

ON RADIOFREQUENCY AND MICROWAVE NON-IONIZING BIOEFFECTS: EXTENDED 4G AND 5G NETWORKS, PSYCHOSOMATICS AND HOLISTIC PREVENTION

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Abstract. In previous months, dissatisfaction with the announcement of the increasing installation of the extended 4G and 5G mobile networks has been spreading on the Internet. Hence, this paper deals with the hot topic of the influence of electromagnetic (EM) radiation on biological systems and especially on humans. The identification, definition and division of non-ionizing radiation sources are performed. The biological impacts and risk of radiofrequency (RF) and microwave (MW) non-ionizing EM radiation are discussed in detail. Beside thermal effects non-thermal effects are analyzed: HSP proteins, genetic effects, reproductive disorders, neurological effects, electromagnetic hypersensitivities, influence on biochemical processes in the cell. The paper also deals with balancing preventive effects on the human body exposed to harmful influences of non-ionizing EM radiations. Finally some anti-stress holistic recommendations for self-help are suggested as well.

Keywords: EM radiation, influence, biological effects, thermal and non-thermal effects, extended 4G and 5G mobile networks, anti-stress holistic recommendations for self-help balancing.

1. Introduction

In previous months, dissatisfaction with the announcement of the increasing installation of 5G mobile networks has been spreading on the Internet. Although 5G networks bring undoubted technological advances in multiple Internet acceleration and accompanying real-time automation and robotization (so-called Internet of Things), there are also strong resistances to the spread of 5G networks due to potential health problems and observed environmental effects on flora and fauna. Despite this, hundreds of Mask satellites have already been launched to cover 5G internet satellite communications on the entire planet, and it is planned to launch thousands of such satellites in the next few years.

At the beginning of the covid 19 pandemic, a 10-minute video has appeared on the Internet, quickly becoming viral, but it has been soon removed from social networks, not to spread rumors about the additional harmful effects of 5G networks on people in the era of the covid 19 pandemic. But, there can be a grain of truth in the whole story, because the human organism is extremely sensitive to non-thermal electromagnetic radiation of very low intensity. In 2016, my BSc graduate student wrote a diploma thesis *On biological influences of RF and MT of non-ionizing radiation*, with an excellent review of reference literature in that field [1], and last year we published two papers based on it [2,3].

Certainly of special concern are the potential health effects on the human population. For several decades, I have been researching the nature of psychosomatic diseases based on an imbalance in the activity of the acupuncture system, which is resonantly sensitive in the microwave range between 50 and 80 GHz. Restoring the disturbed acupuncture system to balance is the essence of the so-called microwave resonance therapies (MRT) discovered in the late 1980s and applied in accordance with the knowledge of Traditional Chinese Medicine. Soon afterwards, intensive multidisciplinary research has indicated that the acupuncture system behaves like a macroquantum system, which led to the emergence of Quantum Medicine, which has been then often called Information Medicine or Quantum Information Medicine due to its informational specifics [4].

Research in previous decades indicates an important *epigenetic role of stress* (including the so-called EM smog from a number of electrical devices in a wider EM range) in the development of a number of psychosomatic disorders. Therefore, a correct and comprehensive discussion is needed about the non-thermal effects of EM radiation in all bands (from ULF through RF / MW), which is opposed by powerful electrical and telecommunications lobbies. They are guided by radiation protection standards that are based solely on thermal influences. But there is a major impact on psychosomatic health of very low intensity of non-thermal radiation, so the efforts of mobile device manufacturers are in vain because the acupuncture system is extremely sensitive to very low radiation intensities through a system of non-threshold gap junction (GJ) electrical synapses that permeate the acupuncture system (as well as heart muscle, liver, smooth muscles, and neurons with electrical synapses) [4,5].

There are also *viral videos* that show how in the focus of the directional microwave field of three mobile phones (of even lower 3G or 4G generation) you can cook an egg or fry popcorn, and one can imagine what it happens to the brains of people who hold a mobile phone near their head during a conversation, or what will happen by using the phones of the future 5G and higher generations.

The paper consists of five chapters. The first chapter is introductory and lists the motivation for writing this paper. The second chapter deals with the biological impacts and risks of RF / MW exposure to non-ionizing radiation. The third chapter considered the quantum-holographic framework of psychosomatics, which enables a fundamental understanding of the *epigenetic nature of psychosomatic disorders* as well as the *limitations and methods of their prevention and healing*. The fourth chapter discusses ways to *optimize the existing numerous holistic risks in the environment*. The fifth chapter is concluding.

2. On biological influences and risks of RF / MW non-ionizing radiations

The biological effect is a change in the biological system that (i) can be measured and that (ii) occurs after a stimulus. The biological effect indicates the existence of sensitivity of the biological system to the appropriate stimulus. It is clear that a biological effect does not necessarily indicate the existence of a biological or health risk, for example if the change in the system is temporary, or if it has positive consequences. But if it is permanent, or if such changes often follow one another, then that effect should certainly be well studied.

It has long been thought that the only effect produced by RF / MW non-ionizing radiation is thermal. However, it turns out that there are effects that are not thermal, that require lower field intensities and that are far more significant than thermal because they are potentially very dangerous [4,5]. But major world organizations continue to deny the non-thermal effects and base their radiation protection recommendations on the thermal effect.

2.1. Thermal effects

A well-studied biological effect of RF / MW non-ionizing radiation is the heating, in which any dielectric material, including biological tissues, is heated by oscillations of polar molecules, which are induced by the EM field. When a person uses a phone, this thermal effect is most noticeable on the surface of the head, increasing the temperature by a small part of the degree. This increase in temperature is an order of magnitude smaller than the increase in direct sunlight. The human cerebral bloodstream is able to cope with excess heat by increasing blood flow. Exposure to higher RF / MW radiation can lead to tissue damage [6].

According to this principle, i.e. the biological effect, the recommended limits of human exposure have been formed, issued by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which has published recommendations for exposure to non-ionizing radiation up to 300 GHz [7]. These recommendations are based on many years of evaluation of scientific reports. Only the thermal effect was

taken into account for their formation, and the existence of non-thermal effects was denied. Restrictions are divided into two groups: (i) Basic Constraints and (ii) Reference Levels.

Basic restrictions depend on the frequency of EM radiation and between 100 kHz and 10 GHz are expressed via the quantity of SAR (Specific Absorption Rate, per unit mass in the prescribed time interval, with a temperature increase of more than 1°C), in order to protect the whole body, or local tissue or body parts.

Reference levels are used for practical assessment of exposure and maintaining it within the recommended limits. They are obtained from the basic limitations of mathematical modeling and on the basis of laboratory measurements, being expressed in measurable or reference values.

2.2. Non-thermal effects

Non-thermal effects are biological effects that occur at low intensities, i.e. field strengths, which cannot cause a thermal effect and which are sometimes significantly below the recommended exposure limits.

HSP proteins

Some scientists even claim that non-thermal effects are actually basically thermal. Thus, it was pointed out in [8] that there are several thermoreceptor molecules in cells and that they activate a cascade of other systems, mechanisms of genome expression; and production of heat shock proteins (hereinafter HSP) in order to protect cells from metabolic cellular stress produced by heating. They say that the increases in temperature are too small to be detected by the measuring instrumentation used in the research.

On the contrary, the authors in [9] showed that the effects related to HSP proteins are not a consequence of thermal effects, i.e. heating. They used a 900 MHz GSM mobile phone, whose radiation caused a temporary increase in Hsp27 protein activity. According to their conclusions, the activation of HSP proteins can lead to the development of cancer in the brain and to an increase in the permeability of the blood-brain barrier (BBB). Furthermore, if these events were repeated over a longer period, there could be an accumulation of brain tissue damage. They add that other factors that lead to brain tissue damage may be involved in the effects caused by cell phone radiation.

The authors in [10] developed a theoretical mechanism by which RF / MW radiation from mobile phones could cause cancer, through chronic activation of heat shock responses. Ascending regulation of HSP proteins is a normal defense response to cellular stress. However, chronic HSP protein expression is known to induce or promote oncogenesis, metastasis, or resistance to cancer drugs. They suggest that repeated exposure to mobile phone radiation (and certainly other sources of MW radiation) act as repetitive stress leading to continuous expression of HSP proteins in exposed cells and tissues, which affect their normal regulation and can lead to cancer. This hypothesis provides the possibility of a direct link between RF / MW radiation (and other ubiquitous digital radio technologies) and cancer.

Genetic effects

Many studies have shown that RF / MW radiation causes a change in gene and protein expression in certain cells at intensities that are less than the recommended limits. The study [11] reviewed 114 scientific papers dealing with the genetic effects of RF / MW non-ionizing radiation, published during 2007-2014. In the analysis of these works, it was shown that 74 (65%) of them showed biological effects, while the remaining did not. This study also analyzes 59 papers dealing with ELF radiation.

Several papers have implied the participation of free radicals in the genetic effects of RF radiation [12-14]. Increased free radical activity and changes in enzymes involved in cellular oxidative processes are the most consistent effects observed in human and animal cells after exposure to RF radiation. Many

biological effects of EM fields can be explained by intracellular changes in oxidative status, including genetic effects [11].

The effects of RF and ELF radiation have been shown to be very similar. The explanation of similar genetic effects of these radiations, whose energies are many times different, is given in an interesting paper *DNA is a fractal antenna in electromagnetic fields* by M. Blank, R. Goodman, [15] and lies in the fact that DNA behaves like a fractal antenna. As the authors of that paper state in their conclusion, "a wide frequency range of interactions with EM radiation is a functional characteristic of fractal antennas, and DNA appears to possess two structural characteristics of fractal antennas, electrical conductivity and self-similarity." This property of DNA could explain the basic mechanism of its interaction with EM radiation, which is present at all radiation frequencies.

Two important findings in studies are that the effects of EM radiation depend on the waveform and cell type. In [14] it was shown that increased free radical activity and DNA fragmentation in rat brain glial astrocytes occur at 20 minutes of exposure to 50 Hz amplitude-modulated 900 MHz RF radiation, while this effect does not occur in unmodulated waves. The authors in [16] found that rat neurons are more sensitive than astrocytes, and showed that the gene expression of rat neurons changes under the influence of 1800 MHz RF radiation modulated with 217 Hz, which is common in mobile phones.

The authors in [17,18] showed that the non-thermal effects of MW radiation of mobile phones below the recommended limits depends on several physical and biological parameters. Frequency-dependent effects of GSM mobile phone on reparative 53BP1 / γ H2AX proteins and chromatin conformations in human lymphocytes were observed. They showed that the radiation of a UMTS mobile phone causes significant negative effects in human lymphocytes similar to the effects of a GSM phone and heat shock. Unlike GSM phones, UMTS emits MW radiation from a wider frequency window and can hypothetically cause greater biological effects due to the more "effective" frequencies.

UMTS MW radiation has been shown to affect chromatin and prevent the formation and localization of 53BP1 / γ H2AX proteins in the focus of double-stranded DNA breaks in human lymphocytes and have confirmed the dependence of the effects on frequency. What is particularly interesting is that the effects on 53BP1 / γ H2AX proteins lasted for 72 hrs after cell irradiation, even longer than the stress response to heat shock. This long-lasting effect on these important human cells of the immune system can represent a strong link between health hazards and mobile phones.

Reproductive disorders

The study [11] states that there are several studies that show that RF radiation has negative effects on reproduction, especially on the physiology of sperm and germ cell DNA. And a review of BioInitiative 2012 [19,20] summarized the evidence regarding infertility and problems with reproductive potential. Most evidence comes from human and animal tests on sperm and male fertility. Mobile phone radiation damages human sperm with very low power densities (in the range 0.00034 - 0.07 μ W/cm²). Exposure levels are similar to levels as a consequence of carrying a mobile phone in a trouser pocket, or from using a laptop in your lap. The authors state that sperm do not have the ability to repair DNA due to the structure of the protein [19,20].

Several studies have shown negative effects on sperm quality, motility and DNA damage in men who use mobile phones and especially in those who carry mobile phones, PDAs or pagers on their belt or in their pants pocket [12,13,21-23]. There are fewer animal studies that have looked at the effects of cell phone radiation on female fertility parameters. In [25], reduced ovarian development and size, premature cell death of ovarian follicles and ovarian-feeding cells in wine flies (*Drosophila melanogaster*) were obtained. In that paper, it is also shown that the reproductive capacity is much more weakened by modulated radiation compared to unmodulated.

The authors in [25] showed that exposure of mice to "standby" levels of RF radiation (mobile phone is turned on but does not transmit telephone conversation) caused a significant reduction in the number of egg follicles in pups, and also a significant reduction in the number of pups born in these conditions. And in [26], irreversible infertility of mice was shown after five generations exposed to RF / MW radiation. Mice were exposed to a baseline radiation level of less than one microwatt per square centimeter ($< 1 \mu\text{W}/\text{cm}^2$).

Neurological effects

There are many published papers dealing with the influence of RF / MW non-ionizing radiation on brain electrical activity (EEG), as well as on human sleep. Here are some of the ones that have noticed the effects. There are also a large number of works in which no effect has been noticed. In [27], the influence of GSM mobile phone on the central nervous system (CNS) and evoked potentials (ERP) was noticed. The authors in [28] noticed changes in alpha waves in the EEG when subjects were exposed to mobile phone radiation. And in [29], similar effects of 2G and 3G mobile devices on EEG were observed.

There are several papers that have noted the effects of RF / MW radiation on sleep. In [30] it was observed that pulsed-modulated 900 MHz radiation increases the low-wave activity of the brain towards the end of sleep, negatively affecting the quality of sleep. And [31] confirms that mobile phone radiation affects EEG signals during non-REM sleep phases, and that this effect depends on the individual personality. In a study [32] using fluorodeoxyglucose and positron emission tomography, it was shown that exposure to MW radiation of the parts of the brain closest to the antenna when talking on the phone leads to an increase in glucose metabolism in them.

Electromagnetic hypersensitivity & sleep

In everyday life we are exposed to increased levels of combined static, ELF and RF / MW non-ionizing radiation. All these fields together form one colorful EM field, which is popularly called EM smog.

EM hypersensitivity (EHS) is the sensitivity of people to EM non-ionizing radiation. A large number of people report health problems attributing them to EM radiation. These people show various symptoms that, as they attribute them, occur during conversations on mobile phones, or even home cordless phones, or near mobile phone base stations, when using laptops or computers, near WiFi transmitters, in transportation, in a car, or when using household appliances [33,34]. The symptoms that occur are subjective and most often occur more than once at a time. Some of the main symptoms are: sleep disorders, headaches, nervousness, fatigue, problems with concentration and dizziness.

In a questionnaire conducted on general practitioners in Switzerland [35], 69% of them had EM radiation consultations, the average of about 3 consultations per year, and in 54% of cases the link between EM radiation and symptoms was considered probable. In another questionnaire conducted on physicians in Austria [36], only a third had never had such patients, and as many as 96% of physicians somewhat or completely believe that there is an impact of EM non-ionizing radiation on health. In Sweden, EHS is officially recognized as a functional disorder (not a disease), and surveys show that about 3% exhibit some of the symptoms when exposed to EM radiation, which implies that people with EHS should be provided with the opportunity to live and work in an environment with low EM radiation [37].

In [38] it was discovered that in EHS persons there is an increased concentration of mast cells in the skin, especially of the face. A higher number of mast cells may explain symptoms such as itching, pain, edema and erythema. In a study [39], clinical and biological 727 EHS and MCS self-reported cases were investigated. 521 were diagnosed with EHS, 52 with MCS and 154 with both EHS and MCS. Since inflammation is a key process that occurs in both EM radiation and chemical effects on tissue, and

histamine is a major mediator in inflammation, they systematically measured histamine in patients' bloodstreams. Almost 40% had increased histaminemia. Oxidative stress is part of inflammation and plays a role in damage and response. Nitrotyrosine, the signal of peroxynitrite production (ONOO-) and BBB opening, was increased by 28%. Protein S100B which is also an indicator of BBB opening was increased by 15%.

Autoantibodies against O-myelin were detected in 23%, indicating that EHS and MCS could be associated with an autoimmune response. Hsp27 and / or Hsp70 were found in 33% of patients. Since most patients reported insomnia and fatigue as symptoms, they examined the ratio of 6-hydroxymelatonin sulfate and creatinine in urine within 24 hrs and found that it was reduced in all examined cases. Examination of blood flow in the brain revealed hypoperfusion around the thalamus (capsulothalamic), indicating that the inflammatory process involves the limbic system and the thalamus. Both disorders have been shown to include hyperhystemiaemia, oxidative stress, autoimmune response, hypoperfusion in the capsulotalamic region, and BBB opening indicating chronic neurodegenerative disease. Analysis of the coincidence of EHS and MCS indicates a similar pathological mechanism.

Influences on cell biochemical processes

RF / MW non-ionizing EM radiation have been shown to affect biochemical processes in cells. It affects the GJ-channels by disrupting cell function. It has also been shown that RF / MW radiation affects and changes the concentration of ions in cells, especially calcium (Ca^{2+}). This section discusses the disturbing effects of RF / MW non-ionizing radiation on the organism at the cellular and molecular level, i.e. microscopic, which could lead to disorders and diseases of the organism, the so-called upward causation.

According to [40] the ELF component of the GSM signal affects the GJ-channels by inhibiting them and thereby disrupting the normal functioning of the cells. In [41,42], it was shown that ELF modulated RF / MW radiation affects the concentration of calcium in cells, more precisely its excretion from cells. This effect takes place at low power densities with a maximum at 0.6 - 1 mW / cm^2 [42]. In [41], GSM signals modulated with ELF with power densities of 0.06 - 0.436 mW / cm^2 were used. Calcium excretion was increased due to radiation exposure and continued after radiation. Cell proliferation, DNA, RNA and protein synthesis are increased with ion concentrations in cells, especially calcium, and with cell membrane depolarization. As they say in that paper, it seems that the effects of the external EM field on ion concentrations are related to the interaction between the EM field and the ion channels of the membrane, which is manifested by improper operation, i.e. opening of these channels.

However, it is shown that EM RF / MW non-ionizing radiation in smaller doses and applied in a finer way can also have a positive impact on human health. The mechanisms and techniques based on this knowledge will be discussed in the next chapter, with the presented mechanism of RF / MW non-ionizing radiation on the global EM field of the human, which explains both positive and negative effects of this radiation on the human body through quantum holographic macroscopic downward causation (descending causality), with possible preventive bioresonant balancing effects on the organism exposed to the harmful effects of non-ionizing radiation.

3. Quantum-informational framework of psychosomatics

Contemporary medicine has put its emphasis on the *alopathic-dosed non-economic highly pharmaceutical-oriented* medicine technologies. On the contrary, in the past years more attention is payed to *bioadequate homeopathic-dosed economic bio-resonant quantum-informational medicine* technologies, related to usage of such values of the field energy, appearing in normal functioning of human organism [42-62]. On these lines, contemporary investigations of *psychosomatic diseases* imply the necessity of application of *holistic methods*, oriented to *healing the person as a whole* and not disease as a symptom of disorder of the whole, suggesting their *macroscopic quantum origin*.

In the focus of these quantum-holistic methods are body's *acupuncture system and consciousness* – which (within the Feynman propagator version of quantum mechanics) have *quantum-informational structure of quantum-holographic Hopfield-like associative neural network* [63] – with very significant quantum-holographic psychosomatic implications. In this context, it should be noted that *Resonant Recognition Model (RRM) of biomolecular recognition* implies that on the bio-molecular level information processing is going on in the *inverse space* of Fourier spectra of the primary sequences of biomolecules [64-66], similarly to (quantum) holographic ideas that cognitive information processing is going on in the *inverse space* of Fourier spectra of the perceptive stimuli [67,68], thus supporting idea on *the Raković quantum-holographic fractal coupling* of various hierarchical levels in biological species [47].

In the context of *acupuncture-based* [42-62] and *consciousness-based* [69-110] *approaches and techniques of quantum-informational medicine*, their goal would be a bio-resonant excitation of the EM MW / ULF-modulated or RF / LF-modulated psychosomatically disordered state (acupuncture palpatory-painful or psychologically traumatic, as one of hundreds of possible disordered states) thus enabling that its initial memory attractor is bio-resonantly excited (similar to an annealing procedure in artificial neural networks [111]) becoming more shallower and wider on account of the deepening of the (energy-dominating) attractor of healthy (acupuncture palpatory painless or psychologically traumatic-free) state. It is then altogether *quantum-holographically projected* on the lower quantum-holographic *cellular level*, thus changing the *expression of genes* [42-49]. Thus, all these acupuncture-based and consciousness-based holistic approaches and techniques might be considered as *quantum-informational therapies*, via *imposing new boundary conditions in the energy-state space of the acupuncture system / consciousness*.

However, when this process is hindered by *transpersonally entangled blockages* in the EM field-related energy-state space of the acupuncture system / consciousness (on numerous laboratory tests revealing the evidence of entangled minds i.e. *extrasensory experiences* in a quantum reality, see refs. [112,113]) – then memory attractors of a quantum-holographic network of field-related *collective consciousness* should be removed as well (via *prayer or circular (psycho / energy) therapies* from all relevant meta-positions included in the problem [42-49,92-110], thus providing *spiritual integration of personality* which *initiates the process of permanent healing* as suggested by experiences of clients in *post-hypnotic regressions* [114]). These transpersonal holistic procedures, alongside with working on all levels of *EM bio-resonant (MW / ULF-modulated or RF / LF-modulated) therapies* [42-62] and *non-circular (psycho / energy) therapies* [69-110], might be the holistic clue for imposing healing boundary conditions in the energy-state space of the acupuncture system / consciousness of the patients, cf. Fig. 1.¹

¹ This represents the basis of so-called *quantum neural holography* [63] (see also ref. [47]), which allows successive reconstruction of the wave functions of the memory states at the output of quantum-holographic Hopfield-like neural network (complete, of both amplitude and phase) in recognition of the wave function of the previously memorized state displayed again at its input (which is the basis of every holography, but everything here is simpler than in the standard laser holography, which requires so-called coherent reference and subject laser beams). Although basic elements of quantum vs. neural system (modeled by formal neurons and connections) are very different, their collective processes obey similar laws. So Hebb's correlation matrix of memory synaptic connections in Hopfield's associative neural networks, corresponds to Green's function (quantum propagator) in Feynman's version of Schrodinger equation:

$$G(r_2, t_2; r_1, t_1) = \sum_{i=1}^P \phi^{k_i}(r_2, t_2) \phi^{k_i*}(r_1, t_1) = \sum_{i=1}^P A_{k_i}(r_2, t_2) A_{k_i}^*(r_1, t_1) e^{\frac{i}{\hbar}(\alpha_{k_i}(r_2, t_2) - \alpha_{k_i}(r_1, t_1))}$$

where ϕ^{k_i} is *i-th quantum memory attractor* (i.e. explicate short-term memory of *i-th quantum state / attractor*), and G is *quantum-holographic memory* (i.e. implicate long-term memory of all P quantum states / attractors in quantum memory) of such informationally interpreted (any) quantum system! Then, (re)construction of quantum attractor patterns, i.e. transformation of the representation of *long-term memory* (of quantum latent consciousness / subconscious) into representation of the *recall / short-term memory* (of quantum manifest consciousness), is analogous to the wave-function decoherence (collapse). In this context, *association of individual consciousness with*

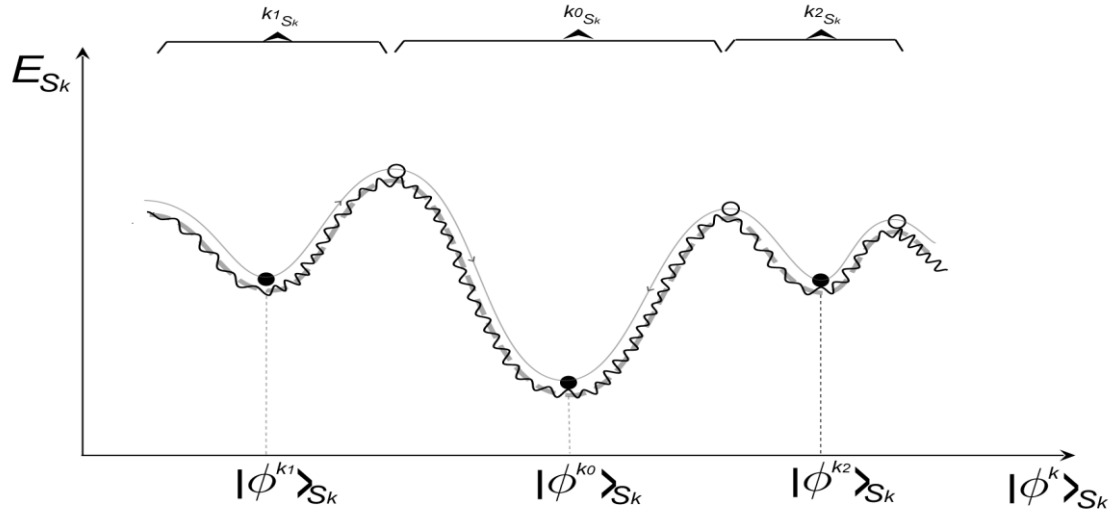


Figure 1. Schematic presentation of the memory attractors (ϕ^{k_i}) in the energy-state hypersurface of *psychosomatic state of open macroscopic quantum-holographic acupuncture system / consciousness* (S_k), as proposed quantum-holographic manifestations of psychosomatic disorders (hundreds of them being in primary psychosomatic diseases and thousands of them in their combinations according to acupuncture-based *Tibetan traditional medicine*, with a therapeutic goal to balance / remove all unwilling side memory attractors in procedure traditionally recommended half a year) [42-49]. This information might be *quantum-holographically* projected onto *lower open macroscopic quantum-holographic cellular enzyme-gene level* (which also functions on *quantum-holographic-like cellular quantum-conformational level* of the molecular recognition, thus influencing gene expression and possible somatisation of the top-down hierarchically projected non-balanced / non-removed psychosomatic disordered information). On the other hand, *higher open macroscopic hierarchical level of quantum-holographic collective consciousness and related (quantum) holistic global psychosomatics* might also be *quantum-holographically* projected onto *lower levels of quantum-holographic individual acupuncture systems / consciousnesses* (with spiritual / social implications on the necessity of transpersonal quantum-holographic removing of all unwilling side memory attractors on the level of collective consciousness, which unless would result in further transpersonal transfer of memory attractors onto individual and collective consciousnesses in this and future generations). See the text and footnotes 1 and 2 for further explanation.

Within this quantum-informational framework, it is plausible to consider a healthy psychosomatic state as the simplest informational state of the lowest quantum entropy (with single memory attractor); and disordered psychosomatic states as more complex states of the higher quantum entropy.²

manifestly-macroscopic-quantum acupuncture system, by applying methods of *associative neural networks*, *quantum neural holography*, and *quantum decoherence theory*, provides *quantum-holographic framework* for psychosomatics, epistemology and spirituality [47] – outlined in this paper.

According to direct mathematical correspondence between classical neural variables (left) and quantum variables (right): $q \Leftrightarrow \phi$, $q^k \Leftrightarrow \phi^k$, $J \Leftrightarrow G$ [47,63], and corresponding Hopfield's classical and Feynman's quantum equations, it might be realized that *quantum memory attractors* $\phi^{k_i}(r, t)$ of (any!) quantum system behave as quantum analogues of classical neural activities in space r and time t – implying that *wave functions* ϕ^{k_i} ($i = 1, \dots, P$) at *space-time points* (r, t) are behaving fundamentally as *P-dimensional parallel neural quantum processors* (notice also their difference in respect to usually exploited *2-dimensional qubits* in quantum informatics [47])!

² In particular, considering a psychosomatic state in generally mixed quantum state of density matrix:

$$\widehat{\rho}_{S_{kv}}^{(k)} = \sum_i |c_{k_i}|^2 |\phi_v^{(k_i)}\rangle_{S_{kv}S_{kv}} \langle \phi_v^{(k_i)}| \equiv \sum_i p_{k_i} |\phi_v^{(k_i)}\rangle_{S_{kv}S_{kv}} \langle \phi_v^{(k_i)}|$$

The mentioned quantum-holographic picture implies that quantum-holographic hierarchical parts carry information on wholeness, enabling subtle *quantum-holographic fractal coupling* between various hierarchical biophysical levels – including numerous acupuncture projection zones and corresponding organs and cells, with underlying *macroscopic quantum-informational control mechanisms of embryogenesis / ontogenesis and morphogenesis* and their backward epigenetic influence on the *expression of genes*, starting from the first fertilized cell division which initializes differentiation of the acupuncture system of non-threshold electrical GJ-synapses [42-49].

The above problem is of fundamentally-theoretical physical significance, as it tackles the question of the *universality of quantum mechanics*, i.e. the question of general validity of the quantum-physical laws for *macroscopic phenomena* as well, mostly treated by the methods of classical physics. Although this question was raised in the early phase of the founding of quantum-mechanical theory (and temporarily put aside for very different reasons, being considered as a difficult scientific problem), in this respect the situation is not much better today, and it can be said freely that the problem of the universal validity of quantum mechanics is still open [117-129].

On this line, it should be pointed out that Sit'ko with co-authors have revealed *necessary and sufficient conditions* for existence of *macroscopic selfconsistent potentials* (of so called Landau-Haken type) alongside acupuncture meridians, with EM MW *eigenfrequencies* of healthy and disordered states of the *acupuncture system* [50,130-133], pointing out that living systems are the fourth level of the quantum ladder of Nature (nuclear-atomic-molecular-biological), governed by specific macroscopic quantum laws of the *Physics of the Alive*.

Also, it is worth pointing out that Umezawa with coauthors and Del Giudice with co-authors, by applying fundamental quantum-field theoretical formalism of *spontaneous symmetry breaking*, have pointed to biological room-temperature macroscopic condensates of virtual quasiparticles of the effective mass and charge, so called *evanescent photons in water* (non-propagated / tunneling longitudinal modes of quantum EM field embedded by biological macroscopic ordered localizations of the electric dipole field of water), as a possible quantum basis of functioning of *cells* in general [134-137,138-143], while Jibu and co-authors have pointed to them as a possible quantum basis of *consciousness* in brain [144-147].

According to such a theoretical concept, as evanescent photons in water are not related to propagating waves (in EM RF range [138-143]), they cannot be detected externally – so in the region of biological macroscopic ordered localizations of the electric dipole field of water special probes must be inserted, to enable embedded quanta of non-propagating modes of the EM RF field to be scattered in detectable propagating modes, which were really detected experimentally in the EM RF region [148].

(where p_{k_i} are probabilities of realization of the k_i -th state), then von Neumann's quantum-mechanical entropy $S = -kTr(\hat{\rho}_{S_{kv}}^{(k)} \ln \hat{\rho}_{S_{kv}}^{(k)})$ is reduced to classical Shannon's entropy $S = -k \sum_i p_{k_i} \ln p_{k_i}$ [47]. In the mentioned quantum-holographic framework, *entropy of the pure-healthy state* of the psychosomatic system (described by the single k_0 -th term in the superposition, of probability $p_{k_0} = 1$), would be equal to $S_{k_0} = 0$ (as the pure quantum state $\hat{\rho}_{S_{kv}}^{(k_0)}$ provides maximal possible information about the quantum psychosomatic system); while *entropy of the mixed-disordered state* of the psychosomatic system (described by the full above superposition), would be $S_{\hat{\rho}} > 0$ (as the mixed stochastic state $\hat{\rho}_{S_{kv}}^{(k)}$ provides uncomplete information about the quantum psychosomatic system).

Accordingly, in the mentioned quantum-holographic framework, the *psychosomatic healthy state* is the state of the *minimal entropy*, while *psychosomatic disordered state* is the state of the *increased entropy*. In the same framework, application of some *psychosomatic therapy* naturally *decreases entropy* (degradation) i.e. *increases information* (organization) of the psychosomatic system!

On the other hand, Popp and co-authors have conducted EM optical measurements in darkness by a specially designed detector and discovered that *biological systems*, from bacteria to biological tissues, *continuously emit ultra-weak photon emission* (mainly in the *visual range of EM spectrum*, of non-exponential attenuation and specific frequency and phase and amplitude modulation for all basic biological and physiological activities). So photons of such non-standard characteristics are called *biophotons* [149]. It was discovered that biophoton emission reflects the following *important characteristics*: health as a symmetry between left and right sides of body; illness as disordered symmetry between left and right sides of body; light channels within body which regulate transfer of energy and information between different parts; biological rhythms such as 14-days, 1-month, 3-months, 9-months.

Especially, Sit'ko and co-authors have conducted EM MW measurements via specially designed radiometric system (on the level of inherent noises $\sim 5 \cdot 10^{-23} \text{ W/Hz} \cdot \text{cm}^2$), which enabled obtaining of the following *important characteristics of the acupuncture channels and points* [150]: *channels* have diameter of 3÷5 mm in their surface exits in the acupuncture points; *refraction index* within channels is $n = 1$ as in the air, while being 5÷6 in the body outside channels; in case of functional disorders of channels, upon external EM MW flux of $10^{-21} \div 10^{-20} \text{ W/Hz} \cdot \text{cm}^2$ the corresponding *acupuncture points* completely absorb radiation, while upon flux greater than $10^{-19} \text{ W/Hz} \cdot \text{cm}^2$ acupuncture points completely reflect external EM MW radiation (so in natural conditions the effects of solar radiation on biological systems are neglecting in the very sensitive EM MW regulatory region, being intensely absorbed by the atmosphere, which was presumably of evolutionary significance in the natural selection of biological species).

Based on the principles of *photonic crystals* and *photonic bandgap guiding* (where the confinement of photons in some low-index hollow-core 3D defect might be achieved by exploiting photonic bandgap reflectivity of the surrounding higher-index (quasi) periodic medium [151]), it seems that the above mentioned EM MW experiments suggest an interesting possibility [152,153] to consider the *low-index $n = 1$ acupuncture channels* as *3D photonic crystal channel waveguides of propagated EM MW photons* (influencing backward the structure and ionic conductivity of the channels), *confined* by the surrounding higher-index (quasi) periodic cellular body medium outside channels (of $n = 5 \div 6$ in the cellular cytoplasm and $n \gg 1$ in the cellular membranes of metabolic depending striking polarization of the volume ion density [154]) *with non-propagated EM MW evanescent photons*.

Exotic aspect of acupuncture channels (of strange vacuum-like refractive index) *may be a relic of the external inflow of vital energy / prana / chi / uncreated light / Whole-Self Radiance* (via miniature *quantum-gravitational tunnels* stabilized by exotic nature of *vital energy* as the quantum vacuum fluctuations in these tunnels [47,126,149,153]), indicating that this type of exotic transpersonal communications provides *continuously-refreshing interaction* between two mentally-addressed persons and thereby *transpersonal stabilize quantum-entanglement* of their acupuncture systems / consciousnesses, i.e. *prevents decoherence* of their macroscopic quantum-entangled states by interaction with their local bodily environments (*in contrast to the situation in the microworld* where there are no such stabilizing mental-transpersonal addressing exotic effects, and hence laboratory formed quantum-entangled particle-pairs must be *well isolated from the environment* in order to prevent their quantum-decoherence [128]).

In this context, it should be pointed out that the *healing effects* upon acupuncture system / consciousness of the patient are *often blocked* by quantum-holographic *spiritual coded self-acceptance* of the disease as a form of (*self*) *punishment* (as suggested by the respondents in the *post-hypnotic regressions* [114]), when *prayers and love* for yourself and others with the aim of ceasing (*self*) *punishment* are necessary – thus *effecting a spiritual integration of personality*, i.e. *unfolding transpersonal energy blockages*, which *triggers a process of ongoing healing* [47,152,153,155-163].³

³ Hereby we point out the experience of Jon RG (John-Richard - 50 years ago) Turner [161]: Some 50 years ago, I was living in Los Angeles, California. I was producing and hosting a talk show *Holistic Viewpoints, Expanding Consciousness* on KPFK-Pacific Radio in Hollywood. At the same time, I had a psychotherapy practice in Beverly

4. Discussion on EM MW ecology & consciousness

Digital communication technologies are increasingly evolving and becoming more widely used, especially new generations of mobile phones and local wireless networks. The effects of these new technologies, more precisely the EM MW radiation on the human body, have been studied a lot in recent times. Current science is not yet able to fully explain them and observe their ultimate dangers, but some worrying effects have been revealed in this paper that could directly endanger human life or affect offspring.

It is very intriguing that quantum-information balancing of disturbed psychosomatics can become very topical in the context of emerging new 5G mobile technologies, whose projected range (24-90 GHz) in full development will overlap with the frequency range of the acupuncture system (50-80 GHz), where bio-resonant deviations of only a few GHz on different acupuncture meridians are the cause of numerous psychosomatic diseases. Along this line, applying *holistic anti-stress* recommendations for *regular balancing* of the acupuncture system / (individual and collective) consciousness can become significant for *improving the psychosomatic status of the general population* [163].

On the one hand, we warmly recommend a simple 4-minute exercise from the group of *meridian EFT-like tapping practices of TaiChi-balancing* acupuncture meridians, which should be practiced daily instead of physical exercise. On the other hand, the author himself emphasizes daily *Jesus' prayer*, supplemented by *Bruno Grening's teachings & Hooponopono practice*, with harmonizing transpersonal effects on the collective consciousness as well. There is also balancing of consciousness / bio-energy achievable through the *Whole-Self Radiance Relaxation Exercise* discovered and developed by Jon RG & Troya GN Turner. All these preventive practices are very easy to adapt.

Concerning ecological damage, if humans are not ready do so, we hope that evolution will make sure that species adapt to the new conditions of EM MW smog on the planet to which they are extremely sensitive through a system of non-threshold electrical GJ-synapses, as the oldest form of intercellular communication.

5. Conclusion

The potentially high-risk effects of EM MW non-ionizing radiation require additional experimental and theoretical research, and it is necessary to determine whether they are really that dangerous, when appropriate measures should be taken. Until everything related to EM MW is not deeply understood, it is necessary to be more careful in handling the devices that emit them and to avoid unnecessary exposure, with additional prevention methods suggested in this paper.

So, the hereby revealed integrative quantum-holographic framework for psychosomatics might have significant holistic implications, providing fundamental quantum-informational framework for better understanding of the nature of stress-induced psychosomatic diseases as well as limitations of methods of

Hills. I was getting referrals of patients who had been declared incurable. Sitting at my marvelously carved Mexican desk, I closed my eyes and asked my Whole-Self what I could possibly do to assist these patients who had failed to find homeostasis after 5, 10, some even 20 years of various therapies. What entered my mind were the words "If you will take each person back to the period before they were born each will experience rapid healing!" With this instruction from my Whole-Self, I pioneered in reawakening and releasing the psychic memories each person had from before conception through after birth. What those patients discovered, in the first person is: *Not only am I the synthesis of my parent's genetic DNA coding which gave me my physical characteristics, I am also the synthesis of their energetically charged thoughts and emotions during their pregnancy which gave me my mental and emotional characteristics: my Whole-Self emotional DNA© (W-S eDNA©)*. The healing came from the recognition that the trauma feelings were the result of their mother's event not something they had done. In next several decades this evolved in the *Whole-Self Prebirth Psychology, Philosophy & Education* [162] prefaced by *The Whole-Self Radiance Relaxation Exercise©*.

anti-stress prevention and healing, which might help in *developing strategies for holistic, integrative psychosomatic medicine in the 21st century*.

Within this framework, it appears that all holistic approaches and techniques can be treated as *quantum-informational therapies*, by imposing new healing boundary conditions in the energy-state space of EM quantum-field-related acupuncture system / (individual and collective) consciousness. It turns out that balancing of psychosomatics can be achieved simply by applying some of the holistic anti-stress recommendations for self-help, based on acupuncture and / or consciousness.

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[163] For more details see [http://www.dejanrakovicfund.org/2018 DRF Stress & Anti Stress.pdf](http://www.dejanrakovicfund.org/2018_DRF_Stress_&_Anti_Stress.pdf)