

**INTERNATIONAL CENTER "SPORTS OF 21ST CENTURY"
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"INSTITUTE OF BIOPHYSICS"**

*"Quantum-pharmacological synergism
coupled to systematic diagnostics
and graduated exertion is the road to longevity"*

L. A. Potyomkin

**BIOLOGICAL AGE IN TERMS
OF PRACTICAL HEALTH**

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This book is intended for wide public. It deals with certain aspects of prophylaxis and treatment of diseases associated with the process of senescence, involving a combination of traditional and unconventional approaches, an integral part of the latter being quantum medicine methods.

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About the author



Leonid A. Potyomkin

- Doctor of Medicine
- Master of Sports (swimming), USSR
- Member of the Chernobyl disaster damage-control team
- Author of more than 130 scientific papers in the field of medicine

Main directions of research:

- Methods of early detection of various pathological conditions through application of clinical, biochemical, pathophysiological, hematological, immunological and other techniques;
- Development of new methods for correction of sportsmen's vitality status, enhancement of stamina and rehabilitation processes.

L.A. Potyomkin is a co-founder of the International Center "Sports of the 21st Century" and Association "Euroquantum", Slovenia.

Dr. Potyomkin provides medical monitoring of training and rehabilitation process for sportsmen in various fields - swimming, sailing, mountain skiing etc. coming from many countries around the world.

To my daughter Catherine and to the growing
generation

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INTRODUCTION. MEDICAL ASSISTANCE & QUANTUM-PHARMACOLOGICAL SYNERGISM IN FORMATION OF PRACTICAL HEALTH STATUS AND CORRECTION OF THE BIOLOGICAL AGE

Everyone would like to feel great and look young for many long years. However, in everyday life one can't help but notice the difference between the people's appearance and what their passports say. It's very nice when there's an opportunity to witness the positive imbalance; however, the reverse picture is much more common and that's, naturally, isn't encouraging.

It's no secret that Nature doesn't endow everyone evenly, widely modifying people's individual exterior characteristics (the phenotype) and producing variants of their improbably complex genetic constitution (the genotype). These variations cover a very wide range between the extremes: we all have heard or actually witnessed examples of senescence diseases at a comparatively young age (infantile oncology, juvenile infarctions etc.). At the same time we could observe aged people never limiting themselves practically in whatever aspects. Congenital weakness of a specific organ or of the entire system is a genotypically preordained characteristic of every organism. But not everything is predestined unchangeably. A provocative influence, which would trigger pathology, might be absent at a given moment. The concepts of healthy life, which formed by the beginning of the third millennium and include today various opinions concerning nutrition, engagement in sports and a lot more, and involve practical application of mod-

ern medical and biological knowledge, do produce some positive results.

Youthful, sprightly people of advanced age are a common sight in any country, any continent around the world today. By objective criteria of fine modern diagnostics the biological age of such people may lag far behind their passport data. Nonetheless, senescence-related diseases can catch up with us at any moment.

According to the World Health Organization data, such diseases include myocardial ischemia, oncological disorders, endocrine dysfunctions (mostly diabetes) and other pathologies. As a rule, these diseases manifest themselves in the period of hormonal changeover of the organism. Is it possible to delay this period, make it less strenuous, and if yes, then how? Perhaps, it's even possible to cancel it altogether and the question is, what means should we employ to achieve this, (assuming that the young age may be extended from 20 to 55, maturity covers the rich and colorful period between 55 and 85 and the advanced age is moved to 85-110 years and beyond)? **This problem represents the most urgent task for medical and biological science in the new millennium.**

Correction of the biological age is a multi-component complex. Its constituent parts are: **individual medical and biological maintenance of the vitality status (which includes systematic monitoring of the key parameters of metabolic activities in the organism and calibrated graduation of physical exercise), new approaches to prophylaxis, rehabilitation and treatment on the basis of the quantum-pharmacological synergism principle**, earlier proposed by us (1); **all these components make it possible to achieve optimization of life's mode by forming its individual algorithms and the practical health status (please see Diagram 1).**

Considering human organism as a complex, self-regulating system, specialists should carry out the timely correction of its homeostasis, precluding the possibility of the senescence diseases developing. Only with correct, meticulous and systematic diagnostics it becomes possible to single out the influence of neurogenic stress, disruptions in social adaptation or overdoses of intensive psycho-emotional and physical exertions on development of myocardial ischemia, oncological disorders,

endocrine dysfunction and other pathologies.

In practical terms, all types of pathology, leading to development of senescence diseases, are in fact a generalized disruption, appearing as a result of a complex interaction of hereditary and acquired disturbances in regulation of blood circulation. The primary cause of these disturbances is changes in structure and functions of the cell membranes.

Markers of these disturbances become noticeable in different types of human body cells; they manifest themselves as changes in ionic permeability, in physical and chemical status of the lipid matrix, in the structure of the membrane-bound proteins, and in activity of membrane enzymes.

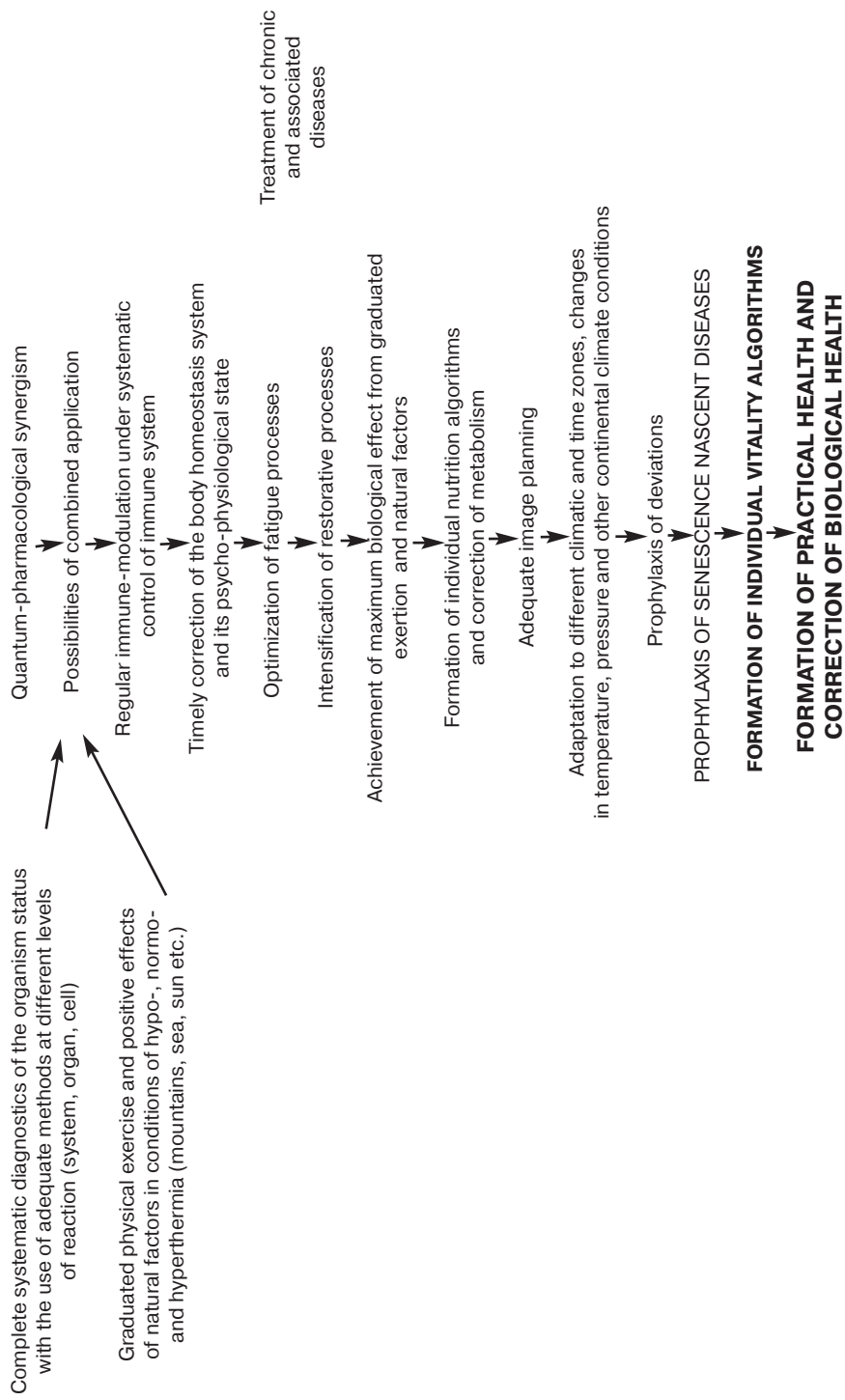
We may safely assume that there isn't a single disease, including the normal senescence dysfunctions, in which the key transmembrane mechanisms weren't involved.

Patients often demonstrate decreasing sensitivity to medications under protracted treatment conditions. This can be attributed to changes in the speed and quality of their metabolism, when efficacy of the medication characteristically drops on the background of prolonged monotherapy and progressing disease. Full restoration of micro-circulation in the affected organ through application of exclusively drug therapy is a hopeless task. It becomes possible only with the use of the quantum-pharmacological synergism effects. Its biological value lies in the ability of low-energy quantum exposure to act as the structural anti-oxidant, promoting normalization of membranous and metabolic processes, intensification of compensatory blood circulation and activation of micro-circulation, in combination with medication treatment.

In our opinion, wide use of the quantum-pharmacological synergism principle shall greatly facilitate prevention of the functional physiological changes degenerating into pathology.

A protracted chronic process of pathogenesis with its complex, multi-factor stages requires a comprehensive and methodical approach to composite therapy. The main task in this process is to guarantee succession and continuity of therapeutic and prophylactic effects on the organism. Numerous publications testify to high therapeutic efficacy of various types of quantum therapy. This method has already undergone its acid test and is now firmly on the list of therapeutic instruments, used with particular effect in acute stages of the dis-

Diagram 1. Medical support for formation of vital individual algorithms, practical health status and correction of the biological age (L. A. Potyomkin)



ease, but its role at other stages has yet to be clarified. The key point here is the need for repeated courses of treatment and the appropriate time intervals between such courses, their length and repetition factor. Another avenue for research would be the prophylactic use of such courses on the background of medication treatment and generalized restorative therapy.

This paper seeks to give a preliminary idea of opportunities and ways of practical application of the quantum-pharmacological synergism by combining the quantum medicine methods and prescription of pharmacological substances, with simultaneous objective and systematic diagnostics.

Positive effects of the quantum-pharmacological synergism can be widely used for elimination of membrane degeneration processes, constantly originating within the cells and triggering senescence-related diseases in the human body.

1. SYSTEMATIC DIAGNOSTICS IS THE KEY TO FORMATION OF PRACTICAL HEALTH AND PROPHYLAXIS OF PATHOLOGY

If our goal is to make timely corrections in the body's homeostatic system and thus build practical health, prevent pathological developments and individually optimize the vitality factors at different stages of the organism's existence, then we'll need an instrument to monitor these processes.

Once we begin to organize such multi-functional diagnostic complex, allowing us to monitor systematically, objectively and fully the state of organism in normal conditions and under intensive psycho-emotional and physical stress, **we must delineate a range of certain high-priority medical and biological disciplines:**

1. Biochemistry
2. Hematology
3. Cardiology
4. Neurology
5. Immunology
6. Pharmacology
7. Psychophysiology
8. Genetics
9. Physical therapy
10. Quantum medicine & diagnostics
11. Ultrasonic scanning technique
12. Computer technologies

13. Experimental medicine

14. An inter-discipline consultative group of experts.

So what criteria should the diagnostic methods meet if they are to be used in the process of medical and biological maintenance of human life?

Of course, these criteria should include sufficient informational density, ease of use and uniformity of results, obtained both in hospital and in dynamic outpatient research conditions, be it before, after or even during periods of maximum physical or psycho-physiological stress. Therefore, yet another important requirement for research of this kind is the proper, state-of-the-art instrumentation, allowing resolution of even the most daunting problems, provided there are specialists skilled enough to use such hardware effectively.

Let's provide some illustration of the above.

BIOCHEMISTRY

The role of biochemical studies of blood and urine cannot be overestimated. Analysis of the well-known clinical indices yields a good picture of the internal status of the organism. This is especially true concerning organic changes, being registered in post-stress periods. On the other hand, the biochemical indices, coupled to the hematological, cardiac, neurological and other indicators provide the basis for recommending corrections in one's way of living. For instance, in cases of insufficient content of hepatic ferments in blood stream (aspartate aminotransferase, alanine aminotransferase) and low levels of hemoglobin or urinary albumen excretion exceeding 3 g/l on the background of dysregulatory syndrome, reduced physical and neurogenic tensions are strongly recommended. The required pharmacological correction with dynamic monitoring of indices is also prescribed. Failure to follow the recommendations shall lead to persistent lysis of liver cells, which in turn results in disruption of glycolytic function and organic dystrophy as long-term effects. There will be no visual symptoms in this period, owing to high compensatory capacity of the body.

But we need to keep in mind, that the levels of certain indices are specific to different age periods and may slightly

differ from those demonstrated by the-called "practically healthy" people. For instance, the index of general cholesterol, participating in formation of young people's hormonal level, should not drop below 5.5 mill mole/l, especially in the intensive physical and psych-emotional exertion phase.

Skilled specialists can reliably detect and, when necessary, pharmacologically or otherwise rectify, any deviations from the standards biochemical indices. What's more, such specialists can isolate and study dynamically the changes in specific indices, characteristic for the given organism, reporting them to the patient and explaining to him the causes or mechanism of such changes, recommending treatment or diet and discussing with him feasibility and nature of physical exercises during the period of studies. Using these results and combining them with data received in other, associated studies, the specialist should report the rehabilitation progress to the patient, help with optimization of the process' inner mechanisms and advise the patient on the need to repeat the analyses. This is the only road to improved condition of the patient and a significant amelioration in the indices of his practical health. Our task is not to describe the indices, quite well known in the clinical, or any other, practice. There are several dozens of them and changes undergone by each one carry important message, characterizing the individual status of various organs, intensity of metabolism etc., including psychological state of the patient and, of course, his genotypic peculiarities, as is the case, for example, with study of lactate dehydrogenate content. In the opinion of American researchers, it displays five types of genotypically conditioned responses and corresponding pathology, which are not easily discernible even to a specialist, who has been observing the patient for a long time. It is of crucial importance to catch the moment when changes degenerate into damage and the norm transforms into pathology.

Understanding of pathogenic mechanisms and borderline cases, especially during periods of physical and psycho-emotional stress, can be greatly aided through the use of other forms of biochemical studies, complementary to the clinical ones. Such additional research may help evaluate, for instance, the influence of pharmacological correction on the key points in the mechanism of pathology development. We

often use original methods of such research in our studies (2- 6).

Dozens of biochemical indices, other than purely clinical ones, may be utilized in this sphere of research. But only the specialists, engaged in serious scientific and clinical research - which the systematic monitoring of a concrete organism undoubtedly is - should be allowed to make decisions on the need to involve the extra studies in addition to the standard clinical ones, and on interpretation of the results thus obtained. Each person is a unique phenomenon, and correct **understanding of changes in the state of his/her organism, detected over long periods of monitoring, represents a difficult practical task, but its correct solution brings the well-deserved success.**

HEMATOLOGY

Hematological studies can be considered both as clinical and as specialized. Their role in the dynamic monitoring is of very high importance. Indices of clinical hematology (the-so-called non-specific blood analysis) have extremely high informational density - they allow the researcher to evaluate the general status of the organism and permit an objective estimate of this or other approach or procedure feasibility, as well as the specific intensity of physical exertion. Results of the clinical analysis of hemoglobin count, the number of erythrocytes, the colour index, the reticulocytes - all represent the highly sensitive indicators of any changes occurring in the organism. They are easily reproduced in the course of studies, provide clearly defined information on the state of the organism and, coupled to other indices, serve as basis for recommendations concerning the necessary correction of the organism's homeostasis.

If a specialist, systematically observing a concrete organism, resorts to specialized hematological analyses in an effort to decode some borderline condition, then it can significantly improve his understanding of the observed phenomena's mechanisms and yield beneficial practical results.

Information concerning condition of the cells pools, circumstantial ideas about the preceding cell generations, data on hematoses processes, obtained with the help of various tools of special hematology - once again, in combination with other indices - permit objective evaluation of different preparations as stimulants of the haemopoiesis process. These preparations enjoy great popularity with many, not always justified, and they are often used repeatedly over short time intervals.

But this is the external side of the issue. As to the internal one, such uncontrolled use of hematoses stimulants delivers a severe blow on the entire system of blood cells generation in the organism, from which it takes a long time to recover. What's more, overloading the organism physically or psycho-emotionally in condition of its incomplete recovery - which only too many people indulge in - may lead to very serious pathological developments. Unfortunately, too often the specialist has weak or no idea of his patient's blood condition dynamics, leave alone other objective indices, crucial after such premedication.

Without doubt, hematological studies represent an integral part of the complete systematic diagnostic process, which must be applied to the organism over its entire life span.

CARDIOLOGY

Methods of practical cardiology, which also has rich arsenal of special tools for evaluation of the cardiovascular system's functional state, should be fully employed by all physicians, engaging in systematic observations. The level of diagnostic significance of cardiological research has significantly risen in recent years. This is due to rapid development of computer technologies and to colossal experience, accumulated by experts in the field of diagnostic algorithms and applied software.

This country can boast of several world-class cardiological institutions, where highly skilled specialists are always ready to render consultative and practical assistance, which is a powerful positive factor.

However, those specialists, who engage in deep and serious studies of methodological and methodical maintenance of human vital functions, must have at their disposal the full arsenal of diagnostic programs for quick and objective appraisal of the organism's condition, with the individual characteristics and problems, related to its cardiovascular system. Inexpert pharmacological support (inadequate choice of incompatible medications prescribed for long periods), intuitive approach to medical recommendations, incomplete rehabilitation of the

organism suffering from metabolite intoxication lead to serious consequences with pronounced pathology.

Swift and clear results of systemic diagnosis, with constant use of ultrasonic scanning, supplemented with mandatory biochemical and hematological tests (for decompensated electrolytic shifts, damaged membrane structures - see "Biochemistry" chapter) help prevent overtension as a pre-morbid condition and detect pathologies in their clinically hidden stage. Such approach permits adequate optimization of the fatigue process - a natural physiological condition of short-term functional imbalance, easily reversible and amenable to compensation both at the expense of the organism's own recuperative resources and owing to adequate and qualified external support.

Justified use of non-specific exercises in the course of functional diagnosis, study of microcirculation, vascularization, parameters of peripheral blood circulation, galvanic skin reflex, skin impedance and other supplementary criteria on the background of ongoing ultrasonic scanning provide a significantly more comprehensive picture of the situation. This, in turn, makes it possible to prevent development of a serious pathology by applying methods of pharmacological and physiotherapeutic correction and sensibly graduating the loads.

In our studies we use various original approaches, based on studies of graduated neurological stress on the background of careful monitoring of the cardiovascular functions and modeling the maximum psycho-emotional exertion.

Systematic monitoring of the organism makes it possible to single out various individual characteristics, specific features and genotypically conditioned or acquired pathological changes without any loss of time.

The modern level of medical science allows prevention of persistent pathology development, whereas graduated stresses with pharmacological and physiotherapeutic support serves as foundation for adequate rehabilitation.

The cardiological studies represent a fast-developing branch of the medical science, greatly aided by massive use of computerized technologies and progress in other medico-biological disciplines. Highly skilled specialists have now at their disposal almost unlimited opportunities for medical and biological support of the organism's vital functions and rendering real assistance in forming the individual approach to that task.

NEUROLOGY

Neurological studies are seldom used in the process of monitoring the organism; as a rule, they are carried out periodically in the course of preventive clinical examinations. However, with rapid progress in computer-aided research, studies of bioelectrical activity of the brain begin to yield invaluable data. Electroencephalography reveals close coordination between morpho-functional features of heart and brain rhythms (ejection fraction, the left ventricle's myocardial contractility and dimensions of the right atrium depend on the power of a-range rhythms in nearly all derivations, whereas power of a-ranges rhythm in the frontal lobes is associated with duration of the right atrium's ejection and flow speed in the pulmonary artery, and so on.)

The use of electroencephalography data is highly justified not only in evaluation of the principal potential of the organism, but also in systematic observations in conditions of psycho-emotional stress and relaxation.

Formation of the modern concept of individual life support program is closely tied to search for new ways and methods of enhancing vigour of the organism, which in turn requires deeper understanding of its functions. So, justified use of additional means and methods in development of this approach represents one of the directions of the modern medico-biological

life support theory.

We use a number of supplementary neurological indicators in our research, which became, with time, an integral part of the diagnostic complex, widely used in practice. One of such supplementary indices is evaluation of the general balance of the central nervous system (CNS), which is based on integral criteria, showing the level of the functional potential and the current state of the cerebral homeostasis. Apart from its diagnostic value, this data represents useful and necessary additional information for further studies.

We are deeply convinced that study and wide use of objective criteria characterizing the functional status of the CNS is a highly promising direction in systematic medical observation.

IMMUNOLOGY

The qualitative level, attained in the process of forming the individual algorithms for optimization of living mode is likely to suffer not just because of methodological and systemic imperfections, but from immunodeficiency losses as well.

Unfavorable consequences in this case bring factors of varying nature, including reckless consumption of medicines. What's more, excessive and too intensive physical and psycho-emotional loads by themselves represent a serious stress on human body, starting the complex, biochemically multifaceted, successive mechanism of fatigue. The skeletal muscles in this process function as trophic part of the immune system, synthesizing and storing glutamine in addition to their other numerous functions. Shortage of glutamine is the most important precursor of the organism's exhaustion (7). Glutamine presence is the requirement for processing of RNA and DNA by T-lymphocytes and reproduction of new T-cells. Deficit of glutamine hampers their morphogenesis (8) and in conditions of excessive stress suppresses immune-genesis. Such state of the organism brings on serious changes in the body systems, which, if not corrected, shall inevitably force the organism into pathological stage. Thus, for various reasons, immunodeficiency is an integral part of the modern way of life and struggle against this factor is one of the most topical tasks for the medical and biological science.

This is why in Diagram 1 immune-modulation occupies a special place, commensurate with the degree of importance it has in methodological provision of the modern way of life. Means and methods of immune-modulations shall be dealt with in a separate chapter of this paper.

PHARMACOLOGY

The use of any classes of pharmacological medications is based exclusively on complete and systematically upgraded information concerning the state and individual characteristics of a given organism, with precise knowledge of pharmacological kinetics, side effects and compatibility of the medications being prescribed.

Only the specialist, systematically monitoring a specific organism, may prescribe drugs, food additives and/or vitamins required for its proper functioning.

Pharmacology by itself is not capable of enhancing vigour of the organism, since that status is the fruit of hard, exhaustive - and daily - work, aided by adequate medical support, preventing transition of the organism into pathological condition, and this is one of the main tasks for such support. The work process must be optimized in relation to loads, with which the organism has to cope and which should be rigidly graduated. And after all these preconditions have been met, pharmacology steps in and helps organize processes of fatigue and, especially, rehabilitation, including timely immuno-modulation. Miracles do not happen and therefore the main task for the system of medical support is to render assistance and avoid doing damage.

This assistance should be based on regularly upgraded

information about the organism, obtained through systematic and fundamental research and thorough understanding of the problems and must never degenerate into fly-crushing with pharmacological steam-roller.

Today's rapid progress in many fields of science and technology results in mind-boggling panoply of preparations, stimulants, food additives etc., synthesized and marketed in a steady stream. This process must be treated with understanding and due caution. Promotional materials more often than not present a somewhat imprecise picture of the contents and effect of this or other medication. At the same time unconditionally positive developments appear, too: biotechnological preparations, genetic engineering products, to name just a few, which make it possible to attain the maximum biological, therapeutic and recuperative and other effects. The qualified and correct pharmacological assistance is a highly complex task, requiring not just thorough knowledge of pharmacological kinetics of the preparations used, but also the ongoing analysis of processes taking place in the organism under observation and mechanisms of pathological degeneration on the intimate level, otherwise it would be utterly impossible to avoid development of persistent, clinically pronounced symptomatic complexes and syndromes (9 - 11).

PSYCHOPHYSIOLOGY

Progress in fundamental research, computer technologies and genetic engineering has given the modern science sufficient number of new means and ways to rectify various imbalances in the body systems, caused by neurogenic stress.

Specialists, engaged in systematic medical and biological observations, are now capable of exerting considerable influence on psycho-physiological condition of their patients, relying on the newest scientific arsenal and - when necessary - reviving the all-but-forgotten old methods. Obviously, they have to build on foundation of the objective research data and to proceed from the most advanced understanding of mechanisms leading to increased psycho-emotional stress at the cellular level; only then timely, modern and, above all, qualified pharmacological and physiotherapeutic correction shall be called for.

Biochemical changes, detected in blood in the process of qualitative evaluation of substances and their derivatives, participating in the formative process of psycho-emotional tension at the level of neuro-mediators, or during excretion, do not always manifest themselves in symptoms, visible at the body level, owing to genotypic stability of the vascular reactions, individual characteristics of microcirculation and functioning of the peripheral blood circulation, which prevent development, for instance, of hypoxia and hypertension.

Therefore the thesis of **the functional changes rooted at the cellular level being of secondary origin**, does play its role. Something always has to happen first, since the organism's compensatory potential has its limits. And this is why psycho-physiological methods must be included in the systematic comprehensive examinations; these methods could be adaptations of the widely known Minnesotan and Spielberg's techniques, somewhat re-oriented and applied on the background of galvanic skin reflex and skin electric impedance measurements. Cardiac intervals measurement by two integral indicators showing the functional potential and state of vegetative homeostasis, with a complement of appropriate stimuli, imitating psycho-emotional stress, as well as other methods, could also be used here. Such methods may often help to detect the very first symptoms on the background of specific biochemical and hematological indices, and practice confirms such conclusion. Afterwards this would be useful in prevention of the possible negative developments and even - subject to skilful and adequate treatment - rectify problems already present.

GENETICS

As far as genetics is concerned, Russia is considered a developing country. This is indeed so, although progress in this field has not yet reached the phase of systematic use in the world practice, either.

So far we can only talk about fundamental research still going on and about practical application of a few innovations, which are very promising - in principle.

However, the initial steps in this direction should not lead to premature conclusions based on the registered number of nucleotides at a single gene level. Any human activity is sufficiently multi-faceted, and to make its reasonable evaluation one has to broaden the range of identifiable new genes.

One of the more important and promising directions in the molecular genetics research is development of DNA diagnostic methods and DNA technologies. In our opinion practical importance of these approaches shall be appreciated in the nearest future.

PHYSIOTHERAPY

Specialists employ objective diagnostic data, obtained in the course of systematic and exhaustive examination of their patients, for formulating specific recommendations concerning nutrition, graduation of physical exertions, etc. They render qualified assistance in optimization of fatigue and rehabilitation processes through application of pharmacological means and physiotherapeutic procedures.

Among the physiotherapeutic methods used nowadays most often we need to point out electro stimulation, ultrasound, balneo- and hydrotherapy, all types of massage, light treatment and others. All these methods have long been successfully utilized for rehabilitation purposes and occasionally they have become an integral part of life's internal algorithms. However, application of these procedures is very seldom carried out under close observation of specialists.

Let's consider the simplest form of physiotherapy - a visit to a sauna. Beyond doubt, this is a beneficial procedure - it helps to get rid, albeit partially, of metabolites and products of degradation, forming in periods of stresses and exertions; these products are normally found in the peripheral areas,

where billions of capillaries remain in collapsed state (persistent peripheral spasms are precursors of hypertension). However, neither the number of such visits, nor intensity of their influence is controlled in any respect save the individual's own feeling and judgment. This attitude is apt to deliver such a blow on the organism, that the subsequent rehabilitation might as well be more intensive than the initial problem required. Our observations show that individually tailored visits to sauna, producing the maximum beneficial effect, should not be attempted more than 3 times a week and must include just 1 or 2 stays inside until the first sweat appears. Careful individual calibration is also required for other physiotherapeutic procedures (including different kinds of massage, applied after the mandatory diagnostic one), the principles and administration of which are amply covered in specialized literature.

QUANTUM MEDICINE

Quantum medicine is based on purposeful use of low doses of electromagnetic radiation for diagnosing, treatment and prevention of various pathological conditions. Only factors matching the natural electromagnetic influences most closely are utilized for therapeutic effect on the vital functions of cells, organs and the entire organism. Low power threshold of electromagnetic energy application, used in quantum medicine, makes such application totally safe. Description of the action mechanisms already studied, possibilities of their practical use in mutually intensifying conjunction with pharmacological preparations (the so-called quantum-pharmacological synergism) for prophylaxis and treatment of senescence diseases, formation of practical health and correction of the biological age occupy the main section of this book.

ULTRASONIC DIAGNOSTICS

The use of ultrasonic diagnostics within framework of medical support of practical health status when forming individual algorithms of living and preventing development of senescence diseases is an important and indispensable fragment of this complex research work.

With sufficient skill in application of ultrasound scanning methods specialists receive an opportunity to obtain additional information on the status of internal organs, their homogeneity, any hypertrophic changes in them, condition of the heart valves etc.

COMPUTER TECHNOLOGIES

The use of modern computer technologies makes it possible to adapt the existing diagnostic methods and programs to the existing mass of data and accumulated experience for the purpose of formulating the organism's homeostatic algorithms to be used in express diagnostics.

Specialists, joining forces with qualified programmers, will be able to create new, original programs and methods, combining a complex of time-proven and new diagnostic tests, simulating various unfavourable influences, including neurogenic stresses and nonspecific exertions with the opportunity to use the test systems under conditions of direct psycho-emotional stress. The prospects of optimization and adaptation of various methods in this direction are extremely promising.

EXPERIMENTAL MEDICINE

Systemic medico-biological support in the process of forming individual algorithms of living, interacting with various disciplines of experimental medicine, helps directing researchers' efforts towards effective solution of specific tasks. For instance, taking samples of blood, urine and other substances in conditions of direct neurogenic stress (exams, public speech, sports competition etc) with their subsequent study would be of invaluable importance for understanding individual potential of organism and its enhancement through various corrective interventions in the organic homeostasis.

What is needed here is exclusion of unwarranted sciolism; new abstract, non-specific tests and methods of assessing the general condition of organism are called for if concrete assistance to organism in terms of enhancing its potential, adequate organization of fatigue processes and optimization - or intensification - of its rehabilitation is to be rendered. Such assistance, increasing the working capacity of the organism, leads in turn to its qualitatively new status.

CONSULTATIONS ON VARIOUS DISCIPLINES

It's only too natural that specialists engaged in systematic medical support and treatment of concrete patients (for instance, family physicians) cannot be experts in gynecology, urology, dentistry, and a lot more medical disciplines at the same time. But, diagnosing symptoms of such malfunctions in their patients and receiving corresponding complaints, they must have an opportunity to send their charges to the specialists with minimum loss of time.

Complex changes in metabolism, revealed in the course of thorough examinations, peculiarities of endocrine or neurological condition, unclear phenomenology yielded by ultrasound scanning or by studies of the immune status - all require collegiate decision-making process **for the sake of human health.**

* * *

The recommendations, offered in this chapter, by no means preclude significance of other areas of medical science, which have their own high priority status (gynecology, urology, ophthalmology and others). Our task is to render concrete assistance to the reader in selection and prioritizing of ongoing dynamic studies, based on their feasibility (informational density, significance, objectivity, reduced time consumption, possibility of unlimited repetition at any given moment). Beyond doubt, the last word will belong to the specialists, engaged in systematic interaction with the concrete patient.

2. QUANTUM MEDICINE. THE MAIN TYPES OF MULTI-FACTOR QUANTUM THERAPY

Quantum therapy is the aggregate of knowledge, means and methods based on the use of electromagnetic radiation, quantum processes and wave informational characteristics of living matter for efficacious correction of human homeostasis (1). Quantum medicine is based on purposeful utilization of small doses of electromagnetic radiation (quanta) for therapeutic purposes. In this case only those effective factors, which stand close to natural ones, are used and their low power makes them absolutely safe for human health (13, 14).

The positive biological effect of quantum therapy, manifesting itself on the organic level, is based on its ability to influence very deep structures, including cell metabolism and interaction between cells, and only after that it begins to affect tissues, organs and so on (according to our concept of secondary nature of functional changes in development of pathology, presented in the preceding chapters). Mechanisms producing this effect, whose action has been studied by now, shall be described later. The most therapeutically promising types of electromagnetic radiation are: magnetic field, laser, infrared and ultrahigh frequency radiation, as well as red and green light (15).

Let's dwell briefly on each of the types listed above:

1) Magnetic field participates in organization of energy defenses of organism against unfavourable factors of environment. Exposure to the magnetic field produced the following effects: anesthetic, resolving, decongesting, and improving the tissue trophism.

2) Pulsed infrared laser radiation, reaching 10 to 13 centimeters down into tissues exerts powerful stimulating influence on blood circulation, neuro-humoral and hormonal factors. It demonstrates the following beneficial effects: regenerative, anti-inflammatory, anesthetic, immunotropic (on the background of intensified microcirculation and synthesis of proteins, hormones).

3) Permanent noncoherent infrared radiation is less penetrating than laser beam. It demonstrates positive effect on central and vegetative nervous system.

4) Pulsed red light, although not going very deep, exerts pronounced anti-inflammatory, anesthetic and anti-edematous influence.

5) Pulsed green light tones up the digestive tract and demonstrates anti-stress properties. It is necessary to point out here that the maximum biological effect from therapeutic application of the above factors can be attained with their synergistic use, which will be shown in the subsequent chapters.

6) The effect of ultrahigh frequency radiation (UHF) has its own peculiarities. The maximum biological impact is achieved when UHF is used as reflex therapy tool and therefore UHF application is not considered in this paper.

2.1. THE HARDWARE

The key developer, promoter and trailblazer in the field of domestic quantum medicine is its namesake Association "Quantum Medicine". Born of the worldwide-known Russian design bureau for space instrumentation, it is today the main producer of tools and apparatuses for quantum diagnostics and therapy. The ranger of its products is shown in Picture 1.

We used precisely this equipment for assembling the multi-factor complex of medical instrumentation recommended for medico-biological support of human life.

3. CERTAIN BIOCHEMICAL ASPECTS OF LOW-ENERGY QUANTUM RADIATION EFFECTS

The universal efficacy of any therapeutic tool producing a whole range of various biological effects, detectable at different levels, is based, as a rule, on direct or strong mediate impact on one of the common, or leading mechanisms of pathological development (rather than on the multitude of individual reactions).

Determining the nature of the endogenous target for the type of influence we are studying is the fundamental issue, which must be resolved if we are to understand mechanisms of its action, phenomenology and possibly to find a wider range of its beneficial effects.

Absence of information concerning fine mechanisms of the endogenous target's nature makes definition of adequate dosage for the influence a hazardous business and moves to the front the intuitive approach to practical application of the influence. However, even under such circumstances it is still possible to optimize intensity of the influence and thus to achieve the maximum therapeutic effect.

Efficacy of magneto-infrared & laser therapy in clinical practice finds sufficient proof in the sheer number of publications all voicing the same opinion, i.e. it has a pronounced anti-inflammatory, anesthetic, immunotropic, anti-edematous and other effects registered on the organismal level (15, 17, 31-33, 41).

Numerous studies, devoted to explanation of the observed beneficial effects on molecular and cell level have produced sufficient number of hypotheses, based, as a rule, on identification of this or other endogenous chromophore as the target for low-energy quantum influence.

The most comprehensive analysis of the current theories and accumulated data on the molecular-cellular mechanisms of the quantum therapy can be found in the works by Professor G. I. Klebanov, Doctor of Biology (14, 16 18).

The following biochemically fine molecular structures currently under biophysical investigation are said to fill the role of the endogenous chromophore: porphyrins and their derivatives, enzymes, molecular oxygen, components of the mitochondria's breathing mechanism (flavoproteins and cytochromes), electrons' passage circuits, tetrahydrobiopteryn, Ca⁺²-dependent processes, leading to cellular priming, biopolymers, antioxidant enzymes and so on. Specialists, who have to solve on the regular basis clinical problems related to biochemistry, hematology, immunology and other medical disciplines, and who also engage systematically in correction of borderline changes, detectable only under influence of unfavourable factors, using pharmacological means and methods, are best suited for understanding the laser therapy effects, provided the necessary categories of knowledge are available to them.

So what biochemical changes precede and facilitate the clear positive effect of quantum therapy in conditions of synergistic influence of several types of variable electromagnetic fields with different radiation spectra and constant field on human organism?

By this time the ability of quantified radiation to exert influence on the key links in the pathogenic process is quite well known - take, for instance, peroxide oxygenation of lipids, activation of which can be considered as the universal mechanism for damaging the cellular plasma membranes. Exposure to low-energy pulsed quantified radiation leads to lower concentrations of malonic dialdehyde (slowed-down peroxide oxygenation of lipids) and activation of anti-oxidant defense enzymes (superoxide dismutase, catalase, ceruloplasmin, glutathione peroxidase); the cellular metabolism is intensified while the biomembranes condition is stabilized. It is well known, that one of the conditions for stable curative effect is

normalization of superoxide dismutase activity, as well as ceruloplasmin in combination with porphyrins and their derivative enzymes, which are in direct contact with the cellular plasmatic membranes. At the same time, the porphyrins influence endoprotein derived relaxing factor (EDRF) through peroxide oxidation of lipids with Ca^{+2} participation. The EDRF normally lowers the tonus of the blood vessels walls, which helps to improve microcirculation through increased production of cytokines during the leucocytes priming (18).

A significant role in generalization of curative effects regardless of their localization in the organism subjected to low-energy quantized radiation treatment, belongs to the signal substances - cytokines, residing in the cellular circulatory pool and participating, via the plasmatic membranes, in formation of the complex organic response, with positive-acceptance support from copper-based oxidation-reduction ferments, localized on the cell surface (peroxide radicals, catalase) (19).

In our preliminary model studies in vivo of the impact the low-energy quantized radiation in varying doses produces on different components of cellular plasmatic membranes we established, with the help of erythrocytes sedimentation method, specifically developed by us in 1983 for the purpose (Potyomkin & associates, (21) that protein components of biomembranes do take part in formation of dosage-dependent effect.

A whole series of published works stresses the leading role of the cellular plasmatic membranes in target selection for magneto-infrared and laser therapy; this - sometimes directly and sometimes by implication - confirms our hypothesis formulated earlier (24). This applies to the above data, too, and demonstrates participation of biomembranes in generation of positive effect from quantum treatment of the organic tissues.

Thus, the influence of the low-energy quantized radiation on elasticity of erythrocytic membranes facilitates penetration of the red blood cells into capillaries of the microcirculation tract, whereas stimulation of the aerobic phase of energy metabolism, with inclusion there of sub-oxidized glycolysis metabolites and lipids oxidation products through mediated membranous mechanism, leads to saturation of venous blood with oxygen and improvement in the general condition of the entire microcirculation system (rather than selective channels)

through the common Ca^{+2} -dependent mechanism. This, by activation of kallikrein-kinin system, brings about a drop in production of vasoactive peptides-kinins.

The post-quantum effect, causing changes in the physical and chemical condition of the cellular membranes, leads to enhancement of functional and fermentative activity of the blood formative elements. By activating the beta-adrenergic receptors it also increases injection of cyclic adenosine monophosphate into the bloodstream, thus intensifying fermentative reactions (25), synthesis of proteins (RNA, DNA), production of ATP and generation of prostaglandin; since it depresses peroxide oxidation of lipids, it demonstrates thereby a powerful anti-oxidant effect and supports synthesis of collagen. In our studies (26) we have demonstrated the post-quantum enhancement of membranous permeability in water-salt preparation of human placenta - a bio-globin, with ensuing increase in resistance to products of peroxide oxidation of lipids.

Such increase occurs through activation of superoxide dismutase and increased stability of the enzymatic complex, ensuring oxidative phosphorylation, with subsequent launching of the improved microcirculation processes described above and the multi-factor, cascade mechanism of metabolic bio-normalization. This extremely important, albeit incomplete list of effects involving cellular membranes can be distilled from the flood of research data today and its - even strictly preliminary - analysis allows us to understand the nature of the powerful therapeutic effects of quantum medicine.

Long-term use of means and methods of quantum medicine in combination with pharmacological intervention demonstrated that effects of the low-energy quantified radiation start at biochemically very fine cellular level, then are translated into phenomena detectable at tissue, organic and systemic level and finally manifest themselves in objective and significant therapeutic action on the level of the entire organism. These effects demonstrate ant-oxidant, immunotropic, regenerative and restorative properties, they synergistically intensify drug action, improve micro- and peripheral blood circulation, trophism of the muscular system and positively affect psycho-physiological condition of the patient (1)

3.1. MEMBRANE CORRECTION AND BIO-NORMALIZATION AS A RESULT OF QUANTUM-PHARMACOLOGICAL SYNERGISM (QPS) IN PROPHYLAXIS AND TREATMENT OF SENESCENCE DISEASES

Membrane correction and bio-normalization action of quantum-pharmacological synergism, which later demonstrates itself in **anti-inflammatory, onco-, cardio-, neuro-, endocrine and immune stabilization**, has its specific cytological pattern. Thus, with inflammation process underway, we can observe dynamic normalization of morphologically intact membranes with renewal of cellular functional activity on the background of transformation, disaggregation and resorption of the inflammatory exudation. Rebuilding of the membranous structures occurs as a result of reutilization of lipids, which until then were closely bound in mineral and protein components of the exudation. If the tissue detritus is utilized to a sufficient degree, then cellular cooperation gets normalized, with restoration of capillary microcirculation during the period of regeneration and vascular invasion into the new tissue, which leads to regression of the inflammation.

The lipids-modulating effect of quantum-pharmacological synergism, based on restoration of lipidic exchange between the serum and cellular membranes (including the lymphocytes) guarantees mobility of the twofold-strata layer and receptor activity, thus making it possible to overcome probable **immunodeficit**, since morphological base of the immune system is present in all organs and tissues, as well as in the hemo-

and lymphocirculation systems.

Intensified formation of photoinductive factor under the influence of quantum-pharmacological synergism (QPS) also facilitates modification of surface-adhesive properties of membranes by stimulating reactions of rosettes and colonies formation on the backdrop of speeded-up metabolism of immuno-competent cells and the corresponding stimulation of the interferon-generating chain. Accordingly, increase in the functional activity of the membranous reception mechanism in T-cells and stimulation of phagocytosis brings about normalization of T-helper/suppressor ratio (with increased number of T & B lymphocytes) and a rise in enzymatic level of hexose-monophosphate shunt and centrisoma (lat). Membrane-based **onco-stabilizing** effect of QPS is tied to the functioning of several types of phosphoinositides and their secondary messengers, as well as phosphatidyl-inositol-kinase, which are components of biomembranes, directly engaged in passage of trans-membrane signals reporting malignant transformation of cells (27).

As a rule, phosphoinositides, just like other onco-markers in blood, reflect characteristics of changes in the metabolic process, when inositide-containing lipids participate in the cellular changeover to uncontrolled transformation and growth, at the same time causing activation of the immuno-competent cells (28).

The tumor cells' priority in consumption of phosphoinositides (29) on the background of insufficient non-volatile functioning of the immuno-competent cells may be used **for prevention of further oncological transformations** through application of synergistic combination of low-energy quantum radiation and phosphoinositides. The parallel stimulation by the low-energy quantified radiation of zones responsible for immuno-competent cells generation leads to activation of mononuclear phagocytes system and production of tumor necrosis factors.

Other observations, carried out jointly with the renowned cancer specialist, E.A. Borisov, on the use of QPS (with added bio-technological preparations) in tumor formation and post-operative regeneration of the mammary gland shall be considered in detail later on.

Nonetheless, evidence of regeneration, with tempo intensi-

fied dozens of times compared to the normal, **including regeneration of tissues, subjected to quantified radiation, the significant cytostatic, antiemetic, desensitizing and anesthetic effects in oncology** must be noted even now.

This approach (QPS) results in enhanced efficacy of **medicamental pathogenetic therapy** and makes it possible to stop development of autoimmune pathologies or to achieve their reduction.

Simultaneously, system-modulating effect of mutually beneficial influence and interdependence of immune and hormonal statuses manifests itself and **enhanced activity of sex glands** is observed, which is highly important as it may be used for **arresting the menopausal syndrome as precursor of senescence diseases**.

Post-QPS tests showed significant increase in the levels of testosterone (for males) and oestradiol/estriol (for females), as well as normalization of FSH:LH ratio in the anterior pituitary.

The parallel decrease in concentration of 11-oxycorticosteroids brings down the serotonin, histamine and even glucose levels, apart from stabilizing acid-base balance through improvement in the membranes' lipids spectrum. A rather pronounced stimulation of natural killers is also evident, while restoration of normal levels of thyroid hormones and cortisol reliably interrupts development of infectious stress. The stress-limiting influence of QPS, as applied to membranes, materializes through significant reduction of vasoactive compounds values by way of the kallikrein-kinin system. Optimization of physical exertion loads is achieved through prevention of destruction by increasing the anti-proteinase potential and timely blockage of the lysosomal proteinases' effect on synthesis of kallikrein-kinin system components, immunoglobulins and structural elements of own tissues.

Timely detection of pathological degeneration precursors in the course of systematic and qualified supervision enables the physician to undertake correct rehabilitation of the homeostatic system, including the intimate membrane-destruction developments, thus barring the possibility of pharmacological aggression.

Massive, but occasionally disjointed, data obtained in the course of studies of quantum impact mechanisms on the organism attest to the leading role of trans-membranous

effects (whether this refers to transition of oxygen to singlet state, or to changes in oxidation-reduction ferments, to tertiary structure of proteins or to structural alterations of the biological fluids, dielectric permittivity of tissues or post-quantum heterogeneity of the temperature fields resulting from variations in absorption distribution, etc.).

In any case, appearance of excessive osmotic pressure on bio-membranes results in their deformations (changes in viscosity) and is a forerunner of metabolic disruptions in the cell, which later on reveal themselves as changes in the conformational state of DNA's chromatin or as amplified pyroninophilia against the backdrop of intensified RNA synthesis. Only changes in physical-chemical state of membranes can produce any changes in the functional status of formative elements.

Precisely trans-membranous effects constitute the foundation for quantum-pharmacological synergism and are links in the common chain of homeostatic correction of organism in the course of qualified immuno-modulation and bio-normalization of metabolic processes and in treatment of various pathologies.

QPS helps to improve metabolism of the immunocompetent cells and stimulate the interferon production mechanism, to stabilize intracellular membranolytic developments, to start the process of capillary proliferation and granulation (during inflammation), to activate macrophages and stimulate the organ-specific regeneration with enhanced synthesis of lysozyme and mucociliary clearance, to boost the local immunity (whole protein, lysozyme, secretory immunoglobulin A), to cause variability of coagulative system through thromboplastin and prothrombin/trombin reactions with simultaneous drop in aggregative capability of thrombocytes and with lower risk of thrombosis, etc.

Practical value of QPS in fighting off the normal senescence degeneration is hard to overestimate.

We have offered a brief tour of trans-membranous effects of the QPS impact, observable during inflammations, as well as in onco- and immunogenesis, as they are known today. The same common links in the pathogenesis chain are worked upon in the course of liquidating the cardiovascular pathology and other somatic disruptions.

The system-modulating influence of QPS is clearly observable as a number of characteristic effects, tied to **improved** microcirculation, capillary proliferation, better oxygenation of tissues due to changes in conformational properties of Hb, **activation** of all erythrocytes' enzymatic systems and facilitating the oxygen supply function, improvement in blood flow properties, **normalization** of vegetative status by improvement in neuro-humoral regulation and correction of sympathico-adrenalin system, normalization of the hormonal status through thymico-thyroid and adrenal interactions, **rectification** of immuno-hormonal disbalance etc.

Direct and oblique influence of QPS on the bone marrow produces a greater number of mitoses, intensifies differentiation and ejection of erythroid and myeloid lines from the cellular depot, as well as increase in the number of polymorphonuclear cells and, especially, neutrophilous leukocytes and mononuclear phagocytes in the peripheral tract.

The persistent quantum-pharmacological transmembranous effects which we have observed, without doubt are connected with **restoration** of microcirculation, **elimination** of histamine and histamine-like substances from the bloodstream, **stimulation** of heparin discharge by the labrocytes, **intensification** of DNA, RNA and proteins synthesis, affecting the serotonin and tryptophan metabolism, decrease in the level of Ca⁺², lipide peroxidation (POL) and glucocorticoids, **increase** in synthesis of prostaglandins and ATP, greater concentration of enzymes and the amounts of T & B-lymphocytes.

A drop in erythrocytes aggregation rate precludes any increase in viscosity of the blood plasma, as well as lowers viscosity of the whole blood. Ejection of anti-oxidants by neutrophils into inter-cellular environment on the background of cellular reactions enhancement, especially macrophage and fibroplastic ones, (the quantum-pharmacological synergetic mechanism in the healing process), shortening the resorption period with simultaneous reduction in microcirculation disruptions and termination of intra-cellular acidosis results in correction of intracellular volatile imbalance.

In experimental hypercholesterolemia QPS makes it possible to lower deformability of erythrocytes and to improve the flow characteristics of blood. However, with normal content of cholesterol this QPS impact on erythrocytes and rheology is

not present, which shows that **low-energy quantified radiation** is completely harmless, whereas the therapy using it is disease-specific.

Great practical significance may have the possible suppressing effect of QPS on **thrombosis threshold** by way of decrease in spontaneous thrombocytic aggression and activity of coagulation homeostasis coupled to enhanced fibrinolytic process affecting the toxic by-products of neutrophilic leucocytes disintegration (i.e. vasoconstricting metabolites) and lesser density of sodium and calcium channels.

Heightened activity of ATPase in the erythrocytes membranes with concurrent decrease in peroxide oxidation of lipids and normalization of calcium metabolism is also noted in this case.

All of the above phenomena in principle may be used in QPS-based fight against one of the most dangerous causes of organic senescence - cardiovascular pathology (please see The Basic Mechanisms of Damage to the Myocardium chapter).

We also used methods of quantum-pharmacological synergism for **restoration of sportsmen's deficient glycolytic glyconeogenesis** on the background of persistent post-steroid presence of hepatic ferments in the bloodstream (1). In the process we observed intensified transformation of deposited fatty acids into deposited glucose with parallel transformation of intracellular fat into glycogen.

The arrested hypoxia of hepatocytes was followed by appearance of prerequisites for anaerobic glycolysis and increased lipide peroxidation (POL) of extracellular fatty acids with mandatory participation of cellular membranes.

Thus, the significant **trans-membranous effects of quantum-pharmacological synergism are based on its direct impact on the basic links of the entire pathogenesis mechanism and therefore they may be widely used for correction of the organism's homeostasis, as well as for prophylaxis and treatment of the normal senescence disruptions.**

In our view, we may well become contemporaries of a situation in medicine, when theoretical knowledge would stand on a par with its therapeutic arsenal and the quantum-pharmacological synergism approach, which we are developing, can play an important role here.

4. IMMUNOMODULATION AND BIO-NORMALIZATION OF METABOLIC PROCESSES (Immunodeficiency as an attribute of modern life)

Practice shows, that colossal losses in work capacity occur due to state of immunodeficiency (12). Specialists are quite familiar with phenomenology of this situation, and the aspects of its pathogenesis have been thoroughly studied and repeatedly described in detail in the corresponding literature. There is no doubt by now that intensity and regimen of ungraduated exertions, which lead to exhaustion of the compensatory potential of the immune system, are individual in each case and depend on many factors, as well as on the genotype.

Extreme physical and psycho-emotional exertions often cause (by objective criteria) phenomenon of functional paralysis of the immune system. Importance of systematic immunological control of the organism's condition is indisputable. It is worth noting here that concomitant circumstances, causing additional tension in the immune system - allergies, acute respiratory and viral diseases, chronic infection foci, dysbacteriosis etc. - are easily detected with the help of the diagnostic arsenal (considered in the preceding chapters), used in the modern system of medico-biological supervision and then eliminated in the course of qualified and timely correction.

During our longstanding research within framework of systematic and comprehensive patients examinations we supervised the immunological state of their organisms with the help

of the commonly used biological, hematological and immunological methods. However, in recent years in addition to the ongoing research we started using a simple and easily reproducible method for evaluation of skin automicroflora (N.N. Klemparskaya, A. A. Ivanov, 49, 50).

It is known that the number of bacteria on the skin surface of healthy people is stable to a certain degree and reflects the general condition of anti-bacterial resistance, as well as the immune status. **Under the influence of endogenous and exogenous factors and, as has been shown by us (23), intensive exertions, the bacterial population on the skin surface is growing.** These changes occur, as a rule, prior to the clinical symptoms of the disease and serve as their precursors. Long-term research by teams, well-known both in Russia and abroad (Biophysical Institute of the Russian Federation, Harvard University and others) has amply demonstrated the connection between the species variety on the skin surface and the overall infection resistance.

Thus, the principle of the proposed test and method are as follows: dropping level of infection resistance allows proliferation of microorganisms on human skin, which is easily registered by automicroflora determination test (AMDT); the smear for AMDT is taken off the upper one-third of inner surface of the right-hand forearm.

The surface of the nutrient medium, contained in hermetically closable plastic box, is pressed against the skin surface, after which the box lid is closed. Incubation occurs at thermostatically maintained temperature of 37°C for 24 hours. The bacterial count is based on the total number of colonies appearing on the nutrient medium. Analysis of the results should be executed by the following four criteria (levels):

normal level - up to 20 colonies;

increased level - 21 - 100 colonies;

high level - above 100 colonies;

very high level - colonies cover the entire surface of the nutrient medium.

Persons demonstrating the bacterial count of more than 100 colonies belong to the higher risk group or have actually contracted a disease. The prognostic value of the proposed test is very high. Let's consider the AMDT indicator structure for practically healthy people for the reference group of 2,000

persons examined in numerous tests.

Decrease in the infection resistance level is expressed in % of the total number of surveyed patients. It has been established that the normal counts level (up to 20 colonies) in the group of practically healthy people equals 75%.

The increased number of colonies (21 - 100) amounted, correspondingly, to 10%. In the higher risk group (over 100 and with the entire surface covered) we found 15% of the patients.

In our research of many years, in addition to the commonly prescribed adaptogens, immune modulators stimulating interferon production, enzymatic preparations with desorbing action, lowering sorption of immunoglobulins to formative elements, anti-oxidants (beta-carotene, affecting the endocrine glands function), we prescribed both to sportsmen at the start of the season and to ordinary people the water-salt, proteins-rich preparation of human placenta, stripped of albumen and hormones, as a bio-normalizing and adaptation agent. The description of the treatment may be found in our publications (51, 52, 53). Let's take this preparation (bioglobin) as the comparison model. It is produced with the new technology of treating the placenta with chlorine dioxide; subsequent separation of heavy fractions and special filtration methods allow for very high purity of the resulting solution and, correspondingly, its colossal advantage over the suspension, placenta extract and amniocene (51). **Bioglobin represents a mixture of water-soluble peptides from human placenta, containing oxidized amino acids. This water-soluble extract, containing the entire complex of trace elements, is stripped of albumen and hormones, has no antigenic properties and causes no allergic reactions. Its over-dosage and/or prolonged application produce no toxic influence on the organism.** Being essentially a bio-normalizing agent, bioglobin demonstrates pronounced regulating and corrective properties as regards the body metabolism, in addition to its anesthetic and anti-inflammatory action. We began using this preparation as a metabolic bio-normalizer with strong reparative and ant-stress effect, but then discovered its considerable immuno-tropic properties as we observed recovery of the cellular immunity indicators and normalization of circulating immune complexes (55).

As new genetic engineering and biotechnology tools appear (for instance, leukiniferon - a preparation of human interferon, other cytokines, synthesized by leukocytes from healthy donors' blood etc.) the range of very promising immune modulators is ever widening.

In the research results and data presented below this class of derivatives is marked as biotechnological preparations (pls. see Picture 2). The picture presents the results of our investigations and observations carried out over many years and showing comparison between AMDT indicator's values for practically healthy people and sportsmen in different stages of their training process (basic, special, top form and competition training). It's common knowledge that for the world-class sportsmen state of immunodeficiency is an attribute of their everyday life, manifesting itself most acutely in periods top-form training (1). Sad as this may sound, at that period their organism may serve as test bed for studies of various borderline conditions, including pathological changes, characteristic for the initial phases of senescence processes.

It is clear (the left part of the picture shows the comparison values) that with the start of the training course the indicator of skin automicroflora is progressively growing provided the sportsmen in question had not been subjected to the immuno-modulation treatment. However, as the picture shows, application of bioglobulin and biotechnological preparations as warranted by the AMDT count, led to a drop in the indicator in the higher risk groups to its value characteristic for practically healthy people and even below that level (in the basic training period this effect was observed at a somewhat later time). It is worth noting here that an immuno-modulation course at this stage completely precluded subsequent catarrhal infections and rebuilt immunodeficiency developing as a result of heavy training exertions. Supervision of the sportsmen's immunological status was maintained through regular application of AMDT (when warranted by the examination results, the immunomodulation course was repeated). This method won an honorary prize at the international exhibition "Sports Industry - 2000".

Application of the above approaches among others for comprehensive correction of organismal homeostasis in sportsmen under training stress allowed for successful perfor-

mance of the required exercises and made it possible to significantly improve results afterwards.

Over comparatively short time the sportsmen from different countries of the world coming under our surveillance achieved good results in the international arenas (world, Europe, national championships) in technically complex, coordination and game competitions, as well as in the cyclic sports, having established more than 20 world, European, and 60 national records (1).

4.1. QUANTUM-PHARMACOLOGICAL IMMUNOMODULATION

The role played by the quantum medicine methods in immuno-modulation is of great importance. In our early studies we had discovered a noteworthy aftereffect of low-energy quantified radiation, which essentially consisted of an increase in biomembranes resistance to products of peroxide oxidation of lipids owing to activation of superoxidismutase and enhanced stability of the enzymatic complex, engaged in oxidative phosphorylation, with subsequent improvement of microcirculation system functions. **This phenomenon was bound to persistent therapeutic effect of the immuno-modulators coupled to magneto-infrared quantum impact, which caused an increase in cellular membranes permeability to the pharmacological preparations.**

Ability of the low-energy quantified radiation to prolong and intensify efficacy of various therapeutic means has been the focus of widespread attention in special literature (34, 1, 41). In the method of periodic immuno-modulation now proposed to specialists we suggest a ten-days course of immunotropic drugs prescribed in combination with magneto-infrared-laser treatment, with constant monitoring via the AMDT count, which we recommend for the purpose, as well as other commonly used biochemical, hematological, immunological etc. indicators, widely applied in medico-biological support system. The

optimal dosage of low-energy quantified radiation during the immuno-modulation course is shown in table 1. The effects, achieved through application of quantum-pharmacological synergism, would exceed those described in the preceding chapter by 35-50%. What's more, the fine diagnostic methods show they appear 2 to 3 times faster (for instance, in the case of a 10-days course: a. with QPS positive effects are detected on the 2nd day, whereas b. under ordinary immuno-modulation without QPS the positive effects start on 5th or 6th day).

Persistence of the effect thus attained is also several times higher than in ordinary course without application of quantum-pharmacological synergism.

Table 1. Optimal dosage of low-energy quantified radiation in the course of immuno-modulation.

Projected area of impact	Frequency (Hz)	Time (minutes)	Number of pro- cedures/day	Length of the course (days)
1. Cubital fossa	50	2	2 morning/evening	10
2. Apical thrust	50	2	2 morning/evening	10

Total dose for the entire course: 1280 mJ

5. QUANTUM-PHARMACOLOGICAL SYNERGISM IN PROPHYLAXIS AND TREATMENT OF CARDIOVASCULAR DISEASES

The commonest cause of organismal senescence, leading to its decline and death is pathology of the cardiovascular system. Better understanding of the damage mechanisms affecting this system in ischemia condition stimulated practical application of the new protection methods for membranes and cardiac myocytes' enzymatic systems, which support immunological competence of the ischemic myocardial cells.

Trans-membranous effect of QPS with simultaneous application of membranes protectors and drugs improving myocardial metabolism may be used for prophylaxis and treatment of the most perilous "disease" - human senescence.

Significance of quantum-pharmacological correction of the myocardial metabolism becomes especially crucial when administration of the traditional drugs, such as cardiac glycosides, diuretics, peripheral vasodilators and the like is fraught with the risk of dangerous side effects.

The clinical efficacy of quantum-pharmacological synergism may be related to its suppressive effect on the process of destruction of sarcolemma's lipidic twofold-strata layer in ischemic cardiomyocytes and prevention of energy deficiency in myocardium.

Therefore the trans-membranous action of QPS, aimed at anti-ischemic protection of the myocardium by stabilizing its energy supply may become an important component of treatment for patients with acute and chronic cardiac deficiency of different etiology.

5.1. THE BASIC MECHANISMS OF MYOCARDIAL DAMAGE

As a rule, any damaging influence is triggering the cascade mechanism of destructive changes development, as well as the compensatory reactions affecting the organ's functions.

Clarification of the pathological mechanisms present in specific functional disruptions, especially those leading to persistent pathology, is unavoidable if the corresponding corrective methods are to be found.

The main substrates for synthesis of ATP, the key energy carrier in normal functioning of the myocardium, are free fatty acids, glucose and lactate, jointly responsible for production of nearly 90% of the total ATP amounts.

A chain of consecutive catalytic reactions produces acetyl-coenzyme A from substrates; inside the mitochondria, it breaks down (the Krebs cycle) into carbon dioxide and hydrogen atoms, which are then transferred to the breathing chain (the electrons transfer) and assist in reduction of atomic oxygen to water. The energy, produced in transfer of electrons via the breathing chain, participates in oxidative phosphorylation and is transformed into ATP energy.

Insufficient supply of oxygen to myocardium results in quick degradation of ATP into ADP with formation of nucleotides (adenosine, xanthine and hypoxanthine), migrating into the inter-cellular space through sarcoplasmic mem-

branes, which prevents re-synthesis of ATP.

In conditions of hypoxia anaerobic type of ATP synthesis begins to prevail, in the course of which only small amount of ATP molecules are formed (compared to the aerobic cycle of metabolic substrata oxidation). The main substratum in this process is glycogen.

Concentration of ATP in the ischemic zone drops rather quickly, which is followed by deficiency of phosphocreatinin. As a result, mechanisms of energy utilization get disrupted and full assimilation of ATP becomes impossible due to emigration of creatinin kinase isoenzymes from the damaged cells and suppression of ATPase activity (37).

Activation of anaerobic glycolysis leads to development of acidosis. This in turn produces disruption in ATP-dependent ionic transfer mechanisms on the background of macroergic phosphates deficiency. Accumulation of calcium ions in mitochondria leads to dissociation of oxidative phosphorylation and to deepening energy deficiency, whereas formation of actino-myosinic bridges interferes with myofibrils relaxation.

An important pathogenic link in development of myocardium dysfunction is formation of the so-called lipidic triad, appearing as a result of: 1) **ATP deficiency**; 2) **increased content of catecholamine in myocardium**; 3) **surplus of calcium ions**. Development of the lipidic triad causes **destruction of the lipidic twofold-strata layer in membranes** with activation of lipases and phospholipases, appearance of detergent effect of under-oxidized fatty acids and activation of **peroxide oxidation of lipids**.

In turn, disruption in membranous structures is followed by increased permeability of sarcolemma, membranes of sarcoplasmic reticule and mitochondria for calcium ions passage.

In the initial stage of ischemia overloading of cells with calcium ions arises as a result of intra-cellular redistribution.

If sarcolemma is damaged, calcium ions start migrating into the cell from the inter-cellular space following concentration gradient, which causes myofibrils contraction and further stimulates membrane-damaging process. The structural changes, enabling the membrane to increase its ability to regulate ionic migration, make the collateral damage to cardiac myocytes irreversible, especially against the backdrop of lytic ferments activity, becoming particularly pronounced at the

time of lysosomes membranes destruction. The most important compensatory mechanism to progressing acidosis in cardiac myocytes is **accumulation of hydrogen ions, which compete with calcium ions**, which displace the latter from combinations with **troponin** in myofibrils. **Inorganic phosphate** and other anions, accumulating in the cells during ischemia also may play the same role of a trap for calcium ions.

Quantity of oxygen and metabolic substrata, delivered by blood, inflow of calcium ions and intensified washing-out of acid metabolites all determine the specific characteristics of damage being done to structure and functions of the myocardium (38).

When planning for curative, as well as prophylactic, effect of quantum-pharmacological synergism, it is necessary to keep in mind that mechanisms of intercellular damage of myocardium are essentially similar to the ischemic damage mechanisms. However, the angiospastic reaction, often appearing at this stage, is further aggravated with endothelium edema, peripheral capillary edema, **intravascular aggregation of cell elements** and contraction of myocardium. Also, relative local hyperoxia is followed with activation of POL and phospholipases, intensified process of membranes destruction and increased content of calcium ions in cells, which in turn promotes degradation of membrane phospholipids, as well as contraction and eventual destruction of myofibrils. A real opportunity to avoid development of the **"stunned myocardium" phenomenon** would mean: 1) reduction in depression of catalytic activity of myosinic **ATPase**; 2) impeding decline in amounts of creatininase isoenzymes, which are responsible for energy supply; 3) normalization of marcoergic phosphates synthesis; 4) rectification of energy deficiency syndrome; 5) restoration of the functional activity of cells and, the most important of all, 6) prevention of oxidative stress condition by precluding formation of free radicals or, should they already be present, depressing their production rate and thereby blocking their activating effect on the genetic self-destruction programs in cells - the so-called apoptosis, or programmable annihilation of cardiac myocytes. It is necessary to remember, that development of ischemia is accompanied with activation of neuro-humoral systems; with this, the simpatico-adrenal system boosts production of catecholamines, which

on the organismal level is detectable in the form of increased heart rate and arterial blood pressure as the myocardium requires an increased supply of oxygen. On the deeper level a considerable intensification of POL can be observed, which causes damage to the membranes, release of lysosomes' proteoclastic enzymes and accumulation of calcium ions. Activation of renin-angiotonin-aldosterone system also facilitates mobilization of apoptosis genes through formation of oxidative stress.

Pathological chains in ischemic stress-induced damage of the myocardium have one link in common: membranes destruction against the background of POL activation and accumulation of calcium ions in cardiac myocytes; this causes similarity in functional disorders in the form of myofibrils contraction (39, 40).

Thus, the increase in catecholamines amounts, surplus of calcium ions and deficiency of ATP in myocardium all stimulate activation of lipases and phospholipases, detergent effect of underutilized fatty acids and activation of ПОЛ. Development of the above "lipidic triad" causes destruction of the lipidic twofold-strata layer in cellular membranes, which in turn means their increased permeability to calcium ions. If at the initial stages of ischemia overloading of cells with calcium ions appears as a result of intra-cellular redistribution, then after the membranes are damaged, calcium starts entering the cells from the inter-cellular space following the concentration gradient. Owing to the structural changes the cell membrane largely loses its ability to regulate the ionic flows and this makes the ischemic damage irreversible. Further decomposition of cell structures occurs under the influence of lytic enzymes. After irreparable damage is inflicted on organelles, the myocardial cells become dysfunctional and perish.

5.2. CERTAIN ASPECTS OF PRACTICAL APPLICATION OF QUANTUM-PHARMACOLOGICAL SYNERGISM IN PROPHYLAXIS AND TREATMENT OF HEART DISEASES

Analysis of modern concepts of myocardial damage mechanisms under ischemia shows, that the crucial conditions for restoration of myocardium functional activity are: 1) protection of membranes and cardiac myocytes' enzymatic systems from ischemic, intercellular and stress-induced damage; 2) prevention of lipidic triad development and overloading of cells with calcium ions; 3) correction of intracellular energy deficiency.

Monochromatic, polarized and coherent laser radiation upon penetration into biological tissues turns into a broadband and very weak thermal beam, losing its monochromatic, polarized and coherent status. **It causes local heating of the tissues, with the thermal energy concentrating mostly on cellular membranes, intensifying inter-cellular metabolism, which determines the subsequent therapeutic effect.**

It is necessary to keep in mind that the secondary electromagnetic radiation is dissipated in the biological tissues to a lesser degree than the primary one, and it penetrates significantly deeper.

Numerous existing and appearing scientific papers, dealing with studies of quantum impact on biological tissues and

the organism as a whole, as well as our own research enable us to isolate a number of persistent trans-membranous effects. With the above in mind we need to point out that the use of quantum-pharmacological synergism causes persistent decrease in calcium level, POL, glycocorticoids and catecholamins, and boosts production of endorphins, prostaglandins, ATP, microsomal amine oxidases metabolizing cholesterol and improves troponins and potassium metabolism.

Processing the data generated in our own research over the previous years, as well as the massive experimental material accumulated by specialists in various fields of medicine and biology - and accounting for the effects briefly mentioned above - we may conclude there exist **a pronounced effect of QPS in the form of cellular membranes protection.**

Understanding the nature of observed phenomena allows their wider practical application.

The recommended procedures for practical application of quantum-pharmacological synergism in prophylaxis and treatment of cardiac diseases are presented in the form of tables attached hereto.

* * *

Observation of quantum therapy effects in pure form on the level of organism appears doubtful. Each organism, as a multi-functional system, possesses significant individual capabilities and copes with various exertions differing in physical and psycho-emotional aspects. Each organism has its own nutritional differences, both in composition and in amounts of nutrients, as well as its own ways for maintaining homeostasis, including intake of vitamins or various drugs and medicinal preparations, as well as different values of certain biochemical indicators. For instance, comparing quantum therapy effects aimed at elimination of the same factor in treatment of chronic diseases (or in their prophylaxis) devoid of sex, age or weight differentiation (as an illustration, since in practice this almost never happens), it would be difficult to make a definitive conclusion as to when the effect would be higher. Patients on a diet of multivitamins, food additives or nutrients possessing strong antioxidative effect may demonstrate in the initial phase of the

therapy a higher level of potassium or iron in blood plasma, which would significantly modify the final effect.

In our view the assertion of some specialists (41) that children with hyperactive type of adaptation system show no reaction to laser radiation is unacceptable. This behaviour is tied to vagotonic orientation of the vegetative nervous system. Neurovegetative pharmacological stimulation (with use of vegetable psycho-stimulants) in this case does not affect the functional state of the vegetative nervous system, but participates (jointly with quantum impact) in complex membrane-correction processes.

Combined influence of low-energy pulsed quantified radiation and the traditional drugs therapy is already used today in clinical practice, but the quantum part of such influence is usually directed at stimulation of metabolic and oxidative processes in organism and its tissues, at pain suppression and at elimination of disadaptation syndrome, so its maximum efficacy is observed only in the initial stages of the disease, when it is still reversible. In such situation parallel administration of a powerful anti-oxidant complex **protectin** is recommended.

Fine biochemical analyses, carried out without loss of time, will make it possible to forestall development of functional disruptions and use quantum-pharmacological synergism as a serious therapeutic tool.

There doesn't exist an organism, which wouldn't respond to quantum-pharmacological synergism application. There is only absence of expected therapeutic effect in incorrectly planned therapy.

6. COMPLEX CORRECTION OF CHOLESTEROL-RELATED PATHOLOGY WITH QUANTUM THERAPY TECHNOLOGIES AND BIOLOGICAL NORMALIZATION OF METABOLIC PROCESSES

Transition of biological systems from norm to pathology is not always possible to detect in time at the level of organism, much less determine the specific type of pathology in its initial stages. Therefore special role in early diagnosis of various pathological conditions belongs to systematic biochemical studies, making it possible to detect and, subject to application of the modern corrective methods, prevent further development of irreversible changes leading to permanent functional disruptions. Failing that, the next phase may well be protracted treatment of the process turned chronic.

Among several groups of related human senescence diseases, which tend to be terminal with time, the WHO specialists give the absolute first place to various cardiovascular diseases. This situation persists for many years by now and it is attributed to the common features of our way of living - progressing industrialization, frenzied tempo of our lives, disruption of social adaptation mechanisms and presence of other stresses, including the neurogenic one.

Consideration of dozens of nosologies related to pathology of cardiovascular system appears impossible without systematic study of different biochemical changes, mostly dependent on the cholesterol metabolism, and serving as an informative indicator of atherosclerosis progress.

The role of cholesterol, especially particulars of its chemistry and circulation in organism and its organs is being considered in numerous scientific works; its concentration range in human body fluids (different fractions of blood, saliva, bile) has been carefully studied; by way of an example we may take some of the lipidic components of the blood plasma, which include age-dependant general cholesterol, representing the ratio of free cholesterol and its esters, fluctuating in the 30-40% and 60-70% range correspondingly. Lipoproteins of different density, circulating in blood serum, contain cholesterol in free and esterized form, as well as the general cholesterol, comprising also phospholipids and triglycerides. Cholesterol population levels itemized by age have been defined, as well as its role as the construction material for, and component of, plasmatic membranes in cells, and much, much more. However, solution for the problem of durable clinical correction of cholesterol-related pathologies is still acutely topical as this paper is being prepared. Its significance for the practical therapy cannot be overestimated. Our studies are devoted to development of new approaches to complex treatment of cholesterol-related pathologies seen as a serious symptom, preceding and accompanying persistent cardiovascular pathology.

Universality of a therapeutic tool or influence is, as a rule, associated with its direct or strong mediated impact on one of the common or the leading, mechanisms in the general pathogenic process, which we have already noted in the preceding chapters.

Efficacy of magneto-infrared-laser therapy application in the clinical practice is demonstrated in many works (42, 43, 44).

Would it be possible to enhance its therapeutic effects if combined with pharmacological preparations? We asked ourselves this question for the first time when we discovered the positive effect from combination of low-energy quantum radiation and certain hepatoprotectors on intrahepatic hemodynamics and microcirculation, associated with slow-down in lysis of hepatic cells, normalization of asparaginic and alanine amino transferases, enzymatic problems and glycolytic gluconeogenesis in organisms of some sportsmen during intensive training.

Subsequent research in this direction demonstrated unbelievable potential of QPS for practical clinical applications.

Using the multi-year experience in immuno-modulation and bionormalization of metabolic processes through the use of various bio-technological preparations (L. Potemkin et al., 1996-2001) and certain familiarity with treatment of somatic disorders with magneto-infrared-laser therapy (L. Potemkin et al., 1996-2001), affecting also optimization of biochemical indicators, we carried out this work.

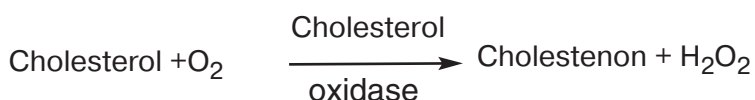
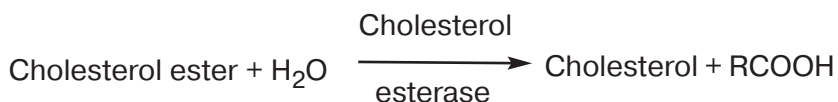
Systemic model tests were devoted to decoding the specific mechanisms, existence of which was revealed in the course of that work. The tests demonstrated that low-energy quantified radiation produces an increase in cellular membranes permeability for biotechnological preparations and an increase in their resistance to products of peroxide oxidation of lipids owing to activation of superoxide dismutase and better stability of the enzymatic complex, which ensures oxidative phosphorylation, to be followed by activation of the microcirculation improvement mechanisms (described earlier) and launching the cascade mechanism of metabolic correction.

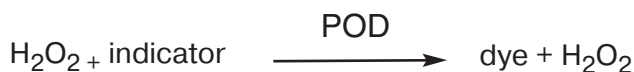
According to the literature, no such research has been made, either in Russia, or abroad.

6.1. SYSTEMIC SUPPORT OF THE RESEARCH

We used in this research the data generated in the course of systematic observations of patients in various age brackets in Russia and abroad over several years' time span, 112 people in all.

Biochemical study of the body fluids was done with Reflotron-4 ("Boerringer Mannheim", Germany; "Roget", Netherlands) clinical analyzers. These devices are capable of studying blood, plasma and serum on the reflection measurement principle with compensation for reference beams; they maintain constant control of more than 50 functions. Although programs for calculation of cardiovascular diseases risk "Procam" and "Faringham" were available, in our research we determined only indices of the quantitative levels of cholesterol in blood, after Brown (45).





To interpret the data obtained we used recommendations of the European Atherosclerosis Society (46).

Cholesterol		Lipid disorder
2,6 mmol\l	100 mg\dl	no
5,2 mmol\l	200 mg\dl	no
5,2-7,8 mmol\l	200-300 mg\dl	yes (HDL
35mg\dl)		
7,8 mmol\l	300 mg\dl	yes
(35 mg\dl = 0,9 mmol\l)		

To register and process parameters of our patients under observation we use multi-channel device Physio Monitor, designed for diagnosing physiological and psycho-emotional state of the patient by a number of parameters (encephalogram, cardiogram, pulse diagram etc.).

Detection of organic changes and observation of the cardiovascular dynamics was carried out with the help of the corresponding specialized software, which constantly monitored the electrocardiogram and the functional state of the cardiac system. The magneto-infrared-laser part of the test relied on the apparatuses of "Rikta" series, which supplied four curative factors with tissue-penetrating effect: narrow-band laser radiation, wide-band infrared radiation, red light and magnetostatic field.

The apparatus was used in the contact mode, when the emitters were pressed directly against the specific zones of the body. Bio-normalization was effected with biotechnological preparations including the entire complex of trace elements and water-soluble biochemical substances in oxidized form, but were stripped of albumen and hormones and didn't have allergic or toxic properties. Their bio-normalizing effect, visible as return of impaired metabolism to the norm, is based on their multi-functional influence, just like the low-energy quantified radiation, including: chondroprotective, anti-stress, absorb-

ing, reparative, anti-inflammatory, immuno-tropic, anti-mutagenic, fertile etc.

One of the key properties of these preparations is their ability to inactivate free radicals, which prevents, among other effects, formation and development of malignant tumors and disruptions in the immune system. But their impact on cholesterol levels in blood had never been studied before.

6.2. DISCUSSION OF PRACTICAL EFFECTS

Coming to discussion of the practical effects, it is necessary to point out once again that in this course of this study we subjected the patients with cholesterol-related pathologies to combined therapeutic exposure to: a) biotechnological preparations (BTP), serving as metabolic normalizers in the standard treatment scheme - 10 daily intramuscular injections per course, with one preparation, chosen as the model in this study; b) magneto-infrared-laser therapy applied daily in the dose, equal to 32.0 mJ (50 Hz x 2 minutes) directly to projection of the cubital fossa and the apical thrust during 10-days course.

Dosage of the magneto-infrared-laser radiation was determined on the basis of summing up the reference values, preset for each emitter working in impulse mode (11). In our case the dose of 32.0 mJ (50 Hz x 2 minutes) was not chosen randomly; precisely this dose, not less than 30 mJ at a time, brought improvement in intrahepatic hemodynamics during our previous research, and in certain cases made it possible to reduce asparaginic and alanine amino transferases-related disruptions in liver.

Accounting for multi-functional pharmacological action of the biotechnological preparation, highly effective, among other things in treatment of metabolic deviations (saline, pro-

tein, lipidic etc.), but whose action mechanism was not known exhaustively, and keeping in mind our preliminary data on optimization of biochemical indicators through application of magneto-infrared-laser therapy, we expected generalized curative effect from their combined application.

As has been noted in the preceding section, altogether we observed and treated 112 people in various age groups and all showing pronounced cholesterol-related pathologies, chosen from patients visiting our Center with complaints about different somatic disorders. The age groups distribution was as follows (see Table 2).

From the table it is clear, that there were 6 age brackets (below 30, 30-40, 40-50, 50-60, 60-70 and above 70). Cholesterol level is shown in mg/dl and mmol/l. Below we shall consider only the mg/dl values as they are displayed on the measuring device meter.

From the data it follows, that: a) there is a tendency towards greater cholesterol levels with increase in age; b) the differences in the indicator's values is reliably measured in groups below 30, 30-40 and in groups 60-70 and above 70; c) the indicator value in group below 30 reliably differs from all other groups excepting group 30-40. Since the patients were complaining, as has been previously noted, about various somatic disorders, including vegetovascular dystonia of hypertension and hypotonic type, primary hypertension (1b; 11a; 111a), various arrhythmias, post-infarction and postoperative conditions, mitral valve prolapse, bronchial asthma, abdominal aneurism, diabetes and other complaints, the therapy to be applied for elimination of cholesterol-related pathologies, detected during the initial biochemical examination was slightly different not only between groups, but also within groups themselves (pls. see Table 3). From the table it follows that practically all patients received BTP - the standard course of 10 daily injections; however, the first group (No. 1, consisting of 28 members from all 6 age brackets) received only BTP. Group No. 2 (also 28 members from all 6 age brackets) simultaneously with BTP received 10-days course of magneto-infrared-laser therapy (hereinafter "MIL") (50 Hz, 32 mJ) applied to projection of cubital fossa (by direct contact) twice a day, in morning and in evening with the total dose of 640 mJ.

Table 2

Age groups	Below 30	30-40	40-50	50 -60	60-70	Above 70
Cholesterol level						
(mg \ dl)	235 - 296	248 - 318	286 - 368	264 - 388	282 - 379	292 - 388
mmol \ l	6,0 - 7,61	6,4 - 8,2	7,4 - 9,5	6,8 - 10,0	7,3 - 9,8	7,2 - 10,0
-						
x						
(mg \ dl)	266 + 22	282 + 27	324 + 32	330 + 34	348 + 38	368 + 34

Table 3.

Cholesterol level	Below 30	30-40	40-50	50-60	60-70	Above 70
Treatment type:						
1) BTP 10 daily injections	4	6	4	5	5	4
2) BTP (10)+ MIL (10)						
50 Hz x 2 min. mornings,	4	6	4	5	5	4
50 Hz x 2 min. evenings on cubital fossa, 640 mJ						
33) BTP (10)+ MIL (10)						
50 Hz x 2 min. mornings,	4	6	5	5	4	4
50 Hz x 2 min. evenings on apical thrust, 640 mJ						
44) BTP (10)+ MIL (10)						
50 Hz x 2 min. mornings, on apical thrust						
50 Hz x 2 min. mornings, on cubital fossa	4	6	5	5	4	4
50 Hz x 2 min. evenings on apical thrust,						
50 Hz x 2 min. evenings on cubital fossa, 1280 mJ						

Group No. 3 (28 members from all 6 age brackets) simultaneously with BTP received 10-days course of magneto-infrared-laser therapy (50 Hz, 32 mJ) applied to projection of apical thrust twice a day with overall dose being 640 mJ. Finally, the fourth group (No. 4), while getting 1 injection of BTP per day, received also 10-days course of magneto-infrared-laser therapy (50 Hz, 32 mJ) applied in mornings to cubital fossa and to apical thrust projections for 2 minutes each with the same procedure repeated in evenings; the overall dose during the course amounted to 1280 mJ (Table 3).

The results of the entire project have been integrated and presented in the summary table (pls. see Table 4). The table does not show the data from systematic ECG observations and functionality of the cardiovascular system, nor blood pressure figures etc. Suffice it to say that there was no observable deterioration in the patients' health indicators. To the opposite, with progress in the above therapeutic courses we recorded positive changes not only in the cholesterol-related pathologies, but also in the somatic disorders, which brought the patients to our Center in the first place.

It is worth noting that arterial blood pressure returned to norm not only among patients who are in transitory state, but among those with persistent hypertension, too.

Let's take another look at Table 4. As was pointed out before, the cholesterol level value was studied as the treatment course progressed against the background of starting level, expressed as averaged values, accounting for confidence intervals, itemized by age brackets. Presentation of individual data proved impossible for reason of their sheer volume. It can be seen that after the start of the BTP course (No. 1) patients in all age brackets on the 5th day demonstrated reliable decrease in cholesterol levels. On the 10th day of the course even more pronounced decrease is visible, except the oldest age group (over 60). Practically all patients showed the cholesterol level values slightly exceeding the upper limit of the norm (age brackets above 50). In a week's time upon completion of the course the tendency towards lower levels was present in all age groups. The minimum value depended on the patient's age and the lowest cholesterol levels were observed in the youngest age groups (below 30, 30-40).

Table 4.

Age groups	Below 30	30 -40	40 -50	50 -60	60 -70	Above 70
Starting values	266+22	282+27	324+32	330+34	348+38	368+34
Course	BTP (No. 1)					
5 days	200+25+	210+25+	200+18+	250+35	258+36	288+36
10 days	140+20+	150+25+	166+14+	195+18+	212+28+	224+22+
1 week	120+15+	135+15+	148+12+	188+22	206+24	205+18
1 month	250+18+	242+27+	256+26+	294+28	270+24	268+24
Course	BTP + Cubital Fossa (No. 2)					
4-5 days	155+18	182+14	176+14	200+15	205+15	192+22
10 days	132+12	144+12	154+16	166+12	190+22	190+18
1 week	135+14	122+10	142+15	138+14	170+18	178+14
1 month	242+24	238+24	230+20	270+32	285+26	285+28
Course	BTP + Apical Thrust (No. 3)					
4-5 days	172+16	190+18	185+15	210+18	215+20	205+20
10 days	144+12	175+16	148+16	172+16	180+16	186+14
1 week	136+12	144+12	154+12	168+14	176+14	144+12
1 month	222+24	239+20	272+26	282+32	266+28	294+26
Course	BTP + C.F. & A.T. x 2 times (No. 4)					
4-5 days	125+10	144+15	140+15	160+15	166+14	190+18
10 days	100	100	100	150+17	140+12	156+18
1 week	100	100	100	100	100	124+12
1 month	108+14	112+12	140+15	150+15	166+14	186+16

The maximum drop in the levels was recorded in all age groups one week after completion of the bio-normalization course.

The data received during therapeutic stimulus of the cubital fossa projection with low-energy quantified radiation (No. 2) concurrent with bio-normalization of metabolic processes are also presented in the table. The following effect was detected: a) tendency towards decrease in the indicator's values in all age groups on the 5th day from the start of treatment was more pronounced than in the first course (No. 1) - reliable differences were observed in the oldest group (over 70), 288+36 (Course No. 1, BTP alone) and 185+22 (Course No. 2, BTP + MIL on cubital fossa) correspondingly; b) stable drop in the indicator's value was observed seven days upon completion of the therapy course; c) in thirty days, just like in the first case (Course No. 1, BTP alone) cholesterol-related pathology returned to its initial state, except in two age groups (40-50 and above 70).

The dynamics of cholesterol changes during MIL therapy applied to the apical thrust projection concurrently with the BTP normalization of metabolism (No. 3) was very similar and no reliable differences from the data received in the preceding course (No. 2) were detected (pls. see Table 4).

The most pronounced therapeutic effect in treatment of cholesterol-related pathologies was observed during and immediately after the MIL course with the total dose of 1280 mJ, with direct contact application simultaneously on the cubital fossa and apical thrust projections twice a day, in mornings and in evenings, concurrent with BTP metabolic normalization (10 intramuscular injections), Course No. 4. The results of such combined treatment exceeded our most optimistic expectations. On the 5th day after the treatment began, reliable drop of the cholesterol levels to norm was recorded. On the 10th day age groups below 30, 30-40 and 40-50 showed reduction to less than lower norm values (100 mg/dl or mmol/l) and the trend to further decrease in 50-60, 60-70 and above 70 age brackets continued even after the 5th day.

Even in a week's time upon completion of the therapy course in practically all groups (except the one over 70) the phenomenon continued. And, most importantly, in a month upon completion of the course the cholesterol levels values

stayed within the physiological norm in all age groups.

Condition of the patients in that period by a number of subjective and objective criteria significantly improved compared to what we had observed prior to start of the therapy. Positive dynamics of associated diseases, which we described above (hypertension, bronchial asthma, diabetes, hyperthyroidism etc.) and which were present in all age groups, was also noted.

The data thus obtained enabled us to make a preliminary conclusion that our approach to treatment of a number of syndromes and diseases, with which we had to deal during our studies, has good potential. Objective indicators of the patients' state, recorded in process of their systematic observation represent a massive database of various biochemical, hematological, immunological, psycho-physiological and other parameters, which had to be evaluated dynamically in patients, suffering from various somatic disorders. Description and systemic analysis of such data is beyond the framework of this publication.

Therefore, the complex treatment of cholesterol-related pathologies based on quantum technologies and bio-normalization of metabolic disorders demonstrates persistent positive effect and may be widely used in practical health care institutions; the magneto-infrared-laser therapy represents the key component of this therapeutic complex.

* * *

The use of the entire potential of quantum-pharmacological synergism for treatment of senescence diseases has great prospects. Even by now a great mass of facts has been accumulated, analysis of which made it possible to formulate the recommendations, offered in this publication. These recommendations are presented in table form at the end of this work. But the most important point, which we would like to make, **is absence of any side effects whatsoever and absolutely harmless nature** of all factors proposed for use in this publication. The possible absence of positive effects may be due to insufficient competence of specialists, who have to calibrate individually the existing tools and methods. There can't be a situation where no positive effects are observed after that condition has been complied with.

7. FORMATION OF INDIVIDUAL APPROACH TO GRADUATION OF PHYSICAL EXERTION OF ORGANISM (graduation of exercise as prophylaxis tool for senescence-related diseases)

The level of the organism's exertions over preceding years, or their absence, full information concerning the organism's health status and preliminary formulation of the expected results from rehabilitation (building the muscular system, enhancing stamina, greater body flexibility, loss of weight etc.) make it possible to formulate an individually calibrated rehabilitation program. Each period has its own peculiarities, purposes and tasks, depending on the general volume, intensity and direction of the proposed exertions; all told, it's the state of the human organism, which is the key determining factor.

It's worth noting here that the main role in the process belongs to the specialist who, due to his training, competence level, experience and proactive approach is capable of making good use of the data on the current state of the organism. Careful attitude towards the patient's health is of crucial importance here.

Thoughtless execution of programs, borrowed from earlier projects, or bold use of little-known, but aggressively advertised methods would be bad tools in formulation of individual approach to rehabilitation.

Compilation of individualized methods of physical exertions graduation, from the medico-biological point of view, should take into consideration the following circumstances:

A) **Secondary nature of functional changes, appearing under influence of the exertions.** A specialist should visually examine his patient on a regular basis, paying attention to his appearance, mood, skin color, pulse and quality of performance under the prescribed loads. However, the precursors of exhaustion or even pathology would be the changes, detectable at a much finer level. They may be registered with the help of special tools and special skills. Their timely detection and proper correction help achieve the maximum effect from the exertions chosen.

B) **There are no ready recipes.** Each person is highly individual. This applies not only to his/her phenotypic, or external characteristics; special role belongs to the individual manner, in which, say, bone marrow, cardiovascular or endocrine systems function, or to distinctive specifics of metabolism. Full information of this type must be at the disposal of each specialist, engaged in observation of a specific organism.

C) **There are no miracles.** Hope for a miracle in the form of an unexpected result or effect from "magic" drugs or methods is not a bad thing by itself; one must believe in miracles and hope for them - this gives internal impetus for further search. But the awaited miracle **can only happen when it has been properly planned, calculated and prepared through daily, intensive and scientifically sound labour oriented in the right direction.**

7.1. THE PERIOD OF INTRODUCTION TO GRADUATED EXERTION, OR THE BASE PERIOD

This period passes against the backdrop of correct immuno-modulation therapy and regular pharmacological and physiotherapeutic rehabilitation of the organism's state, which should be systematically monitored with the help of all methods and approaches described above. The information thus obtained, while outlining the individual characteristics of the organism, allows at the same time to achieve correct graduation of the exertions, aimed to a certain degree at development of muscle power, flexibility and stamina.

Adequate formulation of a better blood supply to the striated muscle fibers (vascularization and capillary proliferation processes) as the sine qua non condition for proper energy supply to the muscular system in the course of the internal organs' optimized training activity, makes it possible to perform individually calibrated tasks without undue losses and thus to develop the external body characteristics sought by the given person.

Systematic and exhaustive examination provides an opportunity to dynamically evaluate development of qualities, required by the given organism, from "within" and, using this information, to make timely decisions concerning specific microcycles and involving exertion graduation, occasionally transcending the previous plans and programs' limits.

Competent and thorough execution of pharmacological and physiotherapeutic support would help avoiding unnecessary losses in this period.

Preparations used in such support reflect competence and experience of specialists, responsible for the health of their patients. It is always necessary to remember that with correctly chosen basic period regimen condition of human organism - determined by visual and objective criteria - is always, and significantly, improved. But euphoria of the first successes should be avoided and the training must not be unduly intensified. This is not yet appearance of new quality, but only utilization of the organism's existing potential. Only the regularly upgraded information derived from systematic medico-biological studies will help make objective evaluation of the organism condition and avoid wrong moves.

It is necessary to remember that the training process is not directed at acquisition of new qualities alone. The most important processes take place at other, much more intimate levels: organs, tissues and, most important, cells and intracellular level. Being aware of the role, played by changes at the cellular level, would help in prevention of organic disruptions and development of pathologies in the organism's systems, which tend to cause negative functional changes in more distant future and thus to negate the new qualities acquired with such difficulty.

The training process is aimed, in the first place, at acquisition of new quality in the functioning of the internal organs and systems (cardiovascular, respiratory, endocrine, haematogenic), which then leads to adequate formation of the external results of the training effort, which only too often is considered the absolute goal. Only clear understanding of this point would bring success on regular basis.

Application in this period of individually graduated exertions borrowed from different sports is a mandatory condition for adequate training process. First of all, it's the aerobic loads - jogging, skiing etc., indoor weight-lifting with elements aimed at development of flexibility and general stamina. The emphasis in this process is put in accordance with the available data on the organism condition. The real pharmacological

and physiotherapeutic support in this period makes it possible to significantly optimize the rehabilitation processes and prepare the organism at all levels of response for accepting more intensive exertions of specialized nature, if such are required.

7.2. THE PERIOD OF SPECIALIZED PHYSICAL EXERTION

This is a very important stage. The role of systematic medico-biological support in this period is crucial. The cost of diagnostic errors and inopportune correction of the exertions intensity combined with inadequate supportive therapy may go very high. Here, just like the preceding stage, systematic evaluation of immunological status must be maintained (in combination with other indicators) and, when necessary, a repeated course of immuno-modulation must be carried out. The specifics of pharmacological and physiotherapeutic individually tailored correction are based on the execution schedule of key tasks, which the specialist should recommend accounting for objective examination data. **Precisely in this period optimization of rehabilitation processes plays a special role, precluding overloads for the insufficiently rehabilitated organism, formation of possible pathologies and thereby the loss of speed and power qualities.**

In this respect special attention should be given to examination of organism at the time of exertions performance, when external evidence, psychological state and pulse characteristics may yield no reliable information concerning the biological effect of the current workout. During such examinations the need for a repeat of some exercises (not required by the training program) very often arises.

Extracting the maximum biological effect from each specialized training session, but not overstepping the pathology borderline, with assistance from optimally organized processes of fatigue and rehabilitation, represents **the main road to acquisition of new organic qualities**. But embarking on this road requires careful and purposive preparation, not limited to biochemical, hematological, cardiological and other special information alone, but also relying on psycho-physiological readiness to perform highly intensive - physically and psycho-emotionally - workouts.

A special role belongs to the range of diagnostic criteria, selected by the specialist for observation of individual responses to exertions and for determining the speed of the organism's rehabilitation process. We believe that serious discussion of such criteria, as formation of lactate, has lost actuality today (especially remembering the five genotypically determined levels of lactate reactions). **The main task for the specialist, engaged in medical support of the training process is to help, rather than to inflict damage, albeit involuntarily** (please see the preceding sections).

Damage can be easily done by incorrect conclusions about the rehabilitation status, by overlooking excessive loads and subsequent crossing the thin line into pathology area. The ensuing therapeutic interference may require a long period and can easily annul all of the hard work's results. Correct and objective diagnostics are of crucial importance here: incorrect evaluation of the changes taking place in the organism would not allow organization of adequate pharmacological and physiotherapeutic support. This is why the specialist must have at his disposal a complete set of diagnostic opportunities, sometimes right in the process of training. **The time for individual decisions along with romantic expectation of pharmacological miracles is running out fast. Only thorough understanding of the processes, taking place in the organism will bring out the miraculous results of properly organized and adequately executed work, combined with competent pharmacological and physiotherapeutic correction of human body's homeostasis and extend his life span!**

8. SOME RECOMMENDATIONS CONCERNING APPLICATION OF THE QUANTUM-PHARMOLOGICAL SYNERGISM FOR PROPHYLAXIS AND TREATMENT OF HUMAN SENESCENCE DISEASES, FORMATION OF PRACTICAL HEALTH AND CORRECTION OF THE BIOLOGICAL AGE (TABLES)

Таблица 5. Оптимальное дозирование низкоэнергетического квантового излучения для профилактики артериальной гипертензии (ВСД и гипертонии I) в течение трех микроциклов с последующим перерывом в один микроцикл (схема 3 + 1).

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Верхушечный толчок сердца	50	1	1	21
2. Область печени	50	1	1	21
3. Область почек (с обеих сторон): слева	50	1	1	21
справа	50	1	1	21

На фоне протектина : 3 раза в день x 1 таблетке.

Таблица 6. Общие процедуры низкоэнергетического квантового излучения при лечении ГБ (II, III) на фоне курса традиционного лечения.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Кубитальная ямка	50	2	1	21
2. Верхушечный толчок сердца	50	2	1	21
3. Область печени	5	2	1	21
4. Область печени	50	2	1	21
5. Область почек (с обеих сторон):				
слева	5	1	1	21
справа	5	1	1	21

На фоне протектина : 3 раза в день x 1 таблетке.

Таблица 7. Специальные назначения низкоэнергетического квантового излучения при профиллактике стрессорных воздействий в период максимального психоэмоционального напряжения.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Верхушечный толчок сердца	50	1	1	14
2. Область печени	5	1	1	14

14 дней (7 дней перерыв) x 2 курса

На фоне протектина : 1 таблетка x 2 раза в день (утро, вечер) = 24 дня

Таблица 8. Профилактика обострений хронических заболеваний сердечно-сосудистой системы в осенне-весенний период на фоне традиционной лекарственной терапии.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Область эпигастрия	5	1	1	5
2. Область почек (с обеих сторон):				
слева	5	1	1	5
справа	5	1	1	5
3. Кубитальная ямка	50	1	1	5

Схема : 5 дней + 2 дня отдыха = 2 курса

На фоне протектина 1 таблетка х 3 раза в день, 30 дней (прием препарата начать за 7 дней до курса квантовой терапии).

Таблица 9. Специальные назначения процедуры низкоэнергетического квантового излучения в период резких температурных перепадов для страдающих заболеваниями сердечно-сосудистой системы.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Кубитальная ямка	1000	2	1	2-3
2. Область печени	5	2	1	2-3

На фоне протектина : 3 раза в день x 1 таблетке.

Таблица 10. Специальные назначения процедуры низкоэнергетического квантового излучения при смене климатических поясов для страдающих сердечно-сосудистыми заболеваниями .

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Верхушечный толчок сердца	50	2	1	7
2. Область селезенки (левое подреберье)	5	2	1	7

На фоне протектина : 3 раза в день x 1 таблетке, 7 дней на фоне традиционного лечения.

Таблица 11. Общие назначения процедур низкоэнергетического квантового излучения в период ремиссии при стенокардии напряжения.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Кубитальная ямка	50	1	1	21
2. Верхушечный толчок сердца	50	1	1	21

21 день + 7 дней отдых = 2 курса; Протектин 1 таблетка x 2 раза в день.

Таблица 12. Общие назначения процедур низкоэнергетического квантового воздействия в период ремиссии у больных стенокардией покоя.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Кубитальная ямка	50	2	1	21
2. Область поясничного сплетения	5	2	1	21
3. Верхушечный толчок сердца	50	1	1	21

Протектин : 1 таблетка х 3 раза в день после еды.

Таблица 13. Общие назначения процедур низкоэнергетического квантового воздействия для профилактики заболеваний сердечно-сосудистой системы.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Верхушечный толчок сердца	50	2	1	21
2. Область шейного сплетения	5	2	1	21
3. Область поясничного сплетения	5	2	1	21

Выполнение рекомендованных общих назначений процедуры низкоэнергетического квантового излучения не исключает использования специальных назначений магнитно-инфракрасно-лазерного воздействия.

Протектин : 1 таблетка х 2 раза в день (утро, вечер)

На фоне общеукрепляющих аэробных занятий (пульс не превышает 130 - 140 ударов в минуту)
 Схема : (3 + 1) 2 курса в полугодие.

Таблица 14. Специальные назначения процедуры низкоэнергетического квантового излучения после повышенных физических нагрузок у неподготовленных людей (пульс превышает более 130 - 140 ударов в минуту во время нагрузки).

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (процедур)
1. Верхушечный толчок сердца	50	5	1
2. Область печени	5	5	1

Протектин : по 2 таблетки x 2 раза через 8 часов в день перегрузки.

Таблица 14. Специальные назначения процедуры низкоэнергетического квантового излучения после повышенных физических нагрузок у неподготовленных людей (пульс превышает более 130 - 140 ударов в минуту во время нагрузки).

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (процедур)
1. Верхушечный толчок сердца	50	5	1
2. Область печени	5	5	1

Протектин : по 2 таблетки x 2 раза через 8 часов в день перегрузки.

Таблица 16. Специальные назначения процедуры низкоэнергетического квантового излучения для применения при стойком повышении артериального давления после неадекватной физической нагрузки.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (процедур)
1. Верхушечный толчок сердца	50	2	1
2. Область поясничного сплетения	5	5	1

На фоне традиционной терапии. Протектин 2 таблетки, 2 раза в день через 3 часа.

Таблица 17. Специальные назначения процедуры низкоэнергетического квантового излучения для применения перед возможной физической нагрузкой неадекватной интенсивности.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (процедур)
1. Верхушечный толчок сердца	5	2	1
2. Кубитальная ямка	50	2	1

Протектина 2 таблетки одновременно с квантовой терапией.

Таблица 18. Специальные назначения процедуры низкоэнергетического квантового излучения для применения перед возможной психоэмоциональной нагрузкой неадекватной интенсивности.

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (процедур)
1. Кубитальная ямка	50	5	1
2. Область брюшной аорты	5	5	1

Протектина 2 таблетки одновременно с квантовой терапией.

Гибкость - очень важный параметр физической кондиции. Бытует такая поговорка : “Возраст суставов - возраст человека”. Специальные упражнения на улучшение гибкости выполняются постоянно. Их интенсивность и направленность зависят от индивидуальных особенностей состояния опорно-двигательного аппарата. При проведении направленной работы на гибкость рекомендуются специальные процедуры низкоэнергетического лазерного излучения на фоне регулярного общесоматического воздействия (по схеме 3 + 1), см. таблицу 4.

Таблица 19. Специальные назначения процедуры низкоэнергетического квантового воздействия, рекомендуемые при выполнении упражнений на гибкость .

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
1. Нервно-мышечные сочленения	5	1	2	21
2. Суставы, связки	5	1	2	21
3. Позвоночник	5	1	2	21

Курс : в процессе тренировки - до выполнения задания и сразу после его завершения.
Цикл 3 + 1 (21 день + 7 дней отдых. На фоне протектина 1 таблетка в день, 21 день)

Таблица 20. Специальные назначения процедуры низкоэнергетического квантового излучения в условиях различных видов силовой подготовки (непосредственно в зале, в зависимости от направленности тренировок, выполняются после разминки - до и после основных серий).

Проекция воздействия	Частота (Гц)	Время (мин)	Количество (проц./день)	Курс (дни)
Основные пучки мышц:				
1. Бицепса	5	1	2	21
2. Трицепса	5	1	2	21
3. Дельтовидной	5	1	2	21
4. Больших грудных	5	1	2	21
5. Предплечья	5	1	2	21
6. Живота	5	1	2	21
7. Сгибатель бедра	5	1	2	21
8. Разгибатель бедра	5	1	2	21
9. Икроножные и т.д.	5	1	2	21

Курс (дни) : В процессе тренировки, до выполнения серий на конкретную группу мышц и сразу после ее завершения (в круговой, интервально-переменной, суперсериях и т.д.). На фоне приема протектина 1 таблетка х 3 раза в день после еды (21 день).

CONCLUSION. QUANTUM-PHARMACOLOGICAL SYNERGISM COMBINED WITH SYSTEMATIC DIAGNOSTICS IS THE ROAD TO LONGEVITY

The biological age determined by criteria of practical health lags slightly behind the passport age. Components of this possible spectacular achievement are presented in Scheme No. 1 in this paper, but they require serious efforts from each individual considering himself modern.

First, this is the **systematic diagnosis** of the organism's state, using adequate methods, meant for various levels of response (systemic, organic, cellular).

Frightening names and seeming complexity of this process are only superficial, since any normal clinic is capable of carrying out this inexpensive procedure in 15-20 minutes. It must be noted here that this process absolutely presupposes participation of a competent **specialist**, just like in any other enterprise. The same is true for other components, which essentially are **graduated physical exertions**, including also the use of positive effects from natural factors and conditions and, most important, **quantum-pharmacological synergism**, the fast-developing direction, both in the contemporary medicobiological research in general and in quantum medicine in particular.

Let's consider the possibilities of modern use of the above components.

First, this would be regular immuno-modulation with constant monitoring of the immune system's status and timely correction of the organism's homeostatic system and its psycho-physiological state. And only afterwards, according to the concepts prevalent in contemporary medicine, there could follow the specialized treatment of chronic and associated diseases, if required.

Next, obviously, comes optimization of fatigue processes, which organically includes intensification of rehabilitation and regeneration processes, leading in turn to the maximum biological effect from graduated physical loads and natural factors involved.

A special role belongs to formulation of individual nutrition algorithms against the background of bio-normalization and correction of metabolism. Combined with the approaches described above, this already allows for adequate planning of the **way of life**, which includes prophylaxis of **pathological states** through timely, regular and competent diagnostics.

Such approach makes it possible to adapt to temperature or atmospheric pressure fluctuations, as well as to conditions prevalent in other time and climatic zones. All of the above, put together, would be a serious impediment to development of **senescence diseases** and permits formation of individual algorithms of the **way of living**.

The components, listed above, are absolutely necessary for building practical health and correction of the biological age and therefore must become part of life of each modern human being.

A very important role is played here by the absolute need to avoid damage, as required by one of the Hippocratic commandments. For instance, **quantum medicine** uses **natural wave and informational properties of living matter**, while quantum-pharmacological synergism enhances effects thus generated. For instance in experimental hypercholesteremia quantum-pharmacological synergism helps reduce deformation of erythrocytes and improve the flow characteristics of blood.

However, with normal content of cholesterol this effect

does not occur, which attests to **harmless nature of the applied influence. Therefore the most unpleasant consequence of low-energy quantified radiation use could be absence of the expected result**, which practically never happens if quantum-pharmacological synergism is utilized (there is only one mandatory condition - the procedure must be performed by a competent specialist).

Special significance belongs to constant administration of a powerful anti-oxidant **protectin** during the entire period of quantum therapy (and this is, essentially, the heart of quantum-pharmacological synergism), which does not preclude administration of other, more traditional means of drug therapy.

Protectin comprises seven components and each is a powerful anti-oxidant by itself. It is capable of significantly boosting the effect of low-energy laser radiation. When not available, this preparation may be substituted with traditional medications (alpha-tocopherol, aevit, retinol etc.).

It must be noted here that the optimal method for administration of magneto-infrared-laser therapy would be application of quantum-pharmacological synergism, whereas repetition of treatment courses guarantees prolongation of remission, greater sensitivity to therapeutic medications, improves prophylaxis efficacy and protects against relapses.

General biological stimulation of adaptation processes during application of quantum-pharmacological synergism depends also on induced changes in membranous apparatus.

Quantum-pharmacological synergism acts in the direction of regulating and correcting the structural organization, morphology and functional properties of biological membranes by including the pharmacological components into the membranes' structure and preventing development of pathologies through correction of reversible dynamic factors. This, in turn, significantly enhances stability of physiological processes in the organism as a whole.

This publication is intended to provide the first glimpse of possibilities and methods of quantum-pharmacological synergism's practical application (representing a fast-developing branch of modern medico-biological science), which produces results when quantum medicine methods are combined with pharmacological interference **with**

systematic and objective diagnostics as the sine qua non condition.

Today the positive effects of quantum-pharmacological synergism begin to be widely used for prevention and treatment of human senescence diseases.

* * *

As everybody knows, "there are no ready recipes" in medicine, so in our publication we sought to demonstrate the **prospects** of the proposed approach, its **harmless nature** and the possibility of obtaining **sound and significant positive effects**, limiting ourselves to mere placing the landmarks on the road to success.

This book represents the very first steps of the new direction in medical and biological research - quantum-pharmacological synergism. This direction has prospects, it has a future. It is rather symbolic that **quantum-pharmacological synergism has been born at the turn of centuries and millennia** and new vistas are opening in the business of protection and improvement of human health. We would like to express our thanks to **our outstanding compatriots**, the founders of the "Quantum Medicine " Association - the world leaders in this complicated, but so vital branch of the modern knowledge, quantum medicine, who succeeded in bringing together unbelievable number of specialists from all corners of the world - **A.Y. Grabovschiner, V.N Khristoforov, N.N. Kirsanova, M.V. Kudinov and all of their associates in Russia and abroad.**

And, of course, I must express my gratitude to the co-author of the idea, from which this direction - quantum-pharmacological synergism - was born, who made possible the very first steps in its practical application, one of the co-founders of the International Center "Sports of the XXI century" and International Association "Euroquant" , without whom this publication would not materialize, my friend and companion-in-arms - **E.I. Panina.**

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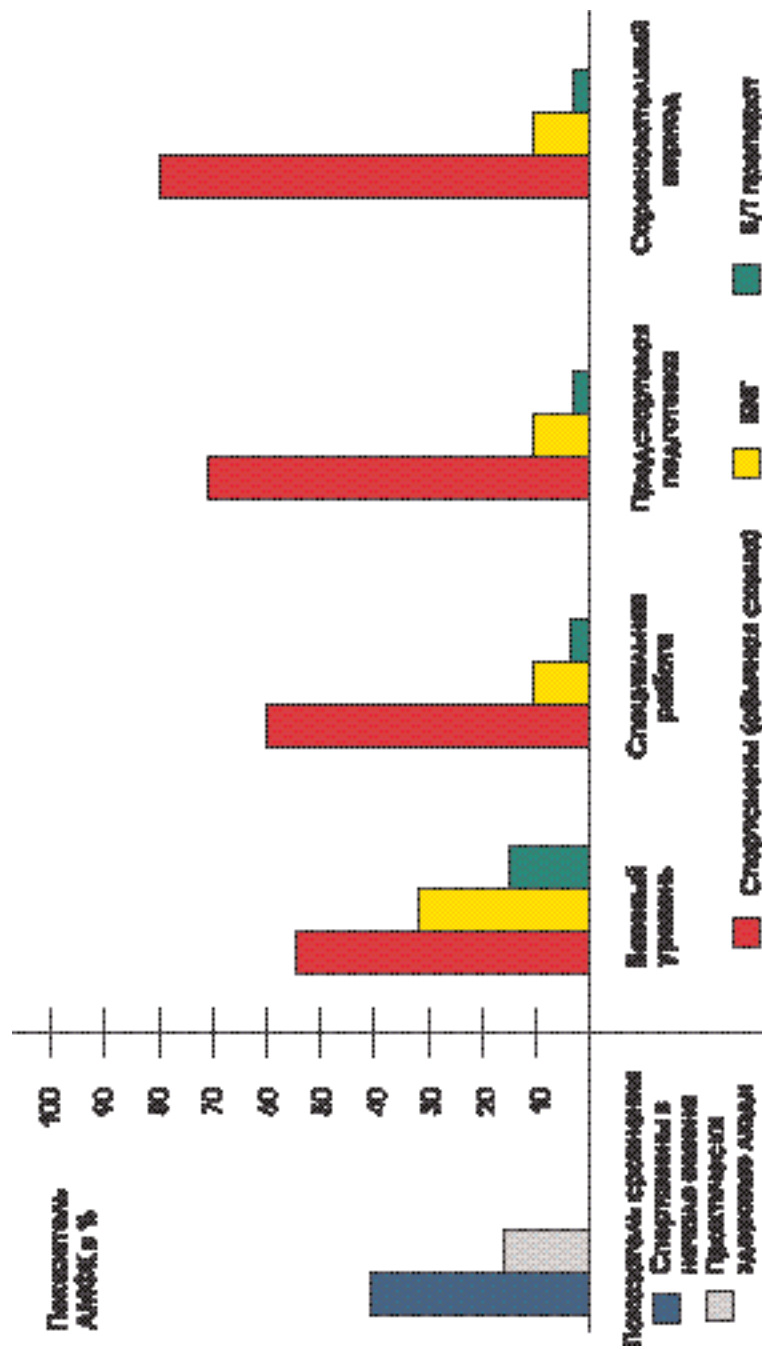


Рис. 2. Величина группы риска по показателю АМОФК у практических здоровых людей и спортсменов

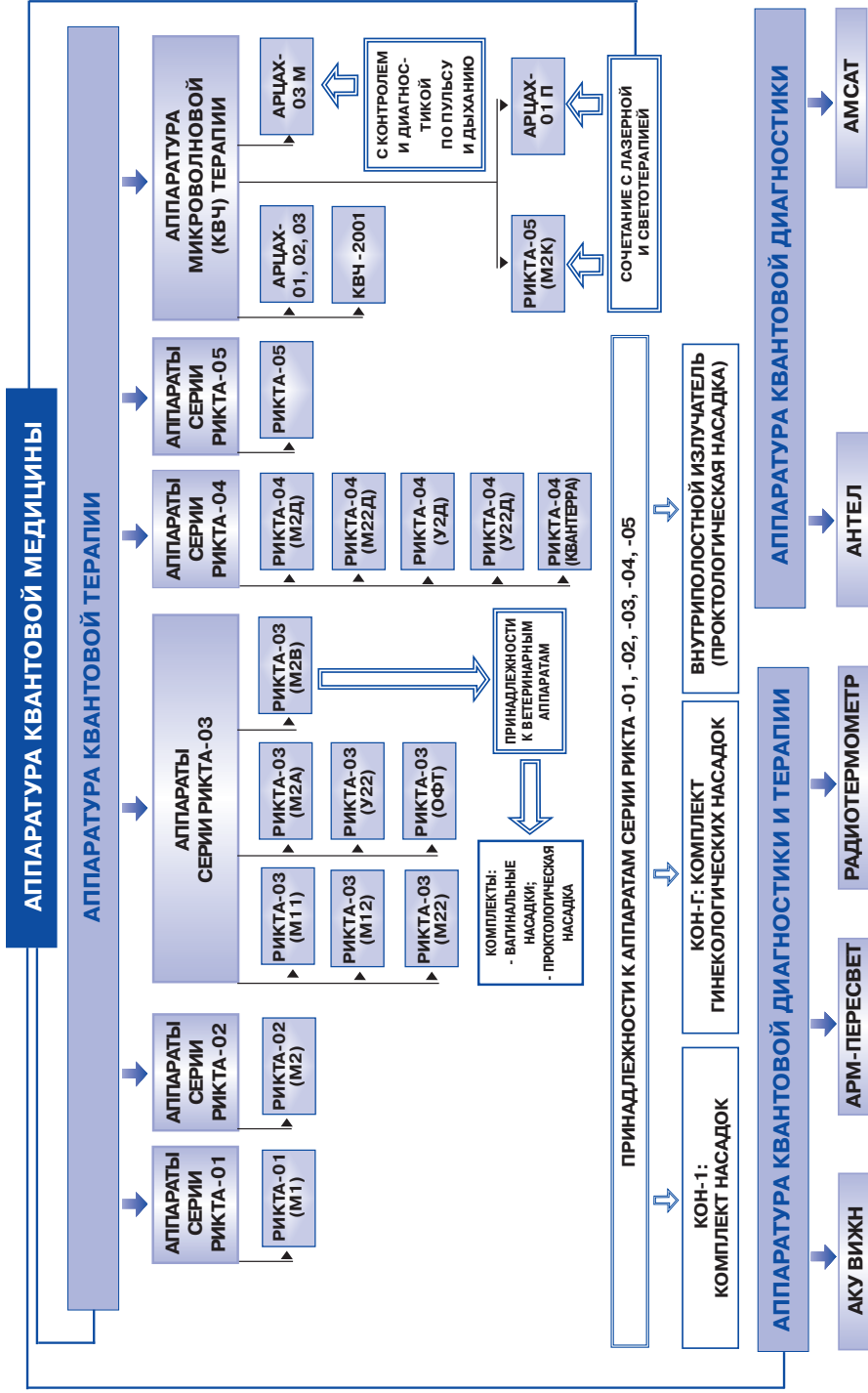


Рис. 3 Перечень аппаратуры, выпускаемой ассоциацией "Квантовая медицина"

