

## QUANTUM-INFORMATIONAL MEDICINE AND QUANTUM-HOLOGRAPHIC INFORMATICS: PSYCHOSOMATIC-COGNITIVE IMPLICATIONS

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**Abstract.** The subject of this paper are quantum-informational medicine and quantum-holographic informatics, which are of special importance because of wider application of integrative medicine in developed countries – as contemporary research of psychosomatic diseases indicates the necessity of application of holistic methods, oriented to the treatment of man as a whole and not diseases as symptoms of disorders of this wholeness, implying their macroscopic quantum origin. The focus of these quantum-holistic methods are body's acupuncture system and consciousness, which in Feynman's propagator version of Schrödinger equation exhibit the quantum-informational structure of quantum-holographic Hopfield-like associative neural network, with memory attractors as a possible quantum-holographic informational basis of psychosomatic diseases. The paper is divided into several parts: Part 1 introduces and outlines the phenomenology of quantum-informational medicine and quantum-holographic informatics; Part 2 is dedicated to the physics of enzyme-substrate interaction, i.e. quantum models of biomolecular recognition, where the necessity of quantum-holistic approach is already obvious; Part 3 treats body's hierarchical neural networks, with numerous quantum-holistic implications for quantum-informational medicine and modelling of psychosomatic-cognitive functions.

**Keywords:** Quantum-informational medicine, Quantum-holographic informatics, Quantum-holographic paradigm, Acupuncture, Consciousness, Quantum models of biomolecular recognition, Body's hierarchical neural networks, Psychosomatic medicine, Holistic medicine, Microwave resonance therapy, Electropuncture, Homeopathy, Meridian (psycho)therapies, Transpersonal interactions, Psychosomatic-cognitive functions.

### 1. INTRODUCTION AND OUTLINE

Most of contemporary books in the field of biophysics is of the reductionist type, mainly dedicated to the molecular biophysics and methods of biomolecular characterization, to a lesser number consider processes in the cellular level, and rarely are committed to a holistic integrative level of the organism and biosphere (which includes social and environmental aspects, biometeorology, geomedicine, chronobiology, psychosomatics, consciousness, homeopathy, acupuncture, yoga, meditation, transpersonal psychology) [1] – although this trend is beginning to change with wider application of *integrative medicine* in the developed countries [2].

The subject of this paper are quantum-informational medicine and quantum-holographic informatics, with special reference to numerous psychosomatic-cognitive implications.

**Phenomenology of Quantum-Informational Medicine.** 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, implying their *macroscopic quantum origin* [3-5]. In the focus of these quantum-holistic methods are body's *acupuncture system* and *consciousness* – which have *quantum-informational structure of quantum-holographic Hopfield associative neural network*, within the Feynman propagator version of Schrödinger equation [6] – with surprisingly significant *quantum-holographic psychosomatic implications* (which will be outlined in the next subsection).

*Acupuncture system* is an ancient Chinese concept of the energy-informational channels/meridians and points, responsible for psychosomatic health and illness (cf. Part 3). The quantum

electromagnetic (EM)/ionic basis of the acupuncture system (of 'non-threshold' electrical 'gap junction' (GJ) synapses [7]) is implied by *resonant windows* in frequency and intensity in tissue interactions with extremely weak 'non-threshold' EM fields [8] (undetectable by nervous system of 'threshold' electrochemical synapses [3-5]), and successes of the Russian-Ukrainian school of microwave (MW) resonance therapy [9-11] and its *quantum-coherent characteristics* (highly resonant microwave sensory response of the disordered organism, biologically efficient nonthermal MW radiation of extremely low intensity and energy, and neglecting MW energy losses across acupuncture meridians), as well as successes of German school of ultralow-frequency (ULF) electropuncture [12] and the *resonant stimulation* of the acupuncture analgesia endorphin (~ 4 Hz) and serotonin and/or norepinephrine (~ 200 Hz) mechanisms [13] – which is now associated with the appearance of *Quantum-informational medicine* [4] (that might also include acupuncture-sensitive *homeopathy* [12] and other *energetic/bioresonance/bioinformational methods* [14]).

And as recent Peruš's theoretical investigations show that any *quantum system* has formal mathematical structure of *quantum-holographic Hopfield-like neural network* [6] – then *memory attractors of the acupuncture network* can be treated as *psychosomatic disorders* representing EM MW/ULF-modulated (*quantum*)*holistic records* (which might be therefore removed only holistically, supported by an extreme efficiency of the *quantum-informational therapies*, that consequently erase the very information of the psychosomatic disorders) – which might represent biophysical basis of (acupuncture *temporarily reprogrammable!*) (*quantum*)*holistic local psychosomatics* [3,4,15,16] (cf. Part 3).

Namely, according to the *Tibetan traditional medicine*, an acupuncture procedure must be repeated every several months [17] – presumably as a consequence of *restituted* patient's mental loads from his *mental-transpersonal-environment* of closely related relatives/enemies/deceased, that remained *non-reprogrammed* on the level of quantum-holographic collective consciousness (which might be supported by the Tibetan *pulse diagnostics* based on 20 pulses, enabling precise diagnosis of psychosomatic disorders not only of the patient himself *but also* of his family members and enemies).

An additional support that the acupuncture system is really related to consciousness is provided by *meridian (psycho)therapies* (with very fast removing of traumas, phobias, allergies, post-traumatic stress, and other psychosomatic disorders [18-20]) – whose simultaneous effects of *visualization* and *tapping/touching of acupuncture points* might be theoretically interpreted as a 'smearing' and *associative integration of memory attractors* of the psychosomatic disorders, through successive imposing new boundary conditions in the acupuncture energy-state space during visualizations of the psychosomatic problems [3,4,20] – so that *meridian (psycho)therapies* (alongside with psychosomatically healing positively-visualizing *meditation* [21] and other *deep psychotherapeutic techniques* [22]) might be also categorized into the field of *Quantum-informational medicine* [4] (cf. Part 3).

**Quantum-Holographic Informatics: Psychosomatic-Cognitive Implications.** In order to put psychosomatic-cognitive aspects of integrative biophysics and quantum-informational medicine in the context of *quantum-holographic informatics* [3], in this paper it is firstly presented physics of the enzyme-substrate interaction, i.e. *quantum models of biomolecular recognition* [3,23-26] (cf. Part 2), wherefrom the necessity of quantum-holistic approach is already clear.

Then the biocybernetical *models of body's hierarchical neural networks* [3] are presented (cf. Part 3). It is firstly noted that models of brain's hierarchical neural networks (*Kohonen's self-organized mapping* neural networks, *Hopfield's associative or attractor* neural networks, and *Haken's synergetic classical* and *Peruš's neuro-quantum* multilayer neural networks) [27-30] demonstrate encouraging advances in modeling cognitive functions – which is not surprising bearing in mind that information processing on the level of central nervous system is going via hierarchically organized and interconnected neural networks. It seems that this hierarchy of biological neural networks is going down sub-cellular *cytoskeleton* mesoscopic level, being

according to some scientists a kind of interface between *neural* and *quantum* levels [31-33]. However, for modeling most cognitive and especially psychosomatic functions the subtle biophysical *Hopfield-like quantum-holographic body's acupuncture neural networks* (modulated by UNF EM fields of brainwaves) are necessary as well, combined with *quantum decoherence theory* [3,4] (cf. Part 3). On the one hand, they demonstrate existence of two cognitive modes of consciousness (direct religious/creative one, characteristic of quantum-coherent transitional and altered states of consciousness, and indirect perceptively/rationally mediated one characteristic of classically-reduced normal states of consciousness) – together with conditions for their mutual transformations. On the other hand, they represent a natural framework for explanation of *psychosomatic diseases* related to somatization of generated memory attractor's states of the open macroscopic quantum acupuncture system (created as a result of interaction with environment and quantum-holographically projected upon lower hierarchical cellular level, thus changing the expression of genes), but also for explanation of contemporary *meridian (psycho)therapies* for fast removing of numerous disorders (traumas, phobias, allergies, post-traumatic stress) – with significant psychosomatic and transpersonal implications.

It should be especially pointed out that *quantum decoherence* might play *fundamental role in biological quantum-holographic neural networks* [3,16,24,25], through adaptation of the energy-state hypersurface of acupuncture system/consciousness (in contrast to *low-temperature artificial qubit quantum processors* where it must be *avoided* until the very read-out act of quantum computation!) – which implies that Nature presumably has chosen elegant *room-temperature solution for biological quantum-holographic information processing*, permanently fluctuating between quantum-coherent states and classically-reduced states of acupuncture system/consciousness, through non-stationary interactions with out-of-body farther environment and through decoherence by bodily closer environment (cf. Part 3).

The same might be related to *lower hierarchical quantum-holographic macroscopic open quantum cellular enzyme-gene level* [3,24,25], which might be also functioning on the level of permanent quantum-conformational quantum-holographic like biomolecular recognition – so that *quantum neural holography* combined with *quantum decoherence* might be very significant element of the feedback *bioinformatics*, from the level of cell to the level of organism (cf. Part 2). This presumably represents a *natural framework for explanation of psychosomatic diseases* related to somatization of environmentally-generated memory attractor's states of the open macroscopic quantum acupuncture system/consciousness – *quantum-holographically projected* upon lower hierarchical cellular level, thus *changing the expression of genes* [3,4,34] (so called macroscopic '*downward causation*', as biofeedback control of microscopic '*upward causation*' in *ontogenesis and morphogenesis*, starting from the first fertilised cell division which initialises differentiation of the acupuncture system of (electrical synaptic) '*gap-junctions*' [3,4,7]).

In the same context, fundamental bases of *quantum-holographic paradigm* are considered too, with implication that whole psychosomatics is *quantum hologram*, both on the level of *individual and collective consciousness*, and that quantum-holographic hierarchical parts carry information on wholeness, enabling quantum-holographic fractal coupling of various hierarchical levels [3,16] (cf. Part 3): acupuncture-based-quantum-informational (un)intentional control of ontogenesis and morphogenesis; quantum-holographic language-influence on the genes expression, with implications of great psychosomatic significance of thought-emotional contents; and global fractal-information coupling of various hierarchical levels in Nature with fundamental holistic implications on the origin of miraculous deep creativities and determinism of the History through the coupling with the existing evolving state of collective consciousness. This forecasts a *great synthesis* of two cognitive modes, rationally-scientific (classically-reduced, in normal states of consciousness) and creative-religious (quantum-coherent, in altered and transitional states of consciousness) within the framework of the (sequentially) appearing *quantum-holographic holistic paradigm* – where personal role becomes indispensable due to the influence and care for collective mental

environment, which is *fundamental question* of both mental health and civil decency, i.e. of both spiritual and civil morality.

In this context, it might be said that *three front lines of psychosomatic medicine* do exist [3,16]: (a) the first one is *spirituality*, where prayer for others mentally/emotionally involved erases for good mutual memory attractors on the level of collective consciousness; (b) the second one is *traditional holistic Eastern medicine and deep psychotherapeutic techniques*, whose efforts temporarily erase memory attractors on the level of acupuncture system/individual consciousness, and prevent or alleviate their somatization, as a consequence of the indolence on the first level; (c) the third one is *modern symptomatic Western medicine*, whose activities through immunology, pharmacology, biomedical diagnostics, and surgery, hinder or soothe somatic consequences of the carelessness on the first two levels. It should be stressed that *necessary* activities on the second and third levels, with *neglect* of the first level, have a consequence of *further transfer* of memory attractors on the level of *individual and collective consciousness* in this and further generations, thus *accumulating* quantum-holographic loads which *afterwards cause* not only illnesses, but also interpersonal fights, wars, and other troubles.

## 2. PHYSICS OF ENZYME-SUBSTRATE INTERACTION: BIOMOLECULAR RECOGNITION

*The most important function* of proteins is to act as *enzymes*: *Enzymes serve as catalysts* in all *biochemical reactions* [3,35]! A *catalyst* accelerates the rate of reaction but is *not consumed* in the overall process.

According to the Arrhenius formula, the *reaction rate constant* ( $k$ ) greatly depends on *temperature* ( $T$ ):  $k = A \exp(-G^\ddagger/RT)$ , where  $G^\ddagger$  is the *free energy of activation*, which characterizes the energy barrier that must be overcome by the system for the reaction to occur. The Arrhenius formula follows from the Boltzmann distribution among energy levels, where exponential indicates the fraction of molecules that possess sufficient free energy  $G^\ddagger$  for the reaction to take place.

The reaction is *possible* only if the *free energy is decreased*. However, this condition is *necessary* but is still *insufficient*: the free energy of activation must be sufficiently *low* that the rate constant is non-vanishing, i.e. that the reaction does proceed. *The catalyst serves to lower the activation barrier* (cf. Fig. 2.1b)!

### 2.1 Semi-Classical Model of Electronic-Conformational Interactions and Biomolecular Recognition

*Conformational properties of enzymes* are essentially important for understanding of enzymic catalytic activity! The *conformational lability of a protein* makes possible its *specific interaction* with *substrates*. As the substrate is (most frequently) low-molecular, and the enzyme is (high-molecular) protein, then the substrate directly interact with particular small part of the enzyme molecule – its *active site* (group and distribution of amino acid residues and cofactors (coenzymes, vitamins, metallo-organic complexes, hormones ...)).

In the *enzyme-substrate complex* (ESC) the *induced structural correspondence* of the enzyme and substrate is dynamically established, thus providing the optimal value of the free energy of interaction. The *conformational transformations* involved lead to a structural fit between the enzyme and the substrate, i.e. *biomolecular recognition*! The enzyme-substrate interaction is a *weak chemical bond* (Van der Waals, hydrogen, hydrophobic, ...), which is, however, very *enhanced* due to *hydrophobic active site of the enzyme*: namely, relative dielectric permittivity  $\epsilon_r$  of the cavity of active site of the enzyme is much less ( $\epsilon_r \sim 3\div 4$ ) compared to water environment ( $\epsilon_r \sim 81$ ), which significantly facilitates the occurrence of electric interactions ( $F \sim q_1 q_2 / 4\pi\epsilon_0 \epsilon_r r^2$ ) between the substrate and the active site of the enzyme. Practically, *electrostatic* interactions within *hydrophobic cavity* (active site) of the enzyme provide main contribution to bioenergetics of enzymic catalysis,

i.e. to reduction of the activation barrier in the enzyme-substrate complex. The energy necessary for conformational changes of the enzyme structure is liberated upon binding of the substrate to the enzyme.

During enzyme-substrate interaction and formation of the enzyme-substrate complex, the states of the electronic shells of the substrate and of the atomic groups of the active site of the enzyme are excited. In the enzyme-substrate complex the energy of electronic excitation is converted to the work of displacement of atomic nuclei. Among the movements of atomic nuclei the lowest energy is demanded by low-frequency deformational vibrations and rotations around single bonds, i.e. conformational changes! Hence, for enzymic catalysis the most significant are interactions of electronic and conformational degrees of freedom – Volkenshtein's electronic-conformational interactions (ECI), cf. Fig. 2.1.

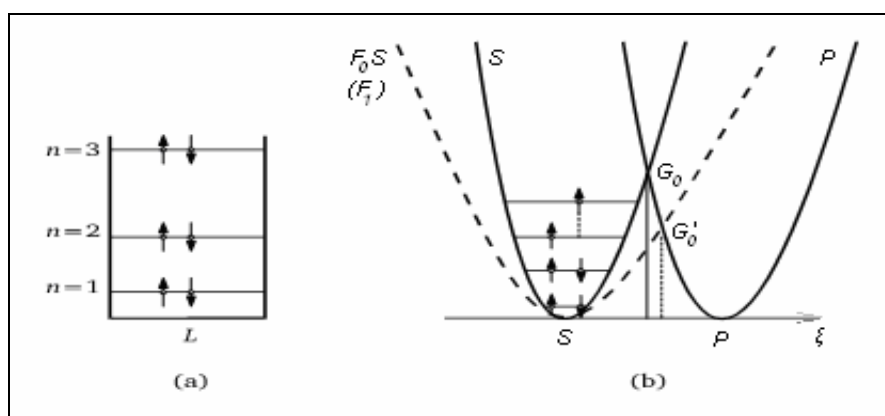


FIGURE 2.1 (a) In order to understand the nature of ECI, it is helpful to make use of a simplified model of the interaction between electrons and atomic nuclei – electrons in a potential box with infinitely high mobile walls, wherefrom the electron pressure force exerted on the wall is easily obtained:  $f_e = |dE/dL| = n^2 h^2 / 4m_e L^3$ . A change in equilibrium results either from the excitation of electrons in the system (arises  $n$ ) or from the addition of electrons (arises number of electrons, i.e. number of hits upon the walls of the box), when the walls of the box move and pass to a new equilibrium position, at an increased distance from each other,  $L + \Delta L$ . (b) On the other hand, if one considers a parabolic well with mobile walls, it will be easy to show how ECI lower the activation barrier ( $G_a \equiv G^\ddagger$ ). The expansion of the parabola of the initial reagents of the biochemical reaction, brought about by the added pressure forces of the electrons, results in the shift of the point of intersection with the second parabola of the products of the biochemical reaction, i.e. to decrease of the free energy of activation ( $G'_a < G_a$ ). Such semi-classical consideration of ECI [35], demonstrates that the energy of electronic excitations is converted to the work of displacement of the nuclei, i.e. to the conformational energy. As a result, the biochemical reaction is accelerated (Arrhenius formula).

## 2.2 Quantum Models of Electronic-Conformational Interactions and Biomolecular Recognition

Two unresolved issues of the (semi)classically addressed problems in molecular biophysics are unreasonably long time necessary for change of biopolymer conformations (Levintal paradox [36]) and long-range directedness of selective biomolecular recognition processes – implying their essential quantum origin [3].

The quantum nature of biomolecular recognition might be supported by: (1) Theory of Non-Radiative Resonant Structural Transitions [23], through intermediate quantum-coherent superpositions of the externally activated electronic-vibrational states of the participating biomolecules; (2) Model of Quantum Decoherence [24,25], through environment-induced conformational transitions in

biomolecular recognition, with possibility to consider cellular biomolecular recognition as a Hopfield-like quantum-holographic associative neural network (by treating all biomolecules of the same type within a cell as *dynamically coupled identical quantum particles*, thus implying deeper *quantum holism of the cell*); and (3) *Resonant Recognition Model (RRM)* [26], based on findings that informational biomolecules and their targets have common RRM-frequency peak but almost opposite phases – which will be elaborated in detail further on.

**Theory of Non-Radiative Resonant Structural Transitions** (Gribov, 2001 [23]), within the framework of standard *quantum-chemical* Hamiltonian (including kinetic energies and Coulomb interactions of all biomolecular electrons and nuclei) and Born-Openheimer *adiabatic approximation* (of separated biomolecular electronic and vibrational degrees of freedom), replaces the (quasi)classical problem of many-electron hypersurface  $E_e(\phi^{(k)})$ , not adiabatically well-defined when traversing between two adjacent local minima, by better defined problem of two (virtually intersecting) isomeric many-electron hypersurfaces (hyper-paraboloids) serving as potential hypersurfaces for two vibrational (isomeric) problems, cf. Fig. 2.2.

From consideration in Fig. 2.2, it can be concluded that *allowed transitions* between isomeric states ( $i, f$ ) are possible only for close states with *non-vanishing* overlap integrals  $S_v^{(i,f)}$  and  $S_e^{(i,f)}$ , or in *cascade* resonant transitions between *close intermediate* participating isomeric states, which might be related to nondissipative polaron/soliton-like transport [3,4,37].

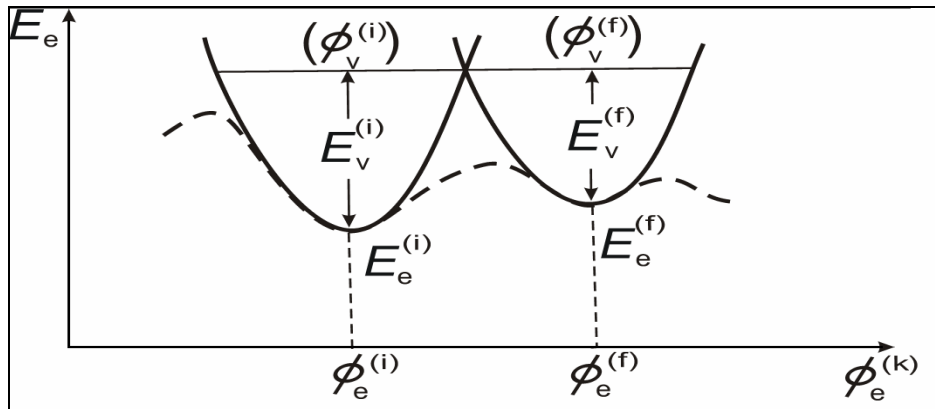


FIGURE 2.2 The (semi)classical problem of many-electron hypersurface  $E_e(\phi_e^{(k)})$  as a potential energy for adiabatically decoupled Q1D vibrational and conformational system (with local minima as semi-classical 'positions', i.e. many-atomic isomer configurations on many-electron hypersurface (broken line in the figure)) – not adiabatically well-defined when traversing between two adjacent local minima – is replaced in the framework of the theory of non-radiative resonant transitions by better defined problem of two (virtually intersecting) isomeric many-electron hyper-surfaces (hyperparaboloids) serving as potential hypersurfaces for two vibrational (isomeric) problems (full line in the figure). In this approach, by external perturbation of the isomers, at this very intersection the conditions for electronic-vibrational non-radiative resonant transitions between the two isomers ( $i, f$ ) are achieved: in the first approximation, the matrix element of dipole transition from  $i$ -th to  $f$ -th isomer is given by  $\mu^{(i,f)} \approx \mu_e^{(i,f)} S_v^{(i,f)} + \mu_v^{(i,f)} S_e^{(i,f)}$ , and it is obvious that transition between two isomers will be allowed when components of corresponding electronic and vibrational dipole moments,  $\mu_e^{(i,f)}$  and  $\mu_v^{(i,f)}$ , and electronic and vibrational overlap integrals,  $S_v^{(i,f)}$  and  $S_e^{(i,f)}$ , do not vanish. Also, during these resonant transitions the perturbed biomolecular system is shortly described by quantum-coherent superposition  $(\phi_e^{(i)} \phi_v^{(i)} \pm \phi_e^{(f)} \phi_v^{(f)})/\sqrt{2}$ , before its quantum decoherence into final electronic state  $\phi_e^{(f)}$  or into initial electronic state  $\phi_e^{(i)}$  (with subsequent de-excitations into lower vibrational states). For details cf. [3].

Also, during these resonant transitions the perturbed biomolecular system is shortly described by *quantum-coherent superposition*  $(\phi_e^{(i)} \phi_v^{(i)} \pm \phi_e^{(f)} \phi_v^{(f)})/\sqrt{2}$ , before its *quantum decoherence* into final electronic state  $\phi_e^{(f)}$  or into initial electronic state  $\phi_e^{(i)}$  (with subsequent de-excitations into lower vibrational states).

**Model of Quantum Decoherence** (Raković, Dugić *et al*, 2004-6 [24,25]) is nicely agreed within the previously described picture of short-lasting description of *quantum-coherent superposition* of states of the two isomers before its quantum decoherence into one of the two final isomer states. It generally allows reproduction of both *existence and stability* of the (stationary) ligand-proteins/target-receptors key/lock nonmatching and matching conformations, and the *short time scales* for the quantum-mechanical processes resulting effectively in (nonstationary) nonmatching-to-matching conformational transitions in selective ligand-proteins/target-receptors key/lock *biomolecular recognition processes* under external (e.g. compositional/chemical, thermal, optical ...) influences on the cell's complementary cytoplasmatic environment.

Dynamic modification of (many-electron) energy-state hypersurface  $E_e(\phi_e)$ , of the *cell's quantum-ensemble* protein/substrate biomolecular macroscopic open quantum system (through changes in operator of density of states  $\hat{\rho}_e(t)$ ), is a natural consequence of coupled electronic-conformational processes – which implies potential possibility to consider cell's biomolecular recognition as *Hopfield's quantum-holographic associative neural network*. This approach assumes *standard cell's local treatment of quantum ensemble of non-interacting dynamically non-coupled N distinguishable* quantum biomolecular proteins of the same type (and their corresponding biomolecular classes of substrates) [3,24].

However, there is an alternative possibility of *holistic cell's non-local treatment of quantum system of non-interacting dynamically coupled N in-distinguishable* quantum biomolecular proteins of the same type (and their corresponding biomolecular classes of substrates) [3,25]. Then dynamical modification of many-electron energy-state hypersurface of cell's biomolecular protein macroscopic open quantum system (and analogously their corresponding biomolecular classes of substrates), can be best represented in the formalism of *second quantization*, which treats *all biomolecules of the same atomic configuration as in-distinguishable quantum particles* which occupy different isomeric-conformational states, and considers such cell's *N-particle protein quantum state* in quantum-mechanical *occupational basis* which describes *number of proteins that occupy* subsequently all states of complete basis set of single-particle isomeric-conformational protein states.<sup>1</sup>

<sup>1</sup> In the formalism of second quantization – the mentioned cell's *N-particle* protein quantum state is considered in quantum-mechanical *occupational basis* (generally bosonic, because of protein-substrate integer spin due to even number of their covalent bonded electrons!), describing number of proteins which occupy complete set of *single-particle protein-substrate isomeric/conformational states*:  $|n_0 n_1 n_2 \dots\rangle_e$ , with conditions  $N = n_0 + n_1 + n_2 + \dots$  and  $E_{S_e} = n_0 E_e^{(0)} + n_1 E_e^{(1)} + n_2 E_e^{(2)} + \dots$  (where  $E_{S_e}$  is the many-electron energy of the total cell's *N-particle-protein* quantum state, while  $E_e^{(0)}$ ,  $E_e^{(1)}$ ,  $E_e^{(2)}$  ... are the many-electron energies of the protein single-particle quantum isomeric/conformational states 0, 1, 2, ...). An many-electron energy-state hypersurface of such protein *N-particle-isomeric/conformational* state has a schematic representation of Fig. 3.2 (in Part. 3), where internal surface of every minimum is proportional to the partial energy ( $n_i E_e^{(i)}$ ) of the *i*-th protein single-particle-isomeric/conformational state occupied by  $n_i$  isomers of the same form ( $i = 0, 1, 2, \dots$ ), so that total energy ( $E_{S_e}$ ) of the cell's protein *N-particle-isomeric/conformational* state is proportional to the sum of internal surfaces of the all minima of the many-electron hypersurface. It should be noted that inclusion of *vibrational degrees of freedom (phonons) of all possible isomeric/conformational states*, requires their consideration in quantum-mechanical *occupational basis* (also bosonic, because of phonon's integer spin!) – describing number of phonons occupying complete set of single-particle *phonon states* of the all protein-substrate isomers/conformations:  $|n_1^{(0)} n_2^{(0)} \dots n_{3N-6}^{(0)} n_1^{(1)} n_2^{(1)} \dots n_{3N-6}^{(1)} n_1^{(2)} n_2^{(2)} \dots n_{3N-6}^{(2)} \dots\rangle_v$  where every isomeric protein-substrate complex composed of  $N_i$  atoms has generally  $3N_i-6$  vibrational degrees of freedom

The second approach provides a *plausible quantum-holistic* picture of biological cell, and especially *phenomenologically approved quantum-holographic (fractal) coupling of various hierarchical quantum levels* – from-biological cell-to-acupuncture system/consciousness-to-collective consciousness (cf. Part 3). This implies Hopfield-like quantum-holographic feedback influence of the EM field of acupuncture system on cells' conformational protein changes and genes' expression (so called macroscopic 'downward causation'), and not only reversed (microscopic 'upward causation'), with mutual quantum-informational control of ontogenesis/embryogenesis and morphogenesis, starting from the first division of the fertilized cell when differentiation of the acupuncture system begins – with significant *psychosomatic and cognitive bioinformational implications* [3,25].

**Resonant Recognition Model** (Cosic, 1997; Veljković, 1980 [26]) is confirmed on more than 1000 proteins from more than 30 functional groups – with numerous potential practical advantages in the fields of molecular biology, biotechnology, medicine, agriculture and nano-technology. It is based on findings that there is significant correlation between spectra of the numerical presentation of constitutive elements of primary sequences (amino acids, nucleotides) and their biological activity or interaction in corresponding biomolecules (proteins, DNAs). The RRM model interprets this linear information by assigning the electron-ion interaction potential (EIIP) value to each constitutive element of primary sequence thus describing their average energy states of valence electrons, with subsequent using signal analysis methods in FFT transforming this numerical series into single-electron wavenumber/RRM frequency domain and determining the common frequency components as peak frequencies in the multiple cross-spectral function for a group of primary sequences. The presence of peak with significant signal-to-noise ratio in a multiple cross-spectral function of a group of sequences with the same biological function means that all of the analysed sequences within the group have this single-electron RRM frequency component in common, with the following general conclusions: (1) such a peak exists only for the group of biomolecules with the same function; (2) no significant peak exists for biologically unrelated biomolecules; (3) peak frequencies are different for different biological function; (4) ligand-proteins and their biomolecular target-receptors have the same characteristic frequency in common but almost opposite phase – providing also novel theoretical possibilities for protein *de novo* design with desired functions!

In the context of the RRM-model, the same characteristic single-electron RRM frequency, and almost opposite phase, presumably characterises not only biomolecular protein and target general function, but also their *macroscopic quantum biomolecular recognition interaction* on the level of biological *cell* – possibly by externally *activated* (compositionally/chemically, by averaged intermolecular approaching of proteins and targets necessary for non-vanishing overlap integrals of the corresponding electronic and vibrational wave functions, or thermally/optically, by supplying vibrational energy necessary for making conditions for electronic-vibrational nonradiative resonant transitions between two isomers (*i, f*), cf. Fig. 2.2) ligand-proteins/target-receptors RRM quantum-resonantly electron-electron coupling *accompanied* by  $\phi^{(i)}$ -annihilation and  $\phi^{(f)}$ -creation of conformones' quanta in two-conformational transitions  $\phi^{(i)} \rightarrow \phi^{(f)}$  (giving rise to (energy-favourable) many-electron energy-deepening of the final state  $\phi^{(f)}$  and many-electron energy-shallowing of the initial state  $\phi^{(i)}$  on the macroscopic quantum level of cell, i.e. to *dynamic*

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(phonon types), out of which every phonon state can be occupied by an unlimited number of phonons (which is characteristic of all bosons, i.e. particles of integer spin). It should be pointed out that an energy hypersurface of multi-dimensional phonon quantum state has also a schematic representation of Fig. 3.2, with potentially unlimited number of phonons in every single-phonon state. So, on the cellular level for *every set of identical molecules*, there would exist *two* (interacting) macroscopic quantum subsystems – first with *modifying many-electron hypersurface*  $E_e(\phi_e)$  and second with *modifying EM multi-phonon hypersurface*  $E_v(\phi_v)$  (where the second one might also include low-energy long-range coherent microwave Fröhlich excitations [38] – created as a result of interaction of electronic and phonon isomeric subsystems, of particular significance in *microwave resonance therapy* (MRT) of a dynamic modification of the EM multi-phonon (and related many-electron) *acupuncture* macroscopic quantum subsystem).



modification of the many-electron hypersurface  $E_e(\phi^{(k)})$  of the cell's protein macroscopic quantum system (cf. Fig. 3.2 [3,24]). On quantum bases of the RRM-model cf. [3,39].<sup>2</sup>

### 3. BODY'S HIERARCHICAL NEURAL NETWORKS

As it was mentioned in the introductory Part 1, contemporary investigations of psychosomatic diseases imply the necessity of application *holistic methods*, oriented on *healing the person as a whole* and not disease as a symptom of the disorder of the whole, implying their *macroscopic quantum origin*, related to body's *acupuncture system* and *consciousness* – with surprisingly significant psychosomatic-cognitive implications (which will be elaborated in the next subsection).

*Acupuncture*, as one of the most significant fields of the *Chinese traditional medicine* [3-5,41], is an *ancient* method, dating from the Stone Age (Chinese tradition is talking about the emperor Shin-Nong (3200 B.C.) as the inventor of Chinese medicine), when needles of the polished stone had been used, until the invention of the copper, 2600 B.C.

The word *acupuncture* means insertion (*acus* - needle), and is related to the insertion of needles in strictly specific locations on the skin (*acupuncture points*), which regulates the flow of the vital energy (*qi*) within its energy paths (*acupuncture channels/meridians*), inter-connecting appropriate acupuncture points. According to Chinese tradition, the channels are interconnected into *two symmetric and closed* (and mutually almost independent) energy-information somatic networks, one on each side of the body. Each network consists of 12 *meridians* – having correspondence to 12 visceral organs: 6 *fu (yang) hollow organs* (large intestine, triple warmer, small intestine, stomach, gall bladder, urinary bladder), which transform food into energy and blood, and 6 *tsang (yin) solid organs* (lung, pericardium, heart, spleen, liver, kidney), which receive energy and blood from the fu-organs, and refine and distribute energy within the body.

The *vital entity* is flowing equally and simultaneously throughout both sides of the body. The time of maximal *qi* activity of each channel is 2 hours, giving rise to a complete 24-hour circulation of *qi* through all 12 channels! Each organ has its hour of entrance (when maximal 2-hour activity of the organ begins) and its hour of exit of *qi* (when minimal successive 2-hour activity of the organ begins): corresponding acupuncture stimulation during its maximal activity is most efficient in decreasing the activity of the organ, while acupuncture stimulation during its minimal activity is most efficient in increasing the activity of the organ. A stylized display of the daily dynamics of *qi* circulation is depicted in Fig. 3.1: the successive regularity of alternative sequence of the paired *yin-yin* and *yang-yang* organs can be noticed.

Beside 12 paired channels, which are great double circulation of *qi*, Chinese tradition has also depicted 2 middle channels, the back one and the front one, independent of the great double *qi* circulation. These central meridians do not correspond to organs but to their functions, being stimulated in the case the meridians of the organs do not react appropriately upon stimuli.

There is a total of 794 (397 + 397) main extra-bioactive points (acupuncture points) on the body. The points can be *stimulated* by sticking metallic needles, but also by heat, pressure, magnets, weak laser beam, ultra-low frequency currents, microwave resonance, airoionic, and bio-therapeutic stimulation.

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<sup>2</sup> Considered in the framework of Hückel-like theory of molecular orbits, quantum approach to the RRM-model [3,39] shows that discrete Fourier transform in the RRM model is basically related to sequential contributions to the first order correction of energy (i.e. *primary sequence of amino-residues*, but not to (single electron) energy of the periodic part of protein's chain). So, results of the RRM model imply that on the biomolecular level an information processing is going on in the *inverse space* of Fourier spectra of the primary sequences of biomolecules, bearing resemblance to quantum-holographic ideas that cognitive information processing is going in the *inverse space* of the Fourier spectra of the perceptive stimuli [40], thus supporting picture of *quantum-holographic fractal coupling* of various hierarchical levels in biological species, with significant potential psychosomatic implications (cf. Fig. 3.2).

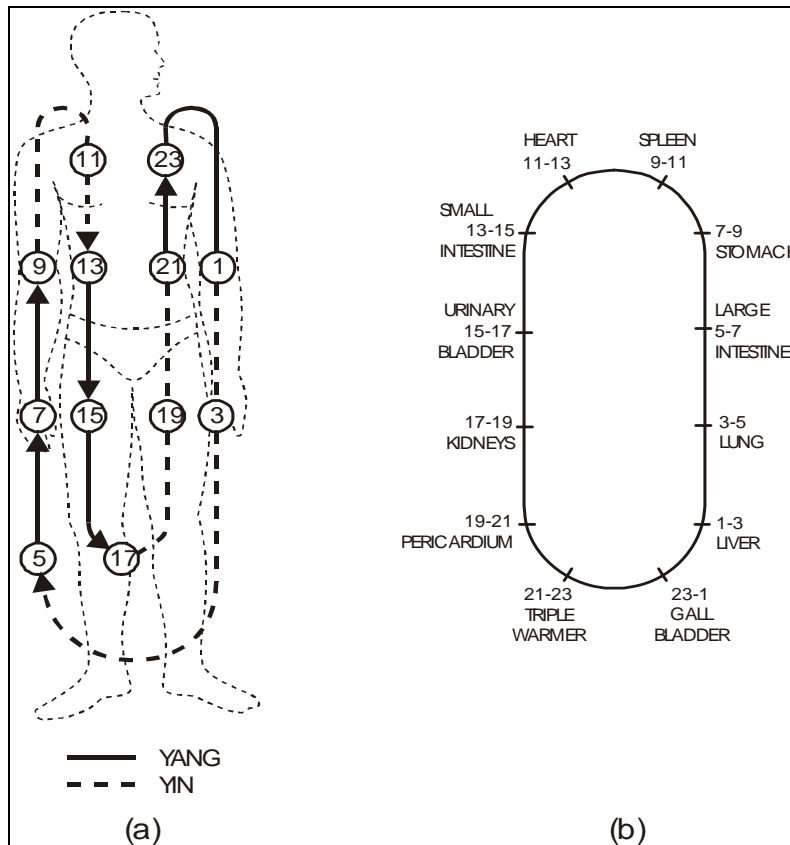


FIGURE 3.1 Stylized display of the traditional Chinese representation of circulation of the qi entity within the human body: (a) during 24 hours, and (b) hours of maximum activity of the organs; actually, each side of the body has its almost independent circulation of qi.

Indian traditional medicine, and especially one of its most prominent representatives, *swara yoga* [3,39], is also acquainted with an energy system analogous to the Chinese acupuncture system: in Indian terminology qi is known as *prana*, and *meridians* as *nadis* (14 of them being basic, like in acupuncture, although three of them being of special medical and spiritual significance: *ida*, *pingala*, and *shushumna* – being interconnected with brain's limbic system).

The *ida* activation influences hypothalamus and hypophysis, and thus the hormone growth synthesis and *anabolic processes*. This channel starts from the *spine base*, flows upward *left* to the backbone and terminates in the *left nostril*, branching into the fine capillars. This channel is active when the *left nostril* dominantly operates, i.e. when contralateral *right hemisphere* is more active.

The *pingala* activation influences hypothalamus and thalamus, but not hypophysis, thus activating *catabolic processes*. This channel also starts from the *spine base*, but flows upward *right* to the backbone and terminates in the *right nostril*, branching into the fine capillars too. This channel is active when the *right nostril* dominantly operates, i.e. when contralateral *left hemisphere* is more active.

The *shushumna* is interconnected with *corpus callosum* (connecting two brain's hemispheres) and cerebellum. This channel also starts from the spine base, being positioned *between ida* and *pingala*: its energy flows through the backbone, and terminates on the top of skull at the fontanella (the 'soft bone' on the child's skull, which hardens after 3-6 months after birth). *Shushumna* is active *very shortly*, in the time intervals of interchanged activities of *ida* and *pingala*. *Shushumna* is the only channel which passes through all *chakras*,<sup>3</sup> i.e. main acupuncture points alongside the backbone, being *functionally* interconnected with neighbouring endocrine glands.

<sup>3</sup> According to Hinduism, there are seven *chakras*, with ascribed mystical significance. By successive activation of these 'centres of consciousness' (in which *prana*/ions circulate clockwise in healthy state, whose circulation slows down in

Through its interrelation with *endocrine glands*, these three *nadis* influence biochemistry of the whole organism. Also, these channels are interconnected with the sympathetic and parasympathic *autonomous nervous system*, which implies that the *acupuncture mechanism*, initiated by acting upon the acupuncture points at the skin surface, is achieved via activation/deactivation of the autonomous nervous system, spine and brain.

*Swara yoga* is very familiar with the significance of *ultradial rhythms* (brain's and nasal),<sup>4</sup> and possibility of their *control* in the processes of recovering or keeping energy and emotional balance of the organism [3-5,42]!<sup>5</sup>

Besides their practical medical aspects, Chinese and Indian traditional medicines are deeply coloured with *mystical connotations*, which was one of the reasons why Western science has been hardly accepting experiences of the Eastern tradition. The second reason was a lack of clear *anatomical basis* of the Chinese and Indian energy system.

However, new investigations of the 'gap junctions' (GJ) non-threshold *electrical synapses* have shown their ~ 10 times increased concentration inside the acupuncture points [3-5,7], which is in accordance with significantly *less electrical resistance* (~ 50 kΩ) of the acupuncture points in respect to the surrounding tissue (~ 1 MΩ) [3-5,41]. Biophysical model of the acupuncture system and states of consciousness [3,15] also implies an *ionic nature of the acupuncture system*,<sup>6</sup> with possibility of its *partial displacements* out-of-body in *altered states of consciousness*,

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psychosomatic disorders with possibility of counterclockwise circulation in most serious diseases [3,4,43]), starting from the spine base and terminating on the top of skull, according to Indian esoteric tradition there proceeds gradual '*spreading of consciousness*', acquiring of psychic powers ('siddhis'; there are eight of them), with final reaching of the state of 'nirvana' (mystical unity with Absolute), thus reaching the spiritual goal and terminating the cycle of reincarnations [44]. In this context the multimillennia controversy on *post mortem* evolution of soul should be mentioned, which is presumably related to interpretative epistemological level of the rationalization of *transpersonal transfer* of mentally-addressed loads within this and further generations *via network of collective consciousness*, with possibility that especially strong conflicts transferred as '*ego-states*' give strong impression of previously spent lives [3,4,45]?

<sup>4</sup> According to *Swara yoga*, *nasal rhythm* has ultradian periodicity ~ 2 hours (i.e. ~ 1 hour of alternative dominance of the left and right phases: ida-pingala-...). Although this rhythm is apparently not in phase with ~ 24-hour acupuncture rhythm of the successive dominance of 12 paired meridians (i.e. ~ 2-hour successive dominance of every organ-related meridian with corresponding yin or yang functions in the mentioned order: yin-yin-yang-yang-..., cf. Fig. 3.1a), it seems that every ~ 2-hour organ-related acupuncture phase (either yin or yang) requires complete ~ 2-hour nasal phase (ida-pingala) in order to *balance activities* of corresponding organ-related pair of symmetrical left and right meridians, to enable both regenerative (anabolic, ida-like left-meridian) and degradative (catabolic, pingala-like right-meridian) organ functions [3,4,11], contributing finally to either yin or yang overall corresponding organ-effect from the viewpoint of the traditional Chinese medicine. This implies that both "-" and "+" ions are metabolically significant (which is confirmed by experiments with experimental animals which die after couple of weeks in the atmosphere without ions!), although small excess (ratio 5:4) of "-" ions is relaxing-well-being for the body!

<sup>5</sup> The brain ultradian rhythm controls the nasal rhythm contralaterally (more active left hemisphere gives rise to more active (more opened) right nostril, and reversely for opposite hemisphere). However, according to *Swara yoga* [3,39] there is also possibility for *reverse influence of the nasal rhythm* on the brain one, by activating less active nostril through special breathing procedure: the more active nostril is closed by finger pressure, this being followed by forceful and short inhaling 10-15 times through the less active nostril. In this way the previously less active channel (ida or pingala) is excited through ionic nostril receptors, then subsequently influencing the limbic brain centre to change the phase of ultradian rhythm. The effect is achieved after only several minutes, which might be monitored by exchanged activity of nostrils. The procedure is very simple, and can be efficiently used to prevent development of cold in early phase (through cutting the ultradian rhythm of developing disorder), for change of stressful mood, etc!

<sup>6</sup> The above *biophysical ionic interpretation* of the acupuncture system can account for the origin of Chinese therapeutic yin-yang/tonification-sedation rules through the type/rotation of the needles [3,4,11]: yin syndrome (excess of "-" ions in some left acupuncture channel) is tonified by taking in "+" ions from air or taking off "-" ions from the channel (through Ag needles working as anode) i.e. by rotating needles in counterclockwise direction on the left channel (thus closing its gap junctions for flow of "-" ions) or clockwise direction on the corresponding right channel (thus opening its gap junctions for flow of "+" ions); and yang syndrome (excess of "+" ions in some right acupuncture channel) is sedated by taking in "-" ions from air or taking off "+" ions from the channel (through Au needles working as cathode) i.e. by rotating needles in counterclockwise direction on the right channel (thus closing its gap junctions for flow of "+" ions) or clockwise direction on the corresponding left channel (thus opening its gap junctions for flow of "-" ions). On the other

which is confirmed by several-millennia-old Eastern and Western *esoteric traditions*, as well as by contemporary investigations [3,4,43-47]. According to this model, *vital energy (qi, prana, pneuma, bioenergy)* would have its theoretical interpretation in *ions*, out of which "+" ions have degradative *catabolic (yang)* influence and flow dominantly through the *right* part of the circulatory acupuncture system, while "-" ions have inhibitory *anabolic (yin)* influence and flow dominantly through the *left* part of the circulatory acupuncture system (cf. Fig. 3.1a).<sup>7</sup> The mechanisms of the acupuncture stimulation keep the activity of the "+" and "-" ions in balance, of normal healthy state.

### 3.1 Quantum and Classical Body's Hierarchical Neural Networks

The prevailing scientific paradigm considers information processing within the central nervous system as occurring through *hierarchically organized and interconnected neural networks*. Hierarchical models of brain's neural networks can be divided into [3,30]: *Kohonen's self-organizing feature mapping* unidirectionally oriented multilayer neural networks [27], *Hopfield's associative or attractor* massively and bidirectionally connected neural networks [28], and *Haken's synergetic classical* [29] and *Peruš's neuro-quantum* [30] multilayer neural networks.

So, it seems that this hierarchy of biological neural networks is going down sub-cellular *cytoskeleton* level, being according to some scientists a kind of *interface* between *neural* and *quantum* levels [31-33]. At the same time it appeared, within the Feynman propagator version of the Schrödinger equation, that the *quantum level* is described by *analogous* mathematical formalism as *Hopfield-like quantum-holographic associative neural network* [6].

The mentioned analogy opens additional fundamental question as to how the *quantum* parallel processing level gives rise to *classical* parallel processing level, which is a general problem of the relationship between quantum and classical levels within the *quantum decoherence theory* as well [48]. Naturally, the same question is closely related to the fundamental nature of *consciousness*, whose in-deterministic manifestations of *free will* [3,15,49,50] and other holistic manifestations of consciousness like *transitional states of consciousness* [3,15], *altered states of consciousness* [51], and *consciousness pervading body* [52] – necessarily imply that some manifestations of consciousness must have deeper *quantum origin* – with significant *psychosomatic and transpersonal implications*, which will be elaborated further on.

On the other hand, as demonstrated by *quantum-coherent characteristics* of the Russian-Ukrainian school of *microwave resonance therapy (MRT)* [9-11] (highly resonant microwave (MW) sensory response of the disordered organism, biologically efficient nonthermal MW radiation of the extremely low intensity, and neglecting MW energy losses alongside acupuncture meridians) – the *acupuncture system* is the only *macroscopic quantum system* in our body (while brain still seems not to be [53]) which is the reason that *consciousness* is related to its MW ultralow-frequency (ULF) modulated *EM field* in the framework of the author's *biophysical quantum-holographic/quantum-relativistic model of consciousness* [3,15,25,45]).

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hand, some other Chinese therapeutic rules need taking into account functional physiological interactions between acupuncture system and nervous and humoral systems.

<sup>7</sup> According to Swara yoga the *rhythmical breathing* through the nose is especially important, in order to inhale as many as possible airoions (prana) within the two (out of three) most significant nadis (the left ida and the right pingala), with their entrances in corresponding nostrils: this is recommended in fresh and nonpolluted air, when even some excess of "-" ions exists, with the relaxing healthy influence on the body! It should be pointed out that breathing through the nose is crucial, with pauses for keeping breath between inhaling and exhaling (in order to inhale as many as possible airoions within ionic channels, and then redistributed through the whole acupuncture ionic system). For keeping good healthy state, a half-hour rhythmical breathing in the morning and evening relaxing walks, with rhythmicity 6:6:12 (during 6 steps deep inhale, next 6 steps keeping the breath, and following 12 steps the full exhale), 5:5:10 or 4:4:8, depending on individual lung capacity. In the same context, in closed environments a microclimate engineering can be recommended by applying *airoionizers* that produce an excess of "-" ions.

And as recent Peruš's theoretical investigations show that any *quantum system* has formal mathematical structure of the *quantum-holographic Hopfield-like associative neural network* [6] – then *memory attractors of the acupuncture network* can be treated as *psychosomatic disorders* representing EM/MW (*quantum*)*holistic records* (which might be therefore removed only holistically, supported by an extreme efficiency of the MRT therapy that consequently erases the very information of the psychosomatic disorders, cf. Fig. 3.2) – which represents biophysical basis of (acupuncture *temporarily reprogrammable!*) (*quantum*)*holistic local psychosomatics* [3,4,15,25,45].

Namely, according to the *Tibetan traditional medicine*, an acupuncture procedure must be repeated every several months [17] – presumably as a consequence of *restituted* patient's mental loads from his *mental-transpersonal-environment* of closely related relatives/enemies/deceased, that remained *non-reprogrammed* on the level of quantum-holographic collective consciousness, which might be supported by the Tibetan *pulse diagnostics* based on 20 pulses,<sup>8</sup> enabling precise diagnosis of psychosomatic disorders not only of the patient himself *but also* of his family members and enemies.

An additional support that the acupuncture system is really related to consciousness is provided by novel *meridian (psycho)therapies* (with very fast removing of traumas, phobias, allergies, post-traumatic stress, and other psychosomatic disorders [18-20]; about meridian therapies see introductory Part 1) – whose simultaneous effects of *visualization* and *tapping/touching of acupuncture points* might be theoretically interpreted as a 'smearing' and *associative integration of memory attractors* of the psychosomatic disorders, through successive imposing new boundary conditions in the acupuncture energy-state space during visualizations of the psychosomatic problems [3,20], cf. Fig. 3.3.

In this context, the association of individual consciousness to manifestly-macroscopic-quantum acupuncture system, and application of theoretical methods of associative neural networks and quantum neural holography and quantum decoherence theory, imply *two cognitive modes of consciousness*, according to the coupling strength consciousness-body-environment [3,25,45]: (1) *weakly-coupled quantum-coherent direct one* (in out-of-body<sup>9</sup> religious/creative transitional and altered states of consciousness, like prayer, meditation, creative dozes, lucid dreams...), and (2) *strongly-coupled classically-reduced indirect one* (in bodily perceptively/rationally mediated normal states of consciousness, like sensory perception, logical and scientific thinking...) – *with conditions for mutual transformations* – and significant *religious and epistemological implications* related to re-gained strong coupling of quantum-holographic contents of consciousness with bodily-environment, classically-reducing directly obtained quantum-coherent informational content.<sup>10</sup> So it seems that science is closing the circle, by re-discovering two cognitive modes of consciousness and at the same time by imposing its own *epistemological limitations* – as it was preserved for millennia in *shamanistic tribal traditions* [55], or as it was concisely described by Patanjali in *Yoga Sutras*, pointing out that mystical experience (samadhi) is 'filled with truth' and that 'it goes beyond

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<sup>8</sup> *Tibetan pulse diagnostics* recognizes about 430 basic *psychosomatic diseases* and several thousands subdivided ones [17] (while Western symptomatic medicine recognizes about 80 basic psychosomatic diseases [5]).

<sup>9</sup> Fundamentally-theoretical reasons for this *out-of-body displacement of consciousness* lays in necessity that consciousness must have, at least in (quantum-coherent) altered/transitional states, *sufficiently isolated* relevant macroscopic quantum degrees of freedom [3,15,25,45] – in order to have *indeterministic characteristics of free will* – which is otherwise not possible in strong body's environment which causes quick quantum decoherence of consciousness into (classically-reduced) normal state [53].

<sup>10</sup> This explains *in principle non-adequate informational rationalization* of any direct quantum-holographic spiritual/religious *mystical experience* (as a general problem of the quantum theory of measurement, of reduction of the implicate order of quantum-coherent (quantum-holographic) superpositions into the explicate order of measured projective quantum and mixed classical states [3,25,45]!). After returning of the displaced consciousness upon the body, in order that transpersonally acquired information ascends to the level of normally conscious state, it is necessary to overcome *two filters* [3,15,25]: *acupuncture system/nervous system threshold filter* (which requires 'emotional colouring' of the solving problem) and *frontolimbic-amplification filter* (which requires 'emotional-thinking priority' of the solving problem). It should be pointed out that (practically) *non-threshold potential* of the acupuncture electrical GJ-synapses [7] makes body's *acupuncture system* extremely sensitive *quantum sensor* [3,4], which can resonantly 'detect' even ultraweak EM fields [8] – with radiesthetic-diagnostic, noncontrolable-patogenic, or quantum-therapeutic psychosomatic effects [54].

inference and scriptures' [43,56], or as this difference between faith and knowledge was formulated at the beginning of the last century by Berdyaev in his *Philosophy of Freedom* as the difference of two modes of cognition, prayer-mediated 'comprehension of the affairs invisible' and rationally-mediated 'comprehension of the affairs visible' [57]!

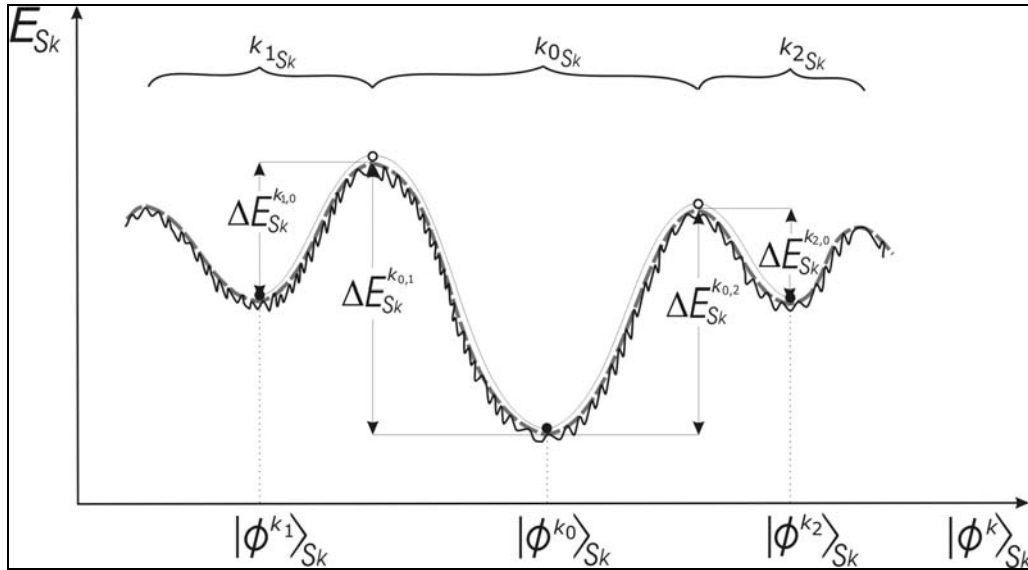


FIGURE 3.2 Schematic presentation of the memory attractors in the energy-state ( $E_{S_k}(\phi^k)$ ) hypersurface of the quantum-holographic memory/propagator of the open macroscopic quantum system  $S_k$  (cell's protein/target biomolecular one, or acupuncture system/consciousness/collective consciousness [3,4]):

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

It should be pointed out that quantum decoherence presumably plays fundamental role in biological quantum-holographic neural networks, through presented energy hypersurface shape adaptation (in contrast to low-temperature artificial qubit quantum processors where it must be avoided until the very read-out act of quantum computation) – which implies that Nature presumably has chosen elegant room-temperature solution for biological quantum-holographic information processing, permanently fluctuating between quantum-coherent states

$|\phi^k(t)\rangle_{S_k} = \sum_i c_{k_i}(t) |\phi^{k_i}\rangle_{S_k}$  and classically-reduced states  $\hat{\rho}_{S_k}^k(t) = \sum_i |c_{k_i}(t)|^2 |\phi^{k_i}\rangle_{S_k} \langle \phi^{k_i}|$  of acupuncture system/consciousness  $S_k$ , through nonstationary interactions with out-of-body farther environment and through decoherence by bodily closer environment of biological open macroscopic quantum system  $S_k$ . The same might be related to lower hierarchical quantum-holographic macroscopic open quantum cellular enzyme-gene level, which also functions on the level of permanent quantum-conformational quantum-holographic like molecular recognition. This represents a natural framework for explanation of psychosomatic diseases related to somatization of environmentally-generated memory attractor's states of the open macroscopic quantum acupuncture system/consciousness and quantum-holographically projected upon lower hierarchical cellular level, thus changing the expression of genes! The above approach might be generalized to highest hierarchical level of the quantum-holographic collective consciousness, with religious/social implications on necessity of transpersonal spiritual quantum-holographic removing of all unwilling side memory attractors (which non-reprogrammed by prayer will unless cause psychosomatic diseases and interpersonal fights in this and/or further generations they are transpersonally and unconsciously transferred to, on the level of field-related collective consciousness).

It should be also pointed out that the proposed quantum-decoherence model might serve as bio-informational basis of *quantum medicine* related to *acupuncture system/consciousness and its psychosomatic states* [3,4]. So, for instance, during *application of MRT therapy* for transferring disordered acupuncture system  $S_k$  from the psychosomatically excited state  $|\phi^{k_2}\rangle_{S_k}$  (cf. Fig. 3.2) into the attracting healthy ground state  $|\phi^{k_0}\rangle_{S_k}$ , it is necessary during the strong external action ( $T_{ext}$ ) to provide external microwave energy for skipping over potential barrier of the disordered state ( $\Delta E_{S_k}^{k_2,0}$ ), which after relaxation process ( $T_{rel}$ ) of taking-off the excess external energy ( $\Delta E_{S_k}^{k_0,2}$ ), gives rise to condition of the completed quantum state change of the acupuncture system, with additional decoherence time ( $\tau_D$ ) and decrease of one quantum of microwave energy in the state  $|\phi^{k_2}\rangle_{S_k}$  and increase of one quantum of microwave energy in the state  $|\phi^{k_0}\rangle_{S_k}$ ! By multiple repeating of this process, the depth of the memory attractor  $k_2$  is getting shallower in favor of deepening of the attracting acupuncture healthy state  $k_0$ , finally giving rise to complete erasing of the psychosomatic disorder  $|\phi^{k_2}\rangle_{S_k}$  and deepening of the healthy state  $|\phi^{k_0}\rangle_{S_k}$ , i.e. *dynamic modification of the potential hypersurface of the acupuncture system*, in full analogy with the situation of learning classical Hopfield associative neural networks (cf. Fig. 3.2, and footnote 1).

Therefore, the *quantum decoherence* might play *fundamental role in biological quantum-holographic neural networks* [3,4,16,24,25], through adaptation of the energy-state hypersurface of acupuncture system/consciousness (in contrast to *low-temperature artificial qubit quantum processors* where it must be *avoided* until the very read-out act of quantum computation!) – which implies that Nature presumably has chosen elegant *room-temperature solution for biological quantum-holographic information processing*, permanently fluctuating between quantum-coherent states and classically-reduced states of acupuncture system/consciousness, through non-stationary interactions with out-of-body farther environment and through decoherence by bodily closer environment. The same might be related to *lower hierarchical quantum-holographic macroscopic open quantum cellular enzyme-gene level* [3,4,24,25], which might be also functioning on the level of permanent quantum-conformational quantum-holographic like biomolecular recognition – so that *quantum neural holography* combined with *quantum decoherence* might be very significant element of the feedback *bioinformatics*, from the level of cell to the level of organism (cf. Fig. 3.2). This represents a natural framework for explanation of *psychosomatic diseases* related to somatization of generated memory attractor's states of the open macroscopic quantum acupuncture system/consciousness (created as a result of interaction with the environment) and quantum-holographically projected upon lower hierarchical cellular level, thus changing the expression of genes!

It should be added, that in the context of *necessary conditions for decoherence* [58], the defining of open quantum system and its environment is a *simultaneous process* – so that in the context of universal validity of quantum mechanics *consciousness might be a relative concept*, non-locally also influenced by farther parts of existing observing universe (and vice versa!) – which is in accordance with the idea of *collective consciousness* as a possible *ontological property of the physical field itself*, with various microquantum and macroquantum (both non-biological and biological) excitations. This implies that the *whole psychosomatics is a quantum hologram* [3,4,25,45], both on the level of *individual and collective consciousness*,<sup>11</sup> which resembles Hinduistic relationship

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<sup>11</sup> Really, as *cosmic collective consciousness* ( $|\Phi\rangle_S = \sum_i c_i |\Phi_i\rangle_S$ ), coincident with the 'field' of Universe, has its own *complementary 'particle' cosmic environment* ( $|\Psi\rangle_E = \sum_i c_i |\Psi_i\rangle_E$ ), their strong-interaction-coupling affects *decoherence of the 'field' of cosmic collective consciousness* into stationary *classically-reduced (observing)*

*Brahman/Atman* ('*Atman is Brahman*' [43,56]), as the whole and its part which bears information about the whole. The mentioned quantum-holographic picture also implies that quantum-holographic hierarchical parts carry information on the whole, enabling *quantum-holographic fractal coupling* of various hierarchical levels in Nature:

(1) *Quantum-holographic coupling with evolving state of collective consciousness*: (i) *locally*, via (non)intentionally mentally-addressed states of acupuncture system/consciousness, with significant psychosomatic implications (due to subsequent acupuncture-based<sup>12</sup> quantum-informational control of ontogenesis and morphogenesis, starting from the first fertilized cell division which initializes differentiation of the acupuncture system of (electrical synaptic) 'gap-junctions' [3,4,7], also supported by experimentally demonstrated *quantum-holographic-language-influence on the genes expression* [62]), as well as with transpersonally-addressed classically-reduced quantum-holographic cognitive-creative implications (Tesla and Mozart as extraordinary examples of miraculous creativity [63,64]), and (ii) *globally*, via advancing individual and collective events<sup>13</sup> (whose memory

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*stochastic state* (described by corresponding density of states  $\hat{\rho}_S = \sum_i |c_i|^2 |\Phi_i\rangle_{SS} \langle \Phi_i|$ , with probabilities  $|c_i|^2$  of realizations of corresponding classically-decoherent states of cosmic collective consciousness, cf. Fig. 3.2). However, *cosmic composite quantum state* ( $|\Phi\rangle_S |\Psi\rangle_E$ ) *evolves without collapse* (due to absence of the complementary outside-cosmic environment!), which implies that *Universe as a whole might be considered as a quantum hologram* subject to deterministic Schrödinger evolution [3,25]! From the above elaborated quantum-holographic idea [59,60] there appears that classically-reduced level of quantum system/consciousness  $\hat{\rho}_S(t)$  or environment  $\hat{\rho}_E(t)$ , is permanently 'emerging' from and 'dissolving' into quantum-holographic level ( $|\Phi(t)\rangle_S |\Psi(t)\rangle_E$ ), and this permanent 'pulsating' is going on extremely fast – with observing Bohm's *explicate order* of either average state of so called 'classical mixtures' (of quantum system/consciousness  $\hat{\rho}_S(t)$  or environment  $\hat{\rho}_E(t)$ ) of quantum-holographic reality via classical measuring devices/senses, or classically-reduced so called 'stationary quantum states' (quantum system/consciousness  $|\Phi_i\rangle_S$  and environment  $|\Psi_i\rangle_E$ ) via macroscopic semi-quantum measuring devices – while non-stationary quantum/holographic reality of Bohm's *implicate order*  $|\Phi(t)\rangle_S |\Psi(t)\rangle_E = \sum_i c_i |\Phi_i(t)\rangle_S |\Psi_i(t)\rangle_E$  might be observed *exclusively* in 'non-stationary quantum-coherent superpositions of states', characteristic of quantum-holographic creative-religious altered and transitional states of consciousness (individual  $|\phi^k(t)\rangle_{S_k} = \sum_i c_{k_i} |\phi^{k_i}(t)\rangle_{S_k}$  or collective  $|\Phi(t)\rangle_S = \sum_i c_i |\Phi_i(t)\rangle_S$ ). This viewpoint is close to experiences of many *shamanistic tribal traditions*, which

consider that *genuine* (quantum-holographic!) reality is represented by *dreams* [61], while (classically-reduced!) awake state is illusion (*maya*, as it is argued in *Eastern traditions* [43,44,56]). In the same context, necessity of direct quantum-holographic coupling of individual and cosmic collective consciousness in observing *implicate order* needs weak out-of-body quantum-communication coupling consciousness-environment, i.e. previous *reprogramming of all psychosomatic loads* (cleansing of possessive or hedonistic *emotional-mental sin/karmic connections* with the world – which as loading 'mental addresses' would give rise to *quantum projections* of mentally/channelled tunnelled consciousness on the *out-of-body environment*, and thus to classically-reduced out-of-body *extrasensory observing* of the mentally-addressed environment, cf. footnote 16!) – and so the efforts of *mystics of all traditions* to *clean consciousness/soul* through spiritual practice (*prayer, meditation, ...*) and thus to reach their final eschatological goal (*Kingdom of God, nirvana, ...*), i.e. *post-mortem salvation* (of the sin-free/karmic-free non-bounded soul) [44,46] appear reasonable! However, it still leaves room for *personal love*, whose highest manifestation is ability and readiness for *permanent and unconditioned forgiving* to loving person (and because of him/her to everybody else, including enemies!), in spiritual prayer and (subtly related quantum-holographic) living practice; the same refers to love for relatives and friends.

<sup>12</sup> On local quantum-holographic coupling on the level of bodily acupuncture system and its numerous projection zones reports contemporary *Su Jok therapy* [65]. On transpersonally-addressed classically-reduced quantum-holographic coupling of closely related relatives/enemies/deceased reports acupuncture-based *Tibetan traditional medicine* [17].

<sup>13</sup> On most fascinating manifestation of global quantum-holographic coupling on the level of *preferences of collective and individual history*, reports so called '*Bible Code*' revealing series of *characteristic keywords* for all historical persons coded by equidistant letter sequences within The Old Testament [66] revealed to Moses on the Mount Sinai 3000 years



attractors might be *reprogrammed by hesychastic prayer for others* thus removing inter-personal loads of the quantum-holographic Hopfield-like neural network of collective consciousness – via prayer-induced hypothetical macroscopic vacuum non-loaded spiritual excitations, as in-deterministic intervention in otherwise deterministic evolution of the quantum-holographic evolution of collective consciousness (and complementary 'particle' environment of the advancing individual and collective events!) which thus provides essentially new non-Schrödinger boundary conditions [3,4,25]!). This leaves room for *free will and influence on future preferences*, and implies indispensable personal role and care for collective mental environment;

(2) *Meridian (psycho)therapies*, with very fast removing of traumas, phobias, allergies, post-traumatic stress, and other psychosomatic disorders [3,4,18-20], via simultaneous effects of *visualization of the psychosomatic problems* and *tapping/touching of some acupuncture points*, which might be interpreted as '*smearing*' and *associative integration of memory attractors of the psychosomatic disorders*<sup>14</sup> through successive imposing of new boundary conditions in the energy-state space of acupuncture system/consciousness (cf. Fig. 3.3), which can be additionally accompanied by discharge of memory attractors of psychosomatic disorders – thus demonstrating a close relationship between consciousness and acupuncture system! Bearing in mind very high efficiency of transpersonal circular meridian (psycho)therapeutic processes, i.e. from all relevant mentally-addressed viewpoints of other persons involved in the treated trauma, this implies that these interactions of the trauma-related persons have quantum-gravitational origin via a miniature '*wormhole*' space-time tunnels in *highly-noninertial physically-equivalent-to strongly-gravitational* transitional states of consciousness<sup>15</sup> of the trauma-related persons [3,4,20] (or '*silver cord*' of vital energy of the astral/mental body, extrasensory observable in altered states between the heart, stomach or throat chakras of the interconnected persons; in African-Haitian voodoo magic the '*silver cord*' between the operator and the victim is intentionally created by visualization, while in Hawaiian hooponopono tradition the '*silver cord*' is cut by visualization thus removing traumatic emotional relationship – which otherwise naturally exists between mother and child, and spontaneously arises by intense exchange of the vital energy between relatives, close collaborators, actual or ex-lovers,

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ago – which might be interpreted as a consequence of the *quantum-holographic nature* of the cosmic collective consciousness (God!?) and its every original manifestation (including The Old Testament, as well as every individual consciousness). On *fractal-informational coupling* of various hierarchical levels in Nature report several contemporary investigations [67].

<sup>14</sup> It should be pointed out that discovery and *neutralization/integration* of client's (Yin-Yang) '*Primordial Polarities*' during Deep PEAT, presumably points to most fundamental roots of client's compulsive and unconscious life game, i.e. on *deep roots of thought processes* on the very borderline (quantum-coherent) implicate order – (classically-reduced) explicate order of the quantum-holographic individual/collective consciousness [3,20]. In the moment of neutralization/integration and getting conscious of '*Primordial Polarities*', on the one hand they become quantum-entangled in quantum-coherent state of the implicate order, and on the other hand they become psychologically integrated in classically-reduced state of the explicate order of client's consciousness – and Being regains its *spiritual and psychological freedom* out of previously unconscious and compulsive life game [3,20].

<sup>15</sup> This could be deeply related to so called '*wave packet collapse*' (objective reduction) [31] which might have quantum-gravitational origin in space-time miniature '*wormhole*' tunnels of highly-noninertial microparticle interactions [3,15] in quantum measurement-like situations (fully equivalent, according to Einstein's *Principle of equivalence*, to strong gravitational fields – in which opening of '*wormholes*' is predicted [68]). The question as to how it is possible that these highly noninertial microparticle processes with inevitable relativistic generation of miniature '*wormholes*' were not taken into account within quantum mechanics which is yet an extremely accurate theory (?) – might be answered that they were (!), but implicitly within the ad hoc *von Neumann's projection postulate* [49] to account for quantum mechanical '*wave packet collapse*' in quantum measurement situations (implying also that von Neumann's ad hoc '*projection postulate*' is based on *quantum gravitational phenomena*, being on deeper physical level than nonrelativistic quantum mechanical ones). In this context, it is expected that only on the level of quantum gravitation the nature of '*wormhole*' tunnels, '*black holes*', and '*cosmological singularities*' will be revealed, when on the Planck-Wiler's scales of length  $\sim 1,62 \cdot 10^{-35}$  m and time  $\sim 0,54 \cdot 10^{-43}$  s the concept of space-time ceases to exist and remains only Wiler's '*quantum foam*', out of which not only space-time singularities but also tiny surrounding parts of space-time are made.

friends and enemies, and can even persist *post mortem* between the alive and dead persons [3,4,20)].<sup>16</sup>

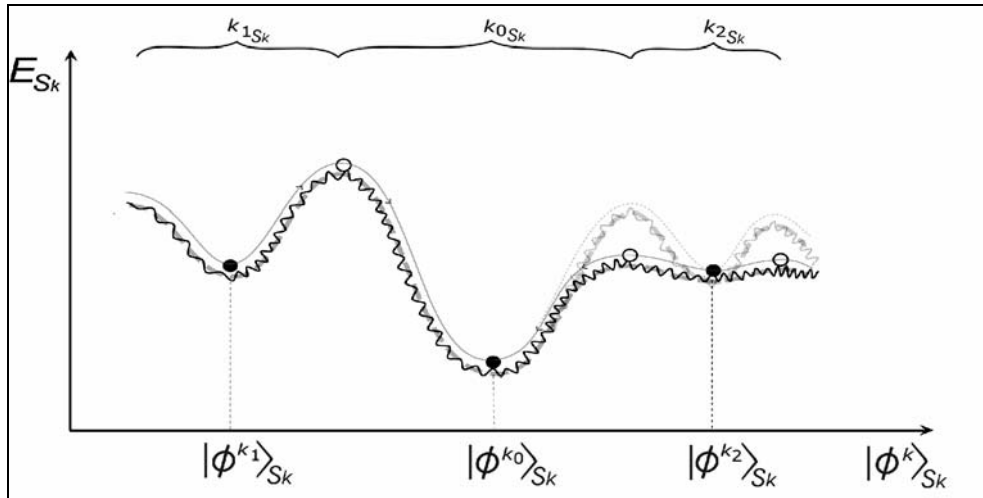


FIGURE 3.3 Schematic presentation of 'smearing' and associative integration of the memory attractor of psychosomatic disorder  $\phi^{k_2}$  into normal ego-state  $\phi^{k_0}$  [3], via simultaneous effects of visualization of the psychosomatic problems and tapping/touching of some acupuncture points, in meridian (psycho)therapies – which might be interpreted as successive imposing of new boundary conditions in the energy-state space of acupuncture system/consciousness  $E_{S_k}(\phi^{k_i})$  – when memory attractor of the initial psychosomatic disorder  $\phi^{k_2}$  (dashed line) becomes shallower and wider (full line), with greater overlap and followed associative integration into memory attractor of normal ego-state  $\phi^{k_0}$ .

In the above context, it might be also said that *three front lines* of psychosomatic medicine do exist [3,4,25]: (a) the first one is *Spirituality and (circular) Meridian (psycho)therapies*, with possibility of permanent erasing of mutual memory attractors on the level of collective consciousness;<sup>17</sup> (b) the

<sup>16</sup> So, our theoretical investigations imply *real origin of esoteric experiences* of various traditions of East and West [44,46]. For instance, according to our elaborated theoretical relationship *consciousness/acupuncture* EM-ionic quantum-holographic Hopfield-like associative neural network [3,4,25,45], *astral body* (*manomaya, lingasarira, manovijnana, ka, psyche, subtle body, psychic body, soul...*) and *mental body* (*vijnanamaya, suksmasarira, manas, ba, thymos, noetic body, spiritual body, spirit...*) [44,46] might be biophysically related to *out-of-body displaced part* (connected with the body by miniature 'wormhole' space-time tunnel) of the ionic acupuncture system, and with embedded EM component of ionic MW/ULF-modulated currents, respectively. Also, *transpersonal interactions* [47,69-76] might be interpreted [3,15,16,25,63] by collapse-like consciousness-channelled quantum-gravitational tunnelling of operator's individual consciousness – mentally addressed on the target's content of collective consciousness in operator's (short-lasting) transitional states of consciousness – thus intentionally channelling composite state of the 'field' of target-under-influence-of-operator part of collective consciousness ( $|\Phi\rangle_S \rightarrow |\Phi_j\rangle_S$ ) and automatically influencing complementary

'particle' output ( $|\Psi\rangle_E \rightarrow |\Psi_j\rangle_E$ ) in quantum-gravitationally-induced and consciousness-channelled collapse  $|\Phi\rangle_S |\Psi\rangle_E = \sum_i c_i |\Phi_i\rangle_S |\Psi_i\rangle_E \rightarrow |\Phi_j\rangle_S |\Psi_j\rangle_E$ .

<sup>17</sup> During EM/ionic interactions with environment the continuous but weak adaptation of the existing energy-state hypersurface of the acupuncture system/consciousness is going on (cf. Fig. 3.2), so that quantum effects of decoherence leave little 'free will' for change of the shape hypersurface, which is dominantly determined by its 'prehistory'. However, during *prayers for others* (non-Schrödinger non-unitary quantum-gravitationally mediated via prayer-induced hypothetical macroscopic vacuum powerful and non-loaded spiritual excitations [3,16,25], variously rationalized in personalized pantheons of religious traditions of East and West [43,44,46,55,73,74]) the *most 'free will'* is achieved as the *whole mutual conflict* (corresponding memory attractor state) of two persons is thus *permanently removed* as a net-effect

second one is *Traditional holistic Eastern medicine and (non-circular) Deep psychotherapeutic techniques*, whose efforts temporarily erase memory attractors on the level of acupuncture system/individual consciousness, and prevent or alleviate their somatization, as a consequence of the indolence on the first level;<sup>18</sup> (c) the third one is *Modern symptomatic Western medicine*, whose activities through immunology, pharmacology, biomedical diagnostics, and surgery, hinder or soothe somatic consequences of the carelessness on the first two levels. It should be stressed, that *necessary* activities on the second and third levels, with *neglect* of the first level, have a consequence of *further transfer* of memory attractors on the level of *individual and collective consciousness* in this and further generations, thus *accumulating* quantum-holographic loads which *afterwards cause* not only illnesses, but also interpersonal fights, wars, and other troubles.

Finally, it should be also pointed out that our investigations are on the line of the again arisen scientific interest for investigation of the phenomenon of *consciousness* in the past decades [1-6,15-22,25,30-34,42-47,49-57,59-67,69-87] – with forecasting *great synthesis* of two cognitive modes, *rationaly-scientific* (classically-reduced, in normal states of consciousness) and *creative-religious* (quantum-coherent, in altered and transitional states of consciousness) in the framework of new *quantum-holographic holistic paradigm* – where *personal role* becomes indispensable due to the influence and care for collective mental environment, which is *fundamental question* of both mental health and civil decency, i.e. of both spiritual and civil morality [3,4,25,45]!

#### 4. CONCLUSION

In this paper theoretical relationship of quantum-informational medicine and quantum-holographic informatics is revealed, which is of special importance because contemporary research of psychosomatic diseases indicates the necessity of application of holistic methods, oriented to the treatment of man as a whole and not diseases as symptoms of disorders of this wholeness, implying their macroscopic quantum origin. The focus of these quantum-holistic methods are body's acupuncture system and consciousness, which in Feynman's propagator version of Schrödinger equation exhibit the quantum-informational structure of quantum-holographic Hopfield-like associative neural network, with memory attractors as a possible quantum-holographic informational basis of psychosomatic diseases, as a 'downward' mechanism for modified gene expression. Wider quantum-informational implications of holistic medicine suggest quantum-holographic fractal coupling of the cellular level/acupuncture system/consciousness/collective consciousness, which implies three front lines of psychosomatic medicine: (1) Spirituality and (circular) Meridian (psycho)therapies, (2) Traditional holistic Eastern medicine and (non-circular) Deep psychotherapeutic techniques, and (3) Modern symptomatic Western medicine, strongly supporting the quantum-holographic paradigm, where personal role becomes indispensable due to the influence and care for collective mental environment, which is fundamental question of both mental health and civil decency, i.e. of both spiritual and civil morality.

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– while other non-reprogrammed interpersonal conflicts in other related persons cause their (unconscious mentally-addressed) transpersonal re-inducement within the two prayer-included persons. Whether circular processing in meridian (psycho-energetic) therapies can have permanent effects in removing mutual conflict [19,20], depends on whether this removes the whole associative chain of the conflict or only particular aspects of them.

<sup>18</sup> It should be pointed out that *healing/psychotherapeutic effects* upon patient's acupuncture system/consciousness are *frequently blocked* by spiritual quantum-holographic coded personal acceptance of the illness as a kind of (self)punishment (as suggested by experiences of volunteers in '*post-hypnotic regressions*' [61]). In this case *prayers for others* are necessary in order to realize necessity of stopping (self)punishment (or themselves to support it by their *repenting prayer* of the type '...My Lord, I accept myself, my personality, my body, my illness, my environment, my relatives, my friends, my enemies, my therapists and my therapies, and I thank You for the past support, and I pray You to spare us of further vast temptations...') – thus performing *spiritual integration of personality*, i.e. removing corresponding attractor's energy blockades within patient's acupuncture system/consciousness (cf. Fig. 3.3), which *initiate the process of permanent healing* [77].

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