms of muscle atrophy is not detectable, no change can be perceived in the coordination of the limbs. Holding of the head and neck appeared for a short time, 5 minutes continuously, she can hold it again after a short rest. Her defecation improved, its consistence improved, being attributed to tasting on the tongue as well. The result of moving the child on the ground is that she can roll around alone for almost an hour which she likes. It can be declared that her fitness, concentration, mood and abilities have greatly improved since the treatments carried out by EMOST, 'it can be regarded as GREAT result compared to the beginning'. The parents stated that the family got a chance to step over the dead point of shock and hopelessness.

Dated: Sepsiszentgyörgy 05.08.2011."

Romania, EU

Council of Danube Cities and Regions

MEMO

FELJEGYZÉS

FM: TO: DATE:

Tankó Ivingó Magna ~~2010~~ 2009. nov. 14., agykárosodás (születési stroke), születési oxigénhiány, izom Pier Roben szindróma 2 hónapos korban diagn.

→ légzés, izomgörcs, látás-hallás reflex, nyelési reflex hiány, tüdőkárosodás, erőtlen, alig életképes állapot.

1. kezelés 06.19-én, aneufotás, tüdőgyull, 339, erősítés, oxigénfelv.
2. 340, 366, 403, 339
3. —"—
4. 340, 341, 366, 403, 339

Eddigi tapasztalat:

A légzés nyugodtabb. Látása jobb ingerekre már reagál. A hallás reflex javult, 2 m-ről is már reagál. Nyelési reflex nem változott. Szülők a látás-hallás reflex megjelenését igen kedvező változásnak ítélik. Kedve javult, kapcsolat teremtő igénye megjelent, Anyuka olvas és énekelés után mintha tetszést nyilvánítana ☺, Tapadása erősödött, Dr. Szabó Julesia megállapítása szerint az izomsorvadásos tünetek nem észlelhetők, kéz-láb koordináció még nem tapasztalható változás. A fej-tartás tartós megjelent, már mind idáig 5 percig folyamatosan, kis pihenés után ismét tartja.

FM: TO: DATE:

A mérlege javult, állapota javult, A nyelvi fejlesztés eredményének is betudják. A Gyerek földön történő mozgatása eredménye, majd egy órás ideig önállóan foglalkozik, ami tetszik neki. Kijelenthető, hogy erőnléte, koncentrációja, kedve és képessége az EMOST kezelések óta sokat javult, "ahogy mondták NAGY eredménynek számít". A szülők kijelentik, hogy a Család esélyt kapott, hogy átbillenhettek a jobb és reménytelenség határán.

Kelt, Sepsiszentgyörgy 2011.08.05.
Románia

Hollán Iliána
0752118190

Tanka Vasile
0741147680

Kezelő

Vezető


Ellan Vannin


Ellan Vannin

Recovery from stigmatic double consciousness

“Recovery from stigmatic double consciousness after nine years. Anamnesis: Twenty-four year old man (resident of Siófok), double consciousness diagnosed nine years ago, subdepression, superficial injuries of stigmatic characteristic on the skin below the shoulder blades, furthermore signs of other injuries not caused by himself (medical evidence), constant nightmares, asocialization, ochlophobia, living alone with his mother, declared to be unemployable due to psychological causes. During personal consultation he has a distant look, he is under the effects of antidepressants, avital, of weak concentration, his manifestations indicate increased sensitivity to stimuli while evoking his experiences. He was directed to Prof. Dr Ágnes Valló psychotherapist, behaviour therapist, university teacher, based on his personality disorder and psychological status, where searching a different treatment became necessary after two psychotherapeutic treatments.

Parent (Szilvia) applied for the treatment of his son as a trial in August 2010. Indication: the treatments affected two areas. The first one is psychological load, depression, phobia and asocialization, in the direction of inhibition, the other targeted direction affected the processing of stimuli, the neurovegetative system, mainly the parasympathetic (perception of stimuli) and symphatic (reactions to stimuli) regulation and the controllability of neurotransmitters. The targeted treatments were carried out on alternating areas on a weekly basis. After the second treatment subject and parent gave an account of improving mood, reduced frequency of lethargic and depressive periods experienced during the first week. During the second week his mood improves even further, he leaves the house for the first time after nine years and takes a walk in the garden. After the third treatment he has the first undisturbed sleep, on the fourth week he pays attention to his clothing. He takes a short walk in the centre of Siófok, on the promenade (at the end of August, in peak season) accompanied by his parents. After the fifth treatment he feels calm and confident enough to travel ALONE by train from Siófok to Budapest for his sixth treatment and then back home. This imbues both his parents and the treating staff with delight and excitement. Before the treatment he talks about the overall favourable changes, settling of his emotions and giving up taking certain antidepressants, appearance of enthusiasm. His manifestations are controlled, reflexes can be evaluated, are adequate, his behaviour is stable. After omitting one week he arrives to the seventh treatment alone by train again, giving and showing the impression of a young man with a healthy psyche. Answering a question he claims that he feels to be cured, he has desires, longing for relationship, fellowship, he think with love of his relationship with his parents and wants to be active, useful. Today, on 15th September 2010 we could present the story of a cured person, his release of stigmatic double consciousness and bipolar depression, ochlophobia, with the application of electromagnetic own signal therapy (EMOST) of BioLabor (Dr.Erdőfi-Szabo), with contribution of subject and parents, with common success and delight.”

Prof. Dr Ágnes Valló
+36 30 981 6332

Declaration of subject:

Paranoid schizophrenia

“My illness is paranoid schizophrenia. One if its characteristic is that the patient is not aware of the illness. I was told by several people (before the treatment of biolabor) that my speech was incoherent. For me it did not seem incoherent at all, indeed I spoke very logically, but there were things I did not dare to talk about openly so I tried to circumscribe them with other words, and if people had taken trouble over concentrating on my message and followed my speech from the very beginning, then the hidden content of my speech would have been made up. My speech was slow and discontinuous because I continuously rephrased my real message into a version that can be hardly understood by criminals. At least at the time I had on my brain that by making the comprehensibility of my sentences more difficult I can avoid ill-intentioned people hurting me.

I have an idea about the cause of development of my illness. According to others this coherent logic is nothing else but the irrational thinking arising from my illness. According to my idea the symptoms of schizophrenia appeared within me when I was buried under the ground. I have not known about it for years but there is an explanation for this as well. According to me psychiatrists oppressed this memory in me, so it was easier to bear it. I was very colloquial with people before my illness, everybody knew and liked me in the hostel, I laughed and made others laugh a lot. Then I suddenly sank in myself. One of my classmates even made a remark that in the summer the UFOs had taken me with themselves and brought me back ruined. I could not explain to him why I had become so speechless, because these memories had been oppressed in me by then.

I started to get used to the situation when in a summer the thing that only happens in movies according to other people, happened again, I was buried again and cut very badly. From that time I dove into myself so much that I don't even remember what I did, what I spoke with whom and how I lived my life after the healing of my injuries. I took my school leaving exam nearly unconsciously and I went through a technical institute.

Later I began to take part in the treatments of Biolabor. The psychologist with whom I am in contact, told me that my speech was more complex and it was not as incoherent as it used to be. What I feel myself is that I am less often in depressive ascetic state. Before the treatment I was continuously depressed. After the treatment only in such cases when something important was a failure. I think I talk more and more to my friends. I used to be like a brainless vegetable. I am not a popular sanguine character even today but I have taken a road towards improvement due to the biolabor treatments.

Dated: 25.11.2010 17:26, Musztafa A.M.”

Thanks giving graphic by Musztafa

PRELIMINARY EXPERIMENTS:
Single EMOST treatment effect on electrocardiogram and the serum concentration of urea, albumin, cortisol, chloride, CPK, TSH, and CRP

UNDER REVIEW

We performed some preliminary experiments on twelve members of our BioLabor regarding the effectiveness of single EMOST treatment on some serum parameters and electrocardiogram (ECG). ECG results did not show statistic significant improvement after single EMOST treatment. In contrast, some serum factor such as uric acid, albumin, cortisol, chloride, Creatine phosphokinase (CPK), Thyroid stimulating hormone (TSH), C-reactive protein (CRP) indicated some remarkable changes following one treatment.

Cortisol, TSH, CRP, and CPK serum concentrations were reduced in the most of us. The albumin concentration usually showed a slight decrease and the uric acid concentration increased in almost all cases. Chloride level of serum showed a slight increase in almost every case. Of course, these few preface experiments have no great importance, but indicate EMOST treatment may reduce stress factors and affect on the redox/free radical processes as numerous studies reported regarding to the effect of low-frequency and intensity electromagnetic fields.

For example, cortisol levels were decreased in most of the members of our BioLabor after one EMOST treatment. Cortisol is a (glucocorticoid) steroid hormone that produced by the adrenal cortex in response to stress (Inslicht et al., 2011). Its major functions are, among them, to increase blood sugar through gluconeogenesis and suppress the immune system, but recent studies revealed that glucocorticoids (cortisol) have both stimulatory and suppressive effects on immune responses that are dependent on the GC concentration (Yeager et al., 2008).

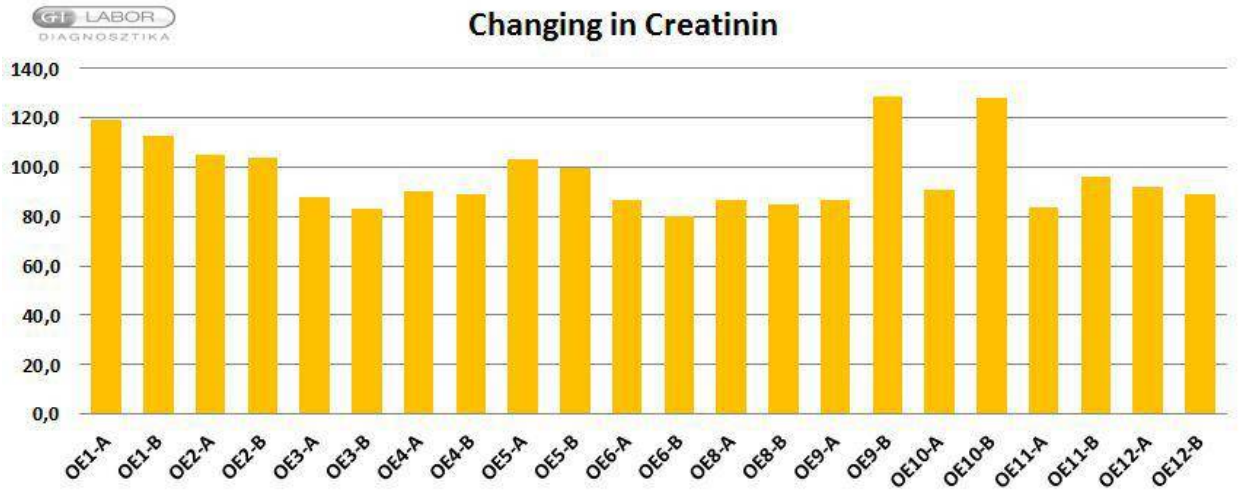
Uric acid concentration increased in almost all cases after single EMOST treatment. However, uric acid is strong reducing agents (electron donors) and potent antioxidants (Warning, 2002). In humans, about the half the antioxidant ability of blood plasma comes from uric acid (Maxwell et al., 1997).

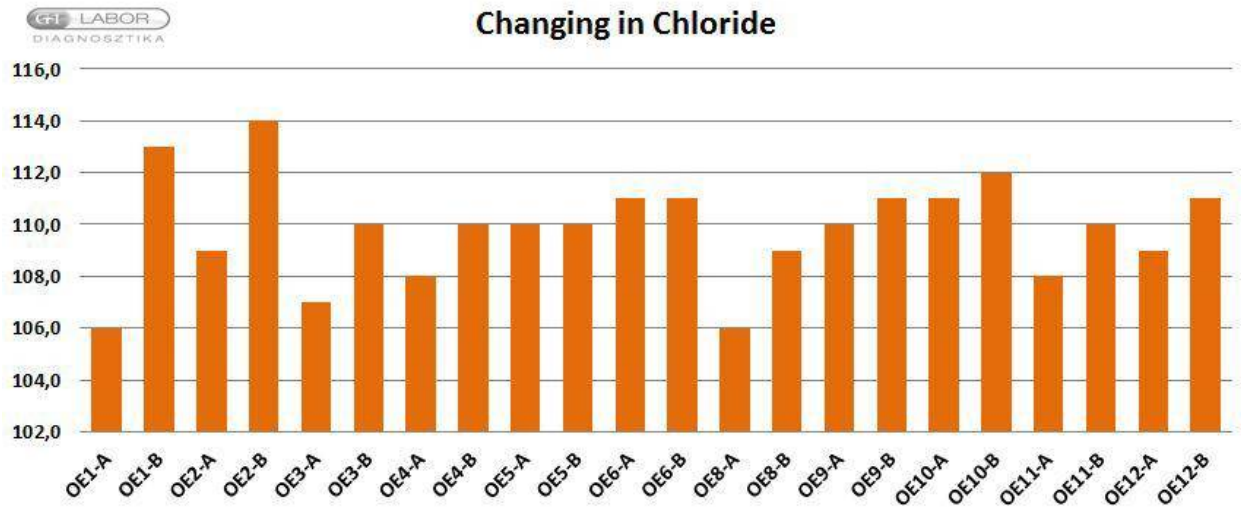
Chloride level also showed a slight increase in almost every case. Chloride is a prominent negatively charged ion in the blood, where it represents about 70% of the body's total negative ion content. However, chloride level has essential role of blood pH value that can influence pH-dependent redox/free radical processes. It seems that EMOST treatments may transiently potentiate functional redox processes.

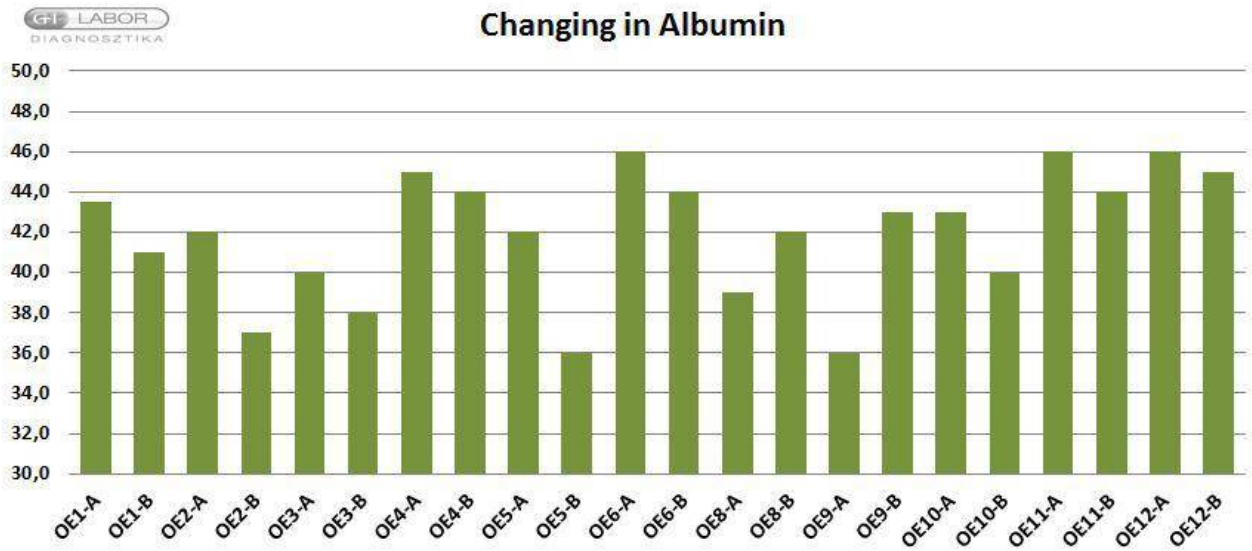
However, we have started a large-scale, controlled testing of EMOST treatments (with forty subjects and with sham exposed controls) regarding its effectiveness on serum parameters and electrocardiogram. We hope that we can report the results in the near future.

Results:

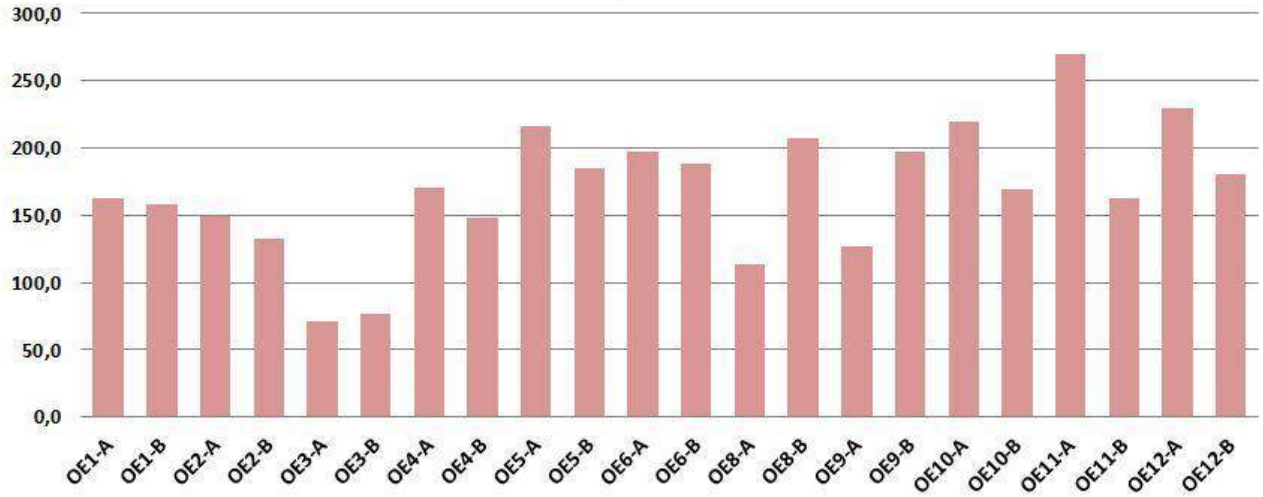
		OE1-A	OE1-B	OE2-A	OE2-B	OE3-A	OE3-B	OE4-A	OE4-B	OE5-A	OE5-B	OE6-A	OE6-B	OE8-A	OE8-B	OE9-A	OE9-B	OE10-A	OE10-B	OE11-A	OE11-B	OE12-A	OE12-B
mmol/l	Chlor	106,0	113,0	109,0	114,0	107,0	110,0	108,0	110,0	110,0	110,0	111,0	111,0	106,0	109,0	110,0	111,0	111,0	112,0	108,0	110,0	109,0	111,0
g/l	Albumin	43,5	41,0	42,0	37,0	40,0	38,0	45,0	44,0	42,0	36,0	46,0	44,0	39,0	42,0	36,0	43,0	43,0	40,0	46,0	44,0	46,0	45,0
U/L	CK	163.0	158.0	149.0	133.0	71.0	77.0	170.0	148.0	216.0	185.0	197.0	188.0	114.0	207.0	127.0	197.0	219.0	169.0	270.0	153.0	230.0	180.0
mg/l	CRP	3.8	3,7	3,3	3,0	7,0	7.0	2,8	2,6	3,4	3,3	1,2	1,2	4.6	2,3	5,0	2,4	2,3	2.3	2,3	2,3	2,3	2,6
mmol/l	Uric acid	434,0	446,0	296,0	285,0	239,0	238,0	196,0	164,0	346,0	246,0	253,0	216,0	309,0	303,0	305,0	364,0	310,0	323,0	278,0	350,0	439,0	357,0
mIU/l	TSH	3.6	2,6	1,0	1,1	2,0	1.6	2,2	1,9	2,2	1,9	1,9	2,0	6.3	6,1	8,6	8,1	1,5	0.9	1,2	1,2	2,4	2,2
nmol/l	Cortisol	381,0	276,0	221,0	141,0	122,0	123,0	215,0	159,0	164,0	120,0	170,0	182,0	333,0	261,0	293,0	208,0	626,0	271,0	215,0	319,0	295,0	316,0



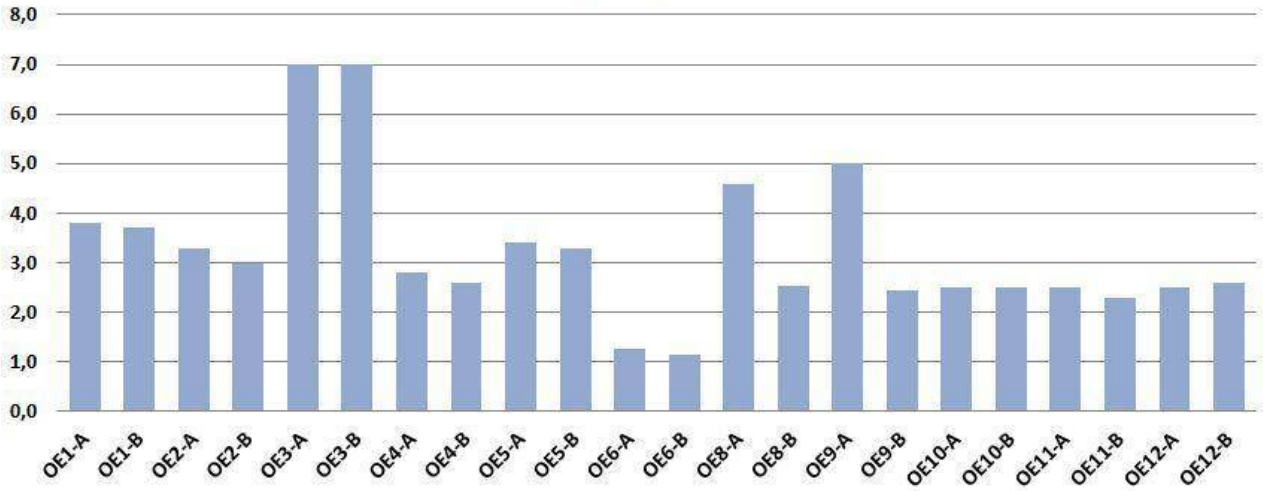




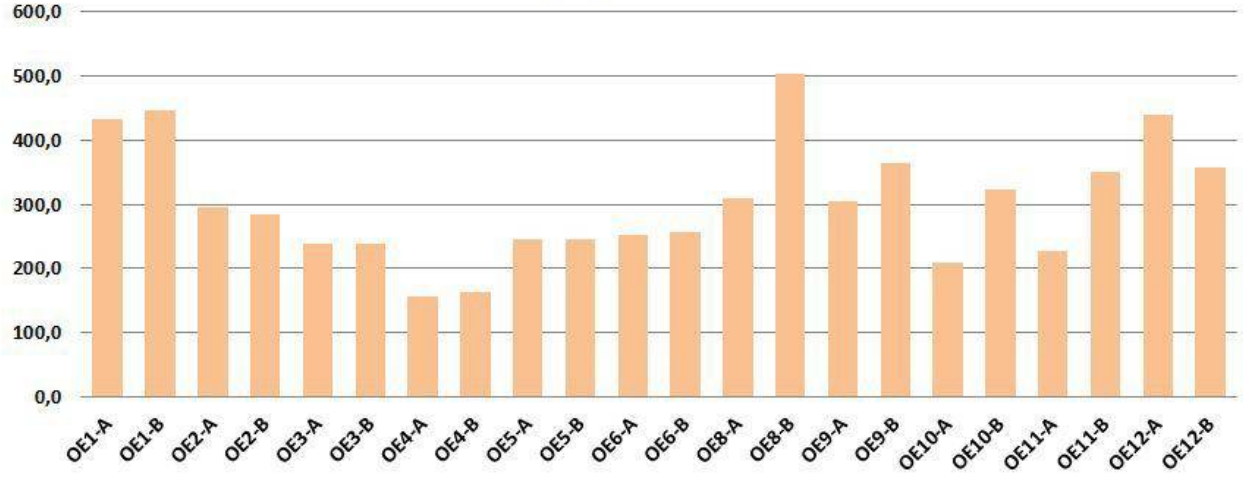
Changing in CK

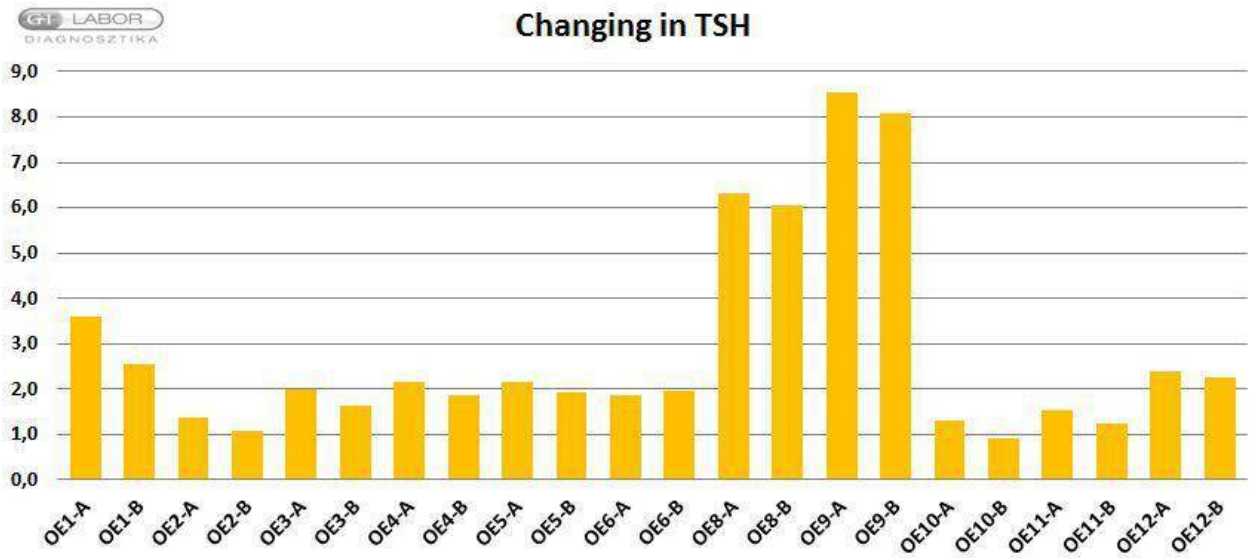


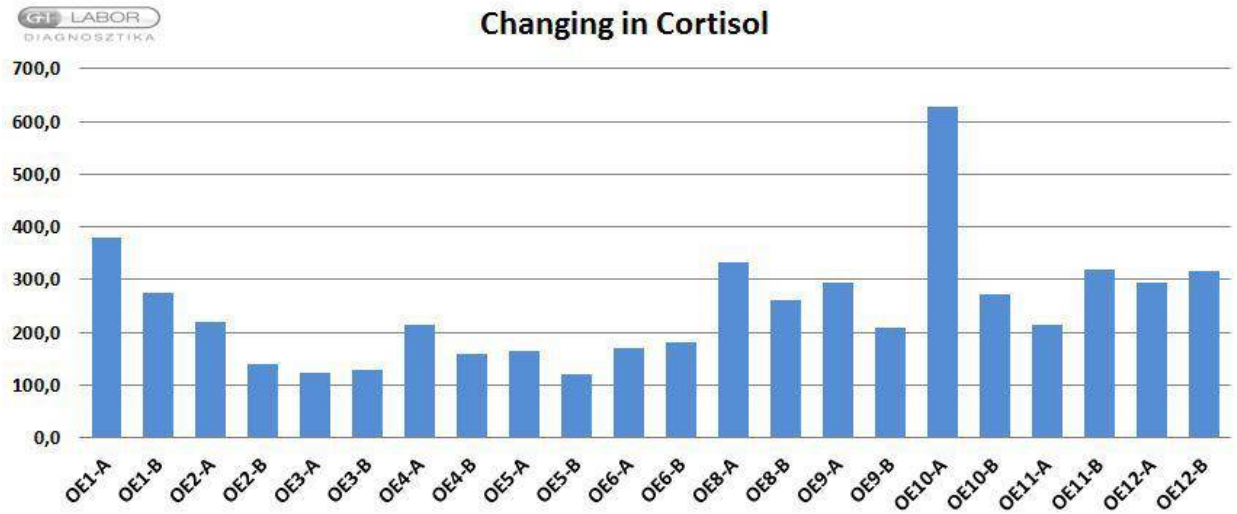
Changing in CRP



Changing in Uric Acid







István Bókkon Ph.D.
Attila Erdőfi-Szabó Ph.D
Dr., Sci-Med. Attila Till MD.

EMOST™
biolabor-med.com

СОГЛАШЕНИЕ
О НАУЧНО-ТЕХНИЧЕСКОМ СОТРУДНИЧЕСТВЕ

г. Обнинск
г.Будапешт

«25» ноября 2012 г.

Федеральное государственное бюджетное учреждение Медицинский радиологический научный центр МЗ РФ, в лице Цыба Анатолия Федоровича, директора ФГБУ МРНЦ МЗ РФ, действующего на основании Устава Центра, ООО «НПП «Медприбор»», в лице генерального директора Березнера Александра Львовича, действующая на основании Устава и компания BioLabor Biofizikai Kft, в лице генерального директора Dr. Attila Erdofi-Szabo Ph.D, действующая на основании Устава, именуемые в дальнейшем «УЧАСТНИКИ», заключили настоящий договор о нижеследующем:

1. ПРЕДМЕТ ДОГОВОРА

1.1. Участники договорились провести в 2012-2013 годах на совместной основе без взаимных финансовых обязательств научно-исследовательскую работу по теме: «Разработка научного обоснования эффективных схем применения в терапевтической практике аппарата «EMOST Redox 1.1»

1.2. Научно-техническое сотрудничество, предусмотренное в п. 1.1., будет осуществляться в соответствии с прилагаемым к настоящему договору календарным планом проведения совместных экспериментальных исследований на лабораторных животных (мыши и крысы) по совместному протоколу, рассмотренному на заседании Ученого Совета ФГБУ МРНЦ МЗ РФ, утвержденным руководителями учреждений и одобренным локальными этическими комитетами учреждений.

1.3. В процессе выполнения совместной научно-исследовательской работы ФГБУ МРНЦ МЗ РФ принимает на себя следующие обязательства:

- принять участие в проведении совместных предклинических испытаний на экспериментальных моделях стимуляции регенеративных и репаративных процессов с изучением эффектов на уровне мезенхимальных и гемопоэтических стволовых клеток (постановка опытов на животных и участие в анализе материала) и разработке на этой основе эффективных схем применения в терапевтической практике аппарата «EMOST Redox 1.1»;
- в случае получения положительных результатов в работах по пункту 1.3. данного соглашения, разработать схему дальнейших экспериментальных исследований по оценке эффективности воздействия на различных моделях заболеваний человека и по оценке безопасности применения в медицинской практике аппарата «EMOST Redox 1.1».

1.4. В процессе выполнения совместной научно-исследовательской работы компания BioLabor Biofizikai Kft, принимает на себя следующие обязательства:

- передать на период проведения совместных исследований в ФГБУ МРНЦ МЗ РФ аппарат «EMOST Redox 1.1»;
- пригласить на одну неделю сотрудника ФГБУ МРНЦ МЗ РФ для ознакомления с работой аппарата «EMOST Redox 1.1».с оплатой всех расходов по его командировке и пребыванию в Венгрии;
- в случае получения положительных результатов в работах по пункту 1.3. данного соглашения, заключить новое соглашение с ФГБУ МРНЦ МЗ РФ по проведению дальнейших экспериментальных исследований по оценке эффективности воздействия на различных моделях заболеваний человека и по оценке безопасности применения в медицинской практике аппарата «EMOST Redox 1.1», необходимые для регистрации прибора как допущенного для медицинского применения в РФ и для получения разрешений более широкого

применения разработанных новых медицинских технологий основанных на его применении.

1.5. Координационные действия между ФГБУ МРНЦ МЗ РФ и компанией BioLabor Biofizikai Kft возлагаются на ООО «НПП «Медприбор»».

1.6. Совместная научно-исследовательская работа будет выполняться в течение одного года от момента подписания данного договора и будет завершена написанием совместного отчета, который может быть использован участниками договора для планирования дальнейших работ в плане внедрения новой медицинской аппаратуры в лечебную практику

1.7. Публикация результатов проведенной научно-исследовательской работы проводится по согласованию сторон. В случае получения патентоспособных решений ФГБУ МРНЦ МЗ РФ, BioLabor Biofizikai Kft и ООО «НПП «Медприбор» имеют равные права на защиту их патентом и последующее практическое использование.

2. Соглашение составлено в 3-х равнозначных экземплярах, по 1-ому экземпляру – каждой стороне.

3. СРОК ДЕЙСТВИЯ ДОГОВОРА И ЮРИДИЧЕСКИЕ АДРЕСА СТОРОН

3.1. Срок действия договора:

начало «__» ноября 2012 г.

окончание «31» декабря 2013 г.

3.2. Юридические адреса сторон:

Федеральное государственное бюджетное учреждение Медицинский радиологический научный центр МЗ РФ. Адрес: 249036, Обнинск, Калужской обл., ул. Королева, 4

Компания BioLabor Biofizikai Kft. Адрес: 1125, Budapest, Kiralyhago u. 1-3.

Общество с ограниченной ответственностью «Научно- производственное предприятие «МЕДПРИБОР». Адрес: 249034, Калужская обл., г. Обнинск, пр. Ленина, д. 152, офис 54.

Неотъемлемой частью договора является следующее приложение:

1. Календарный план проведения совместных экспериментальных исследований на лабораторных животных (мыши и крысы) по совместному протоколу

Директор ФГБУ МРНЦ МЗ РФ, академик РАМН	Генеральный директор ООО «НПП «Медприбор»	Директор BioLabor Biofizikai Kft:
_____ А.Ф. Цыб	_____ А.Л. Березнер	_____ Dr. Attila Erdofi-Szabo Ph.D

BioLabor
Biofizikai- és Laboratóriumi Szolgáltatások Kft.
1-1122 Budapest, Városmajor utca 20., www.biolabor.hu
Adószám:14912492-1-43

КАЛЕНДАРНЫЙ ПЛАН

проведения работ по соглашению между Федеральным государственным бюджетным учреждением Медицинский радиологический научный центр МЗ РФ и компанией BioLabor Biofizikai Kft,

№№ пп.	Наименование этапов	Чем заканчивается этап
1.	Передача в ФГБУ МРНЦ МЗ РФ аппарата «EMOST Redox 1.1» и командировка специалиста МРНЦ в Будапешт для ознакомления с работой на данном аппарате	Акт передачи прибора 15.12.2012 Г.
2.	Проведении совместных предклинических испытаний на экспериментальных моделях стимуляции регенеративных и репаративных процессов с изучением эффектов на уровне гемопоэтических стволовых клеток	Промежуточный отчет 01.07.2013 г.
3	Поведении совместных предклинических испытаний на экспериментальных моделях стимуляции регенеративных и репаративных процессов с изучением эффектов на уровне мезенхимальных и стволовых клеток	Заключительный отчет 31. 12.2013 г.

Директор ФГБУ МРНЦ МЗ РФ, академик РАМН	Генеральный директор ООО «НПП «Медприбор»»	Директор BioLabor Biofizikai Kft:
А.Ф. Цыб	А.Л.Березнер	Dr. Attila Erdofi-Szabo Ph.D

BioLabor
Biofizikai- és Laboratóriumi Szolgáltatások Kft.
H-1122 Budapest, Városmajor utca 20., www.biolabor.hu

Список сотрудников и приглашенных на презентацию прибора «EMOST Redox 1.1» Венгрия

п/п	Ф.И.О	Место работы
1.	Цыб Анатолий Федорович Cüb Anatolij Fjodorovics	Академик, Директор ФГБУ МРНЦ Минздравсоцразвития России Akadémikus, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az igazgatója
2.	Каплан Михаил Александрович Kaplan Mihail Alekszandrovics	Профессор, Зав. отд. ФГБУ МРНЦ Минздравсоцразвития России professzor, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
3.	Коноплянников Анатолий Георгиевич Konopljannyikov Anatolij Georgievics	Профессор, Зав. отд. ФГБУ МРНЦ Минздравсоцразвития России professzor, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
4.	Пахоменко Константин Валентинович Pahomenko Konsztantyin Valentyinovics	К.м.н., Зав. отд. ФГБУ МРНЦ Минздравсоцразвития России az orvostudományok kandidátusa, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
5.	Крылов Валерий Васильевич Krilov Valerij Vasziljevics	Д.м. н., Зав. отд. ФГБУ МРНЦ Минздравсоцразвития России az orvostudományok kandidátusa, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
6.	Гусева Зинаида Александровна Guszeva Zinaida Alekszandrovna	Зав. отд. ФГБУ МРНЦ Минздравсоцразвития России az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
7.	Курпешев Оразахмет Керимбаевич	Зав. отд. ФГБУ МРНЦ

	Kurpesev Orazahmet Kerimbajevics	Минздравсоцразвития России az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
8.	Романко Юрий Сергеевич Romanko Jurij szergejevics	Д.м.н., Зав. НОО ФГБУ МРНЦ Минздравсоцразвития России az orvostudományok doktora, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézményének, az Orvosi Radiológiai Tudományos Központnak az osztályvezetője
9.	Ткаченко Нина Павловна Tkacsenko Nyina Pavlovna	В.н.с. ФГБУ МРНЦ Минздравсоцразвития России vezető tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
10.	Жаворонков Леонид Петрович Zsavoronkov Leonyid Petrovics	Зав. лаб. ФГБУ МРНЦ Минздравсоцразвития России az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, az Orvosi Radiológiai Tudományos Központ laboratóriumának vezetője
11.	Петин Владислав Георгиевич Petyin Vlagyiszlav Georgijevics	Зав. лаб. ФГБУ МРНЦ Минздравсоцразвития России az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, az Orvosi Radiológiai Tudományos Központ laboratóriumának vezetője
12.	Филимонова Марина Владимировна Filimonova Marina Vlagyimirovna	Зав. лаб. ФГБУ МРНЦ Минздравсоцразвития России az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, az Orvosi Radiológiai Tudományos Központ laboratóriumának vezetője
13.	Ярославцева-Исаева Елена Викторовна Jaroszlavceva-Iszajeva Jelena Viktorovna	Н.с. ФГБУ МРНЦ Минздравсоцразвития России tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
14.	Капинус Виктория Николаевна	Врач ФГБУ МРНЦ Минздравсоцразвития России

	Kapinusz Viktorija Nyikolajevna	orvos, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
15.	Боргуль Ольга Валентиновна Borgul Olga Valentyinovna	Н.с. ФГБУ МРНЦ Минздравсоцразвития России tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
16.	Малыгина Антонина Ивановна Maligina Antonyina Ivanovna	С.н.с. ФГБУ МРНЦ Минздравсоцразвития России tudományos főmunkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
17.	Михайловская Анастасия Александровна Mihajlovszkaja Anasztaszija Alekszandrovna	М.н.с. ФГБУ МРНЦ Минздравсоцразвития России beosztott tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
18.	Нестайко Татьяна Олеговна Nyesztajko Tatjana Olegovna	Врач ФГБУ МРНЦ Минздравсоцразвития России orvos, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
19.	Боловин Лев Михайлович Bolovin Lev Mihajlovics	Врач ФГБУ МРНЦ Минздравсоцразвития России orvos, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
20.	Спиченкова Ирина Сергеевна Szpicsenkova Irina Szergejevna	Н.с. ФГБУ МРНЦ Минздравсоцразвития России tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
21.	Ключ Валерий Ефимович Kljucs Valerij Jefimovics	Вед. электроник ФГБУ МРНЦ Минздравсоцразвития России Vezető elektronikus, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi

		Radiológiai Tudományos Központ
22.	Матвеева Ираида Алексеевна Matvejeva Iraida Alekszejevna	В.н.с. НОО ФГБУ МРНЦ Минздравсоцразвития России vezető tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
23.	Селева Наталья Георгиевна Szeleva Natalja Georgijevna	В.н.с. НОО ФГБУ МРНЦ Минздравсоцразвития России vezető tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
24.	Чапаева Нина Александровна Csapajeva Nyina Alekszandrovna	Вед. программист НОО ФГБУ МРНЦ Минздравсоцразвития России Vezető programozó, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
25.	Березовская Инна Анатольевна	Веду. Инженер.НОО ФГБУ МРНЦ Минздравсоцразвития России
26.	Лопатин Валерий Филиппович Lopatyin Valerij Filippovics	В.н.с. ФГБУ МРНЦ Минздравсоцразвития России vezető tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
27.	Березнер Александр Львович Berezner Alekszandr Lvovics	Зам.ген.директора ООО «Фита-Фарм» Fita-Farm Kft. vezérigazgató helyettes
28.	Ширяев Вячеслав Михайлович Sirjajev Vjacseszlav Mihajlovics	Нач.отд. ГРУ «Надежда» „Nagyezsda” Központi Hírszerző Hivatal tudományos osztálya
29.	Лепехина Любовь Александровна Lepehina Ljubov Alekszandrovna	В.н.с. ФГБУ МРНЦ Минздравсоцразвития России vezető tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ
30.	Кальсина Сагида Шагитовна	С.н.с. ФГБУ МРНЦ Минздравсоцразвития России
31.	Штейн Людмила Викторовна Stejn Ljudmilla Viktorovna	В.н.с. ФГБУ МРНЦ Минздравсоцразвития России vezető tudományos munkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ

32.	Кучеренко Надежда Георгиевна Kucserenko Nahgyézsda Georgijevna	С.н.с. ФГБУ МРНЦ Минздравсоцразвития России tudományos főmunkatárs, az Orosz Föderáció Egészségügyi Minisztériuma állami finanszírozású intézménye, Orvosi Radiológiai Tudományos Központ

ПРОЕКТ ПЛАНА
экспериментальных исследований по EMOST- терапии в ФГБУ МРНЦ МЗ России

1. Изучение возможного влияния EMOST- терапии на содержание и пролиферативную активность костномозговых мезенхимальных стволовых клеток (МСК) крыс линии Вистар в различные сроки после однократного и курсового воздействия (взятие костного мозга для культивирования МСК через 1 час, 1, 3 и 7 суток после проведенного воздействия у контрольных и подопытных животных).
2. Изучение возможного влияния EMOST- терапии на модели закрытой травмы затылочной головного мозга крыс линии Вистар по морфологической картине регенерации поврежденных тканей мозга, а также по изменениям поведенческих реакций и биологической активности (морфология нервной тканей через 4 недели после нанесения травмы, физиологические тесты через 1 и 3 месяца после нанесения травмы у контрольных и подопытных животных).
3. Изучение в опытах на крысах линии Вистар возможного влияния влияния EMOST-терапии на модели индуцированной введением доксорубицина кардимиодистрофии (морфологический анализ и показатели ЭКГ у крыс через 1 и 2 месяца после затравки животных у контрольных и подопытных групп).
4. Изучение на модели индуцированного острого диабета крыс линии Вистар влияния EMOST- терапии на заживление кожных и костных ран (оперативное удаление стопы в сроки развития острого диабета, морфология тканей до момента заживления ран).
5. Изучение возможного влияния EMOST- терапии на моделях индуцированного введением декстран-сульфата острого и хронического колита крыс линии Вистар (динамика изменения морфологии кишечника, данные о выживаемости крыс в течение 2-х месяцев после проведения терапии, изменения массы тела и кишечника, данные о хемилюминесцентной активности перитонеальных макрофагов крыс).
6. Изучение на модели индуцированного введением липополисахарида E. Coli сепсиса крыс линии Вистар морфологической картины повреждения и регенерации почечной ткани (морфологический анализ через 1 месяц после завершения однократного и курсового воздействия влияния EMOST- терапии).
7. Изучение возможного влияния EMOST- терапии на продукцию хромосомных аберраций в клетках костного мозга необлученных и облученных в дозах 0,5 и 1,0 Гр крыс линии Вистар (подсчет аберраций в препаратах, полученных через 24 после воздействия ионизирующей радиации).
8. Изучение возможного влияния EMOST- терапии на рост перевиваемой опухоли М1 у белых нелинейных крыс по тестам динамики роста, сроках гибели и морфологической картине опухоли.

28.01.2013

Руководитель отделения клеточной и экспериментальной лучевой терапии
ФГБУ МРНЦ, дбн, профессор

А.Г.Конопляников

Director of Division
Oncology of EMOST

Protocolls of Rats by EMOST™

1 (1) Костномозговые мезенхимальные стволовые клетки

1. утром: 92, 407, 530, 245, 211, 308, 210
2. после обеда: 512, 60, 527, 535, 242, 99, 102, 128

2 (3) кардиомиодистрофия

1) 1. день: 92, 341, 191 , 308, 192, 339, 359, 512
2) 2. день: 93 , 190, 492, 191, 193, 359, 309, 508
3) 3. день : 492, 509, 190, 339, 57, 530, 60, 223

3 (7) хромосомные аберрации в клетках костного мозга после облучения, 0,5-1 GR

1. утром: 92, 407, 245, 530, 211, 308, 210
2. после обеда: 512, 60, 527 , 535, 222 , 128

4 (4) индуцированный острый диабет, заживление кожных и костных ран, оперативное удаление стопы

1) утром: 92, 407, 369, 60 , 323, 93, 363, 324, 461
2) после обеда: 94, 221, 339, 212, 530 , 535, 223, 432.
3) 2. день: 95, 363, 64, 539, 221, 339, 462, 128, 515.
4) 3.день: 512, 36, 536 , 40 , 370
5) 4. день: 322 , 226 , 103, 350, 52
6) 5. день: 530 , 212, 221, 339, 456, 512.

5 (6) ткани почекпосле введения E-COLI,

1) утром: 92, 407 , 530 , 211, 322, 212, 252 , 210
2) после обеда: 512, 60, 527, 535, 242, 99, 102, 128

6 (8) опухоль типа M1

1) утром: 92, 512, 508, 470 t, 37 , 462, 60 , 335,
2) после обеда: 93, 509, 339, 456, 471, 463, 336, 211, 323
3) 2. день: 527 , 472 t, 37, 473 t, 492 , 535, 509
4) 3. день: 94, 462, 474 , 475, 221, 339, 476, 510

7 (2) травма мозга

1) утром: 407 , 92 , 64 , 223 , 73, 323, 368 , 512
2) после обеда: 508 , 369 , 324 , 530 , 325, 60 , 260 .
3) 2. день: 93 , 73 , 323, 111 , 218 , 219 , 223, 339, 84 ,

8 (5) колитис

1) 1. день: 92, 170, 530, 300, 436, 77, 78, 112, 221, 339
2) 2. день: 341, 512, 234, 212, 237, 112, 360, 130, 113, 508
3) 3. день: 93, 341, 77, 240, 78, 112, 300, 130

29.01.2013., Обнинск, Россия

СОТРУДНИЧЕСТВО С ВЕНГРИЕЙ: ПЕРВЫЕ ШАГИ

Новый метод лечения - терапию собственными электромагнитными сигналами – вынес на суд специалистов МРНЦ доктор Аттила Эрдефи-Сабо, профессор технического университета штата Орегон, являющийся разработчиком и владельцем собственного ноу-хау и представлявший венгерскую компанию Био-Лабор.

Свою презентацию доктор Аттила Эрдефи-Сабо начал с музыки, звучавшей с компьютера. Разные инструменты воспроизводили одну ноту с общей громкостью и в одном ритме. Ритм – вот ключевое понятие. Все живое на Земле подчиняется определенным ритмам, так же, как в каждом организме есть свои собственные ритмы, все процессы функционирования клеток, тканей, органов происходят синхронно.

Ритмы эти обусловлены слабыми электромагнитными колебаниями, которые излучает живой организм. Каждый орган, клетка имеет свой собственный спектр колебаний. При нормально функционирующем организме эти колебания синхронизированы подобно тому, как инструменты в оркестре играют слаженно, подчиняясь дирижерской палочке. При патологии синхронность нарушается, как при отсутствии дирижера в оркестре начинается разлад. Чтобы восстановить синхронность, нужен дирижер. И таким «дирижером» выступает прибор, разработанный в Венгрии профессором Аттилой Эрдефи-Сабо. Он подобно радиолокатору улавливает собственные внутренние электромагнитные колебания организма и, «подправляя», синхронизируя их, возвращает обратно. При этом никакого внешнего электромагнитного воздействия не происходит: ведь прибор выступает именно как радиолокатор, а не как генератор и использует только собственные колебания организма. Одним словом, процедура не опаснее электрокардиограммы или электроэнцефалограммы – механизм тот же.

Сегодня прибор широко используется во многих странах Евросоюза в целях реабилитации, в первую очередь, инвалидов. Тем не менее, наша медицина привыкла перестраховываться, прежде чем внедрять новые методы. Во время презентации возникло множество вопросов к докладчику. Например, профессора Анатолия Коноплянникова интересовало, проводились ли испытания метода на животных. Оказалось, что нет. И в ходе научной дискуссии решено было провести совместные исследования, используя мощную научно-техническую базу МРНЦ и опыт специалистов Центра в изучении последствий влияния различных видов излучений, в том числе, электромагнитных, на организм человека на клеточном уровне.

Перед началом презентации мы побеседовали с профессором Аттилой Эрдефи-Сабо о предыстории его визита в МРНЦ и дальнейших планах.

– Мы ищем научные связи Венгрии с Обнинском, - сказал он, – и считаем большой честью, что смогли сюда приехать и сделать сегодняшнюю презентацию. Содействовал нам в этой встрече господин Березнер Александр Львович. Но все это стало возможным благодаря директору Института, академику Анатолию Федоровичу Цыбу.

● – В какой стадии находится Ваше сотрудничество с МРНЦ?

– Конкретные шаги по научному сотрудничеству с Центром только начинаются, фактически началом служит нынешний визит. Где-то полгода назад в Будапеште мы впервые встретились с представителем МРНЦ, кандидатом медицинских наук Константином Валентиновичем Пахоменко, который проявил интерес к сотрудничеству и пригласил в Медицинский радиологический научный центр. И сегодня я рад возможности встречи с сотрудниками МРНЦ.

● – В чем для Вас интерес в таком сотрудничестве?

– Мы разработали новый метод и хотели бы поделиться им с коллегами из Медицинского радиологического научного центра, являющегося признанным авторитетом в области биофизики не только в России, но и на мировом уровне. Я очень надеюсь на то, что общими усилиями мы сможем делать совместные шаги в области дальнейшей разработки метода, и это уже будет совместным достоянием. В Венгрии, конечно, ждут информации, какие исследования и разработки в этой области идут здесь, в России. Я особо подчеркнул бы интерес со стороны Реабилитационного института, расположенного под Будапештом и имеющего общевенгерское государственное значение, а также медицинского факультета Медицинского университета имени Семмельвейса в Будапеште.

В заключение нашей беседы господин Аттила Эрдефи-Сабо сказал несколько слов в адрес юбиляра – Медицинского радиологического научного центра:

– Я должен подчеркнуть, что деятельность МРНЦ базируется на исследованиях и разработках мирового уровня. При этом хотел бы особо отметить такую характерную его черту, как гуманизм: здесь в центре внимания – человек, и вся деятельность выстроена вокруг человека.

Вторая характерная черта, которую я считаю очень важной, это то, что МРНЦ задает вектор развития в области биофизических наук, служит ориентиром для многих институтов не только в России, но и по всему миру. Обусловлено это тем, что в МРНЦ не только ведутся научные исследования, но и имеется конкретная лечебная практика.

Благодаря сочетанию в одном центре и науки, и практического опыта развитие МРНЦ идет очень высокими темпами. Думаю, что те преимущества, которые сегодня имеет МРНЦ – общий итог прошедших 50 лет. Поэтому желаю Институту дальнейших крупных удач в следующие 50 лет. И пусть эти преимущества, которыми сегодня владеет институт, обратились в еще большие преимущества.

● Страницу подготовила Елена Колотилина

E.M.O.S.T.

THE

ELECTRO-MAGNETIC OWN SIGNAL THERAPY

presented by

Dr. Attila Erdőfi-Szabó Ph.D.

Biophysicist, developer of EMOST method

doctor of Medical- and Health Sciences

www.biolabor-med.com

2011/2012

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

TABLE OF CONTENTS

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

PROLOGUE

The body refreshes itself every day: you go to bed tired in the evening, and then you get up in the morning ”recovered”, IE even from the most exhausted state you get much better by "something" while energy was not taken. How does it happens? We deal with this neuro-vegetative process.

Dr. Attila Erdőfi-Szabó Ph.D., Chairman

If it seems that traditional and alternative methods are inefficient for healing, and even the natural healing procedures and dietary supplements fail, you should pay attention to the initial phase of a natural regeneration, your self-healing ability, or the lack thereof.

Several studies showed that the extremely low frequency and electromagnetic fields affect the passing of the neuronal action potential and can mimic the effects of the synaptic neurotransmitters. Although the extremely low frequency and electromagnetic fields can only create micro-volt size changes in the neuronal membrane potential, as a result of the signal mounting processes this can significantly influence the passing of the physiological action potential.

The computer-based method we apply in BioLabor, which regulates the patient’s own control processes, was developed in house. It has helped over forty thousand people over a five-year period. It is based on natural self-regeneration, the improvement of the body's self-healing ability through cellular electro chemical balancing.

We use the human body's own, natural, electro- and electromagnetic impulses (similarly to ECG and EEG signals) which belong to the person’s various biological processes. Our unique signal processing method is able to keep up with the pace of biological events, and instead randomly selecting certain moments, it can parallel and continually refine the body's self-regulation.

The Electromagnetic-Own-Signal-Treatment (the EMOST™ method) indicates the systematic diversion (extra-sense detection) and thematic recirculation of extremely low intensity, electric- and electromagnetic radiation that is based on the recorded natural, non-linear bioelectric and bio-electromagnetic signals (may potentials) of subjects. It influences the natural self-checking processes (regulation/adaptation) and the balance control of the electro-chemical processes (modulation of free radicals and antioxidants, redox processes as well as neurotransmission, and potentials/action potentials status) via the electro-chemical processes of the impulses and cellular receptors and free nerve endings. The detected non-linear own signals are processed in analog manner, then selected and reflected on the skin's surface. The state-of-the-arts EMOST method helps adjust and regulate directly the basic physiological flows of the body, organs and cells.

The EMOST™ method can potentiate the cellular metabolism, detection and immune processes in a natural way through the electric- and electromagnetic signals coming from the body's own range. By doing that it helps the biochemical homeostasis to recover, and helps for the neurovegetative system in signal transmission and signal recognising.

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

The Company:

1. Scientific work, education, development of EMOST therapy
2. Clinical laboratory: serology, microbiology, tumourmarker etc., screening tests, electro-somatography
3. Factory medical services
4. Manufacturing of BioLabor EMOST Redox medical devices, service of EMOST therapy countryside, and sale of BioLabor franchise in Europe.
5. 7/7 Customer service, operation (since 2005, close to 70 BioLabor Health Center in 13 counties, and close to 40.000 satisfied customers with the BioLabor EMOST method).

1. Supplement: Definitions

a, Physical Concepts

Atom: the smallest part of the chemical element that is not further divisible by chemical processes (MTA -Hungarian Science Academy's Explanatory Dictionary). An atom is the smallest quantity in chemistry that still preserves the chemical characteristics of the element. Atoms therefore are the fundamental components of molecules and the material.

Electron: the negatively charged elementary particle of the atom that is orbiting the nucleus, the elementary particle of electricity (MTA Explanatory Dictionary). The electrons together with the nucleus form chemical particles, and are responsible for the chemical bonds.

Ions: ion is an atom, or a molecule (atom group), that has an electric charge. The negative charged ion, in other words anion is such an atom or a molecule that has a surplus of one or more electrons; cation on the other hand is a positive charged ion that has a deficiency of one or more electrons the same way as in the original particle. The process along which ions are created is called ionization.

Frequency: The number of periods per one second. Frequency, density. Hungarian Science Academy (MTA)

Periods: regularly recurring sections of a certain phenomenon. (MTA Explanatory Dictionary).

Frequency of an electronic wave: the number of waveforms of electrical signals repeated per one second.

Magnetism: the characteristic of certain materials, atoms, molecules where electrons moving in the same direction generate a magnetic field between the materials.

Electricity: A physical process in which electric charges, their movements and effects can be found.

Electric charge: it is the characteristic of certain subatomic particles (namely the electron's and the proton's) that gets in touch with the electromagnetic field and attractive and repulsive forces occur between them. It is the fundamental feature left over in a few basic elements, which determines the extent to which it participates in the electromagnetic interaction, one of the fundamental interactions. The electrically charged material creates an electromagnetic field and the external electromagnetic field influences its movements.

Electric field: it operates between two electric charges similar to gravity between two objects. An essential difference between the two things is that gravity affects all objects, while the electric field comes into being only among electrically charged objects, on the other hand the force of the electric charges can also be repulsive. The force magnitude is inversely proportional to the square of the distance between the two charges, and is directly proportional to the size of the multiplied charges.

Electricity: it is the result of the flow of electrically charged particles. The particles can be positively or negatively charged. Examples for electricity can be the flow of electrons in metals (or in other conductive materials), or the power created in the electrolytes when charged ions flow in the liquid. The particles themselves are relatively slow physically, however, the electric field that creates the movement is practically moving at light speed.

Direct current (DC): when charged particles move only in a given direction.

Electromagnetic interaction: the physics of the electromagnetic field. The electromagnetic field is the field which fills up the entire space created by the electric and magnetic fields. While the electric field is the result of the charge causing static electricity (that creates electricity in an electric conductor), the magnetic field comes from the movements of the electric charge (like the current in a conductor) and is manifested in the magnetic force similar to the permanent magnets. The change of the magnetic field creates an electric field called electromagnetic induction.

Electromagnetic power: It is the effect of the electric field on the particles of an electric charge. This type of force is one of the four fundamental forces of nature. The other three are the following: ***1)*** the strong nuclear force converging the nucleus, ***2)*** the weak nuclear force responsible for certain types of radioactive decay ***3)*** the gravitational force. All interactions (forces) between physical objects are the ultimate consequences of these 4 fundamental forces, however, the electromagnetic force is responsible for basically all the phenomena in our everyday lives, except for gravitation. All forces can be traced back to the electromagnetic force that affects the electrically charged protons and electrons of the atom., All chemical processes occur through the forces of the interactions of the electron's circulation.

Electromagnetic radiation: oscillating electric and magnetic field exceeding perpendicularly to each other that spreads in the space in the shape of a wave delivering energy and impulses with light speed. Its quantum are the photons. The electromagnetic radiation between the wavelength of 380 NM and 780 NM is visible to the human eye that's why we call it visible light. All the electromagnetic radiation can be arranged according to frequency (wavelength, energy), that is when we can get the electromagnetic spectrum. The physics of the electromagnetic radiation is described by electrodynamics.

Band-path filter: such an electric circuit, which operates in the pre-determined frequency range of electricity.

The ranges of the applied band-path filters via EMOST: 1-10Hz, 10-100Hz, 100-1kHz, 1kHz-10kHz, 10kHz-100kHz, 100kHz-1MHz, as 1-1.000.000 signal/sec.

Wave: state changes of a system that is periodic in time and/or space, IE has regular intervals. Apart from the electromagnetic wave, waves spread in some kind of a medium. They deliver energy without the constant motion of the material of the medium to the direction of propagation, thus the wave delivers energy resulting from motion coming from a stabile point, but no mass.

Interference: a physical phenomenon that occurs if two coherent waves meet with different sources, IE waves whose phase difference is constant. As a result points come into being in space in which waves greatly strengthen each other, and also points in which waves greatly weaken each other (depending on what kind of phase difference the two waves arrive with at the individual points.

b, Biological definitions

Homeostasis: Physiological concept, the ability to adapt to the external and internal changing conditions of the living organisms by which they can ensure their relative biological stability. Under the dynamic permanence and stability of the internal conditions we mean the proper nutrition-supply, the necessary quantity and quality of the respiratory gases, thermoregulation, the proper quantity and quality of the body fluids, volume, ion composition, pH, temperature, osmotic pressure, and the presence of all the protection modes, and the proper operation of all these. These components are ensured by the self-sustaining living organisms with the help of the hormonal and nervous system, collectively known as self-regulating operations.

Potentiation: The process of assisting the establishment of homeostasis.

Receptor: the organism or cells of the nervous system developed to collect stimuli. (MTA Explanatory Dictionary).

Free-radicals: Chemically very reactive atoms and molecules, which serve dominant signal roles in the physiological and pathological condition of the body. Free radicals are atoms or molecules that contain an unpaired electron on their external shells (having magnetic momentum), tend to form pairs and absorb more electrons from other molecules.

Signal process: It is a reflexive process based on stimulus perception and stimulus creation, under which we mean the organization and the operation of the subsystems, and the organization of the sub-systems with each other. This retrospective process is completed in atomic, molecular, cellular, electric- electromagnetic and electro-chemical ways in which the stimulus detection and the stimulus triggering have also a stimulus transmitting role.

Self regulation: it is a continuous regulation based on the control of the operations and the signal processes in order to have an overall homeostasis of the organization.

2. Bio-electrochemical knowledge to get a better understanding of the EMOST effects

"The cell membrane and its environment cannot be considered to be a balanced, closed system and the behavior of the individual ions are not independent. In resting position there is an ion flow maintained by constant electrochemical potential drops between the two sides of the cell membrane in a way that each ionic current density compensates one another. The ion concentration difference is constant between the outer and inner space, which is possible to maintain only with the help of the opposite direction active transport, i.e. operating the Na + / K + pump. The process continues until the ionic current created by the electric field is balanced with the diffusion current of the opposite direction.

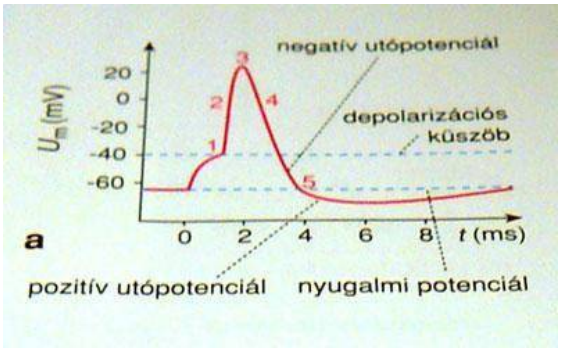
An electric double layer is formed at the time of the dynamic balance so that the electric field and the opposite charge flows caused by the concentration differences can keep the balance with one another. „On the way" to the balance every state equals to a quasi-state characterized by the electrical neutrality of both sides - one by one - and also the temporary state between the distribution of the concentration and the ionic current.

This balance is temporary, because it is true that the sum of the ionic currents is zero, but this is not fulfilled in the flow of certain ions one by one. Therefore the ion distribution changes over involving a change in the diffusion potential (Medical Biophysics, 3rd edition,p. 290, Medicina Publishing House).

We can further increase or decrease the resting membrane potential in a regulated way with the direction of the power (in absolute terms). The membrane gets hyperpolarized or depolarized accordingly. Regardless of the current direction, under the threshold response signals are obtained that are proportional with the power of the effect.

Above the threshold - in case of a depolarizing effect, the nature of the response sign is different from the previous one, and its size is independent from the fact of how much the inducing effect exceeds the threshold. This is the typical response of the so-called "Action potential" which characterizes the cell membrane excitability. (Medical Biophysics, 3rd edition, p. 290, Medicina Publishing House).

If the charge carried by the depolarizing currents (i.e. the proportional rate of the depolarization expressed in mV –s) exceeds a certain threshold, the depolarization becomes independent of the size of the current pulse. The resulting voltage signal with ms duration is the action potential, which circulates with constant amplitude in the nerve or muscle fibers. The typical stages of the action potential during its course can be well-separated (Medical Biophysics. 3rd edition, p. 294 III.34a. Fig.)

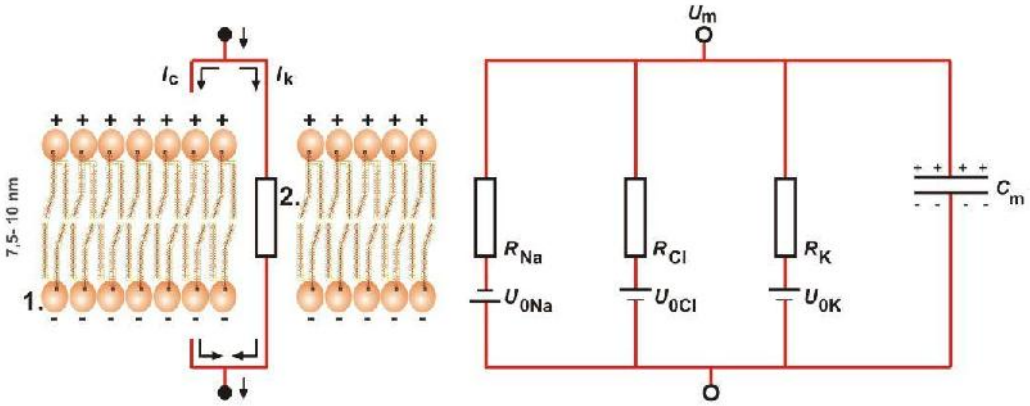


The voltage change during the action potential in the function of time and the change of the status of the voltage-sensitive ion channels in each section

1. Opening of Na^+ -channels
2. Opening of K^+ channels
3. Inactivating some of the Na^+ channels
4. **F**urther outflow of K +, total closing of Na + channels
5. Closing of K^+ channels

The electric model of the cell membrane (Medical Biophysics. 3rd edition, p. 292 III.32. Fig.)

Extra-cellular space



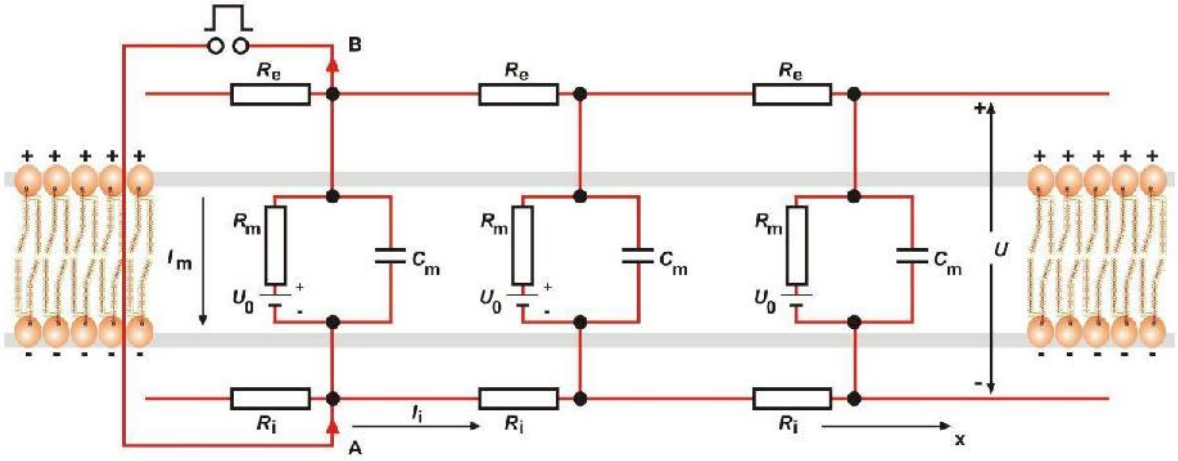
Intra-cellular space

1. Lipid double layer: capacity
2. Ion channel: resistance

The electric model of the membrane. The membrane can be described with transverse resistance (R_{Na}, R_{Cl}, R_K), with capacity (C_m) and with electric power (U_{0Na}, U_{0Cl}, U_{0K}).

The further improvement of the electric model of the cell membrane to interpret the effects of the pulse to the membrane (Medical Biophysics. 3rd edition, p. 293. III.32. Fig.).

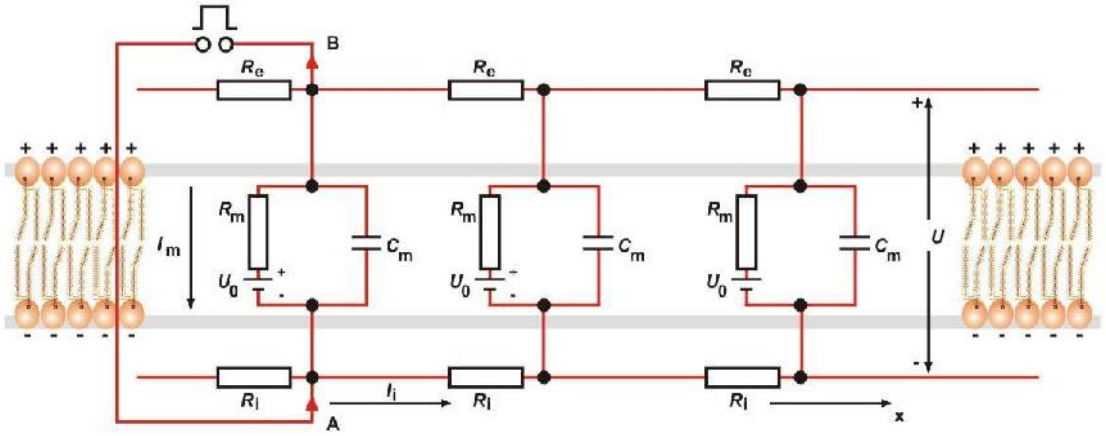
Extra-cellular space



Intra-cellular space

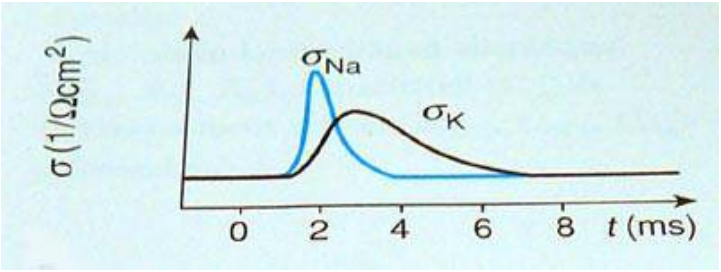
The electric model modified by Hodgkin, which regards the specific changing conductivity of the ion channels as opposed to the constant Rm (Medical Biophysics. 3rd edition, p. 295. III.35. Fig.).

Extra-cellular space



Intra-cellular space

In the course of the stimulated state, the permeability of the membrane changes with regard to Na + and K + ions for consideration of individual ions (Medical Biophysics. 3rd edition, p. 294 III.34b. Fig.).



The typical changes of the specific conductivity of the voltage-sensitive Na + and K + channels during the action potential

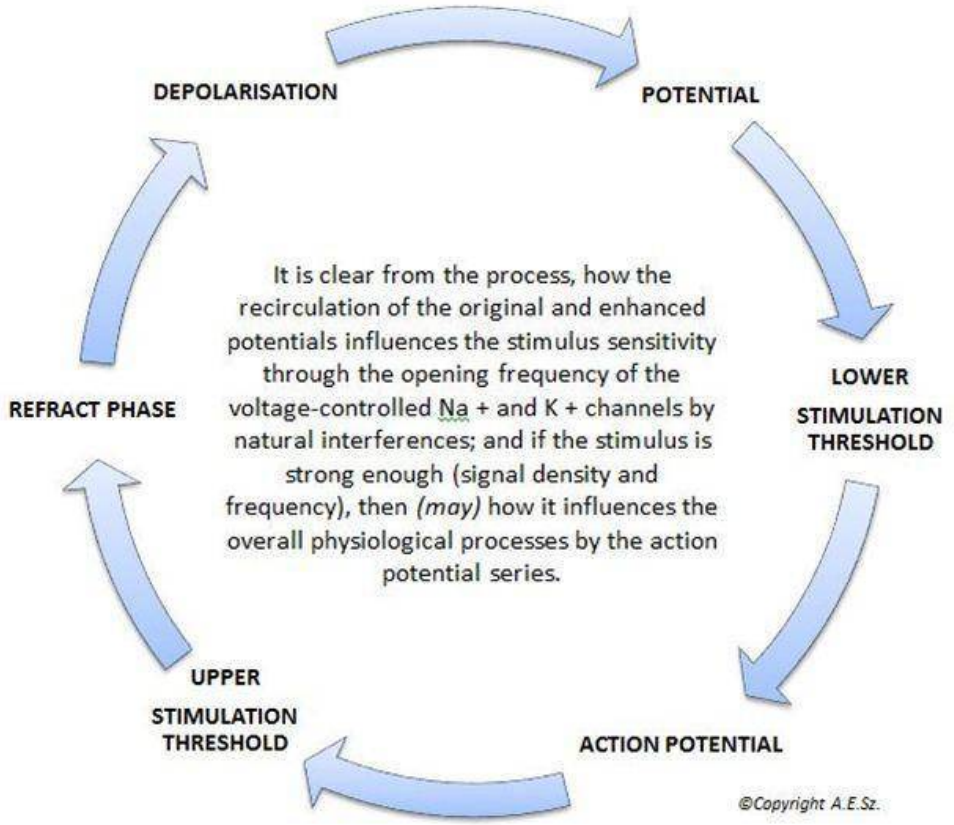
During the membrane depolarization we arrive at a critical depolarizing value, when the voltage-controlled Na + channels begin to open. The increased Na + permeability constant shifts the membrane potential value toward the equilibrium potential of the appropriate distribution of the Na +, in accordance with the Goldman-Hodgkin-Katz equation leading to further depolarization. As a result, large amounts of Na + ions flow towards the intracellular space in accordance with the concentration drop. The presence of Na + ions shifts the negative potential of the intracellular space toward zero, therefore, the depolarization increases.

This Hodgkin-cycle is a typical example of a positive feedback when a change in the system's operation reacts to the system itself in a way that it increases the primary change rate. The cell next to the fully open Na + channels would travel toward the so-called "resting" state if the open state of the channels was a stable conformation. However, it does not occur as the Na + channels are automatically deactivated. In an inactive state, the channels do not hold the stimulus threshold of the cells, which is infinitely large, and the cell cannot be irritated in such a refractory state.

The K + channels are created by the depolarization by opening the Na + channels, however, these channels begin to operate with a delay compared to the Na + channels. In such circumstances, the Na + permeability reduces even more while the K + permeability increases. The active pump pumps K + ions into the cell, and pumps Na + ions out of the cell. As a result of all these processes the original resting state returns and due to delayed closure of the K + channels a transient hyper-polarization occurs. The mechanism, which restores the resting potential, functions on the basis of the principle of negative feedback. After the closure of the K + channels, the Na + channels get into a simple closed state from an inactivated state. In this state, the cell can be irritated again, but its stimulus threshold is higher than at rest (relative refractory phase) (Medical Biophysics. 3rd edition, p.295, 296).

If the Na+ channels open as a result of the depolarization in a definite part of the cell membrane, then the action potential is developed. As the cell membrane is surrounded on both sides by the principal electrolyte, the local electro gradient changes and spreads to all directions. The amplitude of the changes decreases rapidly as the distance increases due to the resistance of the medium during its spread, so we could expect that the action potential is a local phenomenon induced in a well-defined place (i.e. it is greatly diminishing during expansion). If that was really the case, the action potential would be inadequate to help the information flow between the remote parts of the body. In fact, the action potential can spread along the membranes of the neurons (including the axon membrane as well) without any weakening. The required strengthening ("relay station features") is provided by the opening of the voltage-controlled Na + channels. Depolarization might occur according to the rules of exponential decay (see III/4.3.2.) controlled by the space-constant in the adjacent regions of the place of the action potential.

This depolarization can reach such an extent in the close regions compared with the 90mV potential at rest, that the value of the membrane potential can reach -30-40 mV (depolarization threshold). This value is sufficient to open the voltage-controlled Na + channels. Given that the closing of the Na + channels is followed by a 1 ms long inactivated state, during which the channels are not able to be opened, the action potential spreads in one direction only (not "backwards"!). As a result of the cessation of the refractory state, the depolarization wave is at a distance that its effect does not reach the stimulation threshold. In case of irritable mammalian cells, the velocity of the action potential can drop between 1 m /s and 30 m/s (Medical Biophysics. 3rd edition, p.296, 297).



Sense organs are such units of the body, which collect information from the outside world, as well as information from the inner state of the body, and convey this information to the central nervous system. Information is collected by millions of microscopic structures, called receptor cells. These can be found in almost every part of the body, in the skin, in the muscles, in the joints, in the inner organs, in the walls of the blood vessels, and in the specific sense organs, like the eye or the inner ear. Receptors are generally "specialized" to a specific stimulus effect, i.e. a certain wavelength range of the light, molecules of defined shapes, vibration or even temperature. In a stimulated state, the neuron connected to the receptor cell begins to ”burn”, i.e. electrical impulses and a series of action potentials are generated. The nerve fiber transmits the information in the way described above to the spinal marrow and also to the brain. Most of the action potential series gets to a special part of the cerebral cortex through metastases, where certain stimuli can be found separately in different places. The final processing of the information is the responsibility of the associative cortical areas (Medical Biophysics book. 3rd edition, p.301, 302.).

The receptors found in the skin can be considered analogue signal converters, which transform the sensed stimulus into an electro signal, a change in the membrane-potential. It is the so-called receptor- or generator potential. The receptor nerve transforms the stimuli over the threshold into a series of action potentials, the frequency of which is the function of the receptor potential. This "frequency-coded" pulse-sequence runs along the axon until it reaches the sensory center of the cortex (Medical Biophysics 3rd Edition, p. 303).

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

BIOLABOR *Emost Redox 1.1*

The EMOST™ method influences the subject's basic electrochemical, physiological processes by conducting, selecting, expanding, transmitting and redirecting the subject's own, different signal density potential and action potential.

The conducted action potentials buried in noise with different signal density (signal density/sec, means frequency) are supplemented by their amplified / attenuated (-20 dB, 60 dB) and harmonic (5 MHz) versions (further enhanced potency) and then they get re-circulated on the skin surface in a thematic way. If the stimulus is below the stimulation threshold or the relative threshold is high, or sensitivity to stimuli is decreased, the stimulus is not able to elicit action potential and the stimulus remains without reaction.

The recirculation of the original and enhanced potential affects the opening frequency and the stimulus-sensitivity of the voltage-controlled Na + and K + channels. If the stimulus strength is sufficient (signal density, frequency), then the action potentials, which are thus not confined to the direct location of the stimulation but spread in the whole tissue, get to the spinal cord through metastasis, or to the cortical association areas where certain stimuli are formed separately, then they get processed.

The nerve impulse (pulse, action potentials), the electro-negativity wave spreading from the initial part of the axon, moves rapidly along the surface of the membrane (axolemma). Stimulation alters the Na + ion permeability of the membrane and Na + ions flow in the axon. This transport consumes energy, which is provided by the adenosine triphosphate (ATP). The number of positive ions on the outer surface of the axolemma rapidly decreases to zero. As a result the membrane potential drops to zero too, i.e. it gets depolarized. A typical resting potential is -80 mV in a way that the surface of the outer membrane is electro-positive compared to the internal surface; the action potential is about +40 mV in a way that the outer surface of the membrane is electro-negative compared to the inner surface.

The action potential in the thinner axons may be less than 40 mV. The negatively charged part of the outer surface of the axolemma affects the adjacent positively charged part of the axolemma as a stimulus, and the adjacent action potential at rest transforms into action potential in less than 1 ms. In this way, the action potential passes along the nerve fibers, exactly to their end. As the action potential moves along the nerve fibers (axons, dendrites), the entry of Na + ions into the axona ceases and the axolemma permeability relative to K + ions increases. Then K + ions flow to the outer surface of the axolemma, so the resting membrane potential is restored.

The discharge begins on the axon hill, then through the axon, reaching the end of it as it arrives in a synapse, where it leads to the creation of new neurotransmitter molecules and by contacting the dendrites of the neighboring cells it can induce their filling. This process continues until the stimulus reaches a specific cell (such as a muscle moving cell in case of an efferent signal sequence).

The electrical signal is conducted through the cell body and the axon strings. Insulation is produced by special glial cells (Schwann cells) covering the axon. In case of the central nervous system the oligodendrocytes produce the insulation and they do the maintenance as well. The conducting consists of a series of discharges of the pieces after they are fully charged. The charge transfer takes place from gap to gap with a series of bounces, through the so-called saltatorical conducting. (Thus, if the original potential is not high enough, or there is a large loss due to the failure of insulation, then the signal or instruction is not received, which causes a disease of the body, e.g. Amyotrophy lateralsclerosis).

After a nerve stimulus passes the nerve fiber while the axolemma is depolarized, a second stimulus, even if it is strong will not be able to generate a stimulus in the nerve (refractory period). The neurons of the nervous system form a functional conducting field while connected to each other. Where two neurons are in close proximity and a functional relationship appears between them, a synapse is created. A chemical neurotransmitter is released on the presynaptic membrane of the synapse, through which the synaptic gap connects to the specific receptors of the postsynaptic membrane, and stimulates (or prevents) the next neuron (dendrite) and creates a stimulus shift at the effector endings of the peripheral nervous system.

All the neurotransmitters playing the role of opening and closing channels of the neuron wall have different effects and characteristics. The catalyst, stimulating ones, such as acetylcholine, the ones with glutamate and serotonin compounds mostly effect the state of the Na +, K + and Ca2 + cations' channels; while the GABA and glycine compounds that are mainly blockers and inhibitors have an effect on the Cl-anion channel. The latter two play the main role in the neurons of the brain.

As an effect of the action potential, the content of the vesicles gets into the intracellular space, and activates the glutamatreceptors in the postsynaptic cell (e.g. NMDA-receptor). Glutamate is the anion of an amino acid, the Glutamic acid (abbreviated as Glu or E). It has a single, negative charge, it is stored in the vesicles, the presynaptic cell of the neural synapses, and it plays a crucial role in the removal of the nitrogen, it gets deaminated, and as a result an oxidative reaction is created, which is catalyzed by a glutamate dehydrogenase enzyme. Glutamate is the most common excitatory neurotransmitter in the nervous system. It is fundamental in the systematic responses to stress; therefore in its absence the body's immune reactions are impaired. It plays a key role in many metabolic and immunological processes, also the most important energy source for rapidly dividing cells, such as the enterocytes, lymphocytes. It reduces the production of the inflammatory mediators and enhances that of the antiphlogistic ones, and it also enhances cellular immunity. In addition, it increases the barrier function of the intestinal tracks, and a major role is assumed in the process of learning and memory formation.

The nerve stimulus reaches the spinal cord through the afferent neurons. The afferent fibers form a synapses in the spinal cord, (for example) with the large alpha motor cells, - located in the anterior horns of the gray matter of the spinal cord, and the nerve stimulus spreads further along the efferent motor fibers, then it stimulates the work muscle fibers at the motor end plate (neuromuscular junction).

It is clear from the process -by natural interferences, how the recirculation of the original and enhanced potentials influences the stimulus sensitivity through the opening frequency of the voltage-controlled Na + and K + channels; and if the stimulus is strong enough (signal density and frequency), then how it influences the overall physiological processes by the action potential series.

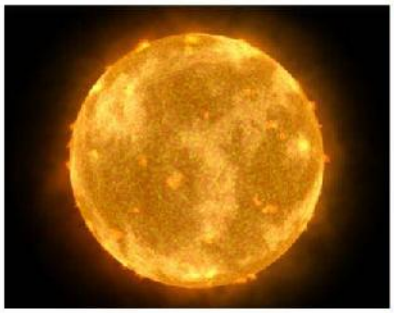
Conclusion

The special analog signal processing of the EMOST™ equipment allows much more length of the detected electromagnetic and regenerated electromagnetic signal information than in the digital (signal loss, signal distortion) cases. The EMOST™ method seems to be able to potentiate cellular communication, the control processes and the operation of the biochemical homeostasis in a natural way by reflecting the electric- and electromagnetic impulses coming from the body's own range, all without the use of any artificial electric- and electromagnetic radiation, and the risks thereof.

On the basis of the experiments so far (see own Bibliography) one of the likely impacts of the EMOST™ method works through the potentiation and balancing of the bio-electro-chemical / redox processes and through intensifying the cellular communication.

EMOST – EM Own Signal Therapy

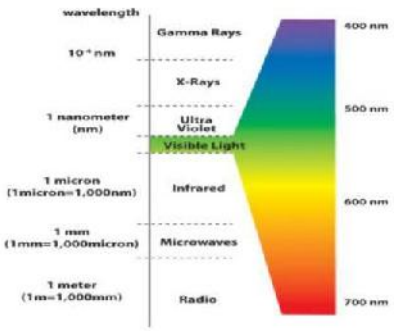
The biological basics



Light is very strange. Sometimes it is best to think of light as a series of waves. At other times, it is useful to think of light as a swarm of particles. When we think of light as particles, we call those particles of light "photons".

Photons are the carriers of all forms of electromagnetic (EM) radiation, not just light. The different types of EM radiation correspond to different amounts of energy per photon. Gamma ray and X-ray photons have the most energy, radio frequency photons have the least energy, while ultraviolet, infrared, and visible light photons have intermediate energies.

Photons travel at the speed of light, which is 299,792.458 kilometers per second (about 186,282.4 miles per second). Photons don't have any mass, nor do they carry an electrical charge.



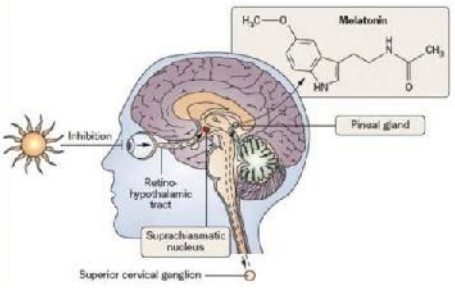
Visible light is one way energy uses to get around. Light waves are the result of vibrations of electric and magnetic fields, and are thus a form of electromagnetic (EM) radiation. Visible light is just one of many types of EM radiation, and occupies a very small range of the overall electromagnetic spectrum. We can, however, directly sense light with our own eyes, thus elevating the role of this narrow window in the EM spectrum because of its significance to us.

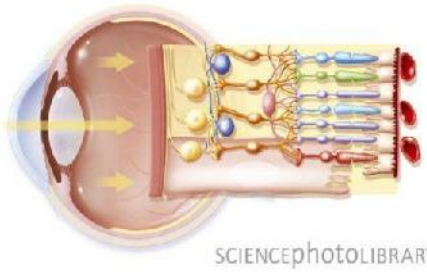
Light waves have wavelengths between about 400 and 700 nanometers (4,000 and 7,000 Å). Our eyes perceive different wavelengths of light as the rainbow hues of colors. Red light has relatively long waves, around 700 nm (10^{-9} meters) long. Blue and purple light have short waves, around 400 nm. Shorter waves vibrate at higher frequencies and have higher energies. Red light has a frequency around 430 terahertz, while blue's fequency is closer to 750 terahertz. Red photons carry about 1.8 electron volts (eV) of energy, while each blue photon transmits about 3.1 eV.

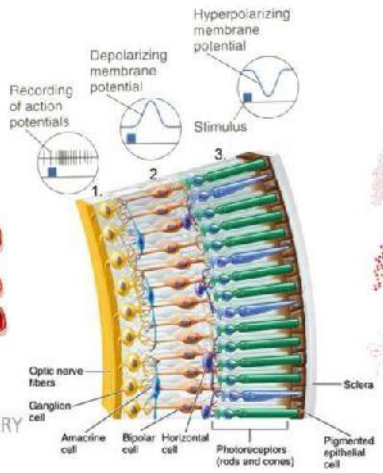
CLASS	FREQUENCY	WAVELENGTH	ENERGY
Y	300 EHz	1 pm	1.24 MeV
HX	30 EHz	10 pm	124 keV
	3 EHz	100 pm	12.4 keV
SX	300 PHz	1 nm	1.24 keV
	30 PHz	10 nm	124 eV
EUV NUV	3 PHz	100 nm	12.4 eV
	300 THz	1 µm	1.24 eV
NIR	30 THz	10 µm	124 meV
MIR	3 THz	100 µm	12.4 meV
FIR	300 GHz	1 mm	1.24 meV
EHF	30 GHz	1 cm	124 µeV
SHF	3 GHz	1 dm	12.4 µeV
UHF	300 MHz	1 m	1.24 µeV
VHF	30 MHz	10 m	124 neV
HF	3 MHz	100 m	12.4 neV
MF	300 kHz	1 km	1.24 neV
LF	30 kHz	10 km	124 peV
VLF	3 kHz	100 km	12.4 peV
VF/ULF	300 Hz	1 Mm	1.24 peV
SLF	30 Hz	10 Mm	124 feV
ELF	3 Hz	100 Mm	12.4 feV

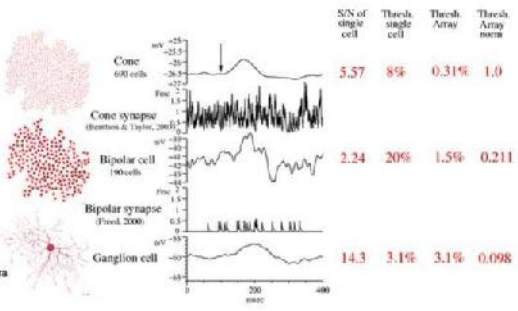
Visible light's neighbors on the EM spectrum are infrared radiation on the one side and ultraviolet radiation on the other. Infrared radiation has longer wavelength waves than red light, and thus oscillates at a lower frequency and carries less energy. Ultraviolet radiation has waves with shorter wavelengths than do blue or violet light, and thus oscillates more rapidly and carries more energy per photon than visible light does.

Light travels at the incredible speed of 299,792.458 kilometers per second (about 186,282.4 miles per second). At this amazing speed, light could circle Earth more than seven times in one second! The lowercase letter "c" is often used to represent the speed of light in equations, such as Einstein's famous relation between energy and matter: "$E = mc^2$". All forms of electromagnetic waves, including X-rays and radio waves and all other frequencies across the EM spectrum, also travel at the speed of light. Light travels most rapidly in a vacuum, and moves slightly more slowly in materials like water or glass.

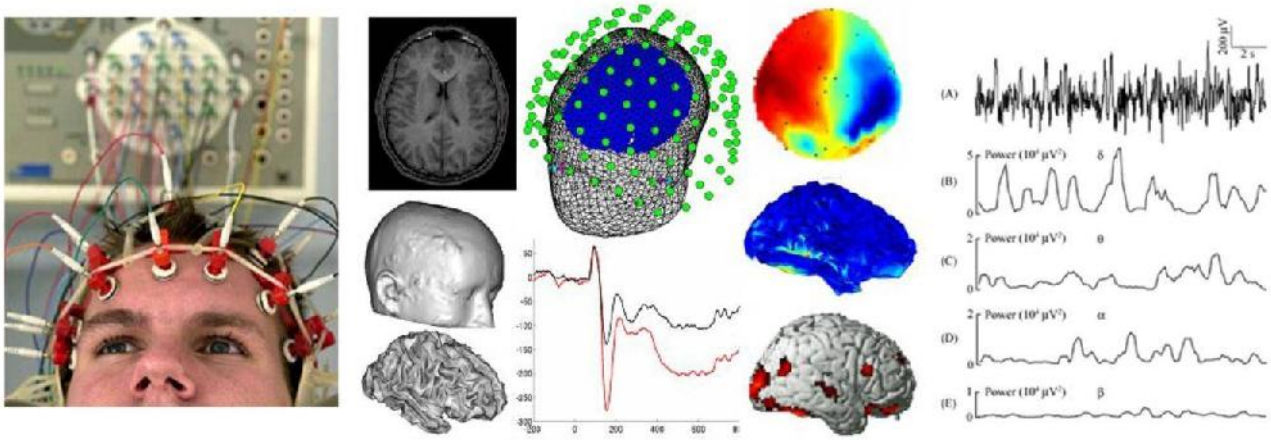


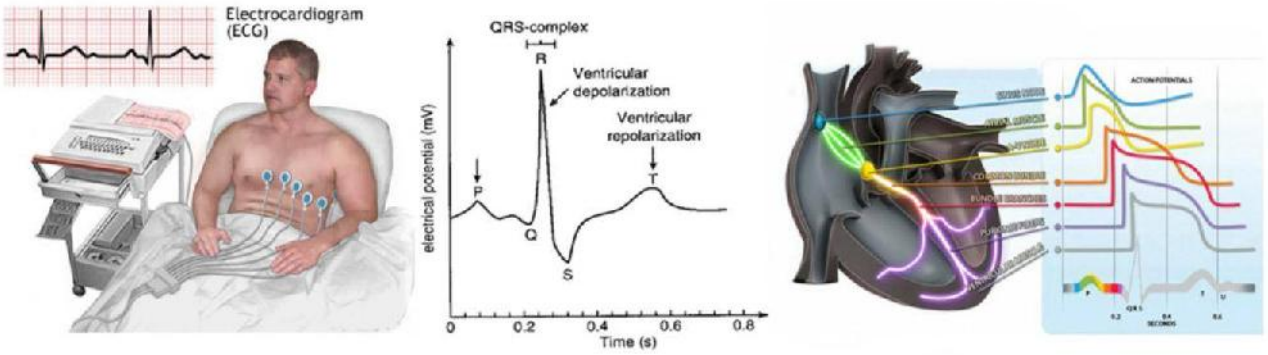


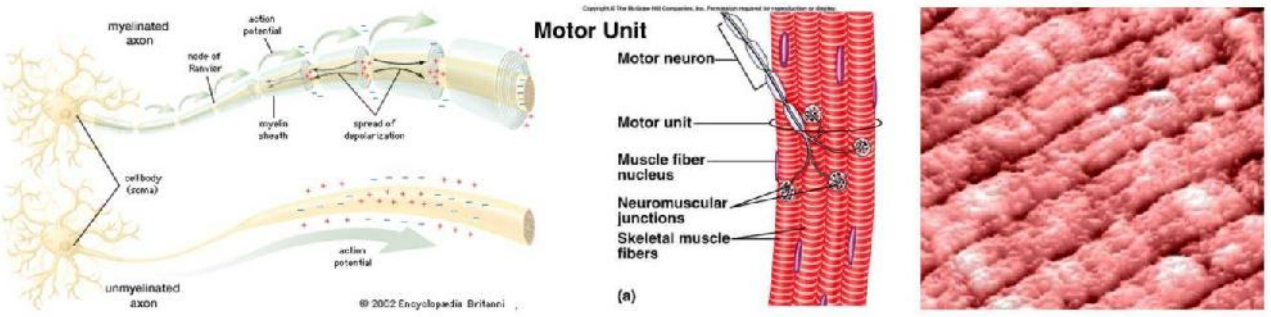




Own Signals
- Actions Potentials -







A short introduction about EMOST™

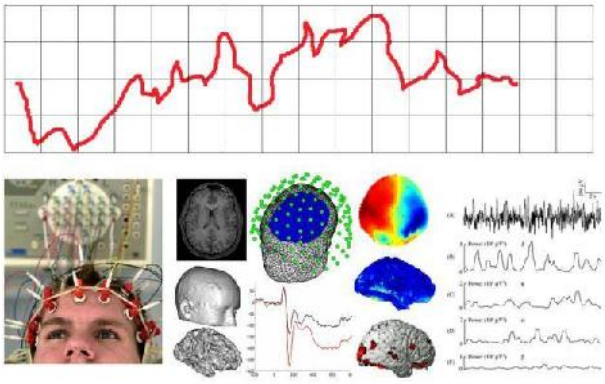
Our method is called EMOST™ (Electromagnetic Own Signal Therapy)

The EMOST Redox 1.1 medical device

Well, what the very special features are of our EMOST™ method compared to numerous electromagnetic devices over the world. Diverse electromagnetic curing devices over the world employ various artificial electromagnetic signals that are mainly modulated with respect to the frequency or the amplitude.

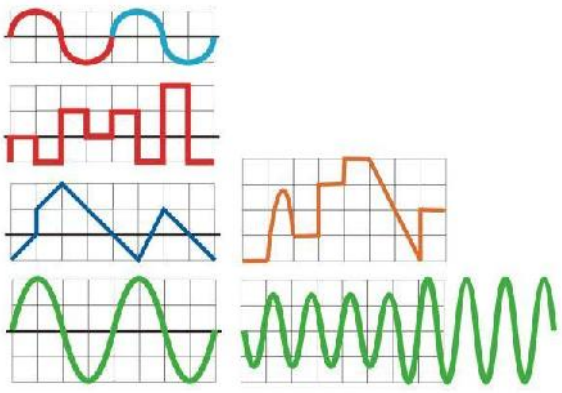
Because it is impossible to investigate the whole range of artificial electromagnetic frequencies for therapeutic applications, it seemed reasonable for us to **use non-linear own bioelectric and bioelectromagnetic signals from skin cells of patients for therapeutic applications**, which can be much more effective than the diverse, artificial electromagnetic signals. Our EMOST™ system can detect and sense non-linear, bioelectromagnetic signals (may potentials) of the patient's skin **in extrasense range** 1 to 1.000.000 signal/sec/mV.

Natural, non-linear signal (potential)



Non-linear own body bioelectromagnetic signals

Synthesized (non-natural), linear signals



Artificial electromagnetic signals

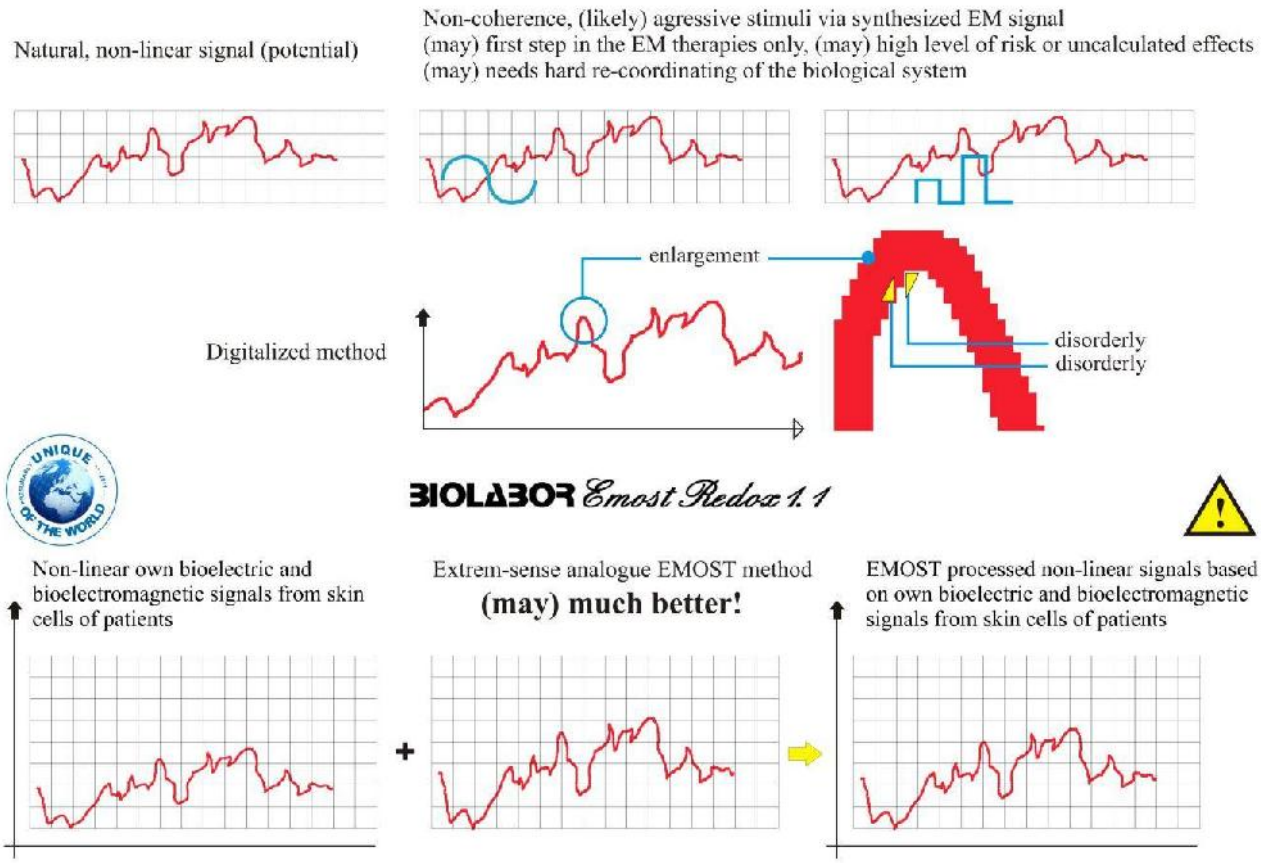
ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

The collected bioelectromagnetic input signals from patients' skin are processed by preprogrammed EMOST device. The patients are treated by preprogrammed signals of EMOST device (frequencies in the range of 1-1,000,000 signal/sec (Hz); intensity range between 1-10 micro Teslas, mV, via special extreme sense input/output flat electrode-antenne).

The next very special feature is of our EMOST™ method compared to many electromagnetic devices over the world that **detected own bioelectromagnetic signals from skin are processed, inside EMOST device, via analogue manner** (**natural based, non-digitalized!**), which are transmitted back via a special flat electrode through different (BioLabor know-how) band/signal combinations, with some amplification (-20dB- +60dB), to the skin's surface on the opposite side, extended by the higher range (Fourier transfomations) of the signal. The extendended range natural based signals helps with interference for activity of potentials and action potentials. (See attached publications on CD)

⚠ The special analogous signal process of EMOST™ device makes it possible that the information content of detected and back-transmitted electromagnetic signal is much coherenced than in digitized cases, so helps for natural potentials to be in action potentials.



We should see that during various diseases, living cells not only demonstrate altered and impaired biochemical processes but also produce altered non-linear bioelectromagnetic complex patterns. Since each patient has a unique description concerning his/her own particular diseases, bioelectromagnetic own signals from skin cells of patients for therapeutic applications can be much more effective than the any diverse, artificial electromagnetic signals.

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

⚠ Our EMOST™ device can guarantee this specific method, because its output signals are based on the appurtenant bioelectromagnetic signals of the patients' own living systems.

Over the last 6 years, in many cases, while pharmacologic treatments were ineffective, our EMOST application was able to help patients. In addition, we perform continuously various clinical experiments by EMOST™ devices and publish them in peer-reviewed scientific journals. Consequently, the EMOST™ is a state-of-the-arts scientific medical method in self-recovering.

Our scientific publications about EMOST

- Bókkon I., Till A., Erdöfi-Szabó A. (2011) Effect of Electromagnetic-Own-Signal-Treatment on electrocardiogram and the concentration of urea, cholesterine, albumin, cortisol, creatin, TSH, CRP in serum. Under processes.
- Bókkon I., Till A., Grass A., Erdöfi-Szabó A. (2011) Phantom pain reduction by electromagnetic treatment. Electromagnetic Biology and Medicine In press
- Bókkon I., Till A., Erdöfi-Szabó A. (2011) Non-ionizing Electromagnetic-Own-Signal-Treatment. 8th European Biophysics Congress. 23-27 August, Budapest, Hungary.
- Bókkon I., Till A., Erdöfi-Szabó A. (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. International Conference of Preventive Medicine and Public Health. 19-20 Nov. Pécs, Hungary.
- Bókkon I., Till A., Erdöfi-Szabó A. (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. Available from Nature Precedings <http://dx.doi.org/10.1038/npre.2010.4989.1> (2010)
- Bókkon I., Till A., Erdöfi-Szabó A. (2010) Phantom Pain Reduction by Non-ionizing Electromagnetic Treatment. Hungarian Epidemiology 7/4/Suppl. p:15. Abstract
- Bókkon I., Erdöfi-Szabó A., Till A., Balázs R., Sárosi Z., Szabó Z.L., Kolonics G., Popper G. (2012) EMOST: Report about the application of low-frequency and intensity electromagnetic fields in disaster situation and commando training, Electromagnetic Biology and Medicine, In press

⚠ Effects of the EMOST on biochemical and physiological mechanisms

a) (the organs deep inside the body are being effected via the easily accessible surface of the skin, as a result of the cells' internal and external bioelectrochemical processes)
b) the radiation in its natural range potentiates the subsystems of the body
c) helps the fine modulations in the central nervous system processes
d) affects the parasympathetic / sympathetic balance of the neurovegetative system
e) affects the cellular signal processes (potentials, action potentials)
f) affects the neuro-endocrin operation
g) facilitates hormonal control
h) helps the immune processes
i) affects the control of free radicals and the antioxidant level (redox processes)
j) affects the control of the acid-base balance (pH)
k) helps the homeostasis of the body in its natural range

Example about extremely low-intensity electromagnetic radiation induced bio-chemical processes in cells: electromagnetic radiation (exposition) → changes in the structures of the membrane receptor → activation of NADPH oxidase at plasma membrane → production of super oxide radicals $O2^{\cdot-}$ → activation of calcium Ca^{2+} channels and lipoxygenase → stimulation of the arachidonic acid cascade → peroxidated lipids → extension of intracellular signals.

Some relevant references:

- Morabito C, Rovetta F, Bizzarri M, Mazzoleni G, Fanò G, Mariggiò MA. Modulation of redox status and calcium handling by extremely low frequency electromagnetic fields in C2C12 muscle cells: A real-time, single-cell approach. Free Radic Biol Med. 2010, 48: 579–589.
- Nindl G, Balcavage WX, Vesper DN, Swez JA, Wetzel BJ, Chamberlain JK, Fox MT. Experiments showing that electromagnetic fields can be used to treat inflammatory diseases. Biomed Sci Instrum. 2000, 36: 7-13.
- Ke XQ, Sun WJ, Lu DQ, Fu YT, Chiang H. 50-Hz magnetic field induces EGF-receptor clustering and activates RAS. Int J Radiat Biol. 2008, 84: 413-420.
- Simkó M. Cell type specific redox status is responsib le for diverse electromagnetic field effects. Curr Med Chem 2007, 14: 1141-1152.
- Cook CM, Thomas AW, Keenliside L, Prato FS. Resting EEG effects during exposure to a pulsed ELF magnetic field. Bioelectromagnetics 2005, 26: 367-376.
- Ryczko MC, Persinger MA. Increased analgesia to thermal stimuli in rats after brief exposures to complex pulsed 1 microTesla magnetic fields. Percept Mot Skills. 2002, 95:592-598.
- Selvam R, Ganesan K, Narayana Raju KV, Gangadharan AC, Manohar BM, Puvanakrishnan R. Low frequency and low intensity pulsed electromagnetic field exerts its antiinflammatory effect through restoration of plasma membrane calcium ATPase activity. Life Sci. 2007, 80: 2403-2410.
- Johnson MT, Waite LR, Nindl G. Noninvasive treatment of inflammation using electromagnetic fields: current and emerging therapeutic potential. Biomed Sci Instrum. 2004; 40: 469-474.

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

How output signals from EMOST device can reach to all parts of body

1. EMOST-sensor 2. skin 3. epidermis 4. dermis 5. fat 6. blood wessels 7. sweat gland
8. receptors 9. free nerve endings 10. nerve 11. neuropeptides 12. fybroblasts, keratnocytes
13. hormones 14. proteases, cytokines 15. Merkel-cells, local immun system

⚠ EMOST™ method can convey the detected and changed bioelectromagnetic patterns of effective cells to surrounding and other cells, which facilitates intercellular communication via biochemical processes, and helps in signal transmission and recognizing of neurovegetative system. Specifically, EMOST™ method can affect the length of cell membranes and the number and variety of membrane-bound receptors and signal transmission..

I. **First signal way**: Output signals from EMOST™ via a flat electrode can influence bioelectrochemical and redox processes of blood circulation of arterial and capillary systems under the skin thus output signals can reach to all parts of our body.

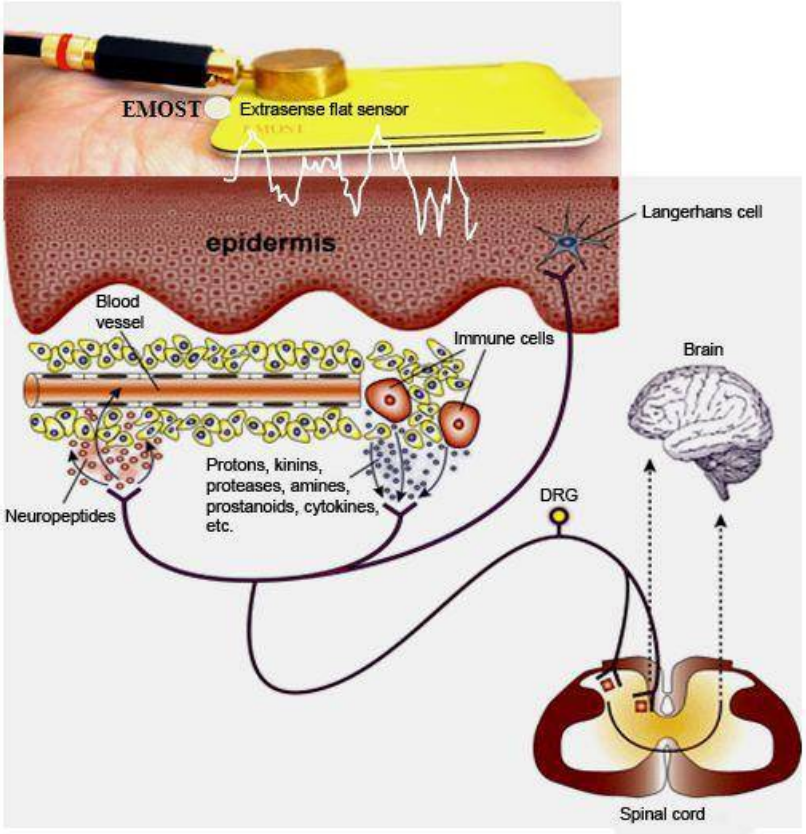
II. **Second signal way**: Output signals from EMOST™ via a flat electrode can influence terminal nerves and sensory receptor cells in the skin. Excited fibres of sensory skin receptor cells convey the EMOST™ induced signals to spinal nerves or cranial nerve, which can modify membrane and action potentials.

III. **Third signal way**: Output signals from EMOST™ via a flat electrode can influence immune system of skin. It is less known that there is twice as much T cells in our skin than in our circulation blood. However, according to latest scientific results, the skin works as a neuro-immuno-endocrine organ.

IV. **Forth signal way:** Output signals from EMOST™ via a flat electrode can influence terminal Merkel cells the skin, as a bipolar electro-accupuncture effect –with non-invasive. The Merkel cells modify the ATP activity. The ATP-activated sensory nerves also lead to modulation of the activity of brain-stem neurons controlling autonomic nervous system functions of gut, lung, urogenital, and cardiovascular systems—all of which have been treatment targets for traditional acupuncture procedures.

Illustration: Third signal way:

The skin as a neuroimmunoendocrine organ. Physiol Rev. 2006 86(4):1309-1379



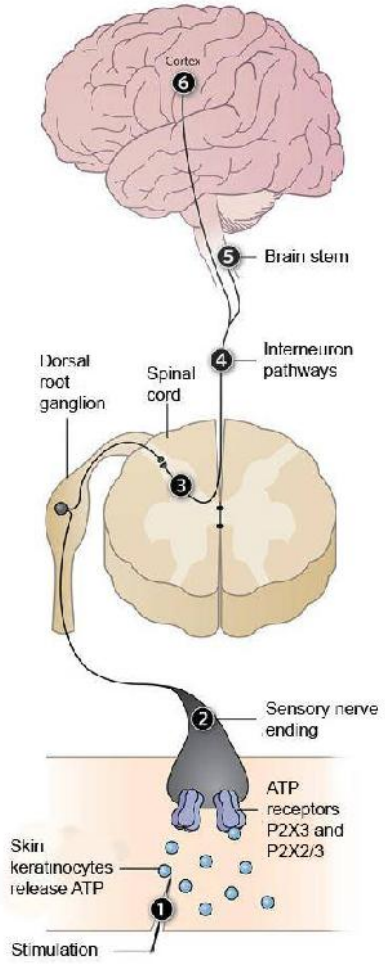


Illustration: Fort singal way:

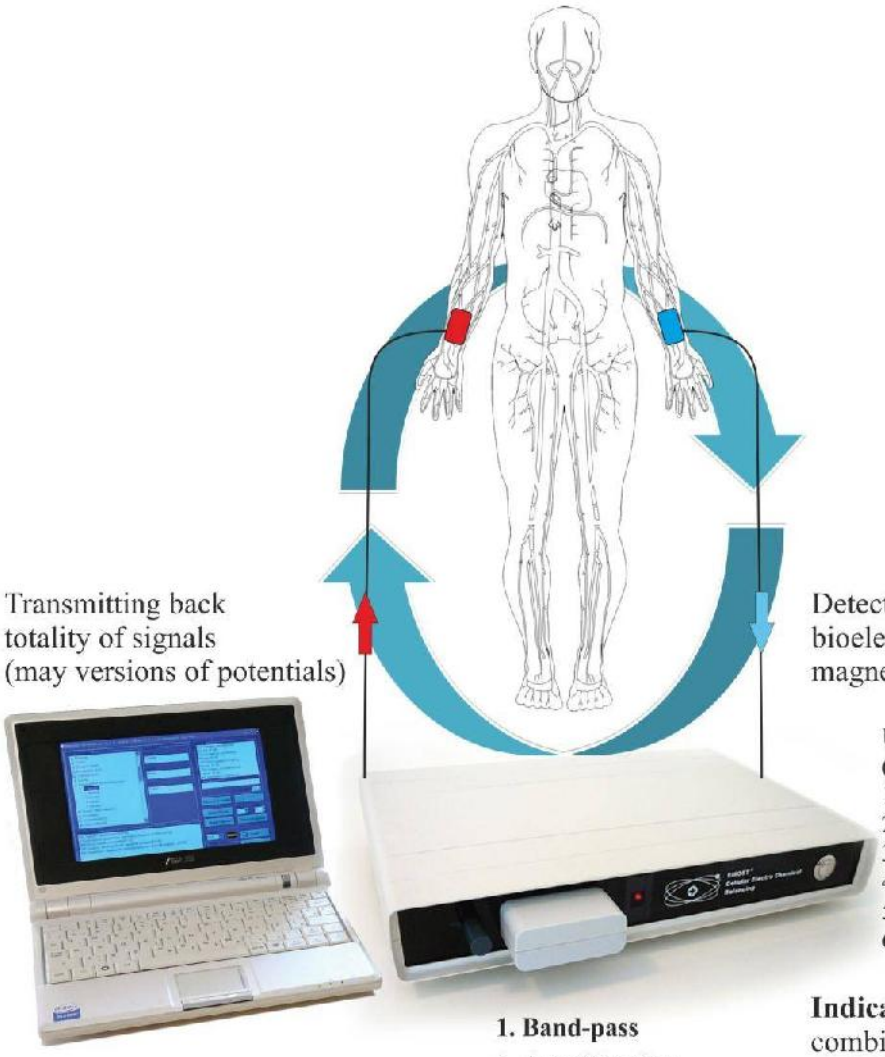
Signal leading to the release of ATP by skin keratinocytes (1). ATP binds to specific receptors located on sensory nerve endings in the skin known as P2X3 and P2X2/3 (2). The signaling message is then relayed via dorsal root ganglia to the spinal cord (3) and subsequently through interneuronal pathways (4) to the brain stem (5) which contains motor neurons that control the functions of gut, lung, heart, arteries and reproductive organs, and the signals also travel to signal centers in the cortex, delivering a message to inhibit flow (6).

http://the-scientist.com/2011/09/01/puncturing-the-myth

Figure source: Roosterman et al. Neuronal control of skin function:

The EMOST® process

transmitting the natural based extrem-low intensity analogue signals back in natural range



Transmitting back totality of signals (may versions of potentials)

Detection of natural bioelectric and bioelectro-magnetic signals

Used bands of detected signals (may periods of potentials)
1. 1-10 signal/sec
2. 10-100 signal/sec
3. 100-1000 signal/sec
4. 1000-10000 signal/sec
5. 10000-100000 signal/sec
6. 100000-1000000 signal/sec

1. Band-pass

2. Amplification

-20 dB,
60 dB

3. Expansion, and extension of variations

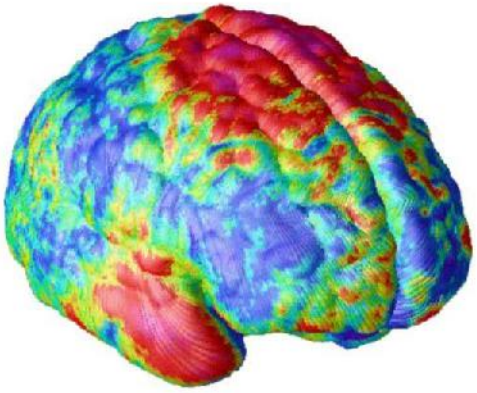
Fourier transform
-14 dB to 5 MHz
0,1 sec. – 102 sec

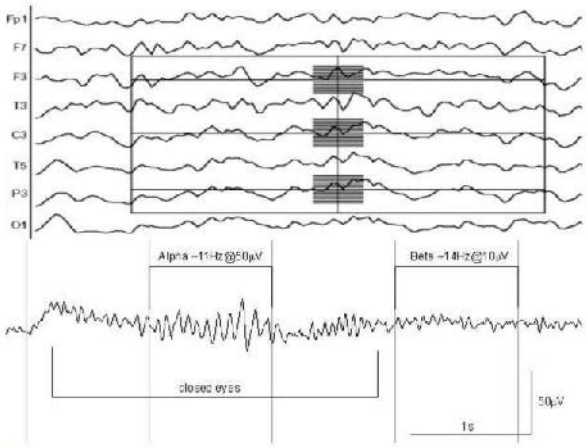
Indicatio:
combinations of signal-bands, variations of amplification and extension of variations

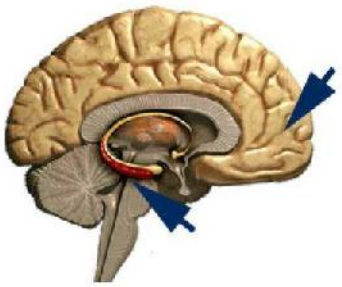
CE 1979 MEDICAL DEVICE

PRESUMABLY UNIQUE OF THE WORLD

Developer/owner: EMOST Nano-MED Ltd., Manuf.: Caduceum Ltd., Excl.Distributor: BioLabor Biophysic Ltd.
www.biolabor-med.com







Probably:

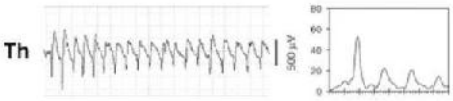
Frontal lobe: also involved in emotion, and in the ability make plans, think creative, and combinations of synapses (from/to memories, experiences etc.)

Amygdala: evaluates sensory information, determining it's importance, agression, anxiety...

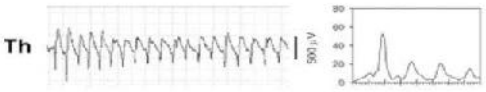
Thalamus: relay center, directs sensory messages (signaling testosterone immun function, apoptose etc.)

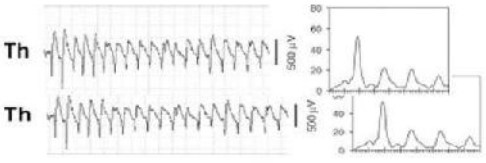
Hypothalamus: responsible for regulating basic biological needs: temperature, thirst, hunger etc.

EMOST ™ recognising and separating it's functional bioelectric signals in it's natural range: (from 1 Hz, potentials µV)



EMOST ™ makes slightly variations of amplification (from 1 Hz, potetntials µV, from -20 dB to 60 dB) via analogue (non-linear, non-digitalized) mode, and makes expansion, slightly extension of functional signal variations via Fourier lines (-14 dB, 5 MHz)

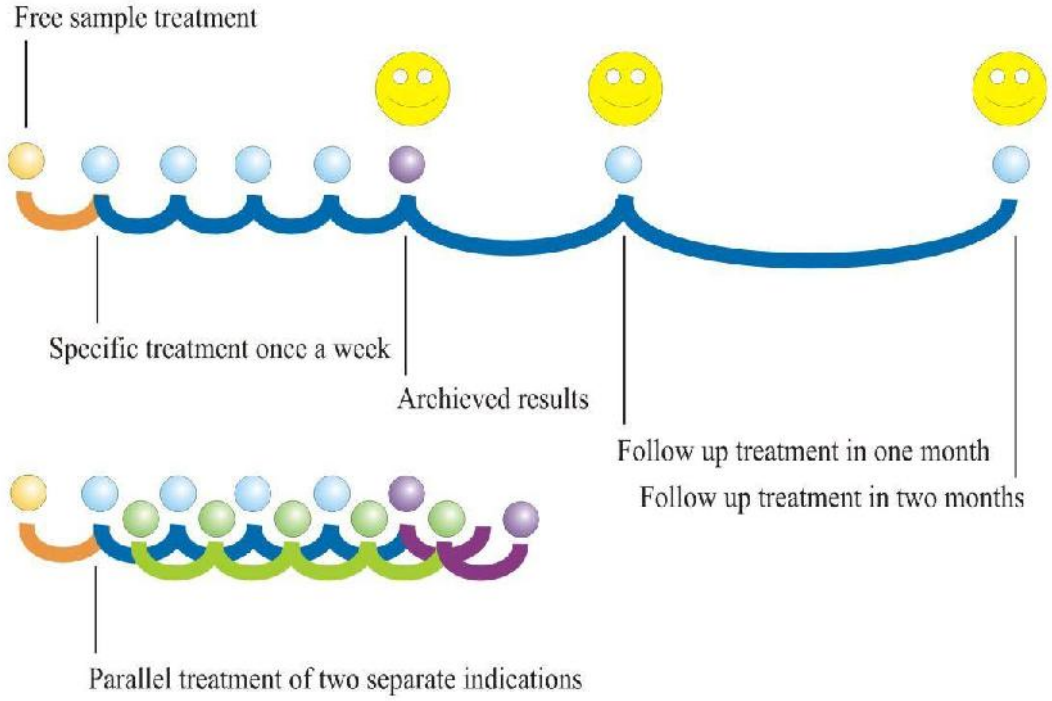




EMOST ™ - the EM Own Signal therapy ™ - then the variations and the original functional signal are returned through another free nerve ending zone, and helps for the neurovegetative system in signal transmission, signal recognising and electro-chemical balancing.

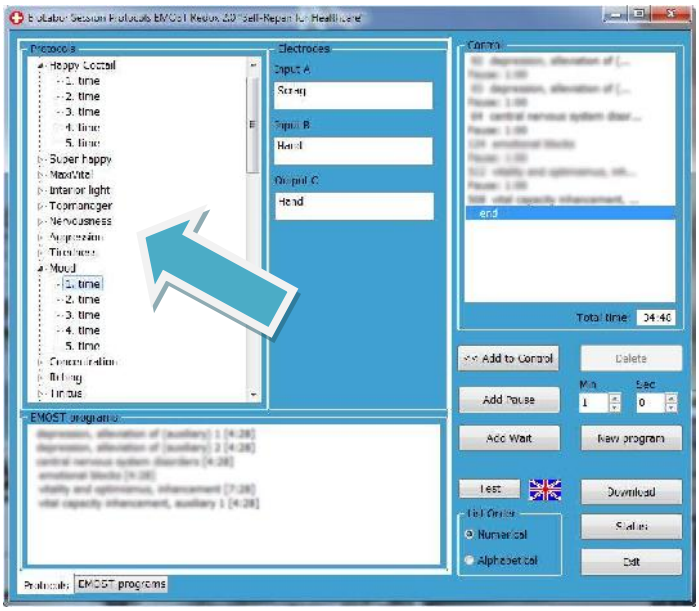
EMOST ™ - the EM Own Signal therapy ™ - the retransmitted own information helps re-coordinating of functional signal, and the retransmitted own functional signal energy has enough redundancy to overcome the dead point and to regain balance.

How often, how many treatments or what kind of treatments can be necessary by EMOST™ in a given disease.



⚠ As the medical intervention is done by the subject's own functional signals, the body records the correction process, and **can later reproduce it on its own** (eh. immune-memory) may **in years**.

⚠ **High-Tech and easy to use!** The EMOST™ medical device is full self-acting and pre-programmed, just choose a treatment, than the unique device works (after seven years of testing and developing) automatically.



BioLabor EMOST® effectiveness according to our last years experiences

a) regular health maintenance in chronic cases
b) neurovegetative based diseases
c) neuro-endocrin and immunological diseases
d) fear, psychic stress related (mental) diseases, depression, lethargy
e) sleep disorders
f) central nervous system diseases, concentration, sensitivity etc.
g) cardiovascular diseases, arhythm
h) respiratory diseases, asthma
i) phantom limb pain rehabilitation, amputee rehabilitation
j) PTSD – Post Traumic Stress Diseases rehabilitation
k) allowance of risks in implantation
l) skeleton and muscular-skeletal disorders
m) stomach and intestinal diseases, irritable intestine syndrome
n) skin and subcutaneous tissue disorders
o) genito-urinary problems
p) in case of injuries and fractions
q) in case of allergic diseases on the skin

Other clinical results:

Veins, phlebitis, vascular wall, varix, venectasia (8), wound healing (6), traumatic bone (3), cardiovascular parameters (1,2), spermium activity (10), sclerosis multiplex (15), pains (5,7,14), rheuma, rheumatic pain (7,12,17), osteochondral defects (13) hypertension (9), depression, feeling blue, lethargie, distress, psychiatrical diseases (1,16,18,19), cronical tiredness (19), sleeping quality (1), fibromyalgia (11,7), brain alpha activity (1,2,5), opioid system (5), oedema, collagen (4).

1) Cvetkovic D, Cosic I. Alterations of human electroencephalographic activity caused by multiple extremely low frequency magnetic field exposures. Med Biol Eng Comput. 2009 Oct;47(10):1063-73.
2) Dean Cvetkovic, Qiang Fang and Irena Cosic. Multiple human electrophysiological responses to extremely low frequency pulsed electromagnetic field exposures: a pilot study. Estonian Journal of Engineering 2008, 14, 2, 138–153.
3) Abdelrahim A, Hassanein HR, Dahaba M. Effect of pulsed electromagnetic field on healing of mandibular fracture: a preliminary clinical study. J Oral Maxillofac Surg. 2011 69(6):1708-17.
4) Uzunca K, Birtane M, Taştekin N. Effectiveness of pulsed electromagnetic field therapy in lateral epicondylitis. Clin Rheumatol. 2007 26(1):69-74.
5) Ghione S, Seppia CD, Mezzasalma L, Bonfiglio L. Effects of 50 Hz electromagnetic fields on electroencephalographic alpha activity, dental pain threshold and cardiovascular parameters in humans. Neurosci Lett. 2005 382(1-2):112-7.
6) Rohde C, Chiang A, Adipoju O, Casper D, Pilla AA. Effects of pulsed electromagnetic fields on interleukin-1 beta and postoperative pain: a double-blind, placebo-controlled, pilot study in breast reduction patients. Plast Reconstr Surg. 2010 125(6):1620-9.
7) Shupak NM, McKay JC, Nielson WR, Rollman GB, Prato FS, Thomas AW. Exposure to a specific pulsed low-frequency magnetic field: a double-blind placebo-controlled study of effects on pain ratings in rheumatoid arthritis and fibromyalgia patients. Pain Res Manag. 2006 11(2):85-90.

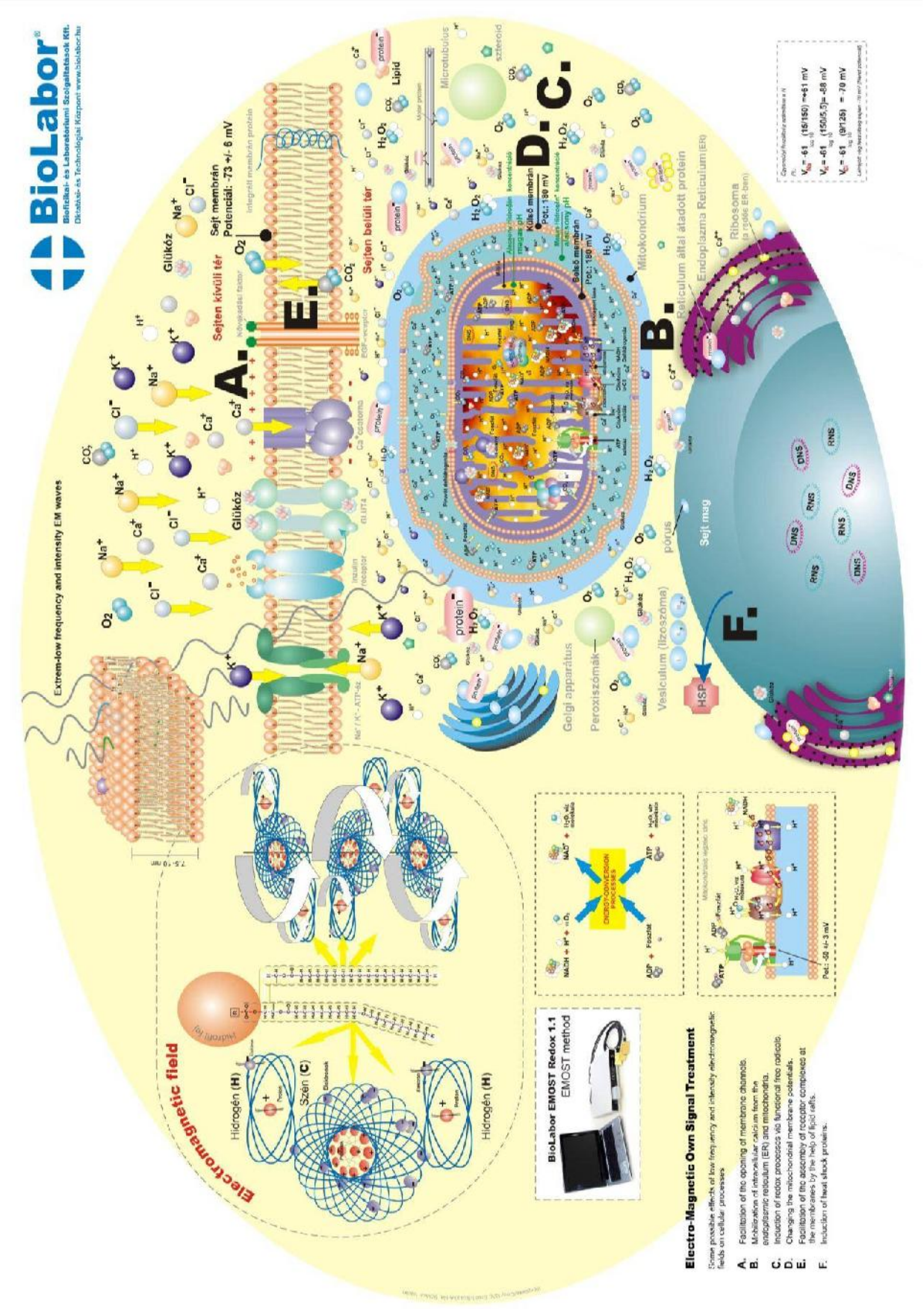
2012

8) Cañedo-Dorantes L, García-Cantú R, Barrera R, Méndez-Ramírez I, Navarro VH, Serrano G. Healing of chronic arterial and venous leg ulcers through systemic effects of electromagnetic fields. Arch Med Res. 2002 33(3):281-9.
9) Nishimura T, Tada H, Guo X, Murayama T, Teramukai S, Okano H, Yamada J, Mohri K, Fukushima MA 1-μT extremely low-frequency electromagnetic field vs. sham control for mild-to-moderate hypertension: a double-blind, randomized study. Hypertens Res. 2011 Mar;34(3):372-7.
10) Iorio R, Delle Monache S, Bennato F, Di Bartolomeo C, Scrimaglio R, Cinque B, Colonna RC. Involvement of mitochondrial activity in mediating ELF-EMF stimulatory effect on human sperm motility. Bioelectromagnetics. 2011 32(1):15-27.
11) Sutbeyaz ST, Sezer N, Koseoglu F, Kibar S. Low-frequency pulsed electromagnetic field therapy in fibromyalgia: a randomized, double-blind, sham-controlled clinical study. Clin J Pain. 2009 25(8):722-8.
12) Duygu Geler Külcü, Gülçin Gülşen, Elif Çiğdem Altunok. Short-Term Efficacy of Pulsed Electromagnetic Field Therapy on Pain and Functional Level in Knee Osteoarthritis: A Randomized Controlled Study. Turk J Rheumatol 2009; 24: 144-8.
13) van Bergen CJ, Blankevoort L, de Haan RJ, Sierevelt IN, Meuffels DE, d'Hooghe PR, Krips R, van Damme G, van Dijk CN. Pulsed electromagnetic fields after arthroscopic treatment for osteochondral defects of the talus: double-blind randomized controlled multicenter trial. BMC Musculoskelet Disord. 2009 10;10:83.
14) Weintraub MI, Cole SP. Pulsed magnetic field therapy in refractory neuropathic pain secondary to peripheral neuropathy: electrodiagnostic parameters—pilot study. Neurorehabil Neural Repair 2004;18:42–46.
15) Sandyk R. Treatment with electromagnetic fields reverses the long-term clinical course of a patient with chronic progressive multiple sclerosis. Int J Neurosci. 1997 90(3-4):177-85.
16) Baker-Price L, Persinger MA. Intermittent burst-firing weak (1 microTesla) magnetic fields reduce psychometric depression in patients who sustained closed head injuries: a replication and electroencephalographic validation. Percept Mot Skills. 2003 Jun;96(3 Pt 1):965-74.
17) Trock DH, Bollet AJ, Dyer RH Jr, Fielding LP, Miner WK, Markoll R. A double-blind trial of the clinical effects of pulsed electromagnetic fields in osteoarthritis. J Rheumatol. 1993 Mar;20(3):456-60.
18) Baker-Price LA, Persinger MA.Weak, but complex pulsed magnetic fields may reduce depression following traumatic brain injury. Percept Mot Skills. 1996 Oct;83(2):491-8.
19) Tsang EW, Koren SA, Persinger MA. Specific patterns of weak (1 microTesla) transcerebral complex magnetic fields differentially affect depression, fatigue, and confusion in normal volunteers. Electromagn Biol Med. 2009;28(4):365-73.

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

Some possible effects of low frequency and intensity electromagnetic fields on cellular processes



ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

Mission

4-Future: Quality of sleeping, incontinency, asthmatic and allergic status, mood, hyperactivities

Clinical result: successful treatment of phantom pain (and sleeping, mood) by EMOST

Post traumic stress treatment by EMOST (*original pictures* ↓) after flood in Felsőzsolca, Hungary

Better concentration, power, rehabilitation, well status after professional sport carriere

EMOST helps better coordination of muscles, psychical stability, vital capacity

ELECTROMAGNETIC OWN SIGNAL TREATMENT

2012

No. 1

Stress related (mental) diseases treatment

Conclusion

The special analog signal processing of the EMOST™ equipment allows much more length of the detected electromagnetic and regenerated electromagnetic signal information than in the digital (signal loss, signal distortion) cases. The EMOST™ method seems to be able to potentiate cellular communication, the control processes and the operation of the biochemical homeostasis in a natural way by reflecting the electric- and electromagnetic impulses coming from the body's own range, all without the use of any artificial electric- and electromagnetic radiation, and the risks thereof.