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**PARADIGM OF MODERN PHARMACOLOGY:
DEVELOPMENT AND CURRENT APPROACHES**

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Abstract. The article focuses on the current approach to understanding pharmaceutical products' effect. It describes a paradigm shift in views on pharmaceutical action in correlation to the processes occurring under pathology. The paper discusses the role of regulatory processes in the development of a disease and a recovery. It points out the necessity of disease registration in order to early start a therapy. The author has also analyzed problems of modern pharmacology paying attention at the inability of monitoring the drug products effect during the treatment process and limited awareness of primary pharmaceutical interrelations with biological substrate. It covers the issues of therapeutical efficiency depending on body oxygen saturation. Special attention is paid to the water medium of a body directly related to the development of pharmaceutical effects. The article emphasizes the challenges of pharmaceutical effect depending on a dosage, structural-functional heterogeneity of tissues, consecution of pathological development, choice of its diagnostics etc. It outlines the most important ways of increasing the pharmaceutical efficiency based on the understanding of quantum-wave processes of the primary pharmacological effect.

Key words: pharmacodynamics, pathology, pharmaceutical effects, therapy, diagnostics, reducing-oxidizing potential, regulation.

Pharmacology is known as a science inventing innovative, efficient and safe pharmaceutical products and studying processes resulted from their introduction into a body. It creates the pillar of pharmaceutical therapy. Needs in safe and highly efficient pharmaceuticals claim complete understanding of the fact in what way a pharmacological product improves recovery.

Pharmaceutical study goes back to the anthropogenic period and, having overcome several stages of development, has been based for almost 200 years on the scientific fundamental principles, though currently there is an opinion that it is not a science, since effects observed under pharmaceutical action cannot be described mathematically. The development of novel knowledge provided changes in pharmacological science and realization of its final goals: assistance in recovery, pharmaceutical effects, targeted development of pharmacologically active molecules, study of body interaction with pharmaceuticals at molecular, nano-sized, quantum-wave levels, i.e. it ensured scientific paradigm shift in pharmacology.

Paradigm (derived from the Greek *paradeigma*, "an example") is considered to be a conceptual model of the problem statement and solution dominating during a certain historic period in the scientific community.

Changes in scientific beliefs on the interaction between pharmaceuticals and an organism can be observed on the example of pharmacological chairs

development in Russia. The appearance of Molecular Pharmacology Chair in the 2nd Moscow State Medical University (Professor P.V. Sergeev, an academician of RAMS; Candidate of Medical Sciences N.L.Shimanovsky, Head of this Chair) appeared to be that very mainspring in Russia, which led on a lot of scientists, and the 1st school of young scientists-pharmacologists held in Pushchino (in which the author participated) raised a great interest in this problem among the youth. Synthesis of a large amount of biologically active substances demanded a search of body molecules being able to interact with these compounds resulting therapeutical effects. Thus, an original scientific direction "preparation – target-receptor" has been striking out, which currently appears to be the leading direction in search of effective pharmaceuticals.

In the 1970s the problem of the medical use of oxygen at an ambient pressure higher than atmospheric pressure – hyperbaric oxygen therapy (HBOT) – was being developed intensively. Fair amount of knowledge was available about pharmaceuticals interaction under lack of oxygen in a body; however, no valid scientific generalizations were made about pharmaceuticals effect under HBOT. Action mechanism of oxygen in a body, especially under pathological conditions, was not fully specified as well. The problem of metabolic processes changing under oxygen excess in a body was being solved successfully at the Pathophysiology Chair of the Voronezh State Medical University

under the direction of Professor A.N. Leonov. The novel data led to the conclusion that oxygen saturation of a body can influence the process of pharmaceutical effect formation.

Our first systematic research related to the action of oxygen under increased pressure on pharmacodynamics of cardio-vascular preparations allowed to determine previously unknown regularities of toxic changeability, therapeutic effectiveness, pharmacological properties of cardiogenic, antianginal, anti-arrhythmic, anticoagulant, vascular and other agents under hyperbaric oxygenation. Oxygen has been found to have alpha-adrenomimetic and beta-adrenolytic action, i.e. produce receptor action accompanied by appropriate effects.

Currently oxygen properties can generally be presented in the following way:

1. An acceptor of electrons in the respiratory chain etc.

2. A reagent in reactions of free-radical oxidation of membrane lipids that provides conformational restructuring of membranes and their permeability.

3. Being paramagnetic in its basic state it can result in agitation of electro-magnetic field within a radius of 100 angstrom magnitude and influence processes of electron transition in biomembranes.

4. Oxygen can influence dipole orientation of interacting molecules in biomembranes and possibly the structured water.

5. Oxygen changes conformational properties of protein-clinging enzymes molecules.

6. It changes sensibility of alpha-beta-adrenoreceptors, muscarinic receptors and, probably, other bio-macromolecules.

7. Binding of oxygen with an iron atom heme is accompanied by the electron density shift of both reduced iron and adjacent nitrogen-bearing groups, i.e. electrical current generation with relevant magnetic field generation. Therefore, oxygen is considered being the most important ambient informational factor mating structural and field components of living systems that is important in understanding of a great number of pharmaceutical effects.

This research work has developed a new concept in the pharmacodynamics of drug products under HBOT [1]; the attempt to evaluate processes in a body at the submolecular level being exclusively scientific result.

Currently, based on the pharmacological paradigm: "pharmaceutical – receptor", experimental study of biologically active compounds starts with the computerized search of their affinity to biological substrate. Determination of the assumed organ or tissue activity of the investigated compounds is used for this purpose. A complex "Microkosm" has been developed in the Volgograd State Medical University

under direction of the Academician of the Russian Academy of Sciences (RAS) V.I. Petrov, which gives an opportunity to reveal pharmacological properties of new chemical compounds promptly and with the significant degree of reliability.

However, body informational-energetic interrelation with the environment takes place constantly, thus, ensuring principle "each and all know about everything" to be realized. From this perspective, the idea of regulation of the body vital functions phenomenon has taken a different shape especially for understanding the origin of pathological processes and opportunities to influence them therapeutically, since pathology, besides structural-functional changes, also includes longstanding or permanent violation of photon energetical and informational balance. Nevertheless, at the present time the principal postulate explaining pharmaceutical effect is considered to be drug products interaction with certain body receptors ("targets of action"). Better understanding of the processes of the body vital activity regulation under the constantly changing environmental impact is impossible without taking into consideration the role of water in the body, the role of tissue biofields, the role of electron-photon interrelations at the cellular level.

According to the receptor pharmacology, a molecule of a drug product correlating with receptors results in their conformational restructuring, which causes changes of membrane permeability, enzymes activity and, due to this, changes of cellular metabolism and function. Pharmacological receptors appear to be acceptors of natural mediators (adrenaline, noradrenaline, acetylcholine, dopamine, serotonin and others). Drug products are known to react with the same receptors. However, there are 10 known non-receptor mechanisms of drug interactions and therapeutical affects. They are as follows:

1. Physical mechanism (osmotic and adsorbent properties).
2. Chemical mechanism (acids, alkalies).
3. Denaturation of proteins (antiseptics).
4. Chelate bonds with metals (tetracycline).
5. Inclusion of a drug product into biomolecules (fluorouracil).
6. Inclusion of a drug product into membrane (narcotic substances).
7. Competitive antagonism with the substance essential for the body (sulfanilamides).
8. Action of pharmaceuticals through structured water (LLL, homeopathy).
9. Resonance mechanisms (bioresonance therapy).
10. Alteration of the informational flows in the body (acupuncture, psychotherapy) etc.

As G Ling [2], V.L.Voeykov [3] et al stated, understanding the possibility of receptor interrelations giving sufficiently adequate

explanation to action mechanism of a great number of pharmaceuticals demands detailed analysis of compliance of current physico-chemical, biophysical, informational achievements to current status “biologically active substance – target”. A living organism is reported to be an open system exchanging substance, energy and information with the environment; exogenic reactions are consumed by an organism and are included into informational exchange [4]. The fact is deemed to be proved that a major carrier of information both – inside a living system and between living organisms, – appears to be electromagnetic radiation [4, 5, 6, 7, 8 and so on].

Self-production is regarded as a general property of a living thing, and a system of receptor-informational interrelations – intercellular, intracellular etc., which is inseparably associated with the impact of various environmental factors, is reported to be an essential peculiarity to control this process. Endogenic informational consistency is provided in a body by physical (electromagnetic and acoustic fields) and biological (neuromediators, peptides, ions etc.) factors, herewith the leading place as concerning precision, inclusiveness, transmission rate of information goes to physical factors. These factors are not considered to be the major objectives of academic medicine since their quantum-wave characteristics have not become either foundational in understanding the development of pathological process or objectives of therapeutical exposure yet. However, there is an opinion [9] that the future of medicine belongs to the quantum mechanics field. It is even suggested to solve the challenges of brain and body interrelations based on quantum physics principles [10] that emphasizes importance of study of quantum-wave interrelations in processes of body living activity in general and pathology development in particular. Transition from information exchange in the form of substance to the field level is assumed to occur by electromagnetic field of a certain range [11], the fact that still raises hot debate.

An organism consisting of 50-100 trillion cells is constantly renewing, moreover, each tissue is renewing with its specific rate keeping the information about life of all previous generations in DNA. Changes of body functioning degree under the environmental factors can lead to changes of genetic apparatus that, in turn, causes tissue restructuring giving a new grounding to informational interrelations. If force and rate of environmental factor impact is comparable in time with processes of tissue self-renewal, it is such structural changes that occur; if the impact is too powerful, changes too rapidly or has continuous effect, then adaptive, accomodational reactions fail to be formed in due time and this result in structural-functional violations

altering informational body processes as well. Thus, these regularities should be taken into consideration in the therapeutical process.

Initial diagnostic criteria of a pathological process appear to be patient’s complaints and symptoms of a disease. J. Vitulka [12] states that signs and symptoms are not the disease itself but the unique form of the human protective system of attempt to eliminate fight a disease. It is structural and functional violations which are diagnostic criteria. To all intents and purposes it will be more sensible to register and evaluate changes of regulatory processes and choose adequate response measures before morphological changes develop. For exactly this reason the authors have developed a technique of regulatory changes registration.

Therapy should be aimed not only at the elimination of a symptom and correction of structural and functional alterations, but at deeper mechanisms of restriction of self-reproduction processes with due account for predisposition. Current therapeutical procedures are mainly aimed at the correction of structural-functional changes and due to their low selectiveness they significantly influence healthy tissues that is not obligatory realized as unwanted (registered) side effect, but may result in the changes which support abnormal condition of other organs and systems for a long period of time. Recurrent course of a disease can also be related to these reasons.

It is necessary to take into account that “... any body molecule, but for structural function, to this or that extent has a regulatory role as well, at this hormones, enzymes, biogenic amines, biologically active substances – they all are specific regulators” [13]. (*translation is ours*) It is proved in the works about the mediator role of stimulating aminoacids by the academician V.I. Petrov, that is why one may talk of a fact that function continuity is provided by regulatory processes continuity, that the entire metabolism is a sort of state regulation, and, generally speaking, – never-ending regulatory interaction.

Since structural-functional changes cannot occur without preceding violation of regulatory processes, it is evident that treatment should be aimed at the restoration of normal tissue regulation at all levels: cellular (self-reproduction of biologically active structures), intercellular (informational flows of ions, mediators, peptides, aminoacids and others) and interorgan – neurohumoral. At the same time, the question remains unclear – how the succession of the recovery process is regulated with account of stereo-architectonic of not only a single cell, but tissues and organs as well. Naturally, one of the factors of this process can be their function, but violated function cannot provide normal process of self-reproduction. Therefore, there exists another mechanism of regulation of restoration

processes in a body under pathological condition. This mechanism should control processes of self-reproduction and react clearly to the exposing environmental factors. The authors suppose that there is a certain algorithm (dynamic plan, a graph) of cells, tissues and organs self-reproduction in a living body, which can change itself during the pathology and not perform the function it provides in its usual (non-pathological) state. Structured body water possessing memory property and able to instantly transfer information between all cells, including the information obtained under environmental impact, can be material basis for such an algorithm. A phenomenon of bioresonance can be a mechanism of perception of such information, and changes of spiroid chain formations of biogenic water clusters can appear to be its transference, though it might also be solitons displacement [14].

Therapeutical manipulations should start with restoration of this algorithm. There is an uninterrupted and inseparable connection between the algorithm of restoration and structural-functional interrelations. The algorithm is considered to be an integrating part of these interrelations in time and in space, and if being exposed it influences the structure and functions of a cell, tissue, an organ and a functional system.

Disease patterns have repeatedly changed during the development of medicine. Humoral and solid body pathology prevailed for almost 100 years, but beginning with the last mid-century cellular pathology took priority. Progress in the molecular biology and immune-histochemistry created a basis for the molecular pathology model. At the same time there appeared a danger that detailed study of molecular processes under various diseases can result in more incomplete understanding of general regularities of a disease at the entire body level, an endless number of medicinal factors, including pharmaceuticals, and, eventually, will bring medicine to a dead-lock.

The authors' multiple thorough research of body changes under simulation of a pathological process has revealed that there are no qualitative changes between indications of pathology and initial norm at the metabolic level, structural level of cells and tissues, functional level of organs and systems. Practically all phenomena registered during simulation of a disease also occur in healthy animals. Quantitative differences depending on spatially-temporal are the only to be revealed. For example, the important role of sarcomere contracture changes in myocytes under the pathogenesis of myocardial infarction have been detected by the authors at the cellular level (electron microscopy), however, the same changes have also been found out in the myocardium of healthy animals. Only the quantitative differences have been observed: 2-5 contractures at the cellular cross-section are considered

to be the norm, 6-12 and more have been observed under pathology. These changes are detected and justified as necrotic patches under myocardium infarction at the tissue level, and as the enhancement of A-discs anisotropy in the divisions of healthy animal myocardium after being polarized. Even more distinct confirmation of the above-mentioned one can obtain analyzing myocardium functional characteristics, for example, cardiogram: inequality of R-R intervals in healthy people changes considerably after the onset of a pathological process and only thorough mathematical processing of cardiograms gives an opportunity to make adequate conclusions. At the biochemical level it is also very difficult to give a definite answer about the benefit of changes in a biochemical process under the influence of some medications. The fact is that inequality of enzyme activity can be clearly detected through tissue and it is kept under therapeutical intervention, therefore, total enzyme activity cannot be a criteria of the therapeutic benefit of a medication, but only 3-D histochemical image, which is unfortunately impossible to obtain in real time regimen, can be of greater use.

Radical pathology on the basis of functional-structural violations of cellular membrane is considered to be a priority [15]. Free radicals appear to be atoms or chemical compounds having an unpaired electron. Such electrons give free radicals properties of high reactive ability and paramagnetism [16, 17]. These radicals define bactericidal and cytotoxic effects of leucocytes, cell proliferation and regulation of vascular tone [18]; result in inhibiting action of DNA and RNA synthesis in endothelial cells [19], they are supposed to take part in nor-adrenaline synthesis [20, 21]. However, hydroxyl radical (HO*), which is able to result in DNA violation, regenerate formation of organic radicals inducing processes of lipids peroxidation to participate in bactericidal and cytostatic leucocytes action [22], is known to be the most chemically reactive. Together with toxic action attributable to free radicals of oxygen, they are used by the cells in physiological concentrations for modification of membrane enzymes (cytochrome P-450, cytochrome b, glucose-6-phosphatase, adenylate cyclase, monoaminooxidase) and also influence ionic pumps of adenosine triphosphatase [23] and other processes [3]. Therefore, it can be affirmed that one and the same phenomena can be observed under both physiological and pathological processes at the level of individual molecules, even so chemically reactive as free radicals. If not taking into consideration their expressiveness and spatial-temporal character of changes they cannot be used for diagnostics or as a

pharmaceutical targeted receptor. At the same time a separate group of preparations – antioxidants – have been distinguished.

Research of M.B. Shtark and O.I. Epstein [24] devoted to “bipathic phenomenon”, i.e. modifying effect of biologically active substances, applied in small doses, related to the same substances applied in standard amounts, give new opportunities in treatment of pathological processes of various character and localization. A lot of researches on biological activity of small doses of preparations have been performed in recent years [25, 26]. O.I. Epstein in his work [27] provides a detailed analysis of therapeutical effects and mechanisms of action of potentiated antibodies. The question, what can determinate a similar approach to pharmaceutical influence on a body, still exists.

The main theoretical background in understanding such phenomena appears to be a consideration of the necessity of solution structuring in accordance with the condition of initial substance being kept even under dilution of the initial substance up to zero concentration. The idea of structuring in biology was suggested by Clegg [28]. It is known that structured water possesses properties significantly differentiating it from ordinary water. The most important of the abovementioned properties is water memory about the initial substance. Certain research studies prove the fact that this phenomenon may take place in the immunological system [29]. On the other hand, application of a pharmaceutical in very-low-doses is accompanied by hyperergic reaction to it realized possibly through immunological mechanisms of hypersensitivity [27]. It is also known that natural antibodies participate in regulation of natural functions [30]. In 1999 O.I. Epstein *et al* advanced an opinion about presence of modifying properties in potentiated antibodies that was brilliantly proved in their succeeding works. In the view of modern ideas about the role of natural antibodies he considers that it is possible to “regulate a regulator” specifically modifying functional activity of one or another auto-antibodies with very-low-doses of antibodies. He has also developed a conception of substance release-activity giving an opportunity to understand mechanism of action of pharmaceuticals on the different basis. Such a therapeutical approach is reported to be a significant breakthrough in modern pathogenic pharmacotherapy.

The authors’ long-term researches on nonlinearity of processes in a body (illustrated by the study of the cardio-vascular system) have enabled us to formulate a few statements about the significance of this phenomenon for better understanding of life-sustaining activity under pathology and treatment. E.G. Bykov has demonstrated in his researches [32] that there exists initial inequality of glycogen

distribution and respiratory enzyme activity in heart cells, which is kept during myocardium infarction occurrence as well. He also emphasizes the fact that heart divisions with various contractile functions have different heterogeneity index of glycogen amount in cardiomyocytes. Considerable inequality of glycogen at the cellular and cell sheet level have been demonstrated experimentally, and ultrastructural investigations of cardiomyocytes have given an opportunity to reveal temporal and spatial inequality of sarcomeres and their constituents [1]. Structural inequality of heart cells related to location of bioplasts: mitochondria, elements of sarcoplasmic reticulum, nuclear cell apparatus, – has been registered during electron-microscopic study, though one can observe certain regularity (i.e. mitochondria: sub-sarcolemmal, interfibrillar, perinuclear) in their structure. To sum up, it may be concluded that a living organism consisting of various organs and tissues determinate inequality (heterogeneity) of the structure and distribution of its components at the cellular level, which fact is of great biological significance in terms of nonlinearity of registered phenomena. This phenomenon is regarded to be very essential, particularly, to support continuity of cell functioning under the process of persistent self-reproduction of its structures, being discrete in time.

Unequal contractility of sarcomeres due to inequality of calcium ion flows may be the basis of heart rhythm variability. As it is shown in research works of R.M. Bayevsky [33] and Ary L. Goldberger *et al* [34] heart rhythm fluctuations are defined by the influence of sympatic and parasympatic nerves creating characteristics of geometrical fractal in time that supports the idea of chaotic nature of heart rhythm. At the same time, study of dynamic cardiointerval range changes allows not only determining the body capability to adaptive reactions, e.g. under physical exertion, but also controlling the status of regulatory processes of the cardio-vascular system under certain pathological conditions and action of pharmaceuticals. Thus, in the applied aspect a phenomenon of heterogeneity may be the basis for search of novel approaches in diagnostics of donozological stages of diseases and monitoring therapeutical procedures.

The above-mentioned approach in studying structural-functional heterogeneity may be applied not only to heart activity analysis but to investigation of any periodic processes in a body and natural phenomenon. Determination of heterogeneity index of metabolism findings or cell functions gives an opportunity to reveal changes as early as at the level of regulatory and even informational (the most important) processes that, in turns, will allow using not foreign for the body molecules having a lot of

side effects to correct changes, but absolutely harmless informational factors.

It is known that the system of acupunctural diagnostic gives an opportunity to evaluate a body state from the perspective of its inseparable entirety with the environment, and the system of acupoints (biologically active points – BAPs) is taken as bioenergetic and informational [35, 36] performing specific energetic connection with the ambient environment due to intensity and direction changes of electro- and thermal exchange. The authors have changed generally accepted method of BAPs characteristic measurements, which represents specification of difference of potentials or temperature between BAP and intact skin zone at the distance no more than 2 cm during a certain period of time. This indication is being registered for 2 minutes and fluctuations of its value are analyzed mathematically, i.e. changeability (heterogeneity) of BAP status is investigated. Various researches, e.g. F.G. Portnov [37], R. Voll [38], have confirmed association between meridians' points and a corresponding system of organs; this fact being supported by numerous researches allows developing a technique for assessment of pharmaceutical actions (patent №2119296 with priority of 1994) and receiving novel data about the action of cardiovascular, broncholytic, hormone and other preparations on the regulatory processes in the body.

Further investigations of these processes with the help of the differential thermometer (developed with the Voronezh State Politechnical Institute – Professor Y.S.Balashov) demonstrated the possibility of the temperature differences assessment (ΔT) between BAP and an intact skin zone every second with subsequent storage of these findings in the unit memory. Then 16 findings on fluctuations of temperature registered for 2 minutes are calculated, and the regularity of functioning changes of the meridian, where the differences of temperature ΔT have been registered at the BAP, is determined. The fact that indicated changes occur under both – allopathic and homeopathic substance introduction – is very important, it means that authors have developed a technique of registration of informational impact on a body. The technique allows monitoring pharmaceutical effects in real time regimen ensuring timely changes of preparation dosage or its substitution for another one.

Elements of pharmacological Informatology as total options of information data transfer and transformation from environmental factors to internal structures of an organism can be found out as early as in scientific works of the 18th century. Fundamental

principle of quantum mechanics is that molecules are never isolated, but rather united in the uninterrupted structure of charge density extending to the whole Universe. Such properties as dipole moment, ionizing potential and others are typical for isolated molecules, and properties perceived at the macroscopic level, such as temperature, colour, viscosity, melting point play a critical part in affecting biological substrate. However, informational role of pharmaceuticals is not fully understood yet in terms of current molecular conception, which evidently requires further detailed study.

All the above mentioned proves the fact that human knowledge about influence of various factors on a body is not sufficient to be properly interpreted. Research of body water, which is significantly different from the environmental water, can dramatically contribute to the understanding of pharmaceutical performance. The authors have been studying this problem for the recent 15 years.

Research works of physico-chemists show that water molecules provide constant electrical polarization around molecules of the diluted substance resulting in the appearance of sufficiently large electrical dipole in water [39]. All living tissues manifest bioelectromagnetism [40] and due to this fact they can be modified by various electromagnetic fields as a result of free electric dipole laser water effect. It has been proved theoretically and supported experimentally that water being the basis of inner human body fluids (intercellular and intracellular) from a physics perspectives is considered to exist in the state of boundary formed by biological objects contacted with it. This water differs in many physical parameters from the corresponding ones of water in the volume and possesses high biological activity.

The authors of “Nanopharmacology” (Corresponding Member of the RAS N.L.Shimanovsky et al) [41] state that “Currently it must be taken as a fact that pharmaceuticals can be active in very-low doses, what is more, these effects regarding their directionality may differ from those that usually take place under action of pharmaceuticals applied in therapeutical doses.” (*translation is ours*)

The data were published as early as 2006 [42] that there exist free monomers in water – water spin-isomers with their own quantum differences (spinning – spin selectiveness to hydrogen bounding). However, L.N. Gall [14] argues that “water spin-isomery as itself hardly plays any role in functioning of the living system matter.” (*translation is ours*) Nevertheless, S.M. Pershin considers that hydrogen-bounding structures and ortho-para spin isomers provide water with long-lived condition

(comparing to proton switching) after various impacts, which can be defined as specific manifestations of small-capacity memory.

Oxidation-reduction potential value is reported to serve as a measurement of oxidation reduction processes intensity in the system and is defined as concentration ratio between oxidative and reductive forms of ions composing the given system. Direction and rate of chemical reactions can be specified by the changes of oxidation-reduction potential. Investigations of pharmacological properties of ionized water with different oxidation-reduction potential are scarce a considerable part of such investigations have been carried out at the Pharmacology Department of the Voronezh State Medical University (2005 – 2015). These researches have demonstrated influence of anolyte (oxidation-reduction potential +700) and catholyte (oxidation-reduction potential – 500 mV) on the behavioral reactions of rats, their analgesic properties, their impact on narcotic and alcohol effects, catholyte anti-depressive action. The results also allow to specify peculiarities of the regulation system of blood aggregative state in laboratory animals, to determine anti-arrhythmic action, influence on the system of water-salt metabolism, reproduction organs, digestive organs and so on.

In collaboration with the Department of Psychiatry University (Professor O.Y.Shiryaev), the Voronezh Medical the authors attempted to optimize treatment of depressive conditions using updated preparations: Cipramil (Citalopram – a selective serotonin uptake inhibitor); Atarax – atypical tranquilizer with central mechanism of action in combination with catholyte. Together with the Department of Dermatology (Professor L.A. Novikova) the authors have demonstrated a novel psoriasis, eczema, acne, burns of facial skin therapy by including anolyte and catholyte in the treatment of these disorders. The clinical materials support the idea of the most important role of water in the formation of pharmaceutical effects, where the introduction of ionized solutions can change oxidation-reduction potential of the body fluids that modifies pharmaceutical effects.

The phenomenon of long-range action of medication is long known: when preparation changes this or that body index being close to it, but it might be an isolated organ as well, e.g., an isolated ear of a rabbit in N.P. Kravkov's experiments [43], or testing the pharmaceutical and a patient's compatibility with the Voll method widely applied nowadays. All these facts prove the idea that there exist mechanisms of pharmaceutical molecule interactions with body living tissues, apart from psychological and receptor mechanisms. Therefore, not only metabolic and functional, but also informational homeostasis is

considered to be natural for a healthy body, and its maintenance ensures variety of productive life.

To help a patient cure himself is quite as much art as science...Success or failure of a physician depend on the doctor's ability to adequately communicate with patients at the quantum level, where frequencies, images, coherence and wave functions are of greater importance than pathology and disease formula [9].

To sum up, the basis of modern paradigm of pharmacology can be a concept of quantum-wave interaction of pharmaceuticals with bio-substrates of a body. This interaction exactly appears to be the starting point of pharmacological effect formation.

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